

Public Disclosure Authorized



Public Disclosure Authorized



MIDDLE EAST AND
NORTH AFRICA

Public Disclosure Authorized

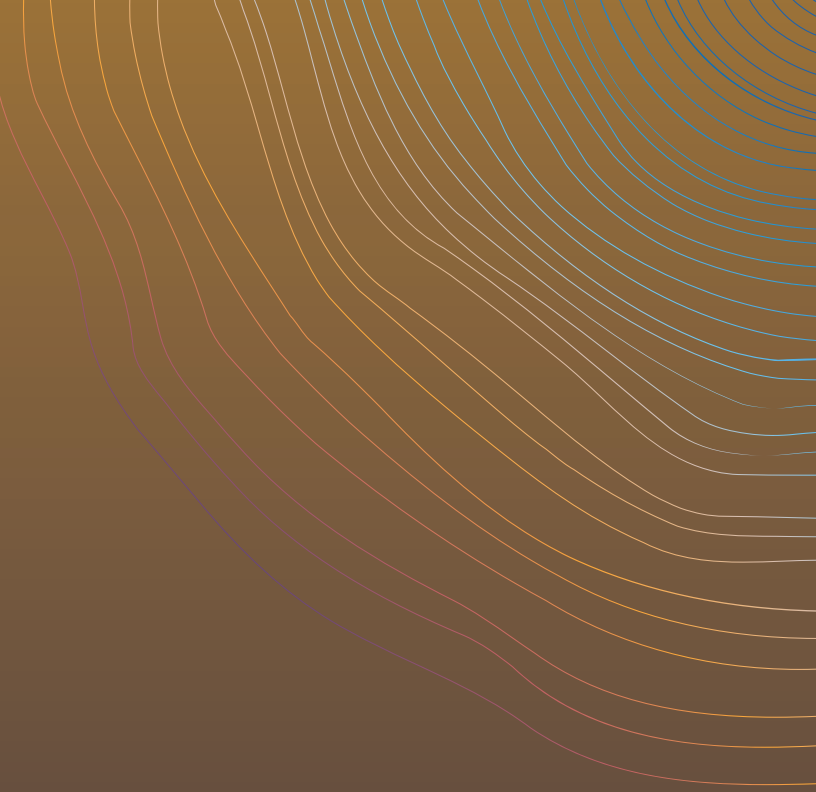
REPUBLIC OF DJIBOUTI

Public Disclosure Authorized

World Bank Group

COUNTRY CLIMATE AND DEVELOPMENT REPORT

November 2024



© 2024 The World Bank Group
1818 H Street NW, Washington, DC 20433
Telephone: 202-473-1000; Internet: www.worldbank.org

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

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

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

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

RIGHTS AND PERMISSIONS

The material in this work is subject to copyright. Because the World Bank encourages dissemination of its knowledge, this work may be reproduced, in whole or in part, for noncommercial purposes as long as full attribution to this work is given and all further permissions that may be required for such use (as noted herein) are acquired. The World Bank does not warrant that the content contained in this work will not infringe on the rights of third parties and accepts no responsibility or liability in this regard. All queries on rights and licenses should be addressed to World Bank Publications, The World Bank, 1818 H Street NW, Washington, DC 20433, USA; e-mail: pubrights@worldbank.org.

The Country Climate and Development Report (CCDR) is a World Bank core analytical product that integrates climate change and development diagnostics. The boundaries, colors, maps and any other information or denominations in this report do not imply any judgment on the part of the World Bank concerning the status of any territory or any of its boundaries. CCDRs use a standard set of tools and approaches that have been herein customized to the specific context of Madagascar. CCDRs typically feed into other core World Bank reports, engagements and operations, with a view of highlighting high-impact policy priorities at the intersection of climate and development action, as well as to encourage and catalyze financing of those identified priorities.



MIDDLE EAST AND
NORTH AFRICA

REPUBLIC OF DJIBOUTI

World Bank Group

COUNTRY CLIMATE AND DEVELOPMENT REPORT

November 2024

CONTENTS

List of Figures.....	iii
List of Tables.....	iv
Acknowledgements.....	v
Acronyms and Abbreviations.....	vi
Executive Summary.....	1

1

Chapter 1 – Climate and Development	9
A. Development context.....	9
B. Risks and opportunities from climate change and natural hazards.....	12
1. Current climate risks.....	12
2. Climate change projections.....	12
3. Climate change risks to development and green growth opportunities.....	14
C. Challenges and opportunities for a low-carbon growth path.....	15

2

Chapter 2 – Country Climate Commitments, Policies, and Capacities	17
A. Summary.....	17
B. Recommendations.....	21

3

Chapter 3 – Selected Climate and Development Priorities	23
A. Leveraging regional integration.....	23
1. Regional integration – Climate challenges and green growth opportunities.....	23
2. Regional integration – Policy options.....	29
B. Safeguarding livability for the people of Djibouti in a marginal climate.....	31
1. Safeguarding livability – Climate challenges and green growth opportunities...	31
2. Safeguarding livability – Policy options...	41
C. Advancing diversification and job creation...	43
1. Diversifying an urban services economy – Climate challenges and green growth opportunities.....	43
2. Diversifying an urban services economy – Policy options.....	51

4

Chapter 4 – Macroeconomic and Welfare Implications of Climate Change... 55

A. Opportunities and threats to macroeconomic performance from climate change.....	55
B. Poverty and distributional impacts of climate change	58
C. Private sector and financial sector issues.....	61
1. Current landscape of climate finance.....	64
2. A strategy to spur climate investment.....	65
D. Fiscal considerations in managing climate change considerations.....	67
1. Structural reforms to expand the fiscal scope for climate investments.....	69
2. Prioritizing concessional financing for sustainable development	69
3. Building a climate-resilient economy by reforming Djibouti’s state-owned enterprises.....	70

5

Chapter 5 – Conclusion and Recommendations..... 73

References..... 78

List of Figures

Figure ES.1. Modeled Cumulative GDP Losses due to Climate Change through 2050 (percent of estimated 2024 GDP).....	3
Figure ES.2. Policy Goals and Investment Strategy for Development and Resilience.....	7
Figure 1. Djibouti’s Two-Decade Economic Expansion Has Raised it to Lower-Middle-Income Status.....	9
Figure 2. Contributors to Djibouti’s Growth.....	10
Figure 3. Projected Change in Temperature and Precipitation in Djibouti.....	14
Figure 4. Climate Change Governance Functions in Djibouti.....	19
Figure 5. Modeled Climate Impacts on Road Transport.....	24
Figure 6. Change in Water Resources and Income Per Capita in Developing Countries with Low Initial Water Resources.....	32
Figure 7. Impact of Heat Stress on Livestock Production (average 2041-2050).....	36

Figure 8. Labor Productivity Losses Due to Heat Relative to Baseline, 3-Year Moving Average.....	38
Figure 9. Vegetation Cover in Djibouti Ville and Comparator Cities.....	39
Figure 10. Malaria Incidence and Mortality.....	39
Figure 11. Disease Mortality and Morbidity for Historical Baseline and for 2041-2050, under Different Climate Futures.....	40
Figure 12. Estimated Current and Future Water Supply Mobilized for Urban Consumption.....	41
Figure 13. Expected Annual Capital Loss from Urban Flooding.....	45
Figure 14. Inundation Depth from Storm Surges Following Sea-Level Rise.....	45
Figure 15. Example of Informal Construction in the Bed of the Langobaleh Wadi, Djibouti City.....	46
Figure 16. Expected Losses to Potential Fisheries Catch Relative to Baseline.....	47
Figure 17. Electricity Tariff Comparison with MENA and Peers.....	48
Figure 18. Power Supply Cost Reduction and its Implication for End-Users.....	48
Figure 19. Power Demand Estimates.....	49
Figure 20. Power Generation Projections by Source.....	50
Figure 21. CGE Modeling of Climate Impacts on Real GDP at Market Prices (Relative to Baseline).....	55
Figure 22. Cumulative Losses of GDP Relative to Baseline.....	57
Figure 23. Simulated Poverty Impact of Climate-Induced GDP Losses.....	59
Figure 24. Key Challenges to Starting a Business in Djibouti.....	63
Figure 25. Sources of Climate Finance in Djibouti, 2020 (in US\$ million).....	64
Figure 26. Policy Goals and Investment Strategy for Development and Resilience.....	74

List of Tables

Table 1. Priority Areas for Adaptation Defined by the 2017 NSCC and the Draft Revised NDC.....	18
Table 2. Migrant groups in Djibouti.....	26
Table 3. Modeled Effects of Migration on Growth, Fiscal Balance, and Expenditure.....	28
Table 4. Groundwater Use of Djibouti Benchmarked Against Neighboring Countries.....	33
Table 5. Losses in the Urban Water Network.....	34
Table 6. Damages in Past Urban Floods in Djibouti City.....	44
Table 7. Additional Priority Investment for Resilience and Green Growth Modeled in the CCDR.....	68
Table 8. Investment and Policy Priorities.....	75

Acknowledgements

The Djibouti Country Climate and Development Report (CCDR) is a collaborative effort of The World Bank, the International Finance Corporation (IFC), and the Multilateral Investment Guarantee Agency (MIGA).

The report was produced by a team led by Jan von der Goltz, Lucine Lominy, and Rick Tsouck Ibounde. The work was supervised by Meskerem Brhane, Fatou Fall, and Catherine Tovey, with additional guidance from Stephane Guimbert, Nadir Mohamed, Moritz Nebe, Paul Nounba Um, Fadia Saadah, and Cheick-Oumar Sylla.

The team consisted of Adeel Abbas, Abdillahi Djama Abdi, Miyir Mohamed Abdillahi, Abdo Said Abdo, Ibtihal Abdou Ben Abdou, Eric Adda, Ali Ahmad, Mohamed-Amin Mahdi Ahmed, Elmi Djama Ali, Audrey Ariss, Moulaye Ibrahim Bamba, Josue Banga, Mounir Bari (IFC), Ana Besarabic, Fadwa Bennani, Lulit Mitik Beyene, Servant Jacques Bleindou (IFC), Nada Bona, Abel Brook (IFC), Mena Cammett (MIGA), Gina Cosentino, Bridget Crumpton, Mona Darweesh (IFC), Nobuhiko Daito, Mackenzie Dove, Anne Duplantier, Malik Garad, Georges Joseph Ghorra (IFC), Junglim Hahm, Mohamed Houssein Hassan (IFC), Gabriella Izzi, Alex Kamurase, Lama Kiyasseh (MIGA), Alexandra Le Courtois, Giorgio Maarraoui, Bilal Malaeb, Fadoumo Ali Malow, Miki Matsuura, Clotilde Minster, Mohamed Aboubakar Mohamed, Asli Elmi Mohamed, Helena Naber, Melance Ndikumasabo, Ferdinand Ngobounan (IFC), Kadar Mouhoumed Omar, Adele Paris (IFC), Federica Ranghieri, Giscard Didier Sagashya, Mohamed Moustapha Sarr, Didier Farah Souldan, Sossena Tassew, Diderot Guy D'Estaing Sandjong Tomi, Ryoko Tomita, Monica Vidili, Emily Weedon, Suiko Yoshijima, and Laura Zoratto. Industrial Economics Inc provided additional modeling for the CCDR.

The team particularly thanks the peer reviewers Kevin Carey and Urvashi Narain as well as Stephane Hallegatte, Craig Meisner, the CCDR core team and other review participants for their detailed feedback.

Extensive technical and policy exchanges in Djibouti in September 2023, February 2024, and October 2024 helped shape the CCDR. The CCDR's preparation particularly benefited from important contributions from the government of Djibouti under the leadership of the Ministry of Economy and Finance, whose support is gratefully acknowledged. The team is also indebted to the Centre d'Études et de Recherche de Djibouti (CERD) and the NDC team at the Ministry of Environment for detailed technical exchanges, and particularly thanks the Government of Djibouti's designated focal points for the CCDR at the Ministry of Agriculture, Water, Fisheries, Livestock and Halieutic Resources; Ministry of the City, Urban Planning, and Housing; Ministry of Education and Vocational Training; Ministry of Energy; Ministry of the Environment and Sustainable Development; Ministry of Health; Ministry of Infrastructure and Equipment; Ministry of Interior; Ministry of Labor in charge of Formalization and Social Protection; Ministry of Social Affairs and Solidarity; and Ministry of Women and Family.

Important guidance was provided by representatives of Djibouti's civil society, the Chamber of Commerce, and participants in a workshop with young entrepreneurs. The team thanks the UN Resident Coordinator's and UNDP Resident Representative's offices for their counsel and for support in convening consultations among development partners. The community of development partners supported the preparation of the CCDR with their advice, including the Embassies of France, Germany, Japan, Qatar, and the United Kingdom, AFD, FAO, IFAD, IGAD, ILO, IOM, JICA, OCHA, UNFPA, UNICEF, UNDP, UNHCR, WFP, and WHO.

This CCDR and the underlying analysis have benefitted from support of the Climate Support Facility Whole-of-Economy trust fund for the Middle East and North Africa region of the World Bank.

Acronyms and Abbreviations

AFD	Agence Française de Développement
ADR	Djibouti Road Authority
CDDR	Country Climate and Development Report
CEM	Country Economic Memorandum
CERD	Djibouti Study and Research Center
CGE	computable general equilibrium
CNDCC	National Steering Committee for Climate Change
DEP	Department of Economy and Planning
DPFZA	Djibouti Ports and Free Zones Authority DPFZA
DTM	Displacement Tracking Matrix
EAPP	East African Power Pool
EDAM	Enquête Djiboutienne Auprès des Ménages
EDD	Électricité de Djibouti
FDI	foreign direct investment
GDP	gross domestic product
GHG	greenhouse gases
ICT	information and communications technology
IFC	International Finance Corporation
IFRC	International Federation of Red Cross and Red Crescent Societies
IOM	International Organization for Migration
IPP	independent power producer
JICA	Japan International Cooperation Agency
MEDD	Ministry of Environment and Sustainable Development
MEF	Ministry of Economy and Finance
MENA	Middle East and North Africa
MOB	Ministry of Budget
MSME	micro-, small-, and medium-sized enterprises
NAP	National Adaptation Plan
NDC	Nationally Determined Contribution
NSCC	National Strategy on Climate Change
ONEAD	National Office of Water and Sanitation (ONEAD)
PEFA	Public Expenditure and Financial Accountability

PPP	Public-private partnerships
RDNA	Rapid Damage and Needs Assessment
SCAPE	Strategy of Accelerated Growth and Promotion of Employment
SDG	Sustainable Development Goals
SOE	state-owned enterprise
STEM	science, technology, engineering, and mathematics
TVET	technical and vocational training
UNCTAD	United Nations Trade and Development
UNFPA	United Nations Population Fund
USAID	United States Agency for International Development
WASH	water, sanitation, and hygiene
WHO	World Health Organization
WTO	World Trade Organization
UNFCCC	United Nations Framework Convention on Climate Change





EXECUTIVE SUMMARY

Key messages

- **Climate change threatens Djibouti's development goals and without effective adaptation, could generate economic losses equivalent to nearly four years of today's output by mid-century.** Climate change exposes Djibouti to more frequent extreme heat, drought, and floods. These events threaten the infrastructure and services that serve the vibrant trade sector and that could enable a more diversified economy. Other sectors prioritized for diversification, including fisheries, information and communications technology (ICT), and tourism, are also directly impacted by climate change. Unless Djibouti adapts, climate change will also have a particularly negative impact on the livelihoods of the poor, on workers' productivity, and on water and food security.
- **Policies and investments aimed at climate adaptation can reduce economic damages and help to build systems that protect livelihoods; a limited set of priority actions could halve the potential GDP losses.** To safeguard its role as a pivotal regional hub, Djibouti can invest in the resilience of its transport infrastructure, deepen regional energy integration, and advance economic integration of migrants with international support. Priority actions to protect livability include investments to avoid water losses in the urban network and manage rural water resources, alongside multidimensional support to food security, investments in the health system, and greater adaptive safety net capacity to safeguard human capital. Economic diversification can be promoted by reducing the impact of floods and heat, climate-sensitive planning in the ICT and fisheries industries, and reforms and investments to deliver better service quality in the energy sector.
- **Significant infrastructure investments have laid a foundation for resilience and economic diversification, but Djibouti must now ensure that these assets deliver on their promise.** While recent infrastructure investments have come at the cost of a high public debt burden, they have also produced assets that could drive economic growth in a changing climate.

These assets include port, road, and rail infrastructure, capacity for desalinization and the import of piped water that can help ensure water security, and electricity generating capacity and interconnections that have lowered the cost of energy production and could boost growth if savings are passed on. A key policy priority is to ensure that these major development assets deliver the benefits they should.

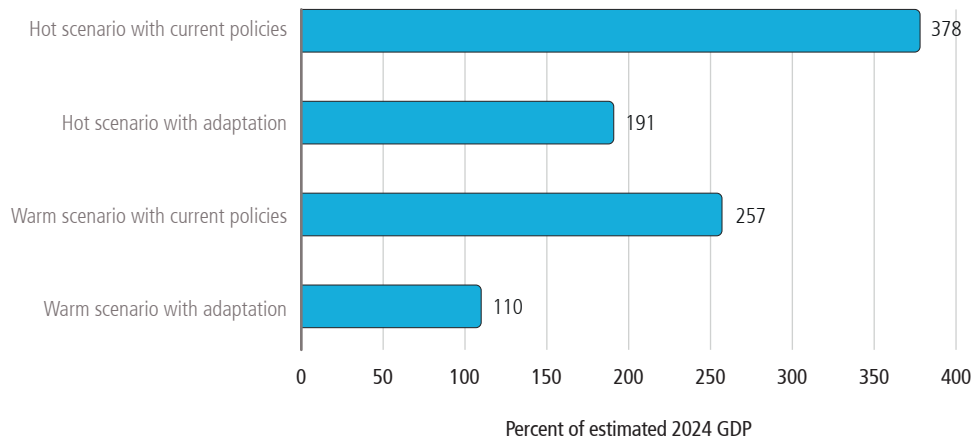
- **Capacity building, economic reform, and an emphasis on skills are critical to successful adaptation.** Successful climate adaptation and diversification hinge on building capacity in the public sector to plan new investments well, to manage key development assets, and to ensure service delivery. Economic reforms are also pivotal to ensuring that investments deliver broad benefits, with priorities being reforms to electricity and ICT pricing, efforts to raise utility state-owned enterprise (SOE) performance, and further improvements in the business environment. Systems and workforce skills are critical enablers of successful adaptation.
- **Building resilience will require additional concessional resources, in the context of reform to ensure their effective use.** Djibouti's climate adaptation and green growth needs could exceed US\$2.8 billion. This Country Climate and Development Report (CCDR) estimates that even a limited set of priority adaptation actions may require US\$1.1 billion in additional funds, including an additional US\$77 million per year through 2035. Such investment can be consistent with Djibouti's goal of achieving both growth and debt sustainability, but it needs to be accompanied by economic reform and additional adaptation resources provided on a concessional basis. International support is particularly warranted given the regional importance of the resilience of Djibouti's economy.

Introduction

Climate change threatens economic growth and livelihoods by impacting the sectors that currently buttress the economy as well as those prioritized for diversification. More extreme heat and more frequent droughts and floods pose risks for Djibouti's key transport and urban services sector, as well as to the fisheries and ICT industries that have high growth potential. The potential economic cost of climate change could amount to as much as 6 percent of gross domestic product (GDP) by mid-century, cumulatively equivalent to nearly four years of today's output by mid-century, or US\$14-US\$15 billion. These economic impacts are among the higher losses predicted among the Country Climate and Development Reports (CCDRs) in the Middle East and North Africa (MENA) region, but within the range. Djibouti also faces risks to livelihoods and livability that profoundly affect vulnerable groups but are not easily quantified in terms of GDP losses. These include risks to water security and livestock livelihoods as well as exposure to extreme heat.

Djibouti can leverage its significant infrastructure investments for adaptation and resilient growth, but reforms and capacity building, along with associated investments, will be critical to achieving this goal. Djibouti has produced significant infrastructure assets, notably through investment in the port, railroads, roads, water pipeline and desalinization capacity, and electricity interconnections and generating capacity. Building on these assets, Djibouti has viable options for climate adaptation to ensure resilience and growth. However, economic reforms are needed to reap the benefits these assets and additional adaptation investments can deliver. These reforms include lowering the price of energy and telecoms, raising the performance of utility state-owned enterprises (SOEs), and raising domestic revenue to create fiscal space. Capacity building is an additional priority, both to ensure effective maintenance and operation of these critical assets and quality of service delivery, and also to efficiently plan and implement important complementary investments, for instance, in resilient roads, water access, flood protection, and services to protect human capital against climate shocks.

Figure ES.1. Modeled Cumulative GDP Losses due to Climate Change through 2050 (percent of estimated 2024 GDP)



Financing needs are considerable, but priority investments are consistent with macro-fiscal stability if additional concessional resources are provided and if economic reforms progress apace. Djibouti’s NDCs put forward a comprehensive portfolio of important adaptation and mitigation needs of US\$2.7 billion through 2030. Given the authoritative NDC process, the CCDR did not attempt to exhaustively estimate needs; however, a partial assessment suggests that additional needs could exceed US\$2.8 billion. Modeling for this CCDR suggests that financing needs for a set of priority investments alone may require US\$ 1.1 billion in additional funding, with the highest needs arising over the coming decade. In the short term, opportunities to mobilize private sector climate funding are likely to focus on marquee projects such as the recently completed Ghoubet wind park, though reforms can gradually broaden the private sector’s contribution. In the meantime, public financing of projects can be consistent with Djibouti’s goal of achieving debt sustainability if the country achieves reforms to promote growth and expand fiscal space, and if development partners provide additional concessional resources. A greater pace of reform will allow for greater adaptation investment.

Development, climate context, and institutions

On the strength of its trade and transport sectors, Djibouti has enjoyed two decades of steady growth, and has made key investments to support resilience to climate change. Growth in these sectors has helped Djibouti reach the status of a lower middle-income country and promoted climate resilience by providing livelihoods outside the climate-sensitive agricultural sector, by establishing the infrastructure that can enable healthy and productive lives in an increasingly difficult climate, and by establishing trade linkages that can somewhat insulate water, food, and electricity supply from climate shocks.

However, job opportunities remain limited and economic diversification is a priority and there is an urgent need for investments in skills as well as fiscal and business-enabling reforms. Despite strong growth, the economy remains starkly segmented between an outward-oriented modern sector and traditional sectors characterized by low productivity. Most well-paying jobs remain in the public and parastatal sector (48 percent of all employment), while the overall employment rate is just 25 percent, and lower among women. Meanwhile, 21 percent of the population continued to live under the national poverty line as of 2017. Debt-financing of infrastructure, while critical for adaptation and growth, has led to serious fiscal and debt pressure. Along with weak governance and other constraints to private sector investment, high energy and telecommunications tariffs create a substantial drag on growth and private sector participation in the economy by increasing operational costs and undermining competitiveness. Education has significantly

improved, with increases in enrolment rates to reach quasi-universal primary enrollment (99 percent) and secondary enrolment of 87 percent in 2023. Still, investment in greater access to specialized training and a better alignment of training with business needs are needed to endow workers with the skills required to contribute to diversification and benefit from growth.

Climate change is increasing the frequency of extreme heat, droughts, and flooding. Djibouti's climate is hot and dry, and temperatures have already risen by about 1° Celsius (C) over the past 50 years. Under the CCDR's 'hot' scenario, by 2050 the number of high heat index days could double from 66 to 123. While there is uncertainty over predictions of precipitation changes, models agree that extreme wet events will increase in frequency, while studies suggest droughts have become more frequent and severe. For instance, extreme rainfall that historically occurs every 10 years is expected to occur every six years by mid-century. Rising sea levels will threaten some of Djibouti's most important economic areas, while a rise in sea temperatures is putting coral reefs and fisheries at risk.

Djibouti contributes a very small amount of total global and per capita emissions; thus, mitigation efforts should be limited to development priorities in the transport and energy sector that have co-benefits. With its small population and low per capita emissions (1.4 tons (t) carbon dioxide equivalent (CO₂e)), Djibouti is one of the world's smallest emitters of greenhouse gases (188th among all countries). Emissions from electricity generation are low due to reliance on hydropower from Ethiopia and new wind energy capacity. Investments can focus on further opportunities to increase renewable energy generation to ensure energy security and meet Djibouti's energy access target of 100 percent by 2030; they can also focus on lowering transport sector emissions, notably by facilitating the operation of low-emission rail transport at full capacity.

Selected climate and development priorities

Leveraging regional integration

Djibouti's unusual degree of interdependence with its neighbors through trade and migration is central to achieving its development priorities, while both enhancing its resilience and vulnerability to climate shocks. As the major port connecting the Horn of Africa to the global

market, Djibouti's transport infrastructure and services play a key role for the region. Heavy precipitation events as well as heat stress put an increasing strain on infrastructure, with yearly damages expected to rise by US\$40 million by mid-century, and additional costs related to labor productivity losses. Trade reliance provides the economy with some insulation from local climate impacts, but climate shocks in the region can be transmitted through changes in trade demand and key prices. As a stable space in a restive region, Djibouti has also become an important host country for displaced persons, migrants, and through-migrants from the region, about one-third of whom are thought to be linked to climate change. These migration flows are likely to increase, putting further demands on public resources and communities.

Development and climate policy for Djibouti should aim to leverage its pivotal position in the region, while building systems that are resilient to regional shocks. To keep its key transport infrastructure resilient, Djibouti will need to invest substantially in management capacity, maintenance, and road upgrades. Modeling shows that such efforts could be highly efficient in reducing expected damages in the sector, avoiding more than 80 percent of expected losses. Trade is already yielding substantial benefits in the water and power sectors, which may not be at direct risk from climate change. Djibouti should ensure that interconnections are fully operational, even while investing in more efficient water use and domestic clean energy generation to increase resilience to regional shocks. Policy reforms should allow migrants greater scope to integrate into the economy but should be complemented with international resources to fund migrants' demand for public services and to help host communities cope.

Safeguarding livability for the people of Djibouti

Climate change will pose significant challenges to livability in terms of water and food security, the viability of rural livelihoods, and the ability to cope with extreme heat and a changing epidemiology. With renewable

water resources as low as an estimated 185 m³ per person per year, Djibouti's groundwater resources are increasingly strained, and rural water access remains precarious. However, Djibouti has made important investments in urban supply by establishing desalinization capacity and a pipeline connection to deliver water from Ethiopia that together provide half of all urban water supply and could deliver more at full capacity. Livestock livelihoods are important in rural Djibouti, and higher heat stress is expected to lower sector revenues by up to 24 percent. Heat is expected to reduce human productivity by up to 3.5 percent by mid-century. The poor are particularly vulnerable to this risk due to their greater dependence on outdoor work and lower access to cooling and well-insulated housing. Malaria incidence has already risen 37-fold over the past two decades, and along with heat-induced health problems, is projected to lead to the loss of up to 1.5 percent of labor supply.

Djibouti can bolster resilience by shoring up water access, taking a multidimensional approach to food security, and expanding access to health care. Even with a growing population, urban water security is within reach with a planned increase of desalinization capacity, additional efforts to bring water transfer from Ethiopia to full capacity and a reduction in distribution losses in the urban network, which currently amount to 44 percent of all water provided for urban consumption. To sustain an acceptable level of rural drought resilience, investments in water harvesting and groundwater management are needed. While opportunities to grow crops will remain limited, food security can be enhanced by investing in water availability for livestock, better shock-responsiveness of the social protection system, improved management and financing of food stocks, and growth in select competitive food value chains, assisted by water-efficient technology. The changing health burden due to malaria and heat-induced illness will require additional efforts to expand access to health care.

Advancing diversification and job creation

Greater urban flood damage, climate risks to priority growth sectors, and rising energy demand will hinder efforts to diversify the economy. As the engine of growth, Djibouti City's economy is pivotal to diversification. Urban flooding already

frequently disrupts the economy, with damages and losses from single events of up to US\$47 million. Climate-induced extreme events are expected to raise annual damages by US\$10 million while a rising sea level is expected to cause US\$38 million in annual losses and damages by mid-century. Key transport infrastructure and productive capital are affected, and the urban poor are highly exposed. Priority sectors targeted for diversification are also sensitive to climate impacts, with fisheries expected to experience a one-sixth decline in potential catch by one-sixth, and coastal ICT infrastructure vulnerable to flooding. Although energy sector investments have increased capacity and lowered the cost of generation, further investments are needed to meet higher demand for cooling and water pumping, even while the over-stretched grid infrastructure is sensitive to damage from heat and flooding.

Investments in urban infrastructure and energy sector capacity and reforms can contribute both to resilience and diversification efforts. Effective drainage infrastructure in Djibouti Ville's Presqu'île districts and sound urban planning can greatly reduce flood impacts. Managing the growth of informal settlements in the city's Balbala districts is particularly important to reduce flood vulnerability and to enable residents to work more productively through access to transport and other services. In the energy sector, planned investments in clean energy generation alongside stronger grid infrastructure energy efficiency measures can help meet demand and boost access. Critically, economic modeling indicates that reforms to lower the exorbitant energy tariffs are key to achieving the government's development goals under climate change conditions and could promote an additional 40 percent of GDP growth over the next five years, as well as much-needed job creation.

Macroeconomic impacts and financing needs

Economy-wide, climate impacts are estimated to generate a permanent annual loss of up to 6 percent of GDP by 2050, or the equivalent of nearly four years of today's output. More specifically, computable general equilibrium (CGE) modeling suggests that the joint effect of sectoral climate impacts could be equivalent to the loss of 6 percent of GDP under the hot scenarios by 2050 and 4.5 percent under the warm scenarios. Cumulative losses through mid-century are estimated to amount to US\$14-15 billion in real terms. A more detailed investigation of possible losses due to flooding shows that there is substantial downside risk, with maximum modeled damages exceeding mean modeled damages by five to eight-fold. Most of these losses are projected to arise from the effect of heat on workers' productivity and from damage to transport infrastructure. Modeling suggests that services are less exposed to climate impacts than manufacturing and agriculture, a pattern that moderates aggregate damages, but also shows that activities where there are diversification opportunities will face additional barriers due to climate change.

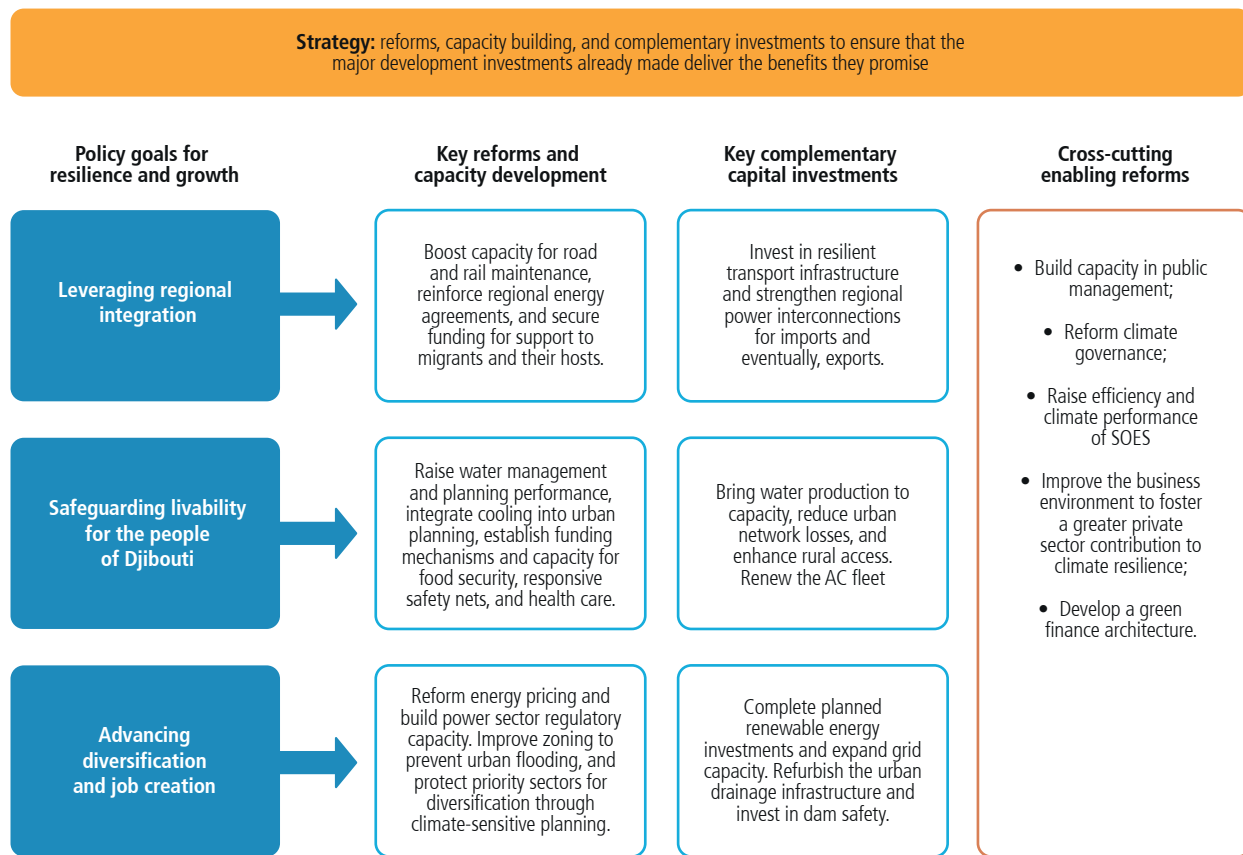
Adaptation investments will pose a difficult fiscal management challenge, but modeling suggests that these investments can effectively lessen climate impacts. Djibouti's 2024 NDC put forward a comprehensive portfolio of important adaptation and mitigation investment needs of US\$2.7 billion, including US\$1.9 billion for 'conditional' actions for which financing still needs to be secured. Given the authoritative NDC process, the CCDR did not attempt to exhaustively estimate needs; however, a partial assessment suggests that needs could exceed US\$2.8 billion. Given financing constraints, this CCDR estimates that a limited set of priority actions for resilience and green growth alone will require US\$1.1 billion in investment, including US\$77 million per year through 2035. Modeling results suggest that such investments and policy actions can halve projected losses from climate change by 2050, with comparable reductions in the impact on employment and on poverty.

A realistic path to funding priority resilience investments would require fiscal, investment climate, and SOE reforms, as well as additional concessional international public funds. Djibouti's ability to finance key adaptation needs is hamstrung by fiscal pressure as well as a small private sector and financial sector that contribute little to green investments. As well, the regulatory environment largely does not enable green financing instruments. Reforms are critical to achieve development and resilience goals; priority goals are to enhance fiscal revenues, improve the business climate for increased private investment, and raise the efficiency and transparency of utility SOEs, as well as their contribution to the economy. Given that select resilience investments are both urgent and have high economic returns, development partners need to mobilize additional concessional funding to enable reforms, build capacity, and make investments that leverage Djibouti's development assets. Modeling shows that, with a combination of reform efforts and additional concessional resources, climate resilience is consistent with Djibouti's goal of achieving debt sustainability.

Policy priorities

Economic reform, capacity building in public management, and investment in skills are critical to the adaptation agenda. Recent investments in transport, water, and energy infrastructure position Djibouti well to pursue a resilient development path. However, to succeed in this ambition, a focus on reform efforts and capacity building is needed to ensure that the investments deliver the benefits envisaged, and to ensure that complementary investments are well-planned and executed. Priority reforms include the reform of electricity pricing, improvements in SOE performance, and steps to enhance the business climate and mobilize private climate finance. Secondly, there is an urgent need to raise the public sector's capacity to manage, operate, and maintain assets in ways that ensure their resilience and economic effectiveness. Skill development will play a fundamental facilitating role in managing investments better and in ensuring that Djiboutians benefit from resilient jobs and growing incomes.

Figure ES.2. Policy Goals and Investment Strategy for Development and Resilience



New investments should seek to complement and leverage existing assets and be integrated with efforts to advance reform, build capacity and skills, and strengthen systems. Well-crafted adaptation actions can help safeguard Djibouti’s role as its region’s trade hub, ensure livability, especially for poorer households, and support diversification of the economy. They should aim to leverage existing capacity, for instance, in consolidating the energy distribution network to ensure consistent service from domestic renewable energy capacity and regional interconnections. There are also important opportunities to complement the existing assets, such as improving urban and road drainage infrastructure to reduce flood damage. Such investments need to accompany reforms, for instance in the energy sector, and capacity building, for example in maintenance of transportation infrastructure. They must also proceed alongside a strengthening of systems, such as by boosting the shock-responsiveness of the safety net, enhancing the capacity of the health system to deal with climate-induced burden of disease, and improving urban governance.

Djibouti has articulated clear climate policies, but a stronger institutional framework is needed to implement them and mobilize financing. Through the NDC process, Djibouti has defined climate priorities that are aligned with national development planning. Roles and responsibilities for implementation must now be further defined, and the national policy coordinating body strengthened, notably through stronger engagement of the Ministries of Budget and Finance. Climate governance in SOEs is equally important given their large footprint in the economy and role in delivering adaptation investments. Finally, to mobilize climate financing, Djibouti can in the short term continue to develop tailored financing models for marquee projects such as the Ghoubet wind farm. It can leverage development funds to increase small- and medium-sized enterprise (SME) financing, while advancing business environment reforms and developing a green finance architecture to promote greater investment in the longer term.

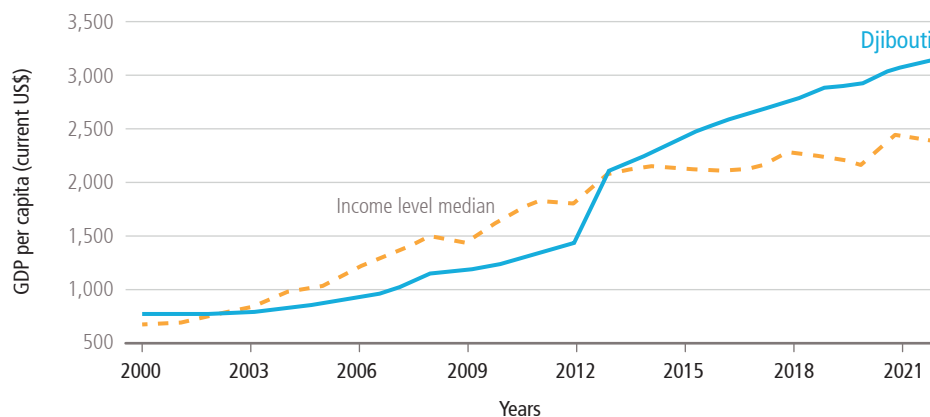


Chapter 1 – Climate and Development

A. Development context

Djibouti's economic expansion over the past two decades has propelled its status up to that of a lower-middle-income country, with a per capita GDP of over US\$3,200. This remarkable economic performance (figure 1) can be attributed to several key factors. The first is the country's political stability and strategic location, which have helped to attract a cumulative net inflow of US\$2.3 billion in foreign direct investment (FDI) between 2000 and 2020. Djibouti's role as a transit point and re-export hub for Ethiopia has contributed substantially to its growth. Approximately 87 percent of merchandise handled in Djibouti's ports consists of onward transit and re-exports to Ethiopia,¹ which generate annual revenues of about US\$400 million from port fees alone.² Additionally, the establishment of foreign military bases in the country has contributed to its stability and growth, generating approximately US\$120 million in annual revenue (Republic of Djibouti Ministry of Budget). Lastly, its robust economic institutions, including the currency board, and its membership of the World Trade Organization (WTO), have played pivotal roles in creating a conducive environment for economic development. These factors, supported by significant investment and revenue, have ensured Djibouti's success in leveraging its geopolitical advantages and institutional strengths to drive economic growth.

Figure 1. Djibouti's Two-Decade Economic Expansion Has Raised it to Lower-Middle-Income Status



Source: World Development Indicators.

Heavy reliance on the services sector leaves the economy susceptible to external shocks, particularly disruptions in trade with Ethiopia. The modern services sector, linked to trade, accounts for about 80 percent of Djibouti's GDP and 60 percent of its formal employment. Hence, any downturn in Ethiopia's economy can have a significant negative impact on Djibouti's economic stability. Lack of diversification in Djibouti's economy heightens its vulnerability to external factors, including escalating debt burdens. However, despite existing vulnerabilities, Djibouti has the potential to pursue a more resilient and diversified growth path. By overcoming constraints such as high production costs and by fostering diversification into labor-intensive sectors, Djibouti could drive sustainable economic growth, create more inclusive employment opportunities, and reduce its vulnerability to external shocks, including those exacerbated by climate change.

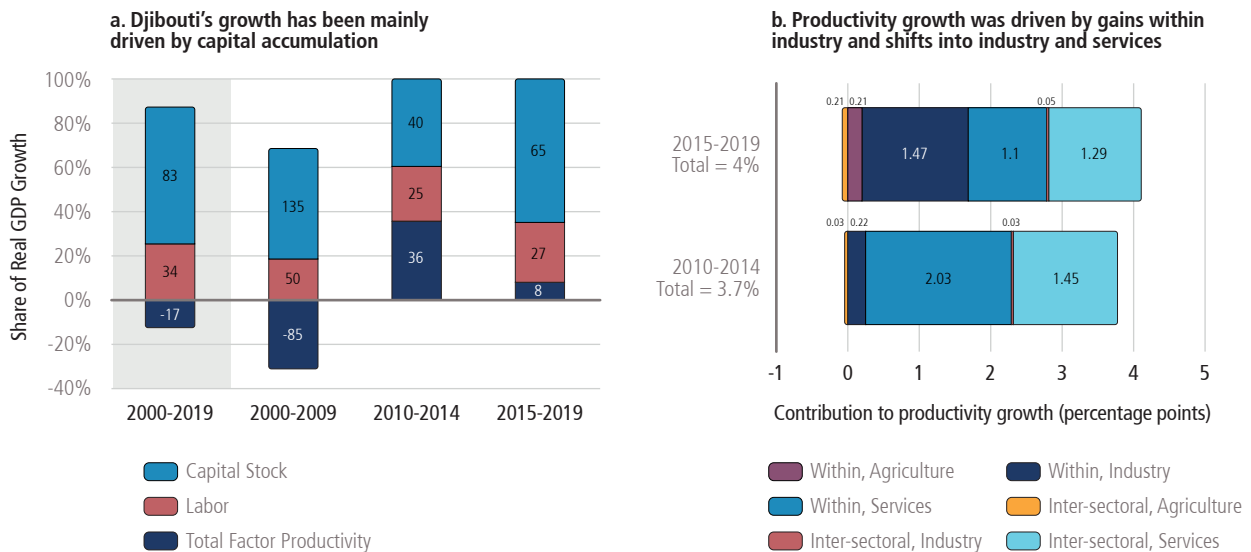
1 Average over the years 2020-2023, according to the table of activity indicators of the Department of Economy and Planning (DEP). DEP calculations based on data from the Djibouti Ports and Free Zones Authority (DPFZA).

2 Communication from Djibouti Port Authority. Revenues have sometimes been reported to be higher.

Economic diversification efforts have been hindered by obstacles to private sector development such as high production costs, particularly in energy and telecommunication. The Price Level Index (PLI) indicates that Djibouti's cost of living is notably higher than in similar countries, which is hindering economic diversification efforts. High electricity tariffs were identified as a major obstacle to doing business by nearly half of firms surveyed (Enterprise Survey 2013). Moreover, telecom broadband costs are high partly because of monopolistic practices. However, climate resilience investments present the country with an opportunity to address these issues. Djibouti has been actively diversifying its energy mix, leveraging affordable hydroelectric imports and exploring renewable sources like wind and solar power. Initiatives to increase connectivity and competition in the telecom sector are also underway.

Limited structural change and a lack of meaningful shifts in productivity and employment have slowed growth. Despite substantial investments in capital-intensive sectors such as ports and SOEs, the economy has struggled to generate sufficient job opportunities, leading to high unemployment, particularly among women and young people. Capital accumulation contributed over half of real GDP growth with an average growth rate of 10.3 percent between 2000 and 2019 (figure 2). In contrast, labor has only grown by 2.5 percent, accounting for just one-fifth of real GDP growth during the same period. The predominance of the public sector in employment further exacerbates the issue, as formal job creation remains insufficient to absorb new entrants into the labor market. The stagnation of employment highlights the need for policies that foster diversification and promote labor-intensive sectors to drive sustainable economic growth and foster greater inclusivity.

Figure 2. Contributors to Djibouti's Growth



Sources: World Bank.

With few good jobs outside the public sector, labor force participation is extremely low—only one in four Djiboutians of working age hold a job. As of 2017, when labor market data was last collected, only about half of the working-age population was either active or looking for a job (46 percent) (Enquête Djiboutienne Auprès des Ménages (EDAM) 2017). In addition, an estimated 9 percent were unemployed and a further 13 percent were discouraged from searching for jobs. These data imply that only 25 percent Djiboutians of working age have a job in either the formal or informal sector. Although official employment data may undercount participation in casual activities, in particular in agriculture and herding, the employment rate is undoubtedly low. Of those employed, nearly half work in the public sector or para-public sector (48 percent), with the informal private sector accounting for most other employment (43 percent), reflecting the limited availability of productive jobs outside of the public sector.

Despite economic growth, about one in five Djiboutians continues to live in poverty, and disparities in wealth remain stark. Based on the 2017 national household survey, 21 percent of all households lived below the national poverty line, and 44 percent below the lower-middle income international poverty line (US\$3.65 per person per day). Approximately 19 percent lived in extreme poverty, surviving on less than US\$2.15 per person per day. Spatial disparities exacerbate this issue, with poverty rates (based on the national poverty line) ranging from 14 percent in Djibouti City to 65 percent in Tadjourah. Extreme poverty is acute in some urban areas, notably within the Balbala communities of Djibouti City that house most migrants and displaced individuals. At the same time, concentration of wealth among the top echelons of society exacerbates inequality. The Gini coefficient, a measure of income distribution, stood at 0.42 in 2017, reflecting high levels of inequality. Notably, the wealthiest 10 percent of the population control one-third of total wealth, and 17 times the wealth owned by the poorest 10 percent. The COVID-19 pandemic worsened poverty and inequality, slowing the reduction in the poverty rate below what had been expected, with estimates suggesting that extreme poverty rates were nearly stagnant, declining only from 21 to 20 percent between 2017 and 2020 (World Bank 2024a). The pandemic's adverse effects, including job losses and price shocks, disproportionately impacted vulnerable households.

Djibouti faces a precarious fiscal situation and high debt. Escalating external public debt and unsustainable fiscal policies are exacerbated by looming climate change threats. The country's heavy reliance on non-concessional external borrowing to finance infrastructure projects has led to a significant surge in debt. Its external debt-to-GDP ratio more than doubled to 71.6 percent between 2013 and 2021. The financing of key ventures such as the Addis Ababa-Djibouti railway and the Doraleh Multipurpose Port has imposed unsustainable debt service obligations. In 2023, total external arrears reached 6 percent of GDP, significantly exceeding the threshold of 1 percent at which the joint IMF-World Bank debt sustainability framework considers a country to be in debt distress. Djibouti's current fiscal stance, marked by generous tax exemptions for investors and low tax rates on essential imports, is likely unsustainable. While these policies have spurred an investment boom, they have failed to generate the revenues needed to service growing public debt. Additionally, the narrow tax base and constant changes in tax policies have further constrained revenue mobilization efforts, creating an environment of fiscal uncertainty that is detrimental to economic stability. Damages and losses due to climate change will impose further cost and accentuate fiscal pressures.

The convergence of escalating debt, unsustainable fiscal policies, and climate change poses a formidable challenge to Djibouti's development. Urgent and comprehensive policy interventions are imperative to address these vulnerabilities and to safeguard the country's economic stability and long-term prosperity. Prioritizing fiscal consolidation, mobilizing more revenue, and strengthening debt management practices are needed to mitigate risks associated with fiscal and debt unsustainability. Proactive measures are also essential to mitigate and adapt to adverse climate change impacts. Failure to address these issues could not only undermine Djibouti's economic stability but also jeopardize its ability to achieve inclusive and sustainable development, posing a significant risk to the well-being of its citizens and future generations.

Aware of these challenges, the government of Djibouti laid out a strategy—Vision Djibouti 2035—to transition from a developing to an emerging economy within 25 years. The strategy focuses on economic diversification, increased investments, and improvements in social and human development indicators, with an emphasis on positioning Djibouti as a regional and international economic hub. Vision Djibouti 2035 targets key sectors for economic diversification: tourism, fisheries, information technology, transport and logistics, and renewable energy. To ensure implementation of this vision, it will be necessary to reduce high production costs, restore fiscal sustainability, and integrate environmental sustainability and renewable energy development throughout the economy.

B. Risks and opportunities from climate change and natural hazards

1. Current climate risks

Water scarcity poses a severe challenge to economic development and livelihoods. Djibouti has very little renewable water, and a hot desert climate characterized by year-round high temperatures, high evapotranspiration, and low precipitation.³ With a mere 225 millimeters of rainfall per year and no permanent surface water other than the saline Lac Abhé and Lac Assal, renewable water resources are very scarce. At an estimated 185 cubic meters per person per year, renewable water is far below the absolute water threshold of 500 cubic meters per person per year. Renewable groundwater is severely overused at 133 percent. Ten major droughts recorded in Djibouti between 1980 and 2019 have threatened rural households that depend on livestock. The 2008-2011 drought caused an estimated GDP contraction of 4 percent, negatively affecting more than 100,000 people and resulting in the loss of half of Djibouti's livestock (République de Djibouti 2011).

Extreme heat is a risk to both life and productivity. In today's climate in Djibouti, temperatures exceed the extreme heat threshold of 35 °C on an average of 66 days per year. Overnight minimum temperatures are above the threshold of 26 °C for about one-third of the year (124 days). These current conditions impair the productivity of the many workers who are outdoors during heatwaves and put substantial strain on road and rail infrastructure. At outside temperatures of 32 °C, productivity decreases by an estimated one-fourth for those engaged in light physical work and by nearly one-half for those undertaking strenuous physical work (ILO 2019).

Episodes of extreme precipitation recur regularly, and urban floods cause substantial damage and disruption. Djibouti experiences substantial interannual variability in rainfall. During the past 20 years, four heavy rainfall events of 80 to 155 millimeters caused inundations in Djibouti City, affecting up to 200,000 inhabitants and resulting in up to US\$47 million in damages and losses in a single event (equivalent to 1.1 percent of GDP in 2023). Both trade infrastructure and urban economic life are significantly impaired by flooding.

A rapid change in malaria epidemiology since 2012 has led to a resurgence of cases. The arrival in Djibouti of the disease vector *Anopheles stephensi* from Asia has led to a precipitous increase in the previously minimal number of malaria cases. The vector is well-adapted to urban environments and can survive the high temperatures of the Djiboutian dry season. Malaria cases have risen from about 2,000 per year in the decade preceding the detection of the new vector to an average of nearly 50,000 in the years 2021-2022, a per capita incidence similar to those in Kenya and Sudan.

2. Climate change projections

Extreme heat is expected to become much more common, with a projected near-doubling of the number of high heat index days and a substantial increase in the number of tropical nights. Average temperatures have already risen by about 1 °C over the past 50 years and are expected to increase by a further 1.5 °C by mid-century under the SSP3-7.0 climate scenario (figure 3a/box 1). This means that the number of high heat index days will almost double from a current 66 per year to 123 (with a 90 percent confidence interval of between 97 and 156 days). The number of tropical nights is expected to increase by about one-third

³ Unless otherwise indicated, the discussion of climate risks is taken from the Djibouti Climate Risk Profile prepared for this CCDR.

from 124 to 166 per year (with a confidence interval of 135 to 194 nights per year). Due to Djibouti's geography, these changes are likely to vary in different parts of the country. The regions of Dikhil and Tadjourah, where high heat index days are currently infrequent, are projected to experience about as many high heat index days by mid-century as Obock does now, while in Djibouti City, the number of high heat-index days is projected to nearly triple.

Box 1. Climate Change Data and Scenarios Used in Projections and Impact Modeling

Climate projections rely on the World Bank's Climate Risk Profile for Djibouti and focus on expected changes under the SSP3-7.0 scenario with an assessment of sensitivity to alternative scenarios.

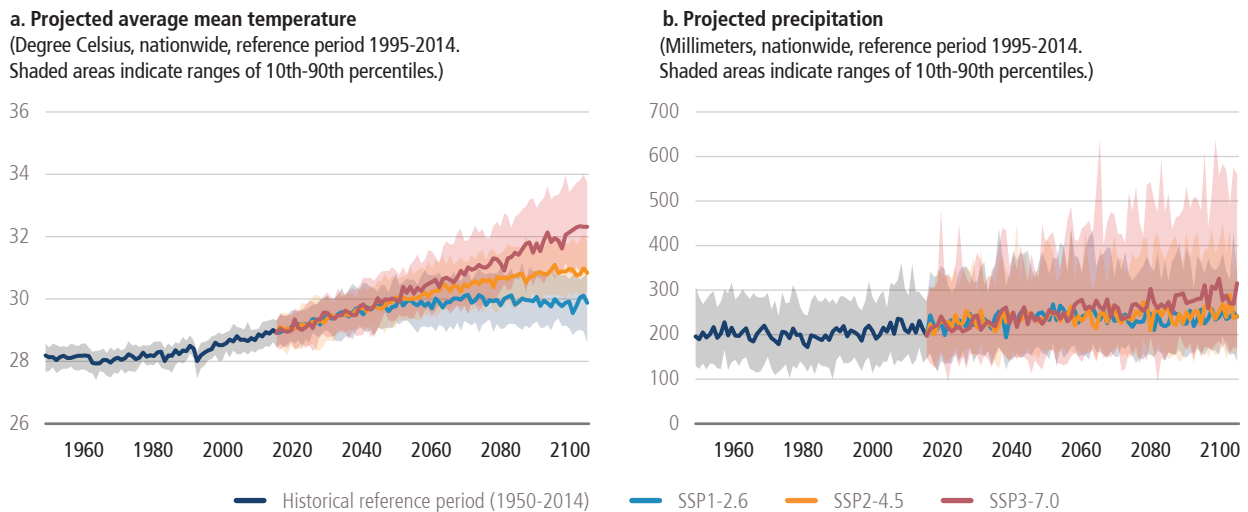
Unless otherwise indicated, the discussion of climate impacts relies on the World Bank's Climate Risk Profile for Djibouti (World Bank 2023c), prepared for the CCDR. Climate data used in the Climate Risk Profile is obtained from the World Bank's Climate Change Knowledge Portal. The Climate Risk Profile uses the somewhat pessimistic SSP3-7.0 scenario for its baseline projections and examines sensitivity to using the SSP1-2.6 (most optimistic) and SSP2-4.5 (somewhat optimistic) scenarios. The range of these findings is reflected in this summary.

In modeling the biophysical impact of climate change, the CCDR considers a 'hot' and a 'warm' set of climate projections reflecting the range of predictions. To account for data and modelling uncertainty, climate model outputs were selected to illustrate a range of impacts under different climate conditions. To this end, where possible, climate projections were first obtained from each combination of three SSP scenarios and 29 global circulation models. Among these projections, three 'hot scenarios' were selected, ranging around the 90th percentile of mean temperature changes from each of SSP1-1.9, SSP2-4.5, and SSP3-7.0; and three 'warm scenarios' were chosen that ranged around the 10th percentile in mean temperature changes from each of the SSPs. For physical phenomena for which the full set of individual model runs was not available (e.g. peak precipitation), the CCDR uses the ensemble median across models for SSP3-7.0 for the 'hot' scenario, and the median for SSP2-4.5 for the 'warm' scenario.

While predictions of changes in total precipitation exhibit high uncertainty, models agree that extreme wet events will increase. Annual rainfall is likely to increase slightly (by 14 percent, with a wide confidence interval of -1 to 52 percent), but given current dry conditions, even large relative changes would make little difference to water availability (figure 3b).⁴ Extreme precipitation events are projected to become both more pronounced and more common. Thus, rainfall extremes that currently occur every 10 years are expected to return every six years, and those that currently occur every 25 years are projected to return every 17 years. (There is much uncertainty, with the 90 percent interval for 10-year events ranging from three to 11 years.) At the same time, the highest average five-day rainfall is expected to increase from 27 millimeters to 46 millimeters, again with a large uncertainty range, with the 10th percentile of model results indicating no change in extreme rainfall levels (27 millimeters) and the 90th percentile indicating a four-fold increase to 108 millimeters. Studies suggest that droughts have already become more frequent and intense and will remain a prominent risk, with the maximum number of consecutive dry days expected to stay approximately stable at a high level of 293 days per year, compared to 306 during the reference period (with a confidence interval of 201 to 339 days).

4 Though aquifers may recharge more effectively in the course of more intense precipitation events.

Figure 3. Projected Change in Temperature and Precipitation in Djibouti



Source: World Bank 2023c.

Sea level rise and coastal erosion will threaten some of Djibouti's most important economic areas, while a rise in sea temperatures is putting coral reefs and fisheries at risk. Under the SSP3-7.0 climate scenario, sea levels are projected to rise by 22 centimeters (with a confidence interval of 15 to 33 centimeters) by 2050 and by 69 centimeters by the end of the century. Rising sea levels cause salt to seep into groundwater, exacerbating damage from storm surges. This is a particular challenge in Djibouti because physical capital and economic activity are concentrated in low-lying areas of Djibouti City. Sea surface temperatures have risen in both the Red Sea and the Gulf of Aden over the 1993-2009 reference period by about 0.64 and up to 0.40 °C per decade respectively (Agulles et al. 2020). These increases contribute to climate volatility and can damage Djibouti's coral reefs and deplete fish stocks.

3. Climate change risks to development and green growth opportunities

Djibouti's unusual degree of interdependence with its neighbors is central to achieving its development priorities and is a source of both resilience and vulnerability. Djibouti plays a key role as the major port connecting the Horn of Africa to the global market. Ninety-five percent of Ethiopian imports transit through the port, and port fees generate about US\$400 million in revenue for Djibouti (UNCTAD 2022). Heavy precipitation events and heat stress increasingly strain the country's trade infrastructure, with increases in yearly damages of US\$40 million expected by mid-century due to climate change. As a stable space in a restive region, Djibouti has also become an important host country for displaced persons, migrants, and through-migrants, about one-third of whom in the region are thought to be linked to climate change. These migration flows are likely to increase, putting further strain on public resources and communities. Djibouti imports most of its food and energy from elsewhere in the region, and imports about 30 percent of its water from Ethiopia. These supply patterns insulate the economy from climate threats within its borders to some degree, but also expose Djibouti to climate events elsewhere in the region.

In Djibouti's already hot and dry climate, greater heat and aridity will pose real challenges to livability. Djibouti has made important investments in new water sources as groundwater resources are increasingly strained. However, further investment will be needed in the efficiency and maintenance of the water system to ensure urban water security. In rural areas, conditions are already unfavorable for crop agriculture, and drought is damaging the livelihoods of livestock farmers. With greater heat and more dry spells, these obstacles will increase. Intense heat during the dry season will erode productivity, while investments in

health services will be needed to counteract changes in epidemiology and rising burden of disease due to heat-induced cardiovascular conditions. The poor are particularly vulnerable to more extreme climate conditions because of their inability to recoup asset losses, their higher reliance on outdoor work and livestock livelihoods, and their greater vulnerability to disasters in unplanned urban settlements and from poorly constructed housing.

Climate change will hinder attempts to diversify Djibouti's economy by causing greater urban flood damage, posing risks to priority growth sectors, and raising energy demands. The government has identified the diversification of its services-based economy as a critical development need. To diversify, Djibouti must safeguard the economy of Djibouti City—where both population and economic activity concentrate—from climate impacts. More severe flooding is expected to threaten urban transport and habitats as well as physical capital, but effective drainage infrastructure and sound urban planning can reduce harm from these events. The growth of informal settlements, partially because of the influx of migrants fleeing from climate events elsewhere, presents an additional challenge to urban productivity. This can be moderated through planning, expansion of social safety nets, and investments in urban transport and other services. Climate change also directly threatens sectors of the economy the government has designated as priority opportunities for diversification such as fisheries, tourism, and ICT. Risks include substantial decreases in the potential fish catch, excess heat hindering tourism, and flood damage to ICT infrastructure. Economy-wide, the energy sector is likely to face growing demand for space cooling and water pumping.

C. Challenges and opportunities for a low-carbon growth path

Djibouti contributes a very small amount of total global and per capita emissions; therefore, investments should focus on development priorities and look to mitigate impacts as co-benefits. With its small population and low per capita emissions (1.4t CO₂e), Djibouti is one of the world's smallest emitters of greenhouse gases (188th among all countries, according to Climatewatch (2022)). Despite an average 4.9 percent annual growth in electricity consumption, emissions from electricity generation have fallen, due chiefly to the 2011 decision to import hydropower from Ethiopia, which accounted for 81 percent of Djibouti's electricity consumption in 2021 (World Bank 2024a). Subsequent domestic investments in renewable energy have further reduced Djibouti's reliance on fossil fuels, including the recent commissioning of a 60MW installed capacity wind farm at Ghoubet financed with support from the Multilateral Investment Guarantee Agency (MIGA). These efforts reduced electricity emissions by 83 percent between 2010 and 2020. In contrast, transport emissions rose by 56 percent and now amount to roughly three times the emissions from electricity generation (Climatewatch 2022). Agricultural emissions result mainly from livestock herds, and estimates vary widely as to their extent.

There are opportunities to increase resilience, promote growth, and reduce emissions in both the transport and energy sectors. While Djibouti's power sector emissions are already minimal, further opportunities exist to increase renewable energy generation through solar photovoltaic (PV), wind, and even geothermal generating capacity. Both lower energy tariffs and investments in the efficient functioning of the energy system will be critical to maintaining Djibouti's clean energy mix and to achieving its development goals. In the transport sector, it will be necessary to protect key road and rail infrastructure from damage due to extreme heat and flash floods. Investments in rail can help reduce transport sector emissions by facilitating operation of low-emission rail transport at full capacity. Also, better regulation of truck fleets can directly reduce emissions while also limiting heat damage to roads.



Chapter 2 – Country Climate Commitments, Policies, and Capacities

A. Summary

Djibouti has demonstrated a commitment to acting on climate change. In 2015, Djibouti submitted its Intended Nationally Determined Contribution for reduction of greenhouse gas (GHG) emissions under the Paris Agreement framework to the United Nations Framework Convention on Climate Change (UNFCCC), and this was converted into a Nationally Determined Contribution (NDC) in 2016. The NDC commits to reducing GHG emissions by 40 percent by 2030, which the national government seeks to achieve by setting a target of 100 percent renewable energy generation. Djibouti's adaptation priorities are to protect the country against rising sea levels, increase continuous access to water even amid drought and rainfall variability, protect biodiversity, and reinforce the resilience of rural populations in the face of threats to agriculture and livestock. Its key focus is on the sustainability of the environment, water resources, infrastructure, agricultural sectors, and coastal zones. Djibouti published its Second National Communication (NC2) to the UNFCCC in 2014, and its goals were reiterated in its Third National Communication (NC3) to the UNFCCC in 2021.

Djibouti's commitment to combatting climate change is outlined in the 2023 draft revised NDC. In 2023, the government prepared a draft version of a revised NDC outlining both mitigation and adaptation measures aligned with the Djibouti Vision 2035 and the National Development Plan. The final version is expected to be submitted at the UNFCCC COP 29 in November 2024. The revised NDC sets out Djibouti's new goal to reduce GHG emissions to 41.3 percent by 2030. It also specifies key priority areas for emission reductions in energy, agriculture, forestry, land use, and waste management, and adaptation priorities in agriculture, water resources, and coastal areas (table 1). The government is emphasizing the need for adaptation to enhance the resilience of vulnerable population groups through the creation of 'green' jobs and by ensuring that sufficient funds are allocated to addressing climate risks.

The climate change commitments in the NDC are integrated into and fully aligned with *Vision Djibouti 2035*, the country's long-term national development plan. The Vision discusses the significant repercussions of climate change on poverty and the economy and the need for sustainable policies regarding energy, water, and the environment, as well as awareness and education campaigns. One of the objectives of the Vision is a 'green' transition, with a target of achieving 100 percent renewable energy by 2035.

The medium-term national development plan also integrates climate change adaptation. The first Strategy of Accelerated Growth and Promotion of Employment (SCAPE), a medium-term version of the *Vision Djibouti 2035*, highlighted climate change adaptation and resilience building with a focus on rural communities and the integration of adaptation into sectoral policies. The recent medium-term national development plan, *2020-2024 Djibouti Inclusion, Connectivity, Institutions* articulates that the country is vulnerable to climate change and makes sustainable development a priority. The plan launched the Environment, Climate Change, and Renewable Energy Program to protect the country against climate change and environmental degradation. To meet the target of 100 percent renewable energy by 2035, the program plans to shut down all heavy fuel oil thermal power plants and move to natural gas as a transitional energy source, the use of hydropower energy for electricity consumption with an interconnection to Ethiopia, and the construction of wind and solar power plants (energy planning is further discussed in Chapter 3 of this report). The government is currently drafting the next national development plan 2025-2029 with a clear focus on climate change adaptation and development, in line with the revised NDC commitments.

A National Strategy on Climate Change (NSCC) prepared in 2017 has not been formally adopted due to resource constraints. The NSCC's objective is to enhance coherence between climate change actions and the existing national policy frameworks (the NDC and SCAPE), and to identify and address climate change in various parts

of the economy and society. The Strategy defines six priority areas: (i) access to water; (ii) best practices in the agricultural, forestry, fishery, and tourism sectors; (iii) reduction of vulnerability; (iv) protection and enhancement of ecosystems; (v) development of sustainable and resilient cities; and (iv) resilience and sustainability of key strategic infrastructure. It calls for the establishment of a platform for sharing tools and knowledge on adaptation and mitigation, as well as mechanisms for measuring, monitoring, and conducting environmental assessments. In 2019, the government developed a draft National Adaptation Plan (NAP), a process under the UNFCCC, aiming to reduce vulnerability to climate change and to facilitate integration of adaptation into all levels of development planning. The main challenges to implementing the plan are lack of up-to-date data and scarcity of financial and human resources. NAP implementation will require identification of priorities, investment projects, targets, roles and responsibilities, particularly related to access to finance.

Table 1. Priority Areas for Adaptation Defined by the 2017 NSCC and the Draft Revised NDC

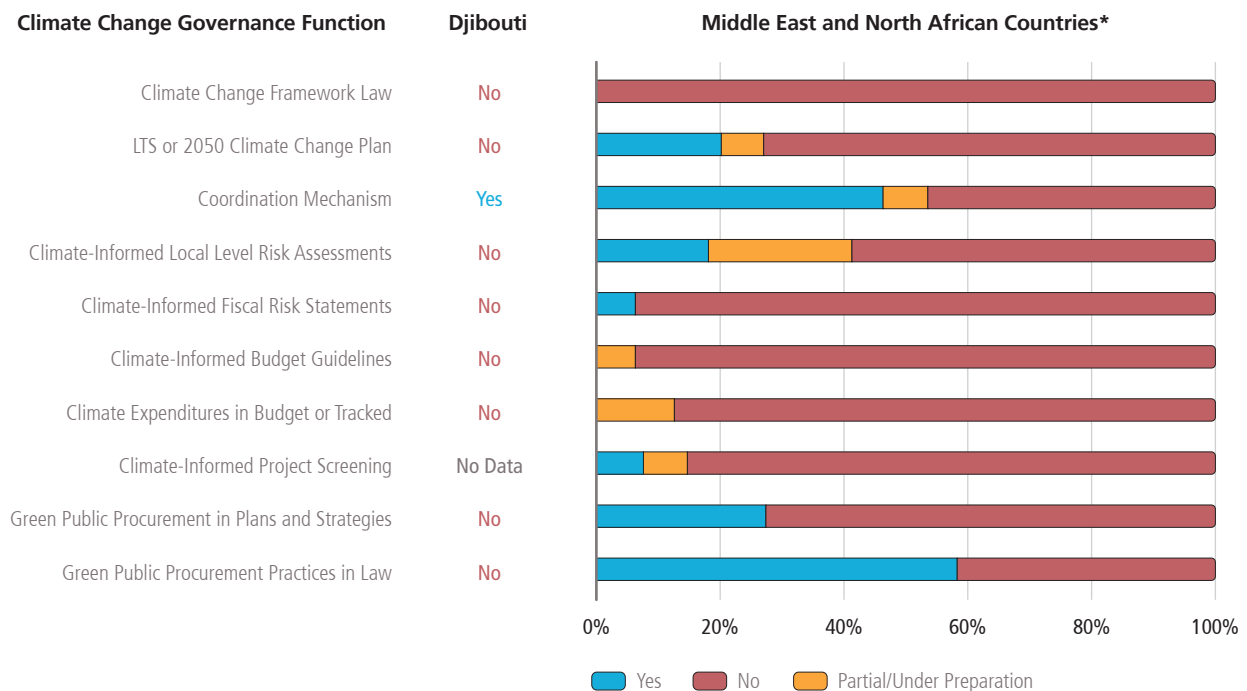
2017 NSCC	Draft Revised NDC
<ul style="list-style-type: none"> • Ensure access to water for all. • Promote best practices in the agricultural, forestry, fishery, and tourism sectors and eliminate harmful practices. • Reduce vulnerability to the effects of climate change and increase the resilience of the most exposed socioeconomic or geographical sectors. • Protect and enhance ecosystems and maintain the services that they provide. • Ensure the development of sustainable and resilient cities in the context of climate change. • Ensure the resilience and sustainability of the country’s key strategic infrastructure. 	<p>Mitigation</p> <p>Priority sectors</p> <ul style="list-style-type: none"> • Energy • Agriculture, Forestry, Land Use • Waste <hr/> <p>Adaptation</p> <p>Adaptation objectives</p> <ul style="list-style-type: none"> • Reduce vulnerability to drought • Protect against rising sea levels • Increase access to water • Protect biodiversity • Strengthen the resilience of rural populations <p>Sectoral priorities</p> <ul style="list-style-type: none"> • Agriculture, including animal, plant, and fish production. • Water resources essential to the agriculture sector • Coastal areas.

Sources: Republic of Djibouti 2017; Republic of Djibouti 2023.

Challenges remain in public investment and asset management related to climate resilience. The Public Expenditure and Financial Accountability (PEFA) assessment conducted in 2023 identifies several major investment projects related to climate change: further drinking water production capacity through desalination and renewable energy, resilience in agriculture, a sustainable electrification project, and a port access road. Despite this active project pipeline, there remains an absence of national directives prescribing selection criteria for such public investment projects, such as project relevance to strategic objectives or project maturity. Nor is there a central entity to screen and prioritize investment projects. Establishing such regulations and capacity could help strengthen the strategic orientation of public investment.

Further steps are needed to embed climate change objectives in core government functions and to adopt a whole-of-government approach to implement climate commitments. Despite submission of the NDC to the UNFCCC and preparation of a revised NDC and its alignment with national development plans, further action is needed to create the institutional environment for effective climate governance (figure 4). While the Ministry of Environment and Sustainable Development (MEDD) is the national focal point for climate change, other key ministries, such as the Ministry of Economy and Finance (MEF) and the Ministry of Budget (MOB), participate to a limited degree in the process. The MEDD is mandated to: (i) strengthen the institutional and legal framework in the environmental sector, (ii) establish a framework for monitoring environmental changes with local authorities, and (iii) promote and coordinate government climate change policies to the sectoral ministerial departments. The MEDD's Department of Environment has led the process of revising and finalizing the 2017 NSCC as well as preparing the revised NDC. However, the MEDD does not have a mandate to develop regulations, policies, programs, or sectoral assessments on climate change or to provide technical assistance to implement them. In addition, the MEDD has no mandate to incorporate climate issues into economic planning, public finance, or preparation of development plans.

Figure 4. Climate Change Governance Functions in Djibouti



Source: Climate Change Governance Indicators 2022.

The government of Djibouti has established a National Steering Committee for Climate Change (CNDCC), but effective coordination and clear mandates remain a challenge. The CNDCC, chaired by the MEDD's Department of Environment, was created by presidential decree in May 1999. In 2018, a draft decree was prepared to reactivate it after it had been dormant for several years. Membership in the CNDCC includes focal points of the relevant ministries and agencies as well as representatives of Djibouti's regions. The CNDCC's mandate is to ensure institutional coordination of climate change-related issues and to provide information on and regulatory monitoring of climate-related policies. Since 2018, the committee has been meeting more regularly and with a high level of participation, including thematic working groups. While the CNDCC reviews and validates key policy documents related to climate change (such as the NDC), the committee has no responsibility for setting goals, strategy, policies, plans, for or implementation. It also lacks

the human resources and operational budget to perform their coordination activities. Instead, civil servants from the ministerial departments concerned are mobilized to conduct the CNDCC's work. As a result, there are no incentives for CNDCC members to participate in coordination work, and meetings remain infrequent.

The composition of the CNDCC could be strengthened to include key central ministries. The Climate Change Unit of the Department of Environment acts as the CNDCC's Technical Secretariat in close collaboration with the Department of National Meteorology. The CNDCC is supposed to convene all relevant institutions involved in the climate field and it does include relevant sectoral ministries, agencies, and local regions. However, not all ministries, departments, and agencies concerned with climate action participate, nor do any territorial administrations, private sector actors, or civil society representatives. While the MEF is included, it remains in practice disconnected from the MEDD's climate change efforts. Similarly, the CNDCC does not include the MOB.

The Ministry of Finance and Economy is planning to establish a coordination unit to help attract climate finance. A *note de service* is being prepared to establish the unit, with a reporting line to the office of the Minister. It is envisaged that the unit will principally be tasked with raising and managing funds dedicated to the fight against climate change and to ensure their efficient use. Important aspects of its work will involve the coordination of relevant national actors (government bodies, nongovernmental organizations (NGOs) and economic entities) and efforts to strengthen their capacity to navigate the existing financing mechanisms. The unit will need to resolve questions of a potential duplication of efforts with other parts of the Ministry of Finance (*Direction du financement extérieur* and *Unité de coordination*) and line ministries in charge of the environment, agriculture, transport, and energy. Adequate resources will be needed to ensure the effectiveness of the coordination unit.

A new office called the Sovereign Carbon Agency is being established within the Office of the President to regulate carbon taxes. The Agency was established by decree under the Office of the President to "reduce ... greenhouse gas emissions by 40 percent by 2030" in accordance with Article 4 of the Paris Agreement and as a mechanism for controlling GHG emissions. Its mandate involves defining carbon emissions goals for the main GHG emitters in Djibouti, including those in the aviation and maritime sectors operating in or transiting through Djibouti as well as foreign military forces. The goal is to raise funds for environmental and energy programs that address climate challenges. However, the Sovereign Carbon Agency is not yet fully established or operational.

There is no clear guidance on mandates and roles for implementing Djibouti's climate commitments. While Djibouti prioritized climate change commitments in the revised NDC and linked it with various national development plans, it has not developed any regulations that assign clear roles and mandates to all relevant government agencies for implementing the commitments or any policies to be pursued to accomplish the commitments (Menzies et al. 2020).

Moreover, despite the importance of SOEs in the economy and in service delivery, there are no legal or regulatory requirements for SOEs to prepare for or respond to climate change in Djibouti. Djibouti now has 74 SOEs, up from eight at its independence in 1977. These include 27 public enterprises, eight industrial and commercial public establishments, and 39 administrative public establishments. There are no requirements for SOEs to report to the government on any climate change risks they face or measures they have taken, and research for this report did not identify any such reporting practices by individual SOEs. This is not surprising given the relative novelty of the idea of taking a systematic and institutionalized approach to environmental protection. Djibouti adopted its environmental code⁵ on July 1, 2009, after adopting and ratifying several laws relating to environmental protection, climate change, and biodiversity preservation.

5 Law No. 51/T AN/09/6ème L.

Djibouti's various ministries and agencies produce little information on climate risks and vulnerability. There is no legal requirement to prepare risk and vulnerability information, and no regulations specifying responsibilities. Nonetheless, several national agencies do report information on climate risks and vulnerability, including the National Meteorology Agency, the Djibouti Study and Research Center (CERD), and the Executive Secretariat for Risk and Disaster Management. Some relevant departments of the ministries responsible for water and public health also report climate information. However, none of this information is regularly updated, and the available information is rarely geographically disaggregated and often does not systematically cover all local regions. Also, this information is not easily accessible or usable by the public.

B. Recommendations

To advance the implementation of Djibouti's climate commitments and objectives, the government might consider the following institutional reforms:⁶

- **Establish clear institutional implementation roles and mandates.** Define a comprehensive regulatory framework specifying what entities are responsible for establishing, monitoring, and reporting on climate objectives, for preparing projects, for mobilizing climate finance, and for preparing and disseminating risk and vulnerability information. This could eventually take the shape of climate change legislation.
- **Enhance the coordination of policies on climate change.** Strengthen the CNDCC's composition by adding the Ministry of Budget; designate climate focal points within the six priority sectors: water resources, agriculture and livestock, coastal and marine ecosystems, waste, energy, and transport; and set sectoral targets for reducing GHG emissions, including for SOEs. The MEF can work to align climate action with development priorities and include SOEs in the NDC implementation through its secretariat for public enterprises. The MEF can also align the objectives of its external finance unit with the climate finance objectives in the NDC.
- **Entrust the CNDCC to the President's Office to enhance coordination,** with the MEDD retaining its essential role as the climate change focal point in the country.
- **Strengthen the MEF's leadership in mobilizing financial resources for climate change** by operationalizing the planned dedicated climate finance unit.
- **Consider developing a set of requirements for climate change reporting by SOEs** given the climate impacts of their construction, fuel discharge, and energy use.
- **Review how regional coordination on climate resilience is being managed** on each of the regional issues of trade in goods and services, water, food, energy, and migration.

6 Findings from this institutional assessment were discussed with government officials as part of the CCDR mission in collaboration with the Environment Directorate on February 14, 2024. The consultation process was chaired by the Acting Director of Environment of the Ministry of Environment and Sustainable Development (MEDD), and included government officials from various ministries (environment, housing, equipment, budget, energy, higher education, agriculture, disaster management) and civil society. Recommendations listed here are a result of this consultation process.



Chapter 3 – Selected Climate and Development Priorities

A. Leveraging regional integration

Djibouti’s unusual degree of regional interdependence is central to its development priorities and makes it both resilient and vulnerable to climate risks. Djibouti plays a key role in the region as the major port connecting Ethiopia and parts of Somalia to the global market, and the region depends on Djibouti as the landing point for cables for ICT access. As a stable space in a restive region, Djibouti hosts displaced persons, migrants, and through-migrants; climate change is likely to further increase these flows. Conversely, Djibouti’s economy depends on the rest of the region. Djibouti’s aquifers are transboundary, and water imports account for 30 percent of supply. Substantial shares of food (84 percent) and energy (more than 80 percent) are imported from Ethiopia, with additional imports from other countries. These supply patterns insulate the economy from local climate impacts, but also expose it to climate impacts elsewhere in the region. Furthermore, with high revenues from re-exports to Ethiopia, any reductions in trade demand in neighboring countries due to adverse climate shocks would harm Djibouti’s economy.

1. Regional integration – Climate challenges and green growth opportunities

a) Transport

Djibouti aims to remain a pivotal logistical hub within the Red Sea and Horn of Africa region, and its efficient port is a key source of revenue. Ethiopia and Djibouti are closely connected through the Ethiopia-Djibouti Transport Corridor. Over the past two decades, significant investments in world-class port infrastructure have positioned Djibouti as an essential gateway for goods entering and exiting the East African region. Approximately 87 percent of the cargo handled in Djibouti’s ports is in transit or re-exported to Ethiopia, yielding about US\$400 million annually in port charges (World Bank 2024a). Services in the coastal towns constitute more than 75 percent of GDP, and 53 percent of employment (Kireyev 2018). Conversely, landlocked Ethiopia, with its vast population of 127 million, relies on Djibouti’s ports for approximately 95 percent of its international trade (UNCTAD 2022). The importance of this economic partnership became evident when trade was strained during recent shocks like the Tigray conflict (Oxford Business Group 2023).

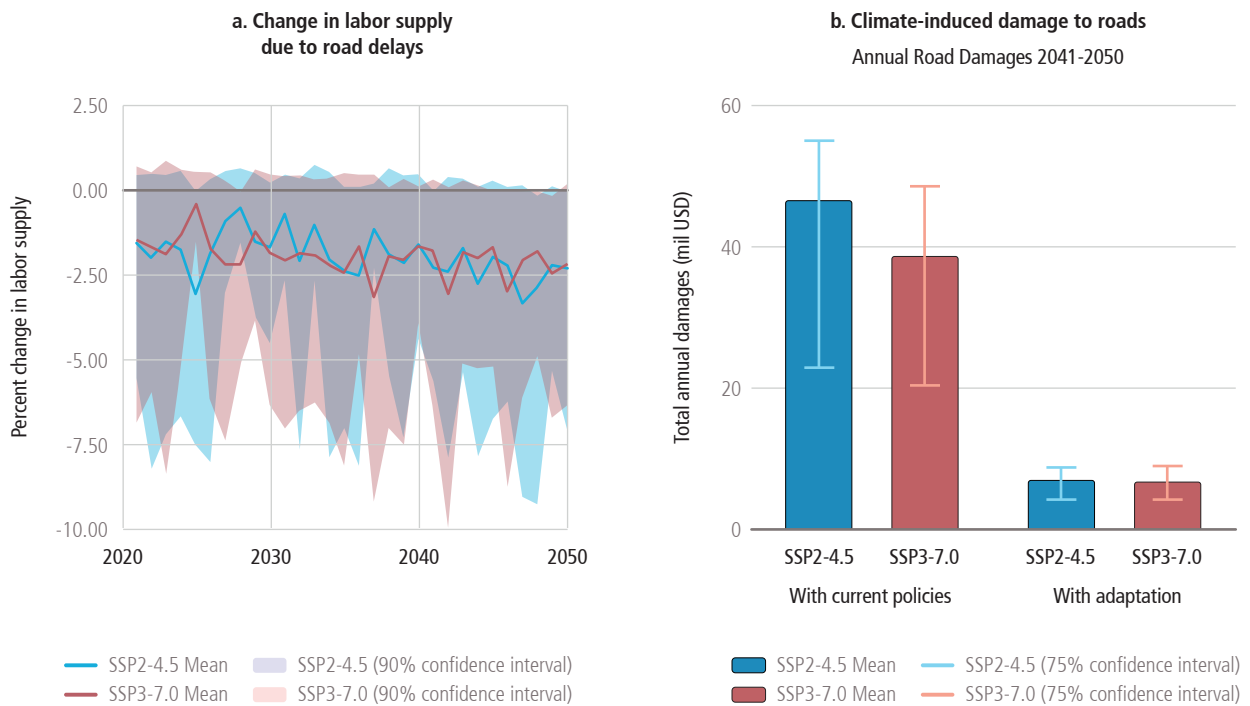
Modeling shows that through trade demand, effective climate adaptation in Ethiopia would contribute to growth in Djibouti in a small but meaningful way. Modeling for this report asked how the different adaptation policy scenarios analyzed in the Ethiopia CCDR would affect demand for trade-related services in Djibouti, and by extension, GDP growth. Under the most vigorous climate adaptation scenario in Ethiopia, Djibouti’s GDP is projected to grow by an additional 0.2 percent by mid-century through trade demand, while under a no-action scenario, it is projected to contract by 0.3 percent relative to baseline. Effective climate action in Ethiopia could therefore contribute up to 0.5 percent to Djibouti’s output by 2050. As shown in Chapter 4, this compares to a direct impact of climate change on Djibouti’s GDP of 6 percent, and an effect of domestic adaptation actions of 3 percent.

High temperatures can cause pavements to soften and deform, causing road damage and reducing safety. With its heavy vehicle traffic, the main Djibouti-Ethiopia corridor is vulnerable to road surface rutting and other damage caused by high temperatures that soften pavement materials. In turn, the degradation of roads hinders users, including freight carriers. Djibouti’s association of transporters reports that rising

temperatures have lowered the frequency of trips, forcing drivers to start their journeys in the afternoon to avoid extreme temperatures. This has reduced the number of truck rotations from five to three per month, decreasing transport capacity, significantly raising costs, and disrupting supply chains.⁷ Rising temperatures and related road damage also reduce the lifespan of transport trucks, necessitating more frequent maintenance and accelerated replacements, adding to operational costs.

Heavy rains cause considerable damage to road networks, with damage from single extreme events estimated at US\$9 to US\$12 million. With poor drainage, roads transform into runoff channels during heavy rains, leading to water accumulation that dynamically damages infrastructure and that eventually can turn into stagnant, polluted, and corrosive environments that further jeopardize structural longevity. The resulting damage can be considerable. After the November 2019 flash floods, damage estimates for transport infrastructure ranged from US\$8.5 million to US\$10 million (World Bank 2020). In 2018, Cyclone Sagar resulted in losses to the road network estimated at about US\$12 million.

Figure 5. Modeled Climate Impacts on Road Transport



Source: World Bank.

Modeling suggests additional annual costs of around US\$40 million from climate-induced damages to roads and bridges, as well as delays in the labor supply. By 2050, the expected additional annual cost of repairs for climate-induced road damage is US\$36 to US\$43 million in the hot and warm scenarios, respectively (figure 5). Nearly all of this damage is expected to come from flooding and heavy precipitation, with much smaller damages due to heat. Perhaps even more remarkably, delays and blockages lead to large labor losses estimated at 3.9 to 4.3 million hours per year, or slightly more than 2 percent of total labor supply. Globally, disruptions to supply chains are known to add further costs; while less relevant to Djibouti’s logistics-based economy today, such impacts could become more relevant with gradual diversification

7 Interview with Djibouti Transport Association, February 2024.

(Hallegatte et al. 2019). Damage to bridges and delays from such damage are expected to add an additional annual repair cost of US\$1.2 million and losses in labor supply of around 0.2 percent. The main contributor to these costs are higher estimated damages from relatively common heavy rainfall and heat, rather than from rarer extreme events.

Climate-related damages are undermining the productivity of Djibouti's flagship investments in rail infrastructure. Electrified, and powered largely by renewable hydroelectric energy, the 728-kilometer railway connecting Ethiopia and Djibouti that opened in 2018 offers a low-emission mode of transportation. It has shortened travel times and reduced transportation costs, and lowered emissions by removing the need for transport of 115,869 containers (TEUs) by truck in 2023. However, the railway infrastructure is exposed to extreme weather events. Drainage systems are inadequate to cope with intense rainfall, leading to rail damage. Associated capacity losses during floods have been estimated at 18 percent, while total flood damage since construction has been estimated at US\$19 million.⁸ Additionally, heat expansion of the rails adds about US\$100,000 per year in maintenance costs. Furthermore, in the hot summer months, only trains carrying empty containers or light cargo are allowed to operate until the late afternoon to avoid damage from heavier trains.

Climate change poses a direct threat to port operations. Climate change is increasingly affecting port operations in Djibouti, with heavy rainfall and strong winds decreasing the overall performance of the terminal. Between June and August, the seasonal khamsin wind disrupts port activities by creating hazardous working conditions, necessitating suspension of operations during storms. There is also an increased risk of damage to the quay and other infrastructure. Globally, high winds associated with climate change can limit maneuverability, berthing, and loading operations at ports, which is also the case in Djibouti (Izaguirre et al. 2021). Rising sea levels and more frequent storm surges pose further risks, exacerbated by coastal land subsidence (Asariotis 2021).

b) Migration

Djibouti's peace, location, and relative prosperity attracts migrants and refugees from the region. Spurred by the allure of a newly sovereign nation and cultural ties across colonial borders, migration has since independence contributed to the growth of Djibouti City, largely fueling an annual 5 percent population growth (Department of Statistics and Demographic Studies 2009). More recently, migrants have come to Djibouti attracted by peace and strong economic growth, fleeing war, conflict, persecution, or difficult climate conditions, or crossing the country through the eastern migration route toward the Arabian peninsula. Little data is available on the number and situation of migrants and displaced people in Djibouti, with the exception of those recognized as refugees and asylum-seekers. Table 2 shows an indicative typology and estimates of population numbers.⁹ However, Djibouti City is known to be home to a large population of long-term undocumented migrants, who, according to anecdotal information, may number between 100,000 and 200,000, or up to one-fifth of Djibouti's population.¹⁰ A recent World Bank study shows that many live in precarious conditions and struggle to pay rent (World Bank 2023

8 This observation as well as the following ones on heat expansion and reduced traffic are based on consultations with the Ethiopia-Djibouti railway.

9 While the typology is grounded in qualitative field work, the issue of nationality and citizenship is an intricate one in Djibouti, and categories are not necessarily mutually exclusive due to the fluidity of the application of the legal statutes that govern them, nor are they necessarily nationally accepted definitions.

10 By way of contrast, only 4,745 registered refugees (about one in every six) live in Djibouti City, according to UNHCR data as of June 30, 2023.

forthcoming), with the most destitute having little access to productive jobs and living in peripheral squatter encampments built from salvaged materials.¹¹

Table 2. Migrant groups in Djibouti

Category	Description	Estimated population
Through-migrants	Since the mid-2000s, tens of thousands of migrants from neighboring countries cross Djibouti every year to reach the Arabian Peninsula.	107,000 are estimated to have migrated through Djibouti in 2023 and 123,000 in 2022. Source: IOM.
Recent migrants	Many recent migrants live in Djibouti without residence permits. This includes economic migrants from neighboring countries, mainly Ethiopia and Somalia; and since the war, some from Yemen who are not formally refugees. Many of these migrants undertake low-skilled labor as housekeepers and nannies, gardeners, or construction workers, send remittances home, and eventually return to their home countries. Stranded migrants are those who wish to continue onward to other countries but remain in Djibouti for months or years due to obstacles such as securing enough money to journey onward or political instability in their intended destination country.	Total number unknown – based on IOM displacement tracking matrix, about 16,000 estimated to have newly arrived in 2023, and 27,000 in 2022. Source: World Bank, based on IOM DTM flow monitoring survey.
Refugees and asylum seekers	Somali refugees arrived from Somalia and Ethiopia in the 1990s and have been in a situation of protracted displacement in Djibouti. Others have arrived during the past decade, fleeing war in Eritrea, Ethiopia, and Yemen.	30,751 officially registered as of June 30, 2023. Source: UNHCR Refugee Population Statistics Database.
Long-term undocumented residents	Some residents lack national identity documents or residence cards but have been integrated socially for many years. They may be married to Djiboutians, have been born in Djibouti to non-Djiboutian parents, or arrived in their childhood and grown up in the country. Most belong to the Afar and Somali ethnicities. Some are citizens of other countries, and others are stateless.	100,000-200,000. Source: World Bank 2023 (forthcoming).

Source: Original table for this report, based on World Bank (2023, forthcoming).

11 For instance, a survey in some slums upgraded under a World Bank-financed project indicated that around 30 percent of residents did not have identification documents, while a 2021 government survey of new slums under the *Programme Zéro Bidonvilles* found that only 52 percent of households had Djiboutian IDs, and a study of the Warableh slum found that nearly 50 percent of the population had arrived in the decade immediately preceding the survey (based on Agence de Réhabilitation Urbaine et du Logement Social 2022).

Since the Tigray conflict in Ethiopia, the number of migrants entering Djibouti has risen precipitously, with most planning to transit toward other destinations. Since 2021, the number of migrants reported by the International Organization for Migration (IOM) as entering Djibouti has risen steeply, with about 169,000 reported to have arrived in 2022, and about 132,000 in 2023, to compared to 38,000 in 2020 (IOM Displacement Tracking Matrix).¹² While most of these new arrivals told the IOM they did not intend to stay in Djibouti (84 percent of all arrivals in 2022 for whom data are available and 88 percent in 2023), it is important to note that Djibouti hosts a large population of through-migrants, with estimated new arrivals equivalent to 15 and 12 percent of the population in these years. In the absence of data, illustrative estimates based on the IOM Displacement Tracking Matrix suggest that some 27,000 migrants and about 16,000 migrants may have newly arrived with the intention of staying in Djibouti, in 2022 and 2023, respectively.¹³

With natural disasters already accounting for one-fourth of migration movements in the Horn of Africa, climate change may further increase the flow of migrants. The steep rise in migration due to instability in Ethiopia illustrates the sensitivity of migration flows in Djibouti to regional events. Within the wider Horn of Africa region, IOM data shows that in 2018, 27 percent of migration movements were driven by natural disasters, with conflict, violence, and persecution accounting for an additional 22 percent (IOM DTM 2018).¹⁴ With conflict and natural disasters both linked to climate change, the region may experience a rise in such movements in the future. And since most climate-related cross-border migration takes place between neighboring countries with strong kinship networks and economic and cultural ties, Djibouti is a plausible destination for such migrants. Indeed, IOM data collected during a regional drought affecting 2.7 million people in the region in 2023 shows an increase in arrivals in Djibouti. Some migrants, most of whom come from Ethiopia's Oromia region, cited floods and drought as the main motivations behind their migration.¹⁵ Within Djibouti, INSTAD data gathered during a drought in 2022 counted 6,086 IDPs (INSTAD and IOM 2022).

Migration and displacement increase demand for public services as well as on the solidarity of local communities. While recognized refugees in Djibouti enjoy generous access to services and employment, the status and rights of undocumented migrants are much less well-defined. There is little information on their access to healthcare, education, water and electricity or the social safety net. Qualitative analysis suggests that these migrants have similar access as Djiboutian households living in poverty, implying that some additional public expenditure is needed (World Bank 2023 *forthcoming*). Beyond public services, Djibouti's local communities have shown remarkable solidarity in sharing scarce water and food with through-migrants, who often arrive after perilous foot journeys of over 500 kilometers, fraught with danger (IFRC 2023). Rising migration would further strain these community resources. While very little data on expenditures is available, a CGE modeling exercise that shows that the arrival of an additional 30,000

12 See: IOM DTM at <https://dtm.iom.int/djibouti>.

13 These estimates are based on the monthly number of individuals who entered into Djibouti and declare an intention to stay in the country. They are computed using the International Organization for Migration (IOM)'s monthly Displacement Tracking Matrix (DTM) reports that provide the number of individuals who entered into Djibouti from Ethiopia as well as percentages on departure countries and intended destination (from the flow monitoring surveys). The resulting estimates are scaled up based on the percentages of other nationalities declared in the survey. It is important to note that these are estimates and not based on official statistics.

14 According to the IOM DTM flow monitoring survey (FMS) collected from January to December 2018 in Ethiopia, Somalia and Djibouti. <https://dtm.iom.int/djibouti>.

15 It is worth making the distinction between movements and the number of migrants. Specifically, the former intends to count the encounters with migrants at Flow Monitoring Points of the DTM. As such, individuals may be double counted. Nevertheless, the measurement of movement and trends over time is indicative of the changes in population mobility through Djibouti.

migrants per year who stay in Djibouti (comparable to the height of the Tigray conflict) may raise annual government expenditure by about US\$1.3 million in the short term, and US\$5.2 million in the longer-run in real terms (table 3). However, not all of this additional expenditure should be thought of as being due to the cost of providing access to social services. Rather, the model considers indirect effects of migration on public spending, notably through GDP growth. Indeed, the fiscal balance is estimated to benefit from migration over time despite additional outlays.

Table 3. Modeled Effects of Migration on Growth, Fiscal Balance, and Expenditure

	Modeled effect of an increase in migration by 30,000 arrivals per year		
	2025-2030	2031-2040	2041-2050
Real GDP	0.16%	0.20%	0.20%
Fiscal balance (% of GDP)	-0.20%	-0.02%	0.45%
Real government expenditure (DF)	226,233,333	547,750,000	920,670,000
Real government expenditure (US\$)	1,266,907	3,067,400	5,155,752

Source: World Bank.

Despite pressure on services and infrastructure, global evidence suggests that with the right policies, Djibouti can benefit from the arrival of displaced and migrant workers. Both global evidence and evidence from Ethiopia indicates that host countries benefit from migrant and displaced workers' contributions in the labor market (World Bank 2023b; von der Goltz et. al. 2024). This is particularly the case when the migrants' characteristics make assimilation easier, as could be the case in Djibouti, as many migrants share an ethnicity, language, or culture with their hosts. All migrants (documented or undocumented) also contribute to economic growth in host countries through their consumption. In line with such expectations, modeling suggests that an increase in migration may slightly raise GDP growth. However, where labor markets are tight, some groups of host workers may experience additional competition, presenting a challenge for policymakers.

c) Water, food, and energy

Maintaining a reliable economic relationship with Ethiopia can make a decisive difference in ensuring water security. Djibouti shares important groundwater resources with its neighbors. The Afar Rift Valley / Afar Triangle Aquifer, one of only two in the country, lies partially in Ethiopia and Eritrea. More recently, a pipeline connection from Ethiopia has substantially increased water supply and further tightened resource links between the two countries. Djibouti currently imports six million cubic meters (m³) of water per year, or about one-quarter of the water currently used in urban areas, but the pipeline's capacity is much higher (see below). At the same time, while climate change is expected to raise the variability of rainfall in Ethiopia, it is also projected to increase average water runoff (World Bank 2024c), so that water imports are likely to be sustainable, if potentially intermittent.

Djibouti is looking to strategically position itself as a key player in an interconnected region by capitalizing on its complementarity with the Ethiopian power sector. Djibouti has invested substantially in power transmission infrastructure with Ethiopia, and 80 percent of Djibouti's energy needs are met by Ethiopian hydropower imports. Interconnection has halved the cost of power generation from around US\$0.22 per kilowatt hours (kWh) in 2010 to approximately US\$0.11 per kWh by 2021. The government considers this to be a transitional measure while it enhances its own power generation capacity and aspires to eventually export electricity, a goal supported via membership in the East African Power Pool (EAPP).

Ethiopia plans a massive expansion of clean energy production but is vulnerable to climate-induced challenges to hydropower and other power infrastructure. Ethiopia plans to grow its current 3 gigawatts (GW) hydropower capacity to about 22 GW by 2045, ensuring cheap domestic power supply and exports (World Bank 2024c). As climate change intensifies, variability in rainfall patterns could intermittently reduce water levels in reservoirs, threatening hydropower generation, while extreme weather events could induce erosion and damage transmission and distribution networks. To bolster resilience, Ethiopia plans to diversify its energy mix; adapt the design of hydropower and geothermal plants to accommodate fluctuations in water availability; and modernize load dispatch and system defense mechanisms. As Djibouti increases its import capacity from Ethiopia through the Second Djibouti-Ethiopia Interconnection Power System, it would be prudent to continue to develop its own energy mix, particularly renewable energy (mainly solar and wind) to ensure its required energy capacity and meet its goal of universal energy access by 2030 (SDG 7). Ensuring energy supply directly links to water security, as it enables Djibouti's capacity to utilize desalinization.

2. Regional integration – Policy options

Djibouti should aim to leverage its pivotal position in the region to pursue development and climate adaptation goals, while building systems that are resilient to regional shocks. Djibouti has long navigated challenging political and economic balances in the region, and building resilience requires that Djibouti both continue to seize the available gains from trade for development while retaining some degree of fallback capacity to weather regional disruptions.

Investments to protect key transport infrastructure can yield efficiency gains and safeguard Djibouti's ability to leverage its strategic location as it diversifies its economy. Given its productivity and competitiveness, the transport sector will play a key role in enabling any diversification strategy. Investments to maintain a cutting edge in transport are key, particularly considering potential competition from Somaliland's port of Berbera and the newly completed Lamu Port in Kenya (estimated to potentially compete for 30 percent and 10-15 percent of Ethiopia's cargo volume, respectively) (Davidson 2016; Humphrey's et al. 2019). Greater resilience of the transportation infrastructure can lower expected climate damage but also greatly reduce damage and losses currently incurred due to extreme heat and rainfall. Modeling of adaptation investments and damage suggest that resilience investment needs are among the largest across sectors, at about US\$770 million, of which about US\$260 million has been secured from donors. This investment would go toward rehabilitation, upgrading, and maintenance of the network including drainage. However, modeling also suggests such investments would effectively reduce losses, with gains likely to far exceed costs. As figure 5b (above) shows, adaptation investments would reduce damage by 83 to 85 percent in the warm and hot scenarios respectively, creating annual cost savings of US\$32 to US\$39 million by the 2040s, in addition to other returns on investment not related to climate resilience. Beyond immediate cost savings, visible improvements in the resilience of transport infrastructure can also further build Djibouti's reputation as a reliable transport hub and strengthen its competitive edge.

Greater emphasis on maintenance and traffic management can help protect transport infrastructure and yield efficiency gains. In a May 2023 report, the Global Center on Adaptation emphasized that road rehabilitation in Djibouti focuses on repairing damaged sections without systematically implementing preventive measures that are more costly in the short term (Global Center on Adaptation 2023). Consequently, repairs only address the symptoms of damage rather than underlying causes, such as inefficiency of the stormwater drainage system and inadequate sizing of roadways. A partnership between the Djibouti Road Authority (ADR) and the National Office of Water and Sanitation (ONEAD) could promote better outcomes by improving coordination between the two agencies, enabling the incorporation of hydraulic and hydrological studies into road design, and introducing a review of construction materials to improve the heat resistance of road surfaces. In addition, since overloaded trucks are a major contributor to road damages, controls to enforce existing legislation on axle loads can help reduce maintenance cost.

Djibouti will need more resources to maintain its welcoming stance toward migrants and displaced people, while reforms should enable new arrivals to participate productively in the economy. Djibouti's legal framework guarantees refugees eligibility to access education, healthcare, and employment opportunities. In 2020, Djibouti launched a new national migration strategy aiming to improve migrants' welfare and that of hosting communities. It seeks to better coordinate the various bodies regulating migration, and to raise awareness on migrants' needs. While irregular migration is a challenge to any country, global evidence implies that it is in Djibouti's economic interest to promote the productive participation of these new arrivals. However, such integration (and that of refugees who have been displaced for longer periods) will, at least in the shorter term, strain social service provision and the urban environment and will require more resources. In addition, in a labor market with weak job growth, sufficient access to capital will be needed to ensure both migrants and their hosts benefit from economic opportunities. Because climate change is likely to increase migration in the region, additional international support for these goals should be viewed as a way of helping Djibouti to adapt to climate risks, while continuing to provide a public good in hosting migrants.

Regional trade in water, energy, and food yields enormous gains and may not be at major direct risk from climate change, but Djibouti should nevertheless invest in increasing its resilience to trade shocks. Djibouti enjoys significant benefits from trade with the region, including high value added from transport, a steep drop in the production cost of energy due to its interconnection with Ethiopia, greatly increased water supply, and consistent access to food imports. Climate predictions for the region do not signal unmanageable stress on water, hydropower, or food supply from Ethiopia, and modeling suggests that expected changes in food production in Ethiopia would have negligible effects on food prices in Djibouti. Policy and investments should therefore aim to realize additional gains from trade. However, both because of the risk of variability and because of potential political and economic uncertainty, Djibouti should also look to grow its domestic capacity in line with its comparative advantage.

Domestic power sector investments can further enhance resilience, including water security. There is significant potential for expanding clean power generation, and Djibouti has already made related investments (see section C.3 of this chapter). Expansion of electricity access has also facilitated establishment of water desalinization capacity (see section B.1 of this chapter). As further explored below, with growing power and water supply capacity, policy and investment should focus on the effective and efficient use of this capacity. The scope for expanding food production is more limited outside of select competitive value chains (see 2.B). However, Djibouti could increase its resilience by diversifying its food import strategies and ensuring funds and mechanisms are available to guarantee food supply during times of regional climate shocks or global price shocks.

In the power and water sectors, strengthening interconnections can help to ensure that gains from trade continue to accrue. Pipeline water delivery from Ethiopia remains constrained because of limited energy access at the pumping site. Works to establish a grid connection are underway at the time of writing and could help fully use the available capacity. In the power sector, further expansion and enhancement of the transmission infrastructure is essential to maintain both domestic and regional interconnectivity. A World Bank-supported second power system interconnection will increase power exchange capability by threefold to 220 megawatt hours (MWh) by 2026 (World Bank 2022). To support its ambition to diversify power supply sources and export capabilities, Djibouti will need to upgrade its own transmission infrastructure. This will also ensure that domestic renewable energy can be transmitted to the cities in support of economic diversification. Djibouti might also benefit from further connectivity and trade with the EAPP market to enhance its electricity supply and renewable energy integration.

B. Safeguarding livability for the people of Djibouti in a marginal climate

Djibouti's hot and dry climate already makes it challenging for people to make a living, and investments in resilience will be essential to maintain development opportunities. Conditions for crop agriculture are unfavorable, and except for meat, most food is imported. Ten major droughts were recorded between 1980 and 2019, with the 2008-2011 drought causing GDP to shrink by 4 percent, affecting more than 100,000 people, and resulting in the loss of half of Djibouti's livestock. Recent floods from 2018 to 2020 caused substantial damage, with 200,000 people affected, resulting in about US\$25 million in reconstruction and recovery efforts in 2019 alone. The poor are particularly vulnerable to more extreme climate conditions because of their limited capacity to recoup asset losses, their high level of reliance on outdoor work exposed to heat and livestock-sector activities threatened by water scarcity, and their greater exposure to disasters in unplanned urban settlements. As a consequence, it will be crucial to make effective investments in climate-related resilience to maintain development opportunities and reduce poverty in Djibouti.

1. Safeguarding livability – Climate challenges and green growth opportunities

a) Water

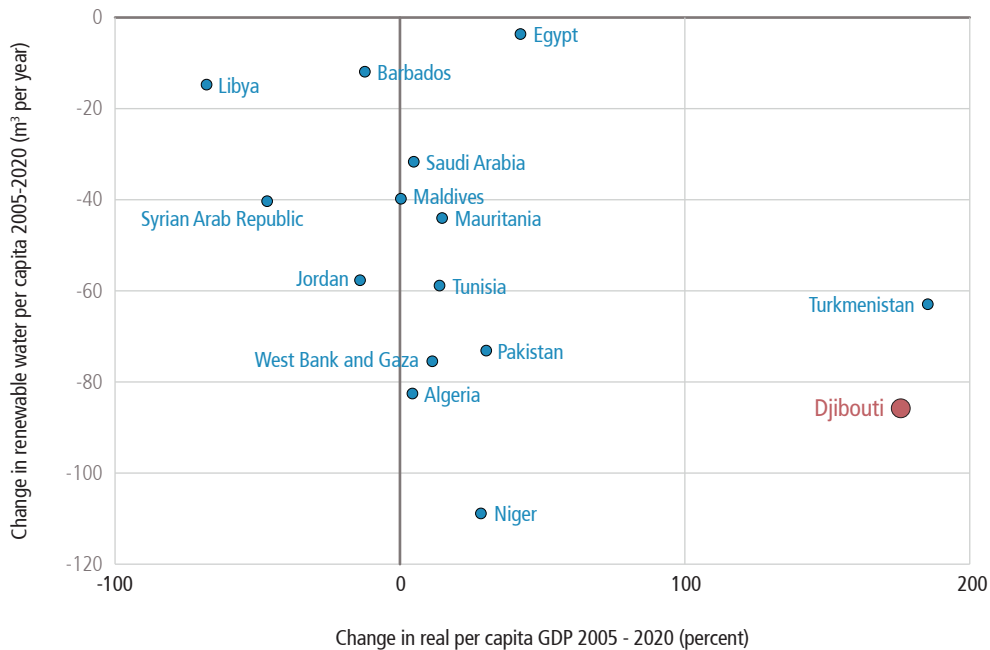
Very scarce renewable water resources pose risks to livability in Djibouti, but with a continued focus on new water resources, the government can build a resilient system. Djibouti has minimal renewable water resources, given its extremely low precipitation and extremely high evapotranspiration. With climate change, seawater intrusion threatens aquifers, while more frequent drought threatens rural livelihoods. However, with already low local precipitation, climate change may not fundamentally change Djibouti's groundwater recharge, while possibly increasing water availability in Ethiopia. Furthermore, Djibouti has made serious investments in diversifying its water sources by creating desalinization capacity and a water transfer pipeline from Ethiopia. The government should aim to boost the resilience of this emergent system while reducing non-revenue water (the difference between the amount of water that is pumped or produced by the water utility, and the amount of water that reaches customers) in urban settings and increasing runoff collection for productive use in rural areas.

Djibouti's renewable water resources are low and declining. Djibouti has no perennial rivers or streams, though seasonal rivers (wadi) are important for supporting oases and recharging shallow aquifers. Two lakes, Lac Assal and Lac Abhe, are too saline to contribute to the water resource base. Precipitation amounts to 3,400 million m³ per year, of which only 6 percent (about 200 million m³ per year) recharges

renewable resources.¹⁶ Current renewable water per capita thus corresponds to as little as 185 m³ per year, much lower than the 2005 value reported by FAO of 420 m³ per year, and less than half of the absolute water scarcity threshold. Among developing countries facing water scarcity in 2005, Djibouti has enjoyed the second-strongest growth through 2020, but the country has also faced the second-steepest decline in renewable water resources per capita (figure 6).

Groundwater is becoming increasingly depleted, and its quality is deteriorating. Historically, groundwater has been the only water resource in Djibouti and remains the predominant one in rural areas. However, years of overexploitation at levels far above those in neighboring countries have caused it to become depleted (table 4). The Djibouti Aquifer, which provides for urban demand, is the only one whose sustainable yield and dynamics are known; its exploitable volume has been estimated to be about 12 million m³ per year (Ofleh 2012). The quality of groundwater is also deteriorating, including due to groundwater salinity is also known to be high: in 2005, more than half of Djibouti’s boreholes were showing salinity of more than 900 milligrams per liter (mg/l), and sometimes up to 1,200 mg/l (water is considered to become significantly unpalatable at levels greater than 1,000 mg/l) (WHO 2022a). Shallow local aquifers that supply many rural areas depend on precipitation for their production and are vulnerable to drought; no information on their contribution to rural supply is available. During four consecutive years of drought in the years 2008-2011, virtually all traditional shallow wells and 80 percent of the community wells countrywide were temporarily or entirely out of service (République de Djibouti 2011).

Figure 6. Change in Water Resources and Income Per Capita in Developing Countries with Low Initial Water Resources



Source: World Bank and Food and Agriculture Organization of the United Nations. Countries included in the figure are developing countries with initial renewable water resources below 500 m³ per year.

16 World Bank Water Accounting Report produced for this CCDR, average over 2010-2021.

Table 4. Groundwater Use of Djibouti Benchmarked Against Neighboring Countries.

	Renewable groundwater abstracted annually (%)
Djibouti	133%
Ethiopia	7%
Kenya	18%
Somalia	8%

Source: World Bank, based on Cobbing and Hiller (2019).

Climate change poses risks to groundwater quality due to sea level rise and the effects of flooding in shallow aquifers but may increase opportunities to harvest rainwater. In coastal areas, where 80 percent of the population live, groundwater salinity is already affected by over-abstraction and the resulting sea water intrusion. Sea level rise will exacerbate this process. As flooding events are projected to become more frequent and intense, shallow aquifers will be exposed to the infiltration of salt water as well as bacteriological, hydrocarbon, industrial, pharmaceutical, and emerging contaminants. However, climate change is projected to increase runoff and could potentially create an opportunity to harvest rainwater to recharge shallow aquifers.¹⁷

Considering the scarcity of renewable groundwater, Djibouti has increasingly invested in non-conventional water sources. Over the past decade, as part of the country’s NDC of 2015, Djibouti has invested substantially in new water sources. In 2015, an agreement with Ethiopia secured the delivery of 100,000 m³/per day (36.5 million m³/yr) of potable water from a well-field in Ethiopia’s Kullen Valley for 30 years. The associated infrastructure, completed in 2018, cost US\$339 million, and includes a 220 kilometer (km) transmission pipeline connecting 28 boreholes in Ethiopia to Djibouti City and towns along the way, four reservoirs of 20,000 m³ each outside the city, as well as a new distribution network. Furthermore, the €83 million reverse osmosis desalination plant at Doraleh, inaugurated in 2021, has the capacity to produce 22,500 m³ per day (8.2 million m³ per year). It is being operated by a private entity for a period of five years, the first example of private sector engagement in the water sector. (Twenty years ago, the country started reusing some wastewater, but production remains very limited.¹⁸)

New water sources are estimated to account for about half of Djibouti’s network production, but issues with energy access inhibit full utilization of the available capacity. Since its opening, the desalination plant has been producing at over 90 percent capacity.¹⁹ However, the transfer pipeline has been operating at only 4 to 21 percent of its capacity annually since 2018 and is currently delivering 6 million m³ per year (16 percent of capacity).²⁰ Challenges in energy mobilization at the pumping site are reported to be

17 See a discussion of this potential mechanism in the World Bank (2024c) Ethiopia Country Climate and Development Report.

18 In 2005, the wastewater treatment plant in Balbala produced 0.14 M m³/yr used for irrigation of green areas in the Ambouli region. The plant in Douda, with a capacity of 1.7 M m³/year, is out of service.

19 ONEAD data. Production in 2023 was 7.5 M m³/yr, and in 2022, 7.4 M m³/year.

20 ONEAD data. The average annual volume since 2018 is 4.7 million m³.

the main obstacles to using it at full capacity. A grid connection is under way but has not yet been completed, and generator capacity at the well field remains insufficient to fully exploit the capacity of the pipeline.

The limited efficiency of the municipal network leads to estimated water losses of 44 percent. The share of non-revenue water is high (table 5): only 56 percent of the water produced reaches the consumer and is billed for. In addition, ONEAD faces substantial challenges in raising payments, with an average of only 67 percent recovery. In 2022, ONEAD billed US\$1.16 per m³ on average; applying the rate of recovery on water billed to the 12.4 million m³ of water lost in distribution, financial losses from non-revenue water thus may have amounted to US\$14.4 million.

Table 5. Losses in the Urban Water Network

	2020	2021	2022
Network conveyance efficiency (water reaching the consumer / water produced)	61%	56%	53%
Cost recovery (water paid / water billed)	84%	61%	67%

Source: World Bank, based on ONEAD data.

Most water demand is concentrated in urban areas, where four out of every five households have access to safe drinking water, although fewer than half are formally connected to the main utility network. The domestic water demand of the city of Djibouti is estimated to be 25.7 million m³ per year, whereas current domestic water supply to these households is only 8.7 million m³ per year. The growth of the urban population will only increase this supply-demand gap. The access rate to safe drinking water for people living in urban areas is estimated to be 83 percent. However, in Djibouti City, only 43 percent of the population is connected to the network (Egis Group and Gret 2022). Network access varies with wealth: according to ONEAD data, households in the highest socioeconomic groups are essentially all connected, while only a quarter of the lower-middle class has a formal ONEAD connection, and virtually none of the vulnerable households do. A majority of those not connected cite high cost as the reason (54 percent); most of them rely on neighbors who have an informal connection (53 percent), purchase water from trucks (23 percent) or collect water from the wadi (16 percent).

Water service from the municipal network is unreliable, with a majority of lower-income households unable to access water every day, and nearly half of all firms reporting production losses due to network disruptions. Lower-middle class households and both vulnerable, and very vulnerable households suffer most from interruptions to water service, with between 51 and 78 percent of these households being unable to access water every day (Egis Group and Gret 2022). Among seven countries in the region for which data on the reliability of firms' access to water are available, only Iraq has more frequent water service interruptions than Djibouti, and none reports that more than 20 percent of firms see their production affected.²¹

Only half of the rural population has access to clean drinking water and only one in five to safe sanitation. Most rural water access is from deep wells and water tanks provided free of charge by the government. In more sparsely populated areas, households draw their domestic water from traditional shallow wells that are often damaged by floods. The rate of access to safe drinking water has been estimated to be

21 World Bank, CLEAR diagnostic prepared for this CCDR.

47 percent among rural households, while only 19 percent have access to safe sanitation. The mortality rate attributed to unsafe water, sanitation, and hygiene (WASH) is 12 times higher in Djibouti (37.6 deaths per 100,000 population) than in MENA lower middle-income peers (averaging 3.4). Water from shallow wells is generally not hygienic because of joint use by livestock. Carrying water from wells to houses imposes a heavy burden of work on women and children. While many rural development projects provide water infrastructure, this support is not usually built around an institutional framework and does not facilitate management and maintenance of the infrastructure.

Estimating current and potential water demand from economic activities is difficult but critical for assessing the contribution made by water to Djibouti's economy and development pathway. ONEAD supplies water to public administration (30 percent of water volumes in urban setting), military bases (7 percent), commercial (5 percent), and transport (2 percent). The development of new sectors as part of the country's diversification agenda is likely to increase pressure on water resources, including the aim of attracting up to 500,000 tourists annually by 2030 through ecotourism. The potential development of the geothermal energy sector might also need significant amounts of fresh groundwater as several geothermal sources in Djibouti are located at a shallow depth near the surface where abstraction might modify the fresh groundwater flow.

b) Food security and livestock livelihoods

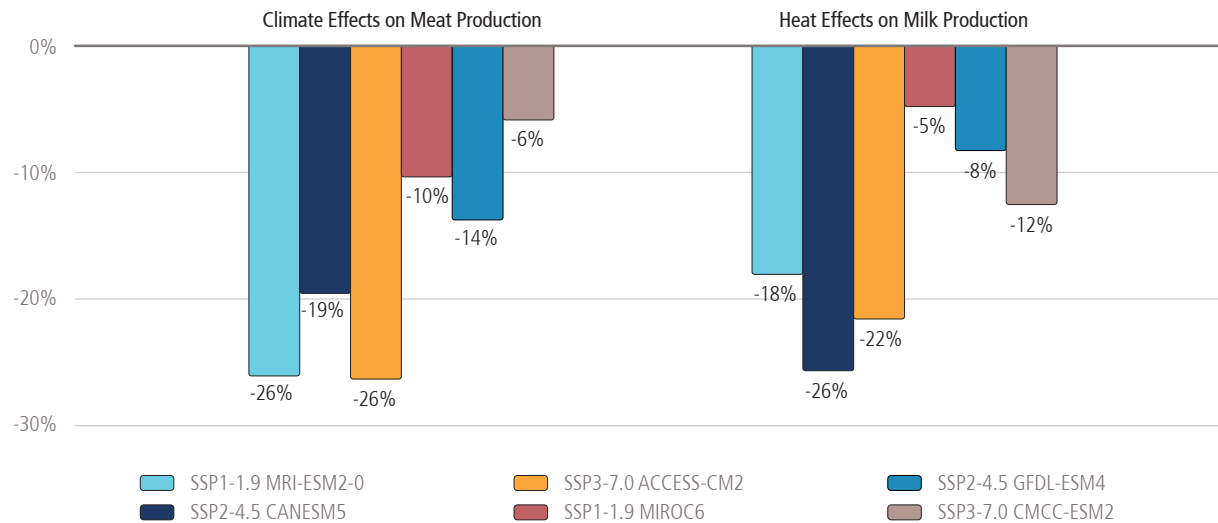
Food insecurity and hunger remain pressing challenges in Djibouti. According to data from the World Food Program, 37 percent of rural residents and 10 percent of urban residents in Djibouti were food-insecure in 2022, and nearly 54 percent of rural households had inadequate food consumption, particularly in the Ali Sabieh, Arta, and Obock regions (WFP 2022). Between 2020 and 2022, the incidence of food insecurity nationwide increased by 10 percentage points (IPC 2022), and the Global Hunger Index (2024) ranks Djibouti 93rd out of 125 countries in 2023. An estimated 35 percent of mortality among children under the age of 5 in Djibouti is directly or indirectly related to malnutrition (Nyamhunga 2020), with a mortality rate among children under 5 years of age of 54 out of every 1,000 in 2021, higher than in Kenya or Ethiopia (37 and 47 per 1,000) (World Bank WDI).

Pastoralism is an important source of rural livelihoods, with four in five rural households engaged in herding. Over 80 percent of the rural population consist of nomadic and semi-nomadic herders who manage about 1 million heads of goats and sheep as well as 50,000 heads of camels and 40,000 heads of cattle (World Bank 2011). Livestock accounts for 75 percent of Djibouti's agricultural GDP and 35 percent of its exports, and it provides more than one-third of the income of rural populations in Djibouti. It is estimated that approximately 60 percent of the rural population depend on livestock as a source of their livelihood, along with nearly one-third of all poor households (30 percent, compared to 11 percent among non-poor households). Beyond income and food, livestock represents a form of savings and insurance for a population who otherwise has little access to these services (IGAD 2015).

Crop production plays a marginal role in the economy, given harsh agroclimatic conditions, and climate change is worsening the situation. Given the unfavorable environment and strong connections to world trade, Djibouti imports 90 percent of its food (African Development Bank 2023). Food self-sufficiency is limited to 1 to 6 percent for key crops, but ranges from 51 to 80 percent for livestock products, and reaches nearly 100 percent for sheep and goat meat (FAOSTAT 2024). Crop agriculture is a marginal sector, and the cultivated area is very limited, estimated at only 0.3 percent of the country's area, with only 14 percent of the cultivated area in principle equipped for irrigation, of which one-third was actually irrigated as of 1999 (no more recent data is available from the past 25 years) (Siebert et al. 2013). The main crops are vegetables, fruits, and date palms. Given the scarcity of water in rural areas, any

expansion of crop production must consider the potential impact on water availability for domestic use and for livestock: it is estimated that an increase by half of the irrigated area would equal the entire current consumption for livestock, unless more efficient irrigation technology is used.²²

Figure 7. Impact of Heat Stress on Livestock Production (average 2041-2050)



Source: World Bank.

Climate change is expected to put livestock livelihoods under increasing pressure, leading to a projected loss of one-quarter of revenues. Animal breeding conditions are becoming more challenging as a result of climate change despite efforts to cross-breed with exotic and dairy breeds and improvements in veterinary surveillance. Difficulties arise from drought, reduced forage availability, the degradation of soils and grazing land, heat stress, and the risk of disease outbreaks (World Bank 2023c). Droughts have become more frequent. Between 1980 and 2019, there were 10 major droughts, some with severe impacts. The drought of 2008-2011 is estimated to have resulted in the loss of half of Djibouti’s livestock, decreasing, for instance, the average number of goats per herder household from 96 heads to 23 heads (République de Djibouti 2011). The expected consequences of further climate change for livestock livelihoods are significant. Under hotter temperature scenarios, losses are expected to reach nearly one quarter of revenues in the sector, while under the more favorable temperature scenarios, losses would be about one-tenth (figure 7). These losses are likely to particularly affect the rural poor given the importance of keeping livestock for their livelihoods. The losses could have more pronounced effects for vulnerable groups such as disabled household members who have few options to earn an income, and whose support depends on scarce household resources. It is also worth noting that they reflect expected average losses, and do not consider the difficulties poor rural households are likely to face in recovering from individual shocks.

Urban households rely nearly exclusively on imported food, providing insulation against local climate shocks, but increasing vulnerability to world price fluctuation. With little domestic production, Djibouti’s urban population relies largely on imported food. This insulates urban households from the effect of drought and other local climate shocks, but also means that fluctuations in world commodity prices are immediately felt. Thus, the combined effects of the COVID-19 pandemic, Russia’s invasion of Ukraine, and the conflict in neighboring Ethiopia led to notable food price increases in Djibouti. By March 2022, wheat flour and cooking

22 Estimated water use based, respectively, on irrigated surface, crop composition, and crop water needs, and herd size and water needs per head.

oil prices had risen by 15 and 22 percent respectively year-on-year. The welfare effects of increasing food prices are more pronounced for poorer households in Djibouti, given that they dedicate a large share of their consumption to food (54 percent for the poorest decile compared to 32 percent for the richest).

Social safety nets are critical to ensuring food and nutrition security in the face of food price shocks. Social safety net (SSN) programs in Djibouti are at an emerging stage. Recent efforts have laid the foundations for SSN systems anchored in a social registry, and the National Family Solidarity Program (PNSF) has some shock-adaptive capacity. However, the program has gaps in coverage and its ability to target shock responses to more vulnerable groups such as women or people with disabilities is limited.

The social safety net reaches about one-third of the poor, and the system has demonstrated an emergent capacity for scale-up in response to shocks during COVID-19 and other crises. By the end of 2023, Djibouti's cash and in-kind transfer programs reached about 33 percent of people in extreme poverty, although lack of a medium-term financing plan for SSNs implies that this modest coverage may significantly reduce in 2024. The regular transfers to beneficiaries amount to DF 10,000, equivalent to approximately 24 percent of the national extreme poverty line. Coverage of safety nets was greatly expanded as part of the government's response to COVID-19, to the food price shock induced by Russia's invasion of Ukraine, and to natural disasters like floods and drought. In response to COVID-19, The PNSF accelerated payments to 12,362 households already receiving support and launched an emergency food voucher program for 65,000 households that had not previously been receiving cash transfer assistance.

Challenges remain to enabling an effective shock response. Djibouti's social registry covers about 42 percent of the population, some 79,000 households in urban areas and 28,000 households in rural areas, for a total of 108,000 households and 449,000 individuals. It can form the basis for scale-up but remains incomplete. Early warning systems for natural disasters are in the early stages of development, but some contingency planning is being undertaken. However, despite the innovative use of digital technology for the COVID-19 response, few social safety systems use digital payments.

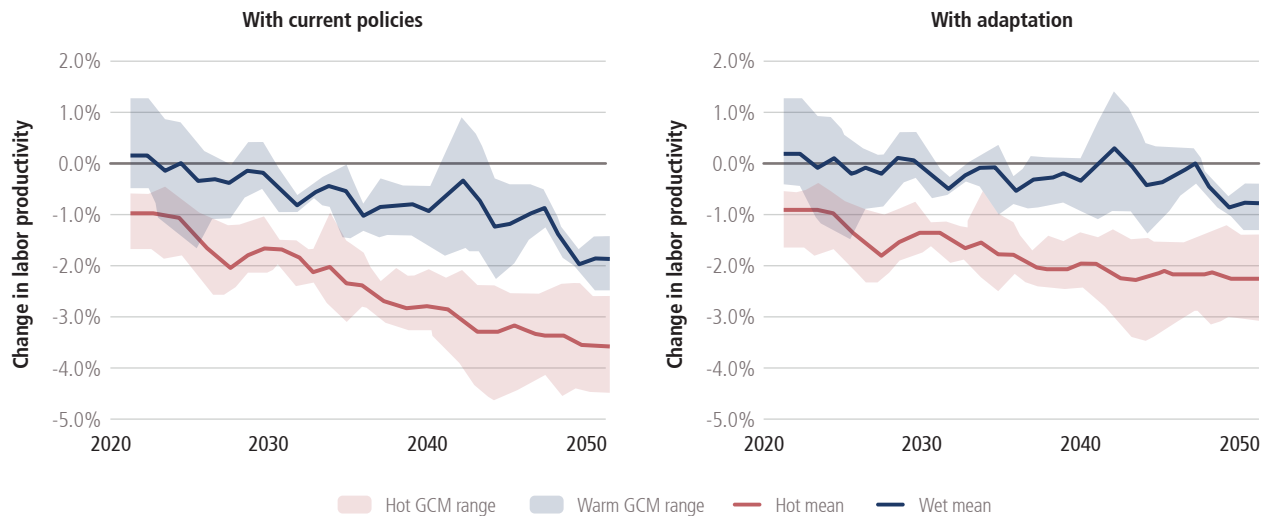
c) Heat, health, and productivity

A further increase in Djibouti's already very high temperatures will affect both productivity and quality of life, with productivity expected to decrease by up to 3.5 percent by mid-century. Temperatures in Djibouti regularly exceed thresholds at which productivity is known to be affected.²³ Productivity is conservatively estimated to decline further by 2041-2050, by some 3.5 percent under the hotter climate scenarios and 2 percent under the warm scenarios (figure 8). These estimates are based on employment shares in the 2017 Djibouti Household Survey (EDAM), which may overestimate the share of indoors employment in the services sector and should hence likely be interpreted as a lower bound on damages.²⁴ Currently, most workers have little protection against heat. Two in every three workers who are not employed in the public sector work outdoors (68 percent). Even among those who work indoors, few benefit from air conditioning: while statistics specific to workplaces are not available, only 17 percent of Djiboutian households had air conditioning units when data was last collected in 2017. Modeling suggests that investments in increasing the availability of air conditioning such as those envisioned in the NDCs may raise the share of indoor workers who benefit from cooling to 30 percent and reduce overall productivity losses to a predicted 2.3 percent under the hot scenario.

23 For instance, at 32°C, the maximum productivity for low, medium, and high levels of physical activity in outdoor work have been estimated to be 75, 63, and 52 percent respectively (ILO 2019).

24 Economic modeling projections for this CCDR discussed further in Chapter 4 show a modest shift of 3 percent of all jobs from employment in services into employment in industry, potentially further heightening heat exposure unless adaptation investments are made.

Figure 8. Labor Productivity Losses Due to Heat Relative to Baseline, 3-Year Moving Average



Source: World Bank.

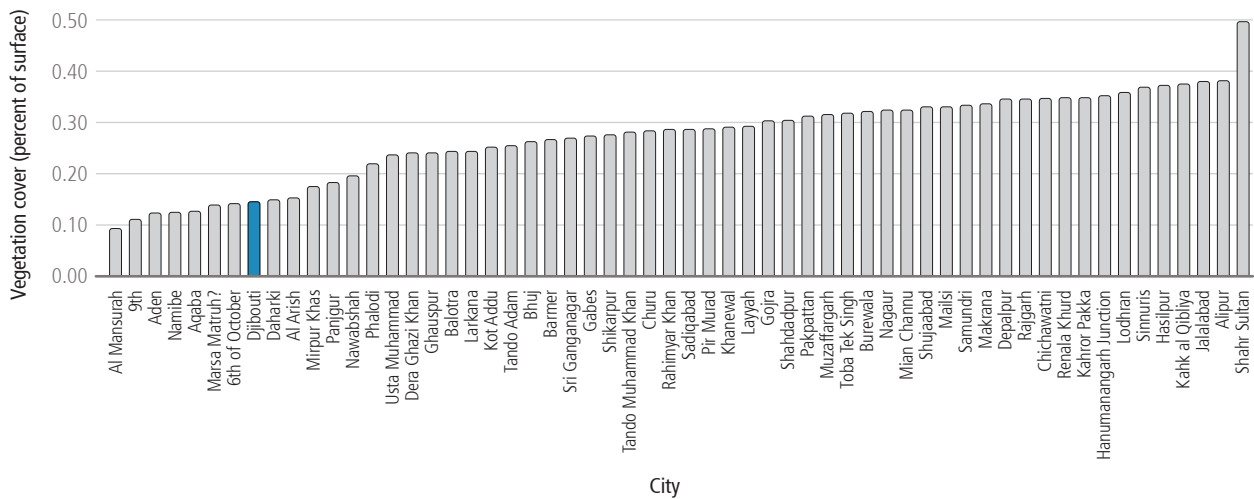
Working outdoors and low access to space cooling and electricity exposes many poor Djiboutians to debilitating heat and the resulting productivity and learning losses and health risks. Poor workers in Djibouti are more likely than wealthier individuals to engage in activities that typically are done outdoors and hence, are more exposed to heat. Activities where there is a particularly high likelihood of working outside²⁵ account for 42 percent of all jobs held by poor workers compared to 25 percent of the non-poor. In addition, very few households outside of the wealthiest quintile have access to space cooling. Among the wealthiest quintile of households, half have access to cooling (50 percent), but even among the second-wealthiest quintile, only 17 percent own an air conditioner, while only 3 percent of the poorer 60 percent own one, and virtually no poor households. Further, while about two in every three households have access to electricity (62 percent), even among those that are connected, electricity use is highly unequal, limiting potential access to cooling. There is a stark urban-rural gap, with 70 and 11 percent of households connected in urban and rural areas, respectively, according to Djibouti’s Ministry of Energy. Similarly, even among households with electricity access, the wealthiest category consumes around 737 kWh per month on average,²⁶ comparable to consumption in the United States (899 kWh) (USEIA 2022), while the 90 percent of households who are in the two lowest-income residential categories consume only 298 kWh and 159 kWh per month respectively. Children in poorer households similarly have little protection from heat when studying, with likely consequences for their learning outcomes (World Bank 2024b).

The pervasive use of sheet metal roofs contributes to vulnerability to extreme heat, and poor households tend to use building materials that provide little heat insulation. Most urban housing in Djibouti is roofed with sheet metal (81 percent; (EDAM 2017)); unless reflective materials are used, such roofs have poor thermal isolation properties, raising heat exposure. Wealthier and poorer communities in Djibouti City and Balbala use the material nearly equally. However, poorer households commonly also use other building materials that provide poor insulation, such as dirt floors (used in 72 percent of the dwellings of the poor) and makeshift wall materials other than concrete, brick, or wood (41 percent) (Bezgrebelna et al. 2021; Clientearth n.d.). Such poorly insulated structures can be several degrees warmer than their surroundings during heatwaves (Ferrara 2024; The Construtor.org n.d.).

25 Agriculture, livestock, forestry, and fishing; extractive industries; domestic services; informal trade; construction.

26 Derived from EDD power distribution master plan, 2021.

Figure 9. Vegetation Cover in Djibouti Ville and Comparator Cities

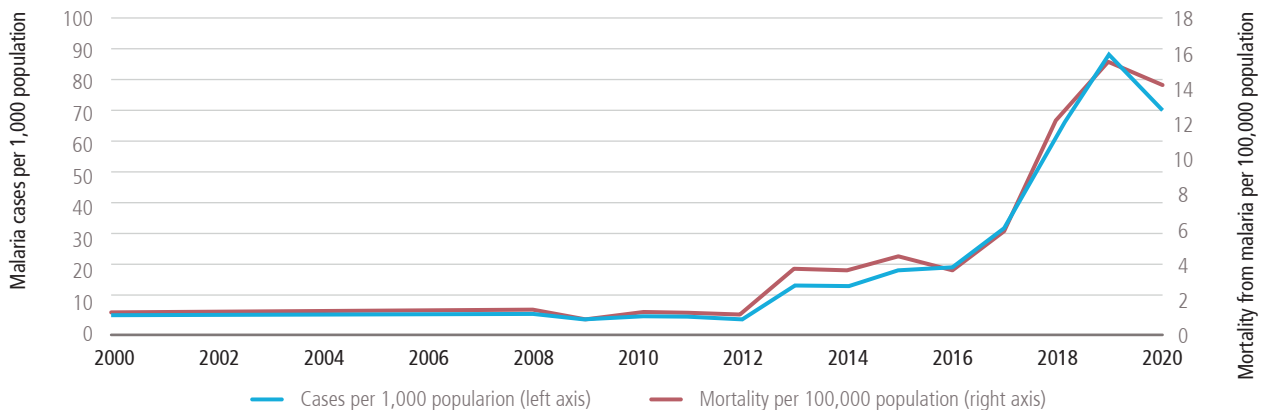


Source: World Bank (forthcoming).

Relative to comparator cities, Djibouti City has a low level of green cover and offers little access to shade. A new World Bank-commissioned urban heat diagnostic compares vegetation in Djibouti city to other urban centers that are comparable in terms of climate and wealth (figure 9). Satellite data shows 15 percent of land area being covered by vegetation, placing Djibouti City seventh-lowest among a group of 58 cities. The comparison highlights opportunities for expansion of tree and vegetation cover for shade, subject to water availability.

Climate change impacts education and training both through damage to infrastructure and through displacement and loss of assets. Floods are damaging to school infrastructure, causing schools to close for days or weeks. This affects the continuity of education, with particularly serious consequences in poorer regions where reconstruction takes longer. For example, Cyclone Sagar damaged 14 out of 46 primary schools and five out of 14 secondary schools in Djibouti city, causing an estimated US\$1.5 million in damages (World Bank 2018). Drought and flood have in the past also led to internal displacement, particularly in rural areas, forcing children to drop out of school. Disasters can also force families to give priority to generating income to compensate for financial losses, preventing youth, and especially girls, from attending school.

Figure 10. Malaria Incidence and Mortality

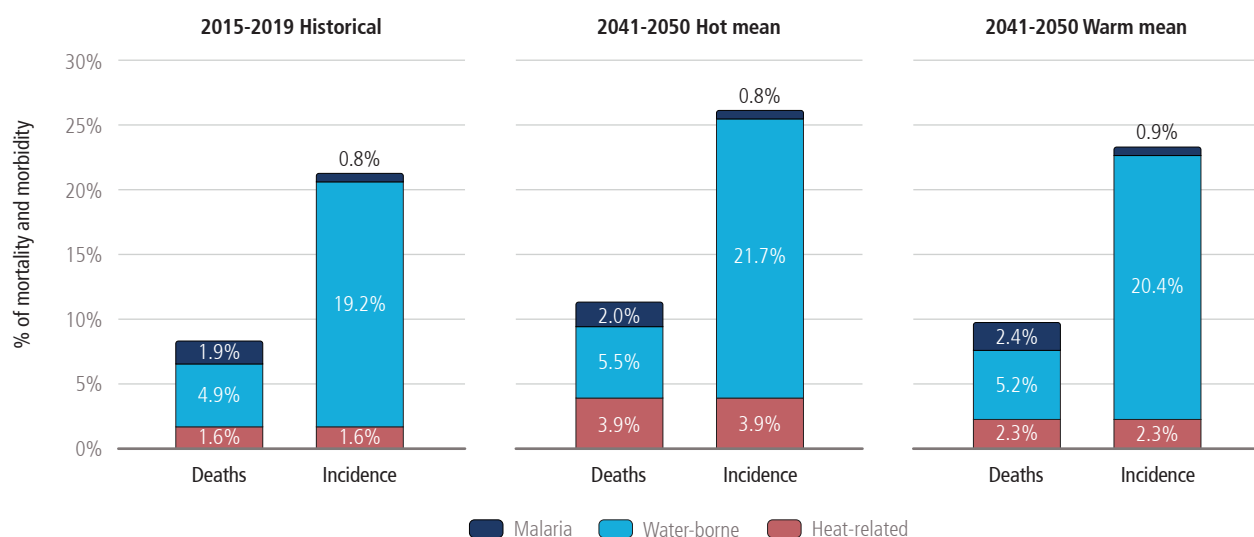


Source: World Bank, based on data from WHO (2022).

Among climate-sensitive diseases, malaria incidence has risen explosively, with a 37-fold rise in rise in cases over two decades, while mortality from heat-related and water-borne disease has declined. Climate change is known to increase the incidence of vector-borne diseases such as malaria and dengue, heat-related diseases, and waterborne infectious diseases. By far the most dramatic change has taken place in malaria incidence. The World Health Organization (WHO) reports that the arrival of the disease vector *Anopheles stephensi* in the Horn of Africa “is thought to have driven the resurgence of malaria in Djibouti City” (WHO 2022b; Seyfarth et al 2019; Faulde et al. 2014). In the decade before the vector was detected in Djibouti in 2012, an average of about 2,000 malaria cases per year was recorded, versus 26,000 cases recorded annually in the subsequent decade (figure 10). The WHO argues that the “highly efficient and adaptable malaria vector” is of particular concern since it “can thrive in urban environments” and “survives extremely high temperatures during the dry season, when malaria transmission usually reaches a seasonal low,” and because of its resistance to common pesticides (WHO 2022b). Between 2020 and 2022, Djibouti recorded an average of 69 cases per 1,000 population, similar to the levels in Kenya (65) and Sudan (73), and far above the mean in the MENA region (5), though well below the mean in Sub-Saharan Africa (221). A yearly average of 108 deaths was recorded in the same years.

Heat-related deaths may more than double under climate change, while the elevated burden of disease from malaria is expected to continue. Modeling predicts a large increase in morbidity and mortality from heat-related illness, mainly cardiovascular events (figure 11). Under the hot climate scenario, the incidence of such illness is predicted to more than double, while under the warm scenario, incidence is expected to rise by 41 percent. Malaria incidence is likely to remain roughly stable at the current elevated levels, with a slight rise in mortality. Both morbidity and mortality from water-borne diseases are projected to increase slightly. By mid-century, these changes in disease prevalence are predicted to entail a loss of labor supply of around 1 percent and one half of a percent, respectively, under the hot and warm scenarios. The change is driven to about an equal degree by a large relative increase in less-common heat-related health problems and a small relative increase in the common water-borne diseases. While little additional burden of disease is expected from malaria, the projection implies that the burden of disease due to the recent rapid spread of malaria will continue to be felt.

Figure 11. Disease Mortality and Morbidity for Historical Baseline and for 2041-2050, under Different Climate Futures



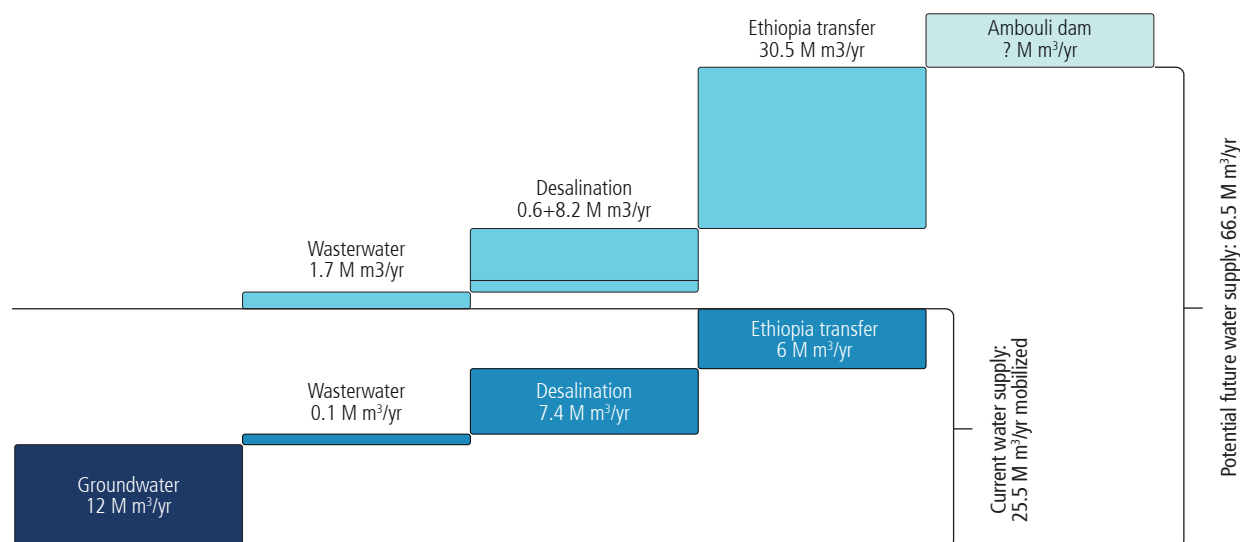
Source: World Bank.

2. Safeguarding livability – Policy options

To ensure livability, Djibouti needs to bring its investments in water security to fruition, leverage trade, social protection, and rural income growth for food security, and enhance access to cooling and health care. Great strides have been made in developing new water sources, and investment can now focus on avoiding losses and the full use and maintenance of available capacity. While the arid climate limits growth in food production, Djibouti can ensure food security by raising rural incomes, growing the shock-responsiveness of the safety net, and reforming food provisioning. Energy price reform can help spread access to space cooling and combine with passive cooling approaches to provide protection from heat.

Djibouti can achieve urban water security through its existing and planned investments in new water sources but must ensure that this capacity is fully used, and that water loss is reduced. In addition to the significant capacity established through desalination and the pipeline connection with Ethiopia, Djibouti has secured a US\$88 million investment to double the production capacity of the Doraleh desalination plant to 16.6 million m³ per year and power the plant with a 12 MW photovoltaic solar plant, and to expand three wastewater treatment plants for a total capacity of 1.7 million m³/yr.²⁷ With these additional investments, Djibouti will have sufficient capacity to satisfy urban demand and to retain some redundant capacity for resilience against shocks (figure 12), if new water capacity is fully used and if water loss in the network is reduced.

Figure 12. Estimated Current and Future Water Supply Mobilized for Urban Consumption



Source: World Bank.

With current losses from leakages being as high as 44 percent, improving the network's performance can yield very large benefits. This is even more important as water is produced from more costly non-conventional sources. Reducing non-revenue water from currently 44 percent to 33 percent would correspond to saving 4 million m³ per year, equivalent to the domestic water needs of 137,000 people in urban space. ONEAD is currently working to improve its performance and reduce losses with \$15 million in donor support. In addition, the NDC argues that an investment of US\$65 million is needed to refurbish the municipal water network. This is a high priority to ensure water security, more effectively use limited public resources, and build ONEAD's capacity to raise funds in the private commercial market or enter into public-private partnerships.

²⁷ According to the NDC, there is also a plan to build a small 0.06 million m³ per year desalination plant in Goubet at a cost of US\$0.8 million.

Investments in water harvesting and groundwater management are needed to sustain an acceptable level of rural drought resilience. Rural areas draw upon already limited renewable water resources. Making better use of existing resources to manage droughts must be a key water security goal. The government has demonstrated interest in rainwater harvesting in rural areas, and a US\$20 million project has been included in the NDC to this end. Given extreme aridity, it may be more fruitful to use retaining walls or small dams to prevent rainwater from escaping to the sea than to tap subterranean water sources. In Somalia, technologies for harvesting water in wadis have been widely adopted with some success in addition to water retention structures like berkads or balleys when water harvesting is not possible.²⁸ Better planning of water management has a key role to play: some areas in Djibouti without permanent access to water are retaining their pasture levels better than those with stable, human-made water resources, suggesting that, in addition to climate change, poor planning may be a cause of scarcity. Notably, consulting with nomadic users of the water points could be helpful in improving the spacing of water resources along traditional transhumance routes, avoiding a clustering of wells and boreholes. It will also be necessary to rehabilitate and upgrade borehole headworks, regulate potentially polluting activities in aquifer recharge areas, and disseminate information on increase knowledge about groundwater.

Although there are limited opportunities to grow crops in Djibouti, food security can be enhanced by investing in agriculture, social protection, and fiscal management. Given its agroclimatic conditions, Djibouti may need to emphasize quality of agricultural production in terms of revenue for those active in the sector, rather than purely quantity. However, it can ensure climate-resilient food security through a mix of agricultural, social protection, and fiscal policies that aim to increase the resilience of livestock livelihoods, raise rural incomes, increase the shock-responsiveness of the social safety net, and reform the food provisioning system to buffer price shocks.

Water security is key to the resilience of livestock livelihoods, while targeted investments in agriculture can help increase the purchasing power of rural households and increase their food security. With drought and livestock loss threatening rural livelihoods, investments in water security are pivotal in protecting rural incomes. In addition, while domestic food production alone cannot satisfy all needs, investing in competitive food value chains such as fruit, vegetables, and dairy could raise the purchasing power of rural communities and raise their resilience against shocks. Djibouti's current investments in the sector follow an integrated strategy of supporting family farming as well as working with producers, producer organizations, and SMEs in commercial agriculture seize growth opportunities, particularly related to market access through the port and to demand from the military bases (Republic of Djibouti 2020). Technology such as water-saving production methods and greenhouses as well as mobile phone-based information provision can contribute. Trade in livestock and livestock products could also expand, but producers need training and better organization to achieve the economies of scale.

With imports certain to remain a key part of food supply, a responsive social safety net and good management of provisioning systems can help to protect the population from food price shocks. Imports will remain the main source of food for Djibouti, even if effective investments are made in livestock, fisheries, and agriculture. Hence, managing both global and regional price shocks is key to ensuring food security—as demonstrated by COVID-19, the Russia's invasion of Ukraine, and the Tigray conflict. The social safety net is pivotal in this effort; its capacity to react to crises could be bolstered by implementing digital payments as foreseen in the national contingency plan and by the planned expansion of the social registry to comprehensively cover shock-exposed households. In addition, reliable funding mechanisms need to be found to finance the scale-up of shock-responses when needed. A stronger safety net can also help households diversify activities and raise incomes, and hence, contribute indirectly to their food security. Furthermore, the government should continue efforts to develop an efficient public-private model for maintaining food stocks, while stronger cold-chain infrastructure and greater warehouse capacity would enable better management of both imported and locally produced food, reducing post-harvest losses and enhancing overall food security.

28 For instance, under the World Bank-supported Biyoole and Barwaaqo projects.

Expanding access to space cooling will require lower energy prices combined with more efficient cooling technology, more widespread thermal insulation of buildings, and more green spaces. Reforms can translate the reduced cost of energy production into lower consumer prices to enable more households to afford space cooling (explored further in section 3.C). In addition, there is the potential to significantly reduce demand for power by taking advantage of passive and efficient cooling technologies such as evaporative coolers. Also, better thermal insulation practices in construction could reduce the amount that customers have to spend on energy, while creating green spaces can play a role in reducing urban heat islands. Shade, wind, and urban design are important strategies for reducing outdoor heat stress. Modelling results suggest that a combination of such measures could improve comfort levels in Djibouti city in outdoor spaces such as streets and plazas (World Bank *forthcoming*).

In both health services and education, additional investment will be needed to improve service in a changing climate. Following substantial investments, access to health care has increased in recent years, with the number of medical professionals having doubled between 2008 and 2017. However, the density of health services in Djibouti remains well below that of other countries in the MENA region, and access remains limited in rural areas. Priorities include continued investment in the hiring of medical personnel, especially in rural areas, in strengthening the resilience of health infrastructure to extreme weather events, and in building the capacity of laboratories and professionals to track the spread of malaria and enable targeted interventions to combat it. To maintain access to education, disaster-resilience of schools will need to be improved; distance learning and digital platforms can also help achieve continuity of learning and could be explored as digital infrastructure and internet access in more remote or vulnerable areas expands.

C. Advancing diversification and job creation

Effective climate investments should be oriented towards supporting Djibouti's goal of diversifying its urban services economy and increasing access to productive jobs. Political and macroeconomic stability have enabled important infrastructure investments that have generated robust annual growth of 2.9 percent in per capita GDP over the past two decades. However, port fees, transport activity, and revenue from military bases account for a disproportionate share of the national income, which is geographically concentrated in the city of Djibouti. The public and SOE sectors serve as a conduit to invest some of this revenue and provide some good jobs, accounting for nearly half of all employment (47 percent) (INSTAD 2022). Still, there are not enough such opportunities to keep pace with the need for jobs, they are limited to service sectors, and the large size of the public sector creates a difficult business environment. Inequality in Djibouti is the highest in the MENA region, with a household expenditure Gini index of 0.42. There is a dearth of opportunity and high poverty among rural residents, with 63 percent of rural households living in extreme poverty (World Bank 2019). Although poverty rates are 15 percent in urban areas, 55 percent of extremely poor households live in cities. As a result, the urban labor market is starkly segmented, and this has been further exacerbated by rapid urbanization. The government therefore considers it a key priority to diversify the economy and expand opportunities.

1. Diversifying an urban services economy – Climate challenges and green growth opportunities

a) Urban flooding

Because Djibouti City is the center of population and economic activity in the country, its resilience must be at the heart of the government's growth and diversification efforts. Djibouti is nearly a city state, with an estimated 776,966 people, or nearly three quarters of the population, concentrated in the capital city (73 percent) (World Bank 2019). While figures from the new population census are not yet available, the previous census estimated that an additional 10 percent of the population lived in secondary cities. The

national urban development strategy aims to balance out spatial wealth inequalities by developing secondary cities, improving the road network connecting them to the capital, and decentralizing some government functions (Republic of Djibouti 2012). Still, the capital is critical to diversification efforts given that it provides the greatest value-added in the country and concentrates logistics, well-trained workers, and purchasing power, hence providing the potential for opening up new sectors for investment and jobs. However, this potential is being threatened by flooding, poor public transport, and poor urban planning that is leading to the recurrent growth of slums. Climate change risks accentuating all of these challenges.

Djibouti City is vulnerable to pluvial and riverine flooding, and past inundations have caused losses of up to US\$43 million in a single event, or an estimated US\$ 10 million annually on average. The flat topography of the old town neighborhoods of the Presqu'île further accentuates flood risk. Flooding often follows tropical cyclones and affects not only residential and commercial buildings but also transport and the water and sanitation and power infrastructure, as well as markets, schools, and other critical public infrastructure. Losses and damages have been significant. Following the floods of 2019, a Rapid Damage and Needs Assessment (RDNA) (Republic of Djibouti, United Nations, and World Bank 2020) estimated that 20,000 buildings had been affected, with estimated total damages and losses of US\$47 million. Analytical work by the AFD suggests that floods of the magnitude of the 2018 and 2019 events may reoccur approximately every 5 and 10 years under historical climate conditions and often affect between 100,000 and 200,000 residents (table 6). In line with such losses, modeling for the CCDR estimates annual damages and losses of US\$10 million on average during the reference period.

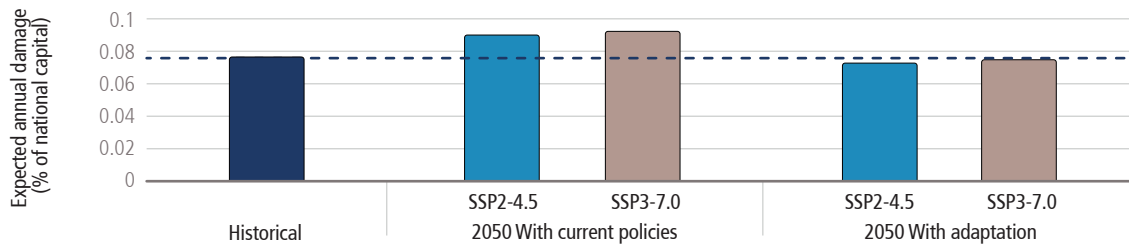
Table 6. Damages in Past Urban Floods in Djibouti City

Dates	Precipitation (mm)	Casualties	Persons affected	Economic damages
6-10 April 1989	507 (3 days)	n/k	150,000	
22 November 1994	360 (2 days)	105 (and 40 unaccounted for)	100,000	
11-14 April 2004	93	300	100,000	
25 March 2013	26	8	n/k	
19-21 May 2018	110	2	5,000-10,000	\$9.1m damages and \$4.5m losses
21-25 November 2019	155	11	200,000	\$43m damages and \$4m losses
20-21 April 2020	80	800	110,000	

Source: World Bank, based on Agence Djiboutienne des Routes (ADR) (2022) and Agence Française de Développement (AFD) (2021).

While there is substantial uncertainty in estimates, climate change is expected to somewhat accentuate the already high damages due to pluvial and fluvial floods. Since there is much uncertainty over precipitation predictions, it is difficult to assess with confidence the impact that climate change might have on urban flooding. Modeling suggests a modest increase in the already considerable damage experienced (figure 13). Expected annual losses may increase by about 21 percent, or up to US\$2 million, while losses from severe 100-year events are also expected to rise by slightly less than 10 percent, or about US\$27 million.

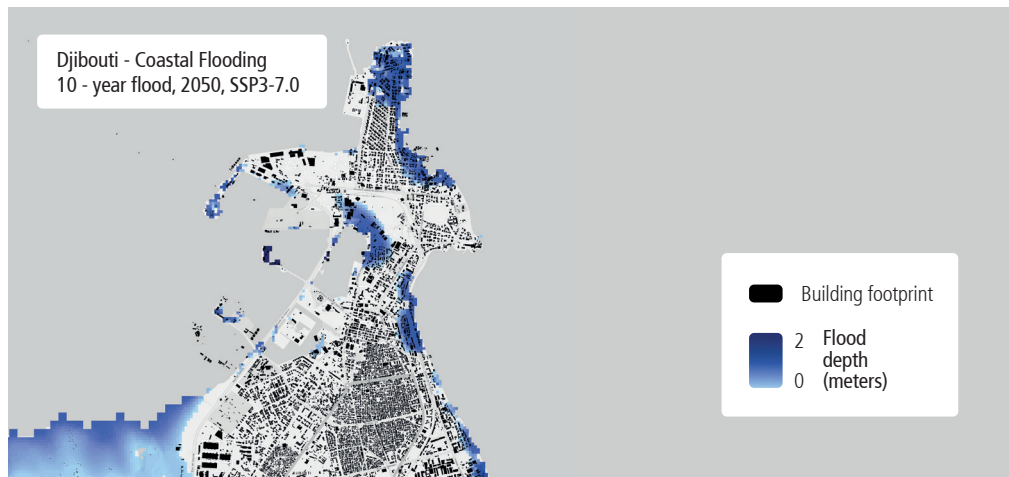
Figure 13. Expected Annual Capital Loss from Urban Flooding



Source: World Bank.

Sea level rise exacerbates flood risk, with annual expected damage of US\$38 million by mid-century. Climate models predict a modest sea level rise of about 20 centimeters (cm) by mid-century and between 40 and 80 cm by the end of the century. There is substantial uncertainty over these predictions, and the 80 percent confidence interval of predictions extends to 50 cm by 2050 and to over 1.6 meters by the end of the century under the hot scenario. Djibouti City’s low-lying topography exposes substantial areas of the city to flooding from storm surges (figure 14); modeling suggests that current average damages amount to 0.2 percent of total capital per year, with climate change expected to cause the additional loss of about 0.3 percent of capital by 2050, or about US\$38 million per year. In a less favorable scenario (the 80th percentile of model runs), flood damages could reach US\$58 million per year. These estimates are likely to be conservative: while there is very little tidal gauge data available to complement globally available data, one available data point suggests storm surge heights exceeding 3 meters (m), compared to 1.6 m suggested by global data (AFD 2021).

Figure 14. Inundation Depth from Storm Surges Following Sea-Level Rise



Source: World Bank.

Some flood risk is caused by poor urban planning. A government analysis carried out after the 2019 floods showed that some construction projects interfered with the drainage of flood waters, including the TOUCH ROAD project and the *Centre Commercial d'Enguela* in the Presqu’île (Republic of Djibouti 2019). The elevated railway track from the Doraleh port as well as some urban growth near the coast have also slowed the outflow of floodwaters. In the extension areas of Balbala Sud, poor urban planning led to flooding in the Nassib neighborhood in 2019. In addition, a lack of affordable housing in residential zones results in dwellings being constructed in the beds of the wadis and other areas that are designated as flood risk zones. For instance, after the 2019 floods, the 160 households who lived in the bed of the Langobaleh wadi suffered severe destruction (figure 15).

Figure 15. Example of Informal Construction in the Bed of the Langobaleh Wadi, Djibouti City



Source : Adapted from Agence de Réhabilitation Urbaine et du Logement Social (2024).

Insufficient drainage infrastructure is the key risk factor for flooding in the Presqu'île neighborhoods.

An analysis of the drainage system in the low-lying Presqu'île neighborhoods has shown that flooding is substantially driven by a lack of density and capacity in the drainage network and an absence of drainage from basins where water collects. In 2018, it was estimated that about €84 million (about US\$90 million) would be needed to create sufficient drainage capacity (Republic of Djibouti, Ministry of Agriculture, Water, Fisheries, and Livestock 2018).²⁹ The government has prioritized a US\$3 million investment for areas where stagnant water collects. The World Bank is currently funding a comprehensive assessment of the drainage network and flood management to inform further action.

Secondary cities are also exposed to significant flood risk, often exacerbated by insufficient drainage infrastructure and poor maintenance.

For instance, Obock experienced inundations in 1989, 2011, and 2021, while Tadjoura is exposed to flood risk due to its flat topography and location at the mouth of large wadis. Mapping shows that the share of population exposed to flood risk in the Arta region is nearly as high as the share in Djibouti City, while the risk faced by residents in the Dikhil and Tadjourah regions is estimated to be a bit higher than one-third of the exposure level in Djibouti City. A 2023 urban planning study of the largest secondary cities suggests that construction in high-risk areas needs to be avoided and that better drainage along secondary and tertiary roads is important in preventing flooding (Direction de l'Aménagement du Territoire, de l'Habitat et de l'Urbanisme 2022).

The improvement of slum housing would not only contribute to flood control but would also support both the productivity and well-being of the residents.

The housing used by poor Djiboutians usually consists of temporary structures or is built with simple materials and provides little protection against extreme weather events. As of 2017, about half of all poor households in Djibouti reported that they lived in temporary structures such as tents, tukuls, or kaolos (53 percent, compared to 5 percent among the non-poor), and most used dirt floors (72 percent, compared to 25 percent). Even in Djibouti City, more than 60 percent of housing is considered precarious, and more than 20 percent of the residents live in slums (Republic of Djibouti 2012), contributing to their vulnerability to shocks. Since the unaffordability of land for housing partially causes the poor state of housing, efforts to promote access to alternative housing such as the government's 'Zéro Bidonvilles' (or 'no slums') program can improve resilience to flooding and facilitate better access to services and opportunity.

As Djibouti City has grown, the limited availability of urban transport has become a challenge that impacts spatial inequality and is expected to be worsened by climate change.

In 2020, the World Bank observed that half of city inhabitants relied on walking, 20 percent relied on shared transport, while only 3 percent

²⁹ Investment needs in the Balbala communities are estimated to be €105 million.

owned a car, and fewer than 1 percent owned a bike or a motorcycle. About 12 percent reported that they used shared transport organized by their employers, while the rest of shared transport is entirely organized by the private sector.

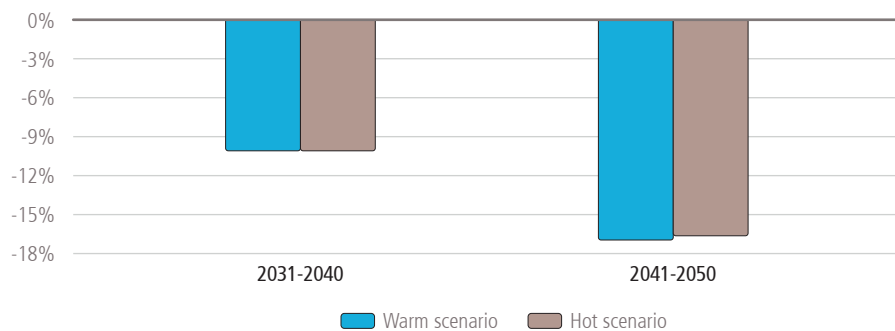
b) Risks in sectors identified by the government as priorities for diversification

Climate change poses significant risks to sectors identified by the government as having potential for diversification. As part of its “Vision 2035”, Djibouti is focusing on diversifying its economy beyond its ports. Key sectors for diversification include tourism, fisheries, as well as information technology and communication. The significant impacts of climate change on other designated priority sectors—transport and energy—are discussed in sections A.1 and C.3 of this chapter.

The fisheries sector in Djibouti has substantial growth potential, though it currently contributes only about 1 percent of the country’s GDP and 1 to 2 percent of employment. Currently, the fisheries sector remains small and underdeveloped, employing around 750 fishermen and women and providing approximately 3,000 direct and indirect jobs throughout the fisheries value chains (Ministry of Agriculture 2017; EDAM 2017). The fishing fleet is dominated by small-scale artisanal operations that collectively produce around 3,000 metric tons annually (Republic of Djibouti Fisheries Directorate 2022). Historically, the catch has included key commercial fish such as king fish, tuna, sea bream, trevally, barracuda, and groupers. Fish consumption in Djibouti, estimated to be 1.5 kg per person per year is extremely low compared with other African countries and much lower than the world’s average of 20.5 kg per year per capita (Republic of Djibouti Fisheries Directorate 2022). However, a recent fisheries performance assessment noted substantial potential for growth in both the domestic and export markets.

Modeling suggests that climate change may lead to a loss of about one-sixth of the potential revenue from fisheries. Climate change reduces the growth potential of fisheries, though important opportunities remain. Under both the warm and hot scenarios, it is estimated that the value of the potential sustainable catch is set to decline by about one-sixth by mid-century (16 to 17 percent; figure 16). These estimates do not consider the increasing difficulty for those working in the fisheries sector that will arise from more frequent and severe heatwaves.

Figure 16. Expected Losses to Potential Fisheries Catch Relative to Baseline



Source: World Bank.

Tourism is sensitive to extreme heat as well as flooding and could add to the strain on water resources and consume substantial amounts of electricity. Leveraging its extraordinary yet untapped natural assets, Djibouti hopes to attract up to 500,000 tourists annually by 2030, up from 167,000 in 2021 according to the UN World Tourism Organization.³⁰ The tourism business is at risk from heat, which may render Djibouti less attractive as a

30 See: <https://www.unwto.org/tourism-statistics/tourism-statistics-database>

destination for parts of the year, while coastal tourism infrastructure is vulnerable to flooding. Conversely, while growth in the sector has the potential of creating good jobs, its environmental footprint must be considered. For example, in Egypt, tourism-related water consumption has been estimated at 717 liters per person per night, a multiple of the estimated approximately 22 liters per day available to residents of Djibouti City (Becken 2014).

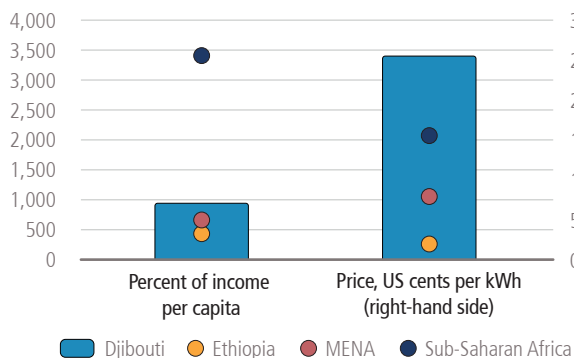
Extreme weather events pose risks to the mobile network as well as underground cables and landing stations for undersea cables, datacenters, and other infrastructure. The mobile access network is the most critical segment of the network to which most mobile users are exposed. Floods can damage the foundations of cellular mobile base transceiver stations and microwave links and disrupt mobile communication networks. In addition to creating disruptions, this can also prevent the coordination of emergency responses. Furthermore, floods pose substantial risk to landing stations of submarine cables and to data centers (classified as ‘high’ in the World Bank’s assessment tool for climate risks to ICT infrastructure) as well as to underground cables (medium) (Sandhu and Raya 2019; Dawson et al. 2018).

c) Energy

Energy is the critical enabler for diversification, and there is a need to lower consumer tariffs, increase energy access, and invest in the climate resilience of the power sector and in greater clean power generation. Energy prices are a key constraint on the growth of the Djiboutian economy, and better access to cheaper power is required for diversification and the creation of better job opportunities. Djibouti has made much progress in enhancing access to green electricity. However, much more remains to be done to ensure the effectiveness of the power infrastructure and to maximize its resilience to climate impacts. There are also attractive options to further expand clean power generation.

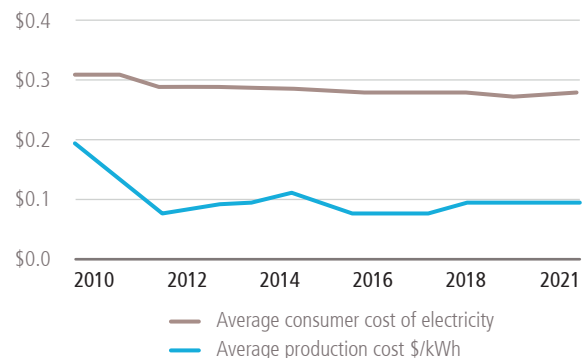
Although introduction of affordable hydropower imports from Ethiopia has lowered the average cost of power generation, end-users in Djibouti continue to pay high electricity tariffs. With an estimated average selling price of US\$0.28 per kWh across all customer categories, Djibouti has the highest electricity tariff in the MENA region and one of the highest in Sub-Saharan Africa (figure 17) (World Bank 2024a). This includes high tariffs for businesses in commerce and industry, which generate 71 percent of the Électricité de Djibouti’s (EDD’s) income, but also slow private sector growth. Some of the high cost of electricity is attributable to high maintenance cost in the aging domestic power generation infrastructure, high administrative and staffing costs, and the utility’s investments in the power transmission and distribution infrastructure. However, while the cost of power generation has fallen steeply since the interconnection with Ethiopia, consumer prices have remained almost constant (figure 18). Rising operating costs are therefore unlikely to account for all of the markup.

Figure 17. Electricity Tariff Comparison with MENA and Peers



Source: World Bank 2024a, based on IMF data.

Figure 18. Power Supply Cost Reduction and its Implication for End-Users

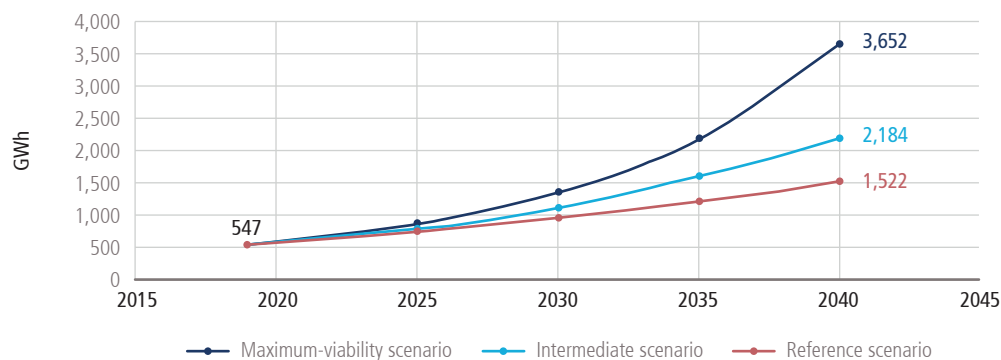


Source: World Bank 2024a, based on EDD data.

The World Bank’s Country Economic Memorandum (2024a) for Djibouti (CEM) shows that lower consumer cost of electricity could give a decisive impetus to private sector growth and diversify the economy beyond the ports. Combined with reforms in telecommunication, a gradual annual reduction of 15 percent in the average electricity price to align electricity tariffs more closely with regional averages could catalyze economic growth by 39 percent by 2030 and facilitate an increase of 7 percent in employment, equivalent to 22,822 workers. A price reduction could be made financially viable by increasing bill collection rates (which currently stand at only 38 percent, compared to an average of 85 percent in the MENA region and 98 percent in Africa) and by reducing other operational inefficiencies.

Djibouti’s government modeling of power demand in the economy projects a three-fold rise in power consumption by 2040, or up to a seven-fold rise in more optimistic scenarios. Djibouti faces a fast-growing energy demand for city infrastructure. In partnership with the IEA, the government has recently prepared a demand forecast and capacity projections to 2040. In the analysis’s reference scenario, consumption rises steadily from 547 to 1,522 GWh per year, continuing a 70 percent increase in EDD’s urban subscriber base between 2010 and 2021. In the more optimistic maximum viability scenario, demand is estimated to rise as high as 3,652 GWh per year (figure 19). These figures highlight the wide range of possible outcomes and underscore the challenges Djibouti faces in crafting the right strategy for its power sector.

Figure 19. Power Demand Estimates



Source: Djibouti Ministry of Energy.

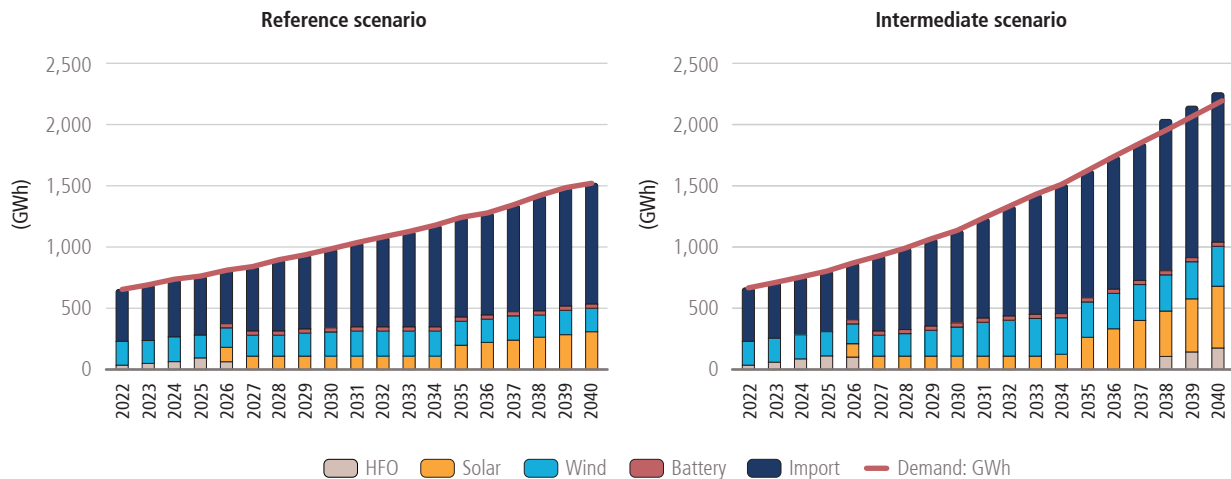
To align with Vision 2035’s objectives, Djibouti is diversifying its electricity mix, which currently relies heavily on hydropower imports from Ethiopia. Hydropower imports from Ethiopia account for more than 80 percent of the supply. The energy mix is therefore low in emissions. The Marabout and Boulaos thermal power plants have a combined installed capacity of 120 MW, of which only 60 MW are effectively available due to aging infrastructure. The country recently inaugurated its first major public-private investment in renewable energy, a wind farm in the Ghoubet region with 60 MW installed capacity. A power purchase agreement has been signed for a planned 25 MW solar farm with an independent producer, now to be extended to an additional 25 MW in solar power capacity.

The World Bank’s recent power supply scenarios, based on the Ministry of Energy’s demand modelling, show a further rapid shift from non-renewable to renewable sources from 2026. Scenarios foresee an increase in hydro imports and solar capacity, although back-up capacity would remain in place and indeed expand with the construction of a 100 MW heavy fuel-based power plant financed by the Kuwaiti Fund.³¹ The country’s installed wind power capacity would slowly expand, while solar photovoltaic and battery storage

31 To align with the Ministry of Energy’s demand projections to 2040, the World Bank’s Electricity Planning Model of energy generation capacity uses the same timeline.

capacity are expected to be added by 2026 and expected to grow over time (figure 20). Furthermore, the country is developing its Least Cost Generation Plan for the sector that would inform the best use of local renewable energy sources (including geothermal and other potential sources) for the most cost-effective measures to meet its projected growing demand.

Figure 20. Power Generation Projections by Source



Source: World Bank Electricity Planning Model.

Djibouti’s low power sector emissions are projected to decline further. Imports of Ethiopian hydropower along with the inauguration of the Ghoubet wind farm have lowered energy sector emissions to 120 kilotons (kt) of CO₂e in 2023, down from 500 in 2013, despite a 40 percent rise in energy consumption according to Climatewatch (2022). Additional reductions in transport and the urban sector emissions are planned in order to meet the NDC’s unconditional target of a 40 percent reduction below to the reference scenario by 2030. Further efforts conditional on international financial support would target a cut of 60 percent in emissions through the diversification and expansion of renewable energy, efficiency measures in construction and the building sector and electrical transport.

Some of Djibouti’s off-grid generation is from fossil fuels, with capacity at least equivalent to one-seventh of the national installed capacity. Neither the government’s nor the World Bank’s power sector modelling accounts for the significant portion of installed capacity that is off the grid. These installations are crucial to military bases and industrial facilities, such as the 30 MW used to operate the American base (with additional unknown capacity at other bases), 5.6 MW for the Kempinski hotel, and 18 MW for Doraleh port. While generation at foreign military bases should not be counted toward GHG emissions, some of the other installations contribute significantly to Djibouti’s emissions. The port is planning to switch to solar power, while efforts to enhance service quality and affordability of EDD’s service may further incentivize off-grid users to connect to the central grid, potentially reducing the remaining sector emissions. An additional environmental and health concern in Djibouti is the widespread use of kerosene for cooking. It could be mitigated through promoting cleaner cooking solutions, through increased availability of electricity for domestic use, and potentially, the introduction of more efficient, less polluting cooking technologies in rural areas.

Power transmission infrastructure is an essential component of reaching universal energy access and reducing the cost of power generation, but the existing infrastructure is under strain. The country’s transmission infrastructure includes a 230 KV double circuit system connecting Djibouti to Ethiopia and a 33 KV line connecting Djibouti City to Ali-Sabieh and Dikhil. Despite improvements, the distribution grid

has been strained by the rapid increase in electricity demand, leading to reduced service quality, shortcuts, and shortening its operational lifespan. For instance, of the existing substations, 40 percent exceed an 80 percent load rate and 23 percent a load rate of 100 percent, while 83 percent have a high utilization factor. The power sector also suffers from significant transmission and distribution losses, estimated at around 17 percent. Upgrades to and expansion of the distribution infrastructure is therefore critical to improving service quality, reducing losses, and integrating renewable energy sources.

High temperatures and floods pose threats to the efficiency of power generation and the durability of transmission and distribution infrastructure. A World Bank-financed assessment of the power sector's resilience to climate change is underway. It is known that persistent high temperatures affect the efficiency and reliability of the power transmission and distribution infrastructure and increase electrical resistance in transmission lines, resulting in higher line losses and reduced efficiency. This is particularly problematic since the hottest months coincide with the highest energy demand for space cooling. Furthermore, excessive heat accelerates the aging of infrastructure components like transformers and cables, increasing the risk of overheating, failures, and outages, compromising the stability of the power grid, and necessitating more frequent maintenance. Floods often lead to significant disruptions in electricity supply. Many substations are constructed at ground level in areas prone to flooding, and experience power outages and may need to be repaired causing prolonged service interruptions. EDD has also found that erosion and sedimentation associated with floods is weakening the foundations of transmission and distribution poles and other structural components.

2. Diversifying an urban services economy – Policy options

The construction of the Friendship Dam and other investments have helped to lower flood risks, but floods still frequently cause significant damage. After the 2004 floods, investments were made in both the construction of the Friendship Dam upstream of Djibouti City and in the management of the Ambouli wadi. Completed in 2018, the dam has a volume of 14 million m³ and can store about half of the runoff in the Ambouli wadi (AFD 2021), which has helped to reduce flood risk. In addition, an early warning system has been installed in the wadi. In Tadjoura, a key investment has been the construction of a 2 km dike to protect neighborhoods at risk of inundation.

Investments are needed in drainage infrastructure in the Presqu'île neighborhoods to address flooding, while zoning decisions must consider risks resulting from sea level rise. Detailed studies have been carried out to identify infrastructure investments that could provide effective protection against flooding in the low-lying areas of the Presqu'île. Because of the concentration of economic activity in these areas, such investments are particularly important to prevent economic losses. It is noteworthy that the estimated EUR84 million of investments needed in the Presqu'île area is less than twice the cost of damages from recent significant flood events or about eight years' worth of current average flood damage. While drainage will also help prevent some risks arising from sea level rise, zoning plans will need to be reviewed to avoid exposure that cannot be effectively addressed through protective infrastructure.

Enforcement of zoning in the Balbala neighborhoods can prevent the emergence of slums and reduce exposure to flood risk, but access to housing for displaced residents needs to be ensured. The zoning plans for the Balbala communities aim to prevent the creation of slums and prohibit construction in the flood risk zones of the Ambouli wadi. However, to effectively protect communities, capacity is needed to translate high-level zoning decisions into designations for individual parcels and to enforce zoning. In addition, because slums and settlements in flood risk zones are established in response to an acute lack of affordable housing for poor households, enforcement must be accompanied by a substantial investment in alternative housing to protect these groups.

Monitoring and maintaining the flood protection infrastructure—including the safety of the Friendship Dam—are key challenges. During the heavy rains of 2019, the Friendship Dam proved its usefulness by retaining about 10 million m³ of water that otherwise would have run off toward Djibouti City through the Ambouli wadi. However, diagnostics have attributed a decline in the effectiveness of the Ambouli wadi dike to a lack of maintenance and highlighted the importance of better monitoring and maintaining the dam and the Ambouli wadi dike, both to halt a gradual reduction in their effectiveness and to avoid the risk of catastrophic rupture or dike breach (AFD 2021).

While early warning systems and contingency planning for natural disasters are both in the early stages of development, some contingency planning is being undertaken. Since the 2004 floods, Djibouti has begun to establish a capacity for emergency management,³² as well as some early warning capacity. However, despite the mobilization of funds and equipment, recent flood events have shown that further technical expertise, staffing, and financial resources are needed to enhance operational readiness (Pacific Disaster Center 2022). Significant additional investment is also required to understand how specific shocks affect different populations and to link early warning systems to an effective response to such shocks. This will also need to involve continued investment in climate data collection to gradually improve the ability to model shocks and reduce uncertainty in predictions.

ICT infrastructure, fisheries, and the tourism sector can benefit from climate-sensitive planning to safeguard the diversification potential. Djibouti's critical ICT infrastructure can be better protected by conducting systematic risk assessments and devising and implementing guidelines for resilient fiber optic cable ducts, requiring concrete casing in areas vulnerable to inundation. Data is commonly stored on premises that lack flood protection; screening for particular sensitivities and the establishment of data recovery centers are called for. Tourism infrastructure needs to be protected from climate risks including sea level rise. To reach potential, fisheries activities need to be diversified along the value chains from production to processing and trade, with the goal of reaching broader markets. To this end, fisheries assets must be protected from climate risks to ensure sustainability of production, and safeguard jobs along the value chains and revenues. Such risks should be considered in all preliminary studies for fisheries activities and infrastructures, with a view to promoting investments that are climate resilient. An effective early warning system should inform fishers before they go out to sea of potential severe weather.

The ongoing expansion of power supply needs to be complemented by investments in the grid as well as price and regulatory reforms to enhance reliable access to power. The power interconnection with Ethiopia and investments in domestic clean energy production have substantially reduced costs and expanded supply. Several additional investments in generating capacity are planned. The SGTD port is also considering transitioning from fossil fuel generators to electricity generated from renewable energy sources. Djibouti has identified some key technologies that are needed to implement the planned clean energy investments, including binary geothermal energy, solar PV rooftops for domestic self-consumption, and solar mini-grids for off-grid electrification, particularly in rural areas.³³ Given this significant progress in power generation, an effort is now needed to enhance the performance and resilience of the grid, reduce consumer prices, achieve efficiency gains, and improve the energy sector investment climate.

To draw private investment to the power sector, key legal and regulatory reforms must begin now to support long-term development. The goal of the ongoing energy sector reform is to create a more predictable and enticing market landscape to attract investors. The newly established regulatory body for the energy sector will play a critical role in providing a stable and predictable environment for private investors by setting

32 Loi n°140/AN/06/5ème L. Le Décret n°2006-0192/PR/MID

33 See: Technology Needs Assessment, Djibouti at: <https://tech-action.unepccc.org/country/djibouti/>

equitable pricing mechanisms, defining quality and reliability standards, and protecting consumer interests. Further reforms should include the establishment of a single-buyer model, streamlining the procurement of electricity from independent power producers (IPPs), and ensuring both transparency and cost-efficiency.

Energy efficiency investments in infrastructure, efficient appliances, and energy-saving behavior can reduce the strain on the power system and lower energy bills. Energy-efficient practices and technologies in the residential, commercial, and industrial sectors can significantly reduce overall energy consumption. These approaches include energy-efficient lighting, appliances, and industrial equipment, along with smart grid technologies. Climate-smart construction can also significantly reduce the need for active space cooling. In addition to managing peak-hour demand, efficiency gains can reduce energy bills. Furthermore, efficiency gains can be achieved by minimizing unnecessary electricity use, for example, through intelligent power management devices that automatically turn off lights and appliances when not in use. Information campaigns and incentives can be used to promote these energy-saving habits among the population.

To safeguard power access against climate risks, Djibouti must incorporate resilience considerations into its energy, transport, and urban planning. Key measures include adopting construction standards for power infrastructure that make it more resilient to climate stress and developing contingency plans for rapid recovery after disasters. This approach should also ensure proper water drainage and the preservation of transport facilities. Additionally, maintaining a reliable power supply right after an extreme event is crucial for supporting health and community facilities, playing a fundamental role in safeguarding the well-being and resilience of communities in the face of environmental challenges.



Chapter 4 – Macroeconomic and Welfare Implications of Climate Change

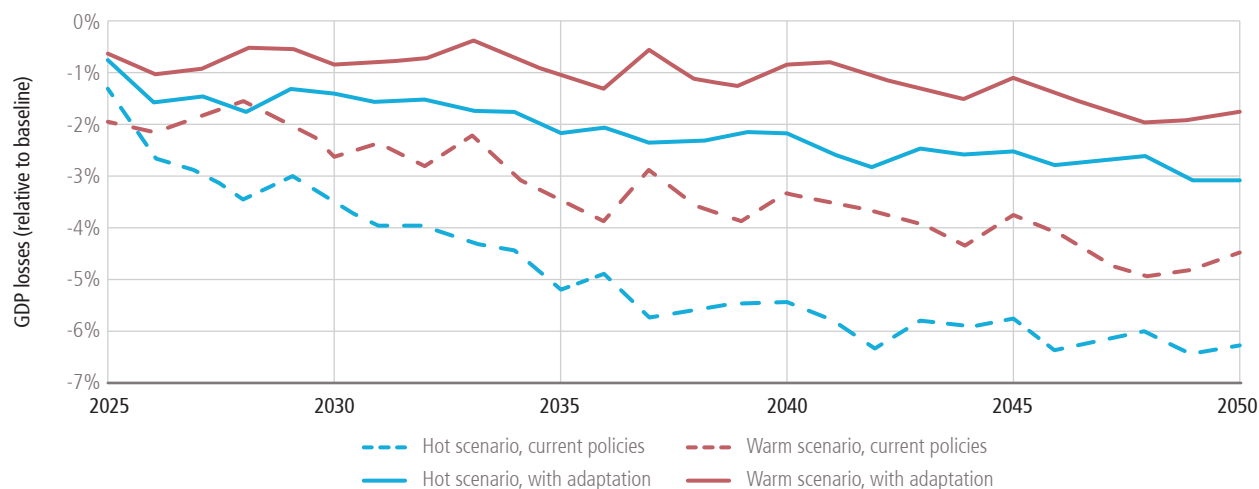
A. Opportunities and threats to macroeconomic performance from climate change

Climate impacts are estimated to amount to a permanent annual loss of up to 6 percent of GDP by mid-century. Modeling of economy-wide impacts suggests that there will be a reduction in real GDP relative to the baseline scenario by more than 6 percent by mid-century (average 2041-2050) under the hot climate scenarios and by about 4 percent under the warm scenarios (figure 21; see box 2 for a description of scenarios). Priority adaptation investments and policies could reduce these losses to about 3 percent and 1 percent, respectively, under the two scenarios. The comprehensive additional investments proposed in the NDCs would likely further reduce impacts.

The estimated losses should be interpreted as permanent changes in Djibouti's growth trajectory rather than as transitory shocks. The modeling results shown here are distinct from those obtained in analyses of shocks such as, for instance, natural disasters, the COVID-19 pandemic, or the Tigray conflict. Economies exposed to these kinds of shocks may decline steeply but usually recover to their initial growth trajectory. By way of contrast, the modeling on which this report relies measures climate impacts as a permanent change in the growth trajectory that will not be recouped.

Taken together, the projected losses through mid-century are equivalent to losing up to the entire national output for nearly four years. An alternative way of expressing expected losses is to compare the cumulative losses in the years 2025 to 2050 to today's GDP. Under this perspective, the model shows that expected losses under the hot scenario amount to nearly four times today's annual GDP (370 percent of estimated 2024 GDP). Cumulative damages under the less favorable climate scenario could thus amount to US\$14-US\$15 billion in real terms. Under the more favorable warm scenario, the losses, while lower, are still equivalent to two and a half 'lost years' over the 25-year period until 2050 (254 percent). Climate adaptation investments and reforms could avoid two 'lost years', though projected losses remain substantial (162 percent and 85 percent, respectively, in the two scenarios).

Figure 21. CGE Modeling of Climate Impacts on Real GDP at Market Prices (Relative to Baseline)



Source: World Bank.

Box 2: Baseline and Climate Scenarios.

Baseline scenario: The baseline scenario corresponds to the CEM reform scenario. The CEM reform scenario in Djibouti involves reducing electricity prices gradually over five years starting in 2024 and implementing price reduction plans for mobile and fixed broadband services to increase internet access. The aim of these reforms would be to stimulate private sector growth, create job opportunities, and diversify the economy beyond its reliance on ports, which could transform the country's economic landscape. The combined impact of electricity and telecommunication price reforms in Djibouti is projected to boost GDP growth by an estimated 39.1 percent by 2030, while also generating an additional 7.2 percent increase in employment, equivalent to 22,822 workers. Moreover, adjustments in these prices are expected to elevate household income by 34.5 percent and household consumption by 24.6 percent, enhancing the availability of goods and services in the economy. The CEM scenario has been improved for the CCDR by including a tax reform aimed at increasing the tax-to-GDP ratio from 11 percent in 2023 to 15 percent by 2050. It also includes some investments in climate resilience whose impact in terms of reducing climate damages could not be modeled. Overall, the scenario should be considered a feasible but ambitious pathway, with significant growth-oriented policy reforms and investment.

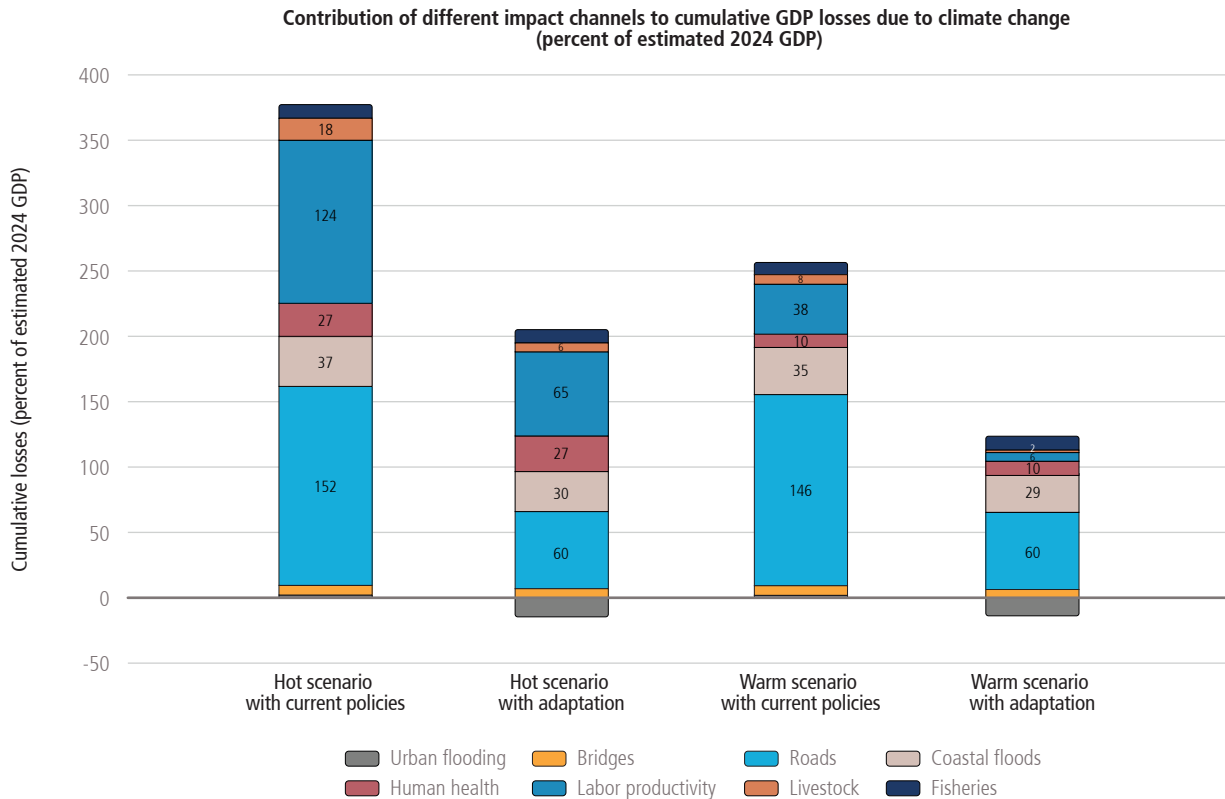
Climate impact scenario: The CCDR's climate impact scenario considers changes to the baseline scenario due to the effects of climate change in terms of: (1) damage to roads and bridges and labor supply lost due to traffic disruption; (2) urban flood damage and losses; (3) damage and losses from floods due to sea level rise; (4) changes in labor productivity due to heat; (5) changes in labor supply due to morbidity; and (6) changes in revenue from livestock and fisheries. It models the economic effect of these biophysical impacts for two sets of climate modeling results, namely those obtained from a 'hot' selection of climate models that predict steeper temperature rises, and those obtained from a 'warm' selection of models that predict more modest increases (see box 1). Other than climate impacts, all other assumptions of the reform scenario are maintained.

Climate adaptation scenario: The adaptation scenario adds to the climate impact scenario investments aimed at increasing the resilience of people, systems, and infrastructure to the effects included in the climate impact scenario. It considers the economic impact both of the costs and benefits (in terms of reduced damage) of such investments. Investment needs are discussed below. Based on World Bank assessments, most adaptation investments are modeled as being financed by concessional public sector borrowing, with limited direct borrowing by SOEs and some private sector investment in air conditioning and in solar energy. In some instances, the scenario considers investments that aim to build resilience not only to the additional impacts of further climate change but also to the adverse impacts that are already happening under the current climate regime. For instance, investments to improve the drainage of flood water in the Presqu'île will help to manage the already substantial impact of inundations, as well as the additional impact of more frequent extreme events due to subsequent climate change.

Simulations show that there is a substantial downside risk to the economy from a higher frequency of floods. Economic modeling usually considers the impact of expected annual losses due to climate change. However, this tends to underestimate the economic and welfare losses of rarer and more severe events, such as large urban floods. A method referred to as 'Monte Carlo simulations' is better suited to capturing the impact of severe events and is applied here to urban and coastal flooding. Under this

method, simulations randomly generate time patterns of extreme events, based on their expected recurrence periods. The range of GDP losses estimated for these different time patterns is a more accurate reflection of the potential damage that may occur in reality. This simulation approach shows that there is a substantial downside risk of higher urban flood damage in the future in Djibouti. The highest losses across a range of 100 possible time patterns in flooding events are eight times higher than the estimated mean loss under the hot scenario, and five times higher under the warm scenario. Similarly, while the expected annual GDP loss from coastal flooding is 1.4 percent by mid-century, simulated losses range from 0.8 percent to 2.1 percent annually.

Figure 22. Cumulative Losses of GDP Relative to Baseline



Source: World Bank.

Among different climate impacts considered in the model, most of the losses to aggregate production are due to damage to roads and associated delays as well as the decline in labor productivity due to heat. In both the hot and warm scenarios, the highest losses are projected to accrue from damage to roads and the resulting traffic disruptions and productivity loss, which amounts to the equivalent of one and a half of today’s annual GDP in the hot scenario (152 percent (figure 22)). As figure 22 shows, adaptation reduces these damages substantially (60 percent of current GDP). Labor productivity losses from heat are the next largest contributor; as is intuitive, they are much more pronounced in the hot scenario, where they amount to more than the equivalent of one year of current GDP by 2050 (124 percent), compared to about one-third of annual GDP under the warm scenario (38 percent). Other losses, from coastal flooding, in the livestock sector, and through the reduction in labor supply due to a higher burden of disease, are each estimated to amount to between one-third and one-sixth of current annual GDP without adaptation.

Modeled results pertain only to additional future losses due to climate change and do not consider the damages that already arise from urban flooding, drought, and other impacts. Importantly, the effects described in figure 22 are *additional* losses resulting from climate change. As discussed above, urban floods already cause large-scale damage to capital, drought currently profoundly affects livelihoods that rely on livestock, and the malaria epidemiology has changed dramatically in recent years. These effects are not included in the estimates shown here. It is worth noting that the adaptation scenario shows the effect of some reductions in these current damages that results from resilience investments; thus, the adaptation scenario in figure 22 shows a GDP gain from urban flooding impacts because the investments made to avoid additional climate damages also reduce some of the current damages. Chapter 3 discusses the available information on both impacts and the benefits of adaptation.

Climate change poses a severe risk to agriculture, but also threatens Djibouti's economic diversification efforts, with the potential to delay its critical structural transformation. By 2050, the anticipated impacts of climate change are projected to lead to a decline in agricultural output 20 percent. The important implications for poverty reduction and inequality are discussed further, below. At the same time, industrial output is modeled to contract by 8 percent, a steeper decline than in Djibouti's core services activities (6 percent). Such setbacks in the manufacturing sector could slow progress towards economic diversification. Proactive investment in adaptation strategies could counter these adverse effects: the CCDR's scenario of priority adaptation measures has the potential to reduce the negative impacts on manufacturing by half, underscoring the urgency and benefit of integrating climate resilience into development planning.

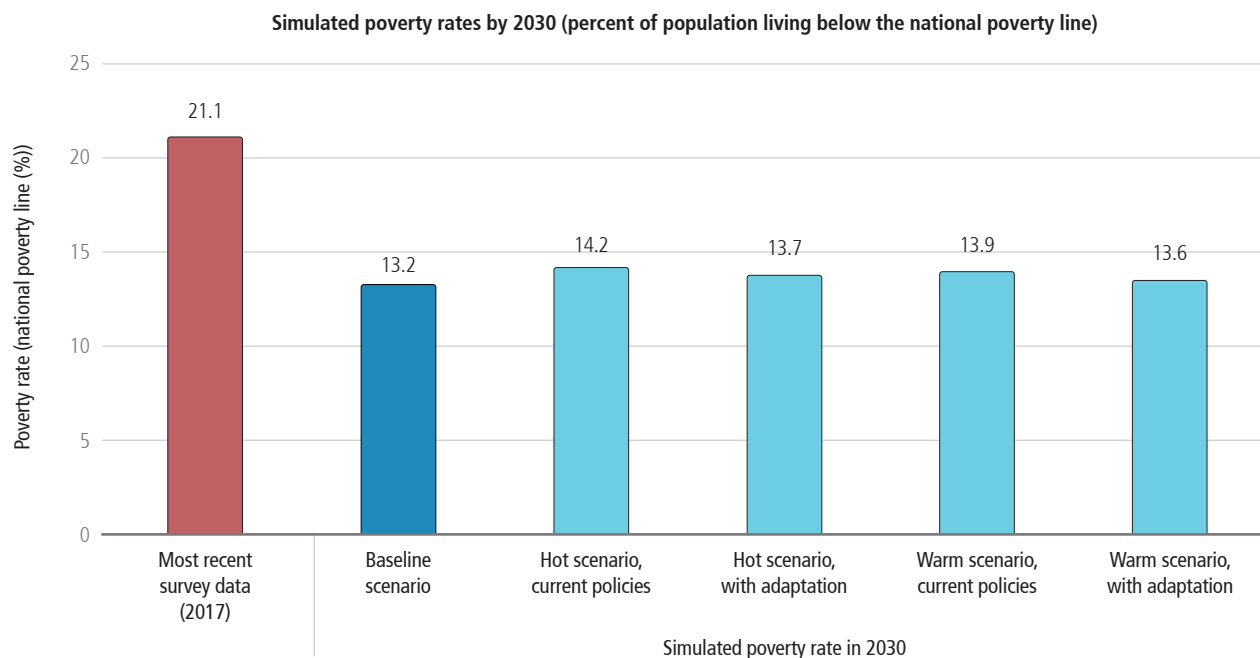
CGE modeling is a useful tool for assessing climate impacts on the economy, but it has some important limitations. Perhaps most fundamentally, CGE models assume that important economic relationships will continue in the future as they have in the past (for instance, the relationship between transport costs and trade). They are not well-suited to assessing the impact of catastrophic events that change economic relationships. Second, not all climate impacts could be included in the modeling exercise, with the most notable exclusion being the risk of water scarcity. Third, CGE modeling considers the impacts on aggregate economic output. While this is a meaningful reflection of the wealth of the economy, it does not necessarily capture the welfare of the population. For instance, while there are significant estimated productivity impacts due to climate change in the livestock sector with negative implications for rural livelihoods, the sector contributes little to GDP, which means that this productivity loss translates into GDP impacts that look modest compared to the impact on, for instance, transport and other services.

B. Poverty and distributional impacts of climate change

Climate impacts are expected to reduce employment by 1.4 percentage points by 2050, though adaptation investments can substantially soften these impacts. Employment is estimated to decrease by 1.4 percentage points by 2050 under the hot scenario without adaptation investments, and by slightly less under the warm scenario (1.2 percentage points). This compares to a current employment rate of 24 percent, which in the CCDR's baseline economic scenario is modeled as rising to 39 percent by mid-century. However, adaptation investments are projected to mitigate negative impacts on employment, with the expected decline reduced to 0.9 percent and 0.7 percent under the hot and warm scenarios, respectively. There is estimated to be little difference in the impact on groups of workers of different skill levels and formality of employment, and adaptation is estimated to be similarly effective in protecting employment among these groups. Sector employment impacts follow the GDP patterns described above, with the greatest estimated employment losses in agriculture (7 percent of baseline agriculture employment in the hot scenario), followed by manufacturing (5 percent) and services (3 percent). However, modeling suggests that adaptation will be less effective in protecting jobs in agriculture than in the other sectors.

Simulations suggest that GDP losses due to climate change would lead to some 11,500 more Djiboutians living in poverty in 2030 than at baseline. Modeling work for the CCDR simulates changes in household consumption due to GDP changes caused by climate change and adaptation policy for a time horizon up to the year 2030. The simulations rely on observed relationships between consumption and changes in production and other features of the economy. They illustrate some implications of a change in growth patterns for the poor but must be seen in the context of other information on vulnerabilities. Simulations suggest that robust growth will translate into a decline of the poverty rate under the national poverty line to 13.2 percent by 2030 in the baseline scenario (figure 23). Under the less favorable climate scenario, however, losses induced by climate change would lead to a poverty rate that is higher by one percentage point (14.2 percent), implying that some 11,500 more Djiboutians would live in poverty than under the baseline scenario.³⁴ Adaptation measures would reduce this increment by about half in both the hot and warm climate scenario, so that about 5,800 fewer households are expected to live in poverty than with no adaptation investments.

Figure 23. Simulated Poverty Impact of Climate-Induced GDP Losses



Source: World Bank.

While differences in exposure to climate risks are modest, poor households are far more vulnerable to climate impacts. Exposure to climate risks and hazards is fairly uniform in Djibouti due both to the country’s small size and the concentration of the population in the capital. However, the impacts of climate change depend significantly on households’ characteristics, and poor households’ vulnerability to climate change (i.e., their propensity to experience severe loss) is more pronounced even while their ability to cope with loss and damage is more limited. The simulation results shown above reflect only vulnerability to changes in aggregate growth. They do not show how the direct impact of climate change varies among households at different wealth levels.

34 Population projections obtained by applying the World Population Prospects 2024 population growth rate between 2024 and 2030 to the 2024 population level ascertained by INSTAD’s population census.

The poor are particularly vulnerable to climate impacts due to their dependence on rural livelihoods, greater engagement in outdoor work, substandard housing, and poor access to resources. The livelihoods of the poor are disproportionately in the climate-sensitive food sector and in outdoor activities. Thus, poor households are more likely to work in agriculture than non-poor households (8 percent compared to less than 1 percent). They are also more likely to work in the informal sector (81 percent compared to 61 percent for the non-poor), and in sectors that are more prone to outdoor exposure³⁵ (42 percent compared to 25 percent). The susceptibility of poor households to extreme weather events is exacerbated by substandard housing. For instance, 55 percent of poor households use non-durable materials like straw and wood for exterior walls, and only 10 percent use cement, which provides more insulation and greater durability in extreme weather events. Similarly, 53 percent of poor households live in non-permanent housing such as tents or huts, compared to 6 percent of non-poor households. Furthermore, poor people, though the most exposed to extreme heat, are least likely to possess assets that might help improve their living conditions. Almost none of the poor households in Djibouti own air conditioning (1 percent) or refrigerators (6 percent), while among the wealthiest households (top-20 percent in asset ownership), half have houses equipped with air conditioning, and 75 percent own a refrigerator.

Women's vulnerability to climate impacts is accentuated by systematically lower access to education and economic opportunities. Obstacles to obtaining education and lower access to economic opportunities puts women in positions of greater vulnerability of their livelihoods to shocks and of reduced capacity to recover from losses. While the gender gap in education has reduced, it remains significant (Malaeb et al. 2023). Thus, when data was last collected in 2017, literacy rates were 43 percent among women over 15 years of age, compared to 63 percent among men of the same age bracket; 33 percent of men in urban areas had no education, versus 53 percent of women. The percentages are starker in rural areas, where 87 percent of women and 78 percent of men had no education area. In the labor market, gender differences are striking. In 2017, 11 percent of women were employed, compared to 46 percent of men. Women who do work were also substantially more likely than men to work in the informal sector (63 percent and 41 percent, respectively), which offers more precarious employment and no social security benefits, as well as typically lower productivity, resulting in a reduced ability to accumulate assets.

Adaptation actions can address key vulnerabilities of the poor, but to this end, investments and reforms must explicitly consider their relevance for the livelihoods of the poor. Many of the adaptation investments described above in principle address key vulnerabilities of the poor, but their design must ensure that they are well-conceived and targeted to be effective in this sense. Thus, access to water for rural households and for livestock directly bolster the health and livelihoods of the poor. In the Balbala communities, where most of the urban poor live, better zoning alongside the provision of housing for resettled groups could greatly reduce exposure to flooding. Better shock-responsiveness of the safety net can help buffer weather shocks due to drought and flood and allow diversification of income sources to gradually build resilience. Reforms to electricity pricing can help make cooling affordable for less well-off households, while investments in grid and generating capacity undergird the goal of bringing access to 100 percent of households.

Community voices are particularly important in designing investments and reforms that effectively reduce vulnerabilities. Organized communities should be recognized as partners with expertise in building resilience and can set priorities, influence government policies, and design and implement investment

35 Sectors deemed more prone to outdoor exposure include: agriculture, livestock, and forestry, fishing, extraction industries, such as mining and quarrying, domestic services (including gardening, security guards, etc.), trade (informal), construction, and public works.

programs that are responsive to community needs. In Djibouti, this approach has been leveraged in programs that engage communities in defining priorities for medium-scale rural infrastructure such as village electrification or the construction of technical schools and health centers as well as seed banks. Self-help groups in support of small market-oriented activities are an additional example of grassroots engagement.

In the longer term, improving the work force's skills will be pivotal to reducing vulnerability and allowing poorer households to participate in resilient development and diversification. Djibouti has made substantial investments in infrastructure assets for development and will need to make additional adaptation investments to ensure resilience. However, these assets will ultimately only have broad benefits if they help to create jobs with higher productivity and higher revenue. Along with business environment reforms, investments in skills will be critical to creating such jobs and to ensuring that poorer Djiboutians gain access to them. Djibouti has made great progress in education, with increases in the gross primary and secondary enrolment rates from 52 and 15 percent in 2004 to 99 and 87 percent in 2022. However, challenges remain. A focus on science, technology, engineering, and math (STEM) training is rare, with the share of students enrolled in these fields unchanged, at below 15 percent, between 2009 and 2019. In a 2020 United States Agency for International Development (USAID) survey, about half of all respondent businesses reported encountering difficulties in hiring, including for positions in priority sectors for diversification such as construction, tourism, and logistics. At the same time, as is common, many graduates for technical and vocational education and training (TVET) still face difficulty in finding employment, with graduates much more likely to be unemployed than to be employed 18 months after completing their training (World Bank 2024a). There remains therefore a need both to offer more access to skill training and to ensure that the training offered is well-targeted toward the skills in demand in growth sectors. Greater involvement of the private sector in designing training offers one potential way to ensure that instruction responds to real workplace need (IFC 2023). Skill training should consider where diversification likely to create new opportunities (e.g. in ICT and tourism), and where investments in resilience can help grow labor demand. (notably in construction and energy-related services).

C. Private sector and financial sector issues

The private sector is nascent and characterized by weak job creation and a duality between a modern export-oriented but undiversified economy and a substantial informal sector. The modern economy relies heavily on revenue generated by the port and free zones, which have seen significant growth. At the same time, approximately 60 percent of the private sector operates informally, driven by micro-enterprises in trade and services. Despite the trade flows and military presence providing consistent income, productivity is low in the informal sector, limiting job creation and poverty reduction. The private sector faces numerous economy-wide and sectoral constraints that hinder its ability to invest and develop, and in turn, its participation in climate action. These include the high cost of doing business (e.g., electricity, telecom), limited access to finance, weak governance, and lack of skilled labor. It is thus not surprising that the formal private sector accounts for only 10 percent of jobs created, due to the strong footprint of the state and the aforementioned barriers to growth, which are more pronounced for women-owned businesses (IFC 2023).

The financial sector has grown rapidly since liberalization in 2006 but remains dominated by conventional and Islamic banks. The financial sector is estimated to contribute 3.9 percent of GDP as of 2022 (MEF 2022). Banks accounted for over 95 percent of the financial system's assets in 2022, with no active capital market or fixed income market. Three main banks hold 70 percent of all assets. Islamic banks occupy a rapidly growing niche in the market with around 20 percent of total banking assets. The microfinance sector remains embryonic but is expected to grow once new regulations currently being prepared by the Central

Bank become effective. The Central Bank is also relying on digital banking and mobile money to modernize the country's banking structure and to advance financial inclusion.

The banking sector remains capitalized and liquid with a consolidated solvency ratio of 16 percent. The financial sector plays a critical role in financing Djibouti's economy through loans to the government, SOEs, private businesses, and households, and recent policy improvements have put the banking sector in a more robust position to support the economy through financing. The solvency ratio remains robust at 16 percent, while the quality of banks' portfolios improved significantly in recent years thanks to the Central Bank's policy on non-performing loans. The share of such loans in the overall loan portfolio fell from 16 percent in 2019 to 4 percent in 2023 (Djibouti Central Bank 2023).

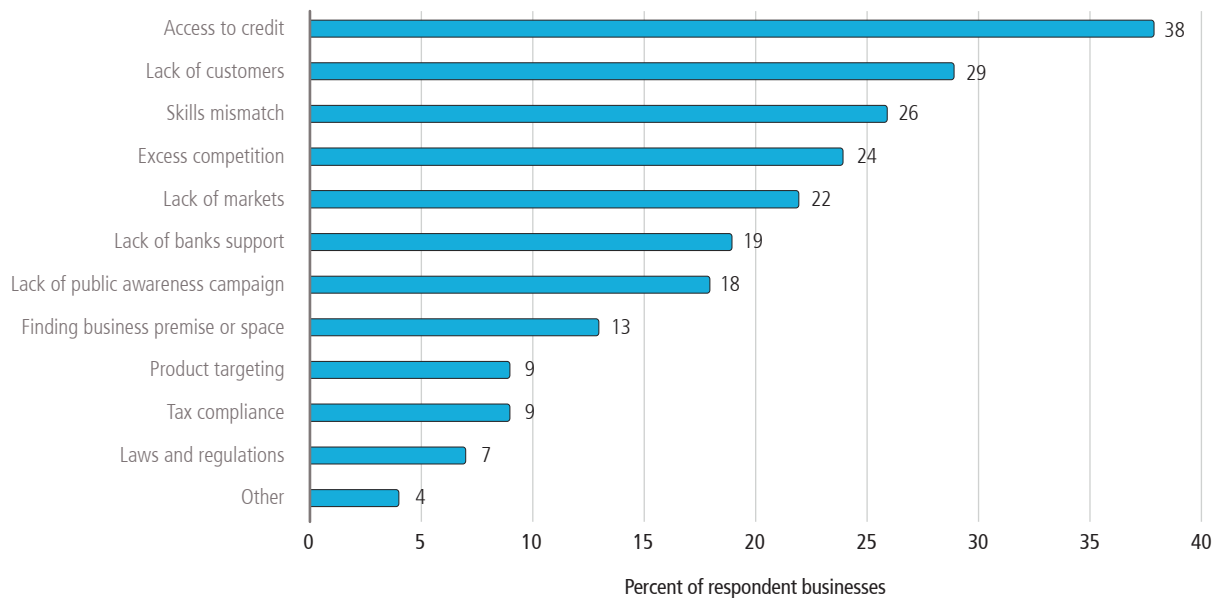
Weak governance poses significant challenges for foreign direct investment. Corruption is viewed as an important constraint, as reflected in low scores on Transparency International's Corruption Perceptions Index, which in 2023 ranked Djibouti 130 out of 180 countries, with a score of 30 out of 100. Investors encounter a weak legal, institutional, and regulatory framework that leads to inconsistent contract enforcement and insufficient protection of property rights. The difficulty investors face in accessing reliable information, coupled with ongoing infrastructure challenges despite improvements in port facilities, further complicates the business landscape. These factors can limit the economy's appeal to potential investors in diversification of the economy and in green growth.

The private sector in Djibouti has limited access to finance, with a financing gap of an estimated US\$147 million (IFC 2023). Despite the highly liquid banking sector, domestic credit to the private sector remains low at only 22 percent of GDP in 2022.³⁶ Less than 5 percent of formal enterprises have access to investment credit, with access typically limited to SOEs, large businesses, and the real estate sector (IFC 2023). Steep collateral requirements and high interest rates are likely to reflect both risk aversion in the banking sector, crowding-out due to SOE borrowing, as well as the Central Bank's tightening of loan classification and provisioning requirements over recent years. Commercial banks charged an average of 7.8 percent in interest in 2022, while 40 percent of businesses that had posted collateral for a loan reported that they had to put up more than twice the value of the loan, with another 33 percent having had to offer the full value of the loan in collateral. To improve access to finance, Djibouti needs to pursue reforms aimed at reducing the risk aversion of financial institutions and complement these reforms with the development of a strong credit infrastructure, further diversification of financial instruments, and programs to support the bankability of micro-, small-, and medium-sized enterprises (MSME) projects. Given the big footprint of SOEs and the real possibility of crowding-out, reforms to improve SOE performance could also help gradually relieve some borrowing constraints.

MSMEs face particular obstacles in accessing finance. Among women entrepreneurs, 58 percent rank poor access to finance as the biggest challenge to their business, along with two in five business owners overall (38 percent; figure 24). The fact that a lack of customers was the next most-frequently cited main obstacle to business speaks to the difficulty of generating business income and hence, the riskiness of borrowing for entrepreneurs. The lockdown measures associated with the COVID-19 pandemic, coupled with the macroeconomic spillovers of Russia's invasion of Ukraine, have taken a heavy toll on MSMEs and have likely exacerbated pre-existing challenges to accessing finance (World Bank 2024a). Collateral requirements are hard to meet for MSMEs and interest rates difficult to bear in small business investments. The limited credit infrastructure also induces a substantial information asymmetry that further raises the cost of borrowing for MSMEs, notably informal women-owned and microbusinesses.

36 International Monetary Fund, International Financial Statistics and data files, and World Bank and OECD GDP estimates.

Figure 24. Key Challenges to Starting a Business in Djibouti



Source: A2F Consulting 2021.

Green finance in Djibouti is nascent, despite efforts to promote sustainability and attract investment for environmentally conscious projects. Mobilizing capital for green initiatives is difficult, in part because Djibouti still needs to advance its policies, legal, institutional, and regulatory frameworks to attract climate-related investments, and develop the enabling frameworks for green financial instruments such as green bonds or sustainability-linked loans. A lack of awareness of and expertise regarding green finance principles within local financial institutions and the domestic private sector also impedes progress in this area.

Djibouti’s vulnerability to climate change-related disasters is substantial, yet its approach to disaster risk financing has largely been *ad hoc* and reactive. The government has started to address this by subscribing a sovereign insurance coverage product against drought and flood risks as part of the pilot phase of the African Disaster Risk Financing (DRF) Program facilitated by the African Development Bank (AfDB). The program aims to expand coverage levels, risk transfer parameters, and technical assistance for more strategic DRF programming.

The financial sector is exposed to climate-related risks identified by central banks and regulators as potential destabilizers of the financial system. The banking sector has seen a notable increase in credit allocation to sectors that are sensitive to climate change, including housing and equipment (no data is available on transport). For instance, equipment loans more than tripled in recent years, rising from DF 31,366 billion in 2008 (US\$177 million³⁷) to DF 285.3 billion (US\$617 million) in 2022. Loans to the housing sector rose from US\$173 million to US\$285 million over the same period. Private businesses accounted for 59 percent of these funds borrowed, and SOEs for 26 percent. Given the climate impacts on homes, critical infrastructure, and business operations described above, this pattern of loan allocations may represent a vulnerability of the financial system to climate risks. In the long term, changes in international carbon pricing policies or consumer preferences may also affect Djibouti’s trade flows and hence, the financial sector. Therefore, the Central Bank should promote the integration of climate risk considerations into financial sector planning.

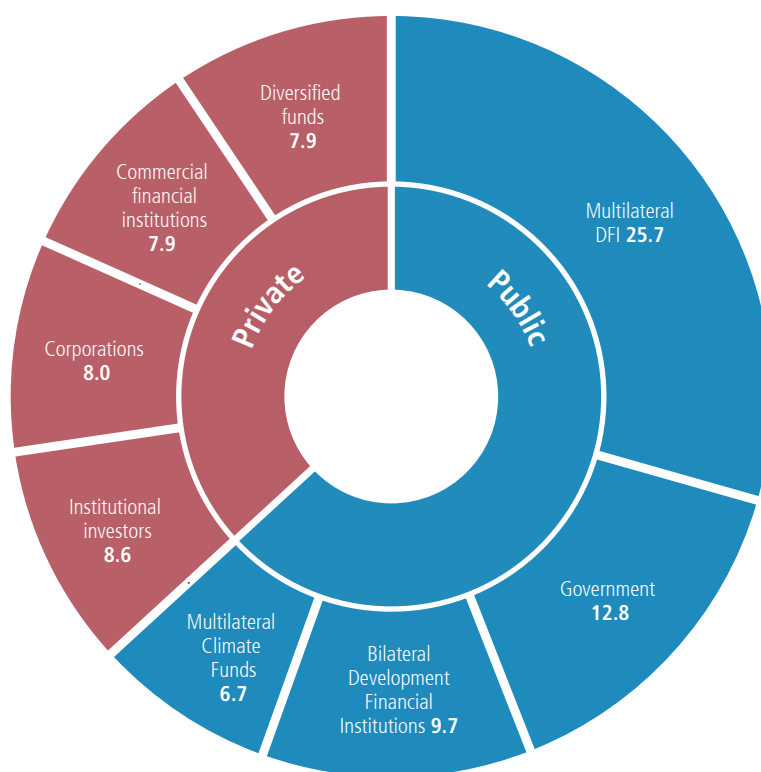
37 Exchange rate as of December 30, 2022: 1 DF = US\$0.005634.

1. Current landscape of climate finance

Despite its significant vulnerability to climate change, Djibouti receives insufficient climate finance to effectively address its adaptation and mitigation needs. Financial flows for climate initiatives averaged about US\$87 million per year in 2019 and 2020, with about two thirds flowing from public sources (63 percent), and one third from private investment (37 percent), according to Climate Policy Initiative data for 2022 (figure 25). As further discussed below, the CCDR estimates that additional financing needs for priority investments alone amount to US\$77 million per year through 2035 for pressing needs.

This shortfall in funding highlights the urgent need to tackle the barriers that limit access to both domestic and international climate finance. Several factors hinder adequate access to climate finance in Djibouti. First, there is a lack of cohesive legal frameworks and strategic climate policies, while existing environmental laws do not specifically address climate change or support mitigation and adaptation efforts (see Chapter 2 for a more comprehensive discussion). Second, coordination challenges persist within the National Steering Committee on Climate Change, leading to inefficiencies and duplicated efforts in project implementation. Third, the global public climate finance architecture presents obstacles with its complexity, stringent requirements, and protracted application processes. Fourth, the private sector's participation is substantially constrained by high operational costs, a lack of transparent governance, weak access to finance and a lack of de-risking tools, as well as limited technical expertise and insufficient legal and regulatory frameworks for climate finance. Fifth, limited access to green financing instruments, inadequate infrastructure for renewable projects, and the absence of a sovereign credit rating exacerbate the risk perceptions among potential investors. Lastly, the scarcity and unreliability of climate risk data, along with a lack of bankable green projects and financial de-risking tools, significantly impede the mobilization of private climate finance.

Figure 25. Sources of Climate Finance in Djibouti, 2020 (in US\$ million)



Source: World Bank and Climate Policy Database.

Djibouti can scale up private climate finance by leveraging its strategic geographic location, existing infrastructure assets, and abundant solar and wind resources for renewable energy projects, while identifying other bankable green projects. In the energy sector, investments in grid capacity, energy storage, and innovative ICT solutions like smart grids can foster green investment. The transport sector provides further opportunities, including electric and hybrid vehicles and climate-resilient railway and ports infrastructure. In the water sector, private participation in desalinization projects has been pioneered and strengthened capacity and efficiency of ONEAD could help further build confidence. The fisheries and tourism sectors can also capitalize on sustainable practices to promote sustainability and attract private finance. Additionally, the construction and housing sector offers opportunities for energy-efficient buildings and green urban planning. Lastly, Djibouti's position as the landing point of key submarine cables offers significant potential for the ICT sector, with longer-term opportunities to promote green growth through the development of smart grids, climate risk monitoring platforms, and green data centers powered by renewable energy. The International Finance Corporation (IFC) is currently working with the Djibouti Sovereign Wealth Fund and the Central Bank to establish a leasing company that could begin to promote green investments across these sectors.

2. A strategy to spur climate investment

To encourage more private climate investment, Djibouti can pursue a three-pronged strategy that improves the business environment, builds a green finance architecture, and leverages its development funds and bespoke financing models. There is an important and well-defined agenda of reforms of the overall business environment, discussed throughout this report, that will in the longer term be critical to incentivizing sufficient private sector investments to reach Djibouti's climate and development goals.³⁸ In the shorter term, Djibouti can consider leveraging its development funds as platforms for specific investments and continue to develop bespoke financing models for marquee projects. Djibouti also should begin establishing a green finance architecture to enable larger dedicated climate financing flows in the longer term.

The Djibouti Guarantee Fund and the Djibouti National Economic Development Fund present immediate opportunities to finance innovative solutions through targeted support for SMEs. The Djibouti Guarantee Fund (DGF) and the Djibouti National Economic Development Fund (DNEDF) could mobilize green finance from their partners and provide green guarantee products to their clients. For instance, the DGF's SME credit guarantee window could specifically target loans for businesses focused on climate-resilient investments, thereby mitigating financial risk for banks and encouraging lending in essential sectors. Additionally, its newly launched affordable housing mortgage guarantee can promote green building practices, ensuring that construction projects incorporate energy efficiency, passive cooling, and resilience against flooding in ways that are suitable to households' income levels. Similarly, the DNEDF, having restructured and recovered from prior governance issues, can prioritize funding for SMEs engaged in climate adaptation solutions and mobilize concessional financing from international climate funds for SMEs. Through accessible funding and capacity-building initiatives, the DNEDF can empower local enterprises to implement sustainable practices that enhance community resilience against climate change impacts. Together, these institutions could make a significant contribution to improving Djibouti's climate adaptation efforts.

³⁸ Governance, fiscal, and SOE reforms are detailed below, in section 4.D, as well as in Chapter 2. Access to finance is discussed above in this section. Reforms to lower energy and ICT prices and improve access are detailed in Chapter 3. See also IFC (2023) and World Bank (2024a).

Continue to apply tailored public-private financing models for flagship investments. However, in the meantime, the government has experimented successfully with tailored public-private financing arrangements for major projects, notably the Ghoubet wind park and the private operating arrangements at the Doraleh desalination plant. As noted, well-targeted reforms and actions to improve market confidence can begin to help standardize investments and increase the volume of financing. Still, tailored financing remains a viable and important way of attracting private investment to major projects. For example, expanding public-private financing arrangements for climate-resilient infrastructure, renewable energy, or water management can unlock the catalytic role of the private sector as a financier, innovator, and implementer of climate-resilient solutions, further advancing Djibouti's green growth agenda.

The government should begin the process of building a climate finance architecture that can in the longer term effectively scale up access to climate finance and achieve the country's ambitious climate goals.

- **Develop and operationalize a medium- to long-term climate finance strategy, including a green financial taxonomy.** The strategy would establish the foundation for mobilizing climate finance at scale in Djibouti in the medium to long-term. It would help identify private-sector opportunities and outline a balanced mix of financing sources (public and private, domestic and international) and instruments (carbon pricing, subsidies, tax incentives, green bonds, green sukus, sustainability-linked loans, and green guarantees and insurance, etc.) that are appropriate to Djibouti's needs, supported by an effective governance and policy framework. Engagement with international financial institutions and regional partners will be critical to accessing the technical expertise and concessional finance required to scale these efforts effectively. In addition, there is a need for a taxonomy that provides investors, project developers, and public authorities with a clear and shared definition of economic activities that can be considered "green." This would promote transparency and trust in the market, making it easier to tailor financial products and channel investments into sustainable projects.
- **Facilitate the identification, design and marketing of bankable priority climate projects that could be attractive to private investors.** This could be achieved through technical assistance for key public and private projects and better collection of data to inform the prioritization and design of projects based on business models (profitability, investment needs, etc.) and their contribution to adaptation and mitigation objectives. In addition, innovative risk-sharing mechanisms like blended finance and public-private partnerships (PPP) could be considered to improve the risk-return profile of these projects, thus enhancing their bankability. Eventually, establishing a platform (whether an ad-hoc or recurring investor conference or an online format) that serves as a marketplace for financiers and project developers could improve transparency and facilitate connections between investors and bankable climate projects. Such a platform could also provide information on project performance and lessons learned, fostering application of best practices.
- **Close capacity and information gaps** to strengthen technical capacity in climate finance, focusing on skills for designing funding proposals, conducting feasibility studies, and integrating environmental, social, and gender considerations.
- **Strengthen climate risk assessment and management in the financial sector.** Given the increasing exposure of the financial sector to climate risks, a climate risk management framework is important for ensuring the financial sector's resilience and stability. The Central Bank of Djibouti could undertake more granular and systematic assessments of these risks in the short to medium term and develop clear guidelines to help financial institutions better manage these risks, in alignment with international best practices and standards.

D. Fiscal considerations in managing climate change considerations.

Djibouti needs approximately US\$2.7 billion to meet the objectives outlined in its revised draft Nationally Determined Contributions (NDCs) for the period 2024-2030. The NDCs report that US\$866 million in funding has been secured, so an additional US\$1.9 billion is required to finance all needs. Given the authoritative NDC process, the CCDR did not attempt to exhaustively estimate needs; however, a partial assessment suggests that they could exceed US\$ 2.8 billion. The needs identified in the NDCs are the equivalent of an average of US\$ 313 million of additional funding per year in nominal terms. Considering that, between 2019 and 2020, Djibouti mobilized only about US\$160 million in climate finance, it will continue to face an annual shortfall of investments relative to its NDC targets without significant improvements in the availability of funding. Closing this gap will require substantial mobilization of both private capital and international support.

The set of priority reforms and investments proposed in the CCDR's adaptation scenario would require an estimated US\$1.1 billion in funding. The CCDR highlights the need for Djibouti to prioritize reforms, capacity building, and complementary investments to ensure that its existing development and adaptation initiatives deliver their full benefits, enabling the country to pursue a resilient development path. The amount needed to implement the priority adaptation and mitigation policies, as detailed in Chapter 3, is estimated at US\$1.137 billion. Investments in the transport, water, urban, and energy sectors account for 90 percent of this total. Notably, the priority investments proposed do not all relate to capital investment; instead, they include substantial funding for capacity building and policy reform. It is also important to underline that the CCDR's scenario of priority investments does not cover all climate investment needs. Successful reform and capacity building can make additional investments possible if such progress is met with further concessional support and growing private-sector contribution.

In the short term, concessional financing and SOE borrowing are expected to contribute most climate financing but reforms to encourage private sector investment must begin now. Given Djibouti's low domestic tax mobilization, limited FDI, and a weak private sector, most financing for resilience investments is in the short run expected to come from the central government's concessional financing and non-guaranteed borrowing by state-owned enterprises (SOEs) (table 7). Tax revenues declined from a peak of 14.3 percent in 2015 to 11.2 percent in 2022 (IMF 2024), while the capacity to attract FDI has diminished, with a significant drop following the onset of the COVID-19 pandemic. These financial pressures highlight the urgent need for fiscal reforms to enhance revenue mobilization and other reform efforts to enable greater private sector participation.

More ambitious reform efforts could help to broaden the scope of feasible investments in green growth. The CCDR's scenario illustrates how a significant effort for reforms and capacity building could foster resilience and green growth in Djibouti under current financial constraints. However, even more ambitious reform efforts and faster progress in building skills and capacity could help to ease the financial constraints that currently exist and broaden the scope of feasible investments. At the same time, fuller utilization of major development assets could mobilize additional revenue and build confidence among private investors.

Table 7. Additional Priority Investment for Resilience and Green Growth Modeled in the CCDR

	Adaptation investment cost modeled (\$m)	Examples of key enabling sector reforms and capacity requirements
Resilient transport	573	Road and rail maintenance capacity; integrated flood management
Electricity access and service quality	130	Energy price reform, power system regulatory capacity
Urban resilience	149	Urban planning capacity, zoning enforcement, disaster management planning
Water security	176	Maintenance of the urban distribution network, planning and maintenance of the rural water management infrastructure
Food security and health	109	Shock-responsiveness of safety nets; food stock management; health system capacity
TOTAL	1,137	

Source: World Bank.

The CCDR’s adaptation scenario suggests that public debt can decline despite investments in resilience as long as growth-enabling reforms proceed, and the resilience investments rely on concessional borrowing. The CCDR’s modeling reflects reforms recommended in the World Bank’s recent economic work, notably changes in ICT and energy tariffs, and reforms to raise tax revenue. The reforms are expected to benefit growth substantially and enable Djibouti to reverse its public debt trajectory and exit debt distress. Thus, in the baseline scenario, debt is expected to fall from 65.8 percent of GDP in 2022 to about 24 percent by mid-century. In the adaptation scenario, if such reforms are implemented, public debt as a ratio of GDP would be 7 percentage point higher, at 31 percent by 2050, but still decline. In addition to the reform program, this trajectory relies on emphasizing concessional financing for the prioritized adaptation actions. This is in contrast to previous infrastructure projects that were largely financed through non-concessional loans.

To support climate investment needs, a four-pronged strategy is needed that emphasizes additional concessional lending, fiscal reform, SOE reforms, and improvements in the investment climate. The CCDR prioritizes investments that support and complement Djibouti’s existing major development investments with a view to ensuring that the efforts already made toward resilience and diversification pay off. To support this investment strategy, partners should provide additional concessional resources, in particular given Djibouti’s key role within the region. Second, a sound financing strategy should prioritize fiscal reforms to mobilize greater domestic resources. Third, reforms in the SOEs, and notably the utility SOEs, are important both to the investment climate and to boosting capacity in the public sector to manage investments as well as operation and maintenance. Finally, longer-term climate resilience and economic stability will rely on reforms to enhance the investment climate and attract more FDI, leverage private sector investments, and consider sustainable debt financing options (these reforms have been further discussed above, in section 4.C). AfDB assesses that the private sector could potentially contribute between 25 and 75 percent of Djibouti’s climate financing needs. The substantial range underscores the importance of reforms to ensure that a meaningful private sector contribution ultimately becomes possible.

1. Structural reforms to expand the fiscal scope for climate investments.

Djibouti faces a significant challenge in mobilizing domestic revenue. The ratio of tax revenue to GDP was estimated at only 12 percent in 2023, notably lower than comparator countries in Sub-Saharan Africa (15.1 percent of GDP) and non-oil countries in the MENA region (15.9 percent of GDP). This decline from 14.8 percent in 2010 underscores a persistent drop in tax revenues. The discrepancy in tax pressure is evident across various tax categories, particularly taxes on goods and services and income tax, where Djibouti lags behind its counterparts. For instance, while taxes on goods and services generate approximately 4.8 percent of GDP in Djibouti, they generate 7.6, 5.7, and 7 percent respectively for non-oil countries in MENA, Sub-Saharan African countries, and low-middle-income countries.

Djibouti is undertaking a series of key reforms to address these challenges and enhance domestic revenue mobilization. These reforms primarily focus on streamlining tax expenditures, fostering tax compliance, and bolstering tax administration. One crucial step involves narrowing tax exemptions for SOEs, which have been major beneficiaries of exemptions and thus have paid minimal taxes in recent years. Despite generating substantial revenues, the aggregated income tax payments from the 23 key SOEs in 2018–2020 represented less than 2 percent of government revenues, and their combined dividends accounted for less than 7 percent of government revenues. The government of Djibouti aims to rectify this by establishing a comprehensive dividend policy to ensure fair and appropriate contributions to the government's finances and by replacing broad tax exemptions with targeted incentives such as investment allowances or tax credits.

Additional efforts should be made to increase the lease payments from foreign military bases. As of the time of writing, the lease payments for the five foreign military bases have remained unchanged in nominal terms since 2016. This arrangement fails to reflect economic realities and hence does not contribute adequately to government revenue. By revisiting and renegotiating lease agreements, the government could maximize revenue from its assets, thus bolstering its fiscal position.

Another critical aspect of reform lies in strengthening tax operations and administration. Current initiatives include revising the organizational structure of tax authorities, adopting performance-measurement tools, and enhancing communication strategies to increase taxpayer compliance. Additionally, measures to increase taxation of the informal sector and broaden the tax base through initiatives such as a study of the tax cadastre and land information system and requiring cash registers in modern retail sectors are underway. For instance, making cash registers compulsory could significantly enhance tax compliance and revenue collection, especially considering the informal nature of many transactions in Djibouti.

2. Prioritizing concessional financing for sustainable development

Djibouti faces the pressing challenge of debt unsustainability, exacerbated by years of rapid borrowing to finance ambitious infrastructure projects. The country's external public debt surged from 34 percent of GDP in 2013 to 71.4 percent in 2021, before slightly declining to 62.8 percent in 2023. Most of this borrowing has been contracted by SOEs. Moreover, external and domestic shocks such as the COVID-19 pandemic and regional conflicts have added to Djibouti's fiscal burden, with public debt service doubling between 2021 and 2022. This unsustainable debt trajectory not only hampers economic growth but also jeopardizes Djibouti's ability to meet its development needs and climate resilience goals.

To restore fiscal sustainability, Djibouti must prioritize concessional borrowing and grants. Concessional debt offers countries favorable terms such as lower interest rates and longer repayment periods, providing more space for fiscal consolidation efforts. By prioritizing debt on concessional terms, Djibouti can alleviate the burden of its debt service payments, freeing up resources for essential investments in development, economic diversification, and climate adaptation. Additionally, Djibouti should expedite debt restructuring negotiations with its primary creditors, particularly those with outstanding arrears, and adopt prudent debt management.

3. Building a climate-resilient economy by reforming Djibouti's state-owned enterprises

State-owned enterprises are central to Djibouti's economy. SOEs' share of Djibouti's GDP is twice as high as the MENA region average, while they employ approximately 20 percent of the formal workforce. Since SOEs control vital sectors such as ports, shipping companies, railways, the national airline, telecommunications, water, and electricity distribution, their economic performance significantly influences GDP growth, while the quality of their service provision shapes the daily lives of Djiboutians.

Djibouti's development model, characterized by strategic investments in SOEs focused on key infrastructure—such as water, energy, and logistics—has enabled the country to navigate its inhospitable climate. Enhancements to the national power grid and port facilities, along with renewable energy projects, have bolstered the resilience of these sectors against extreme weather conditions, reducing outages and operational downtimes significantly. Although significant inefficiencies and distributional gaps persist in this model, the existing infrastructure mitigates some of the adverse effects of climate change. The continued need for adaptation and improvement remains evident, yet the foundational investments in water and energy infrastructure provide Djibouti with a firmer footing to tackle the ongoing challenges posed by a changing climate.

However, Djibouti's SOEs face several challenges that hinder their role as an engine of growth. First, while the SOE sector remains profitable overall, its contribution to the central government budget is relatively low, accounting for less than 2 percent of government revenues in 2022. Additionally, the high level of indebtedness of SOEs poses significant fiscal risks, with external debt payments arrears reaching 6 percent of GDP in 2023. Moreover, the poor quality and high cost of services provided by some SOEs that are critical for productive activities and daily life impact the competitiveness of the private sector and the welfare of households. For instance, Djibouti's domestic broadband speed performance ranks among the slowest globally, and electricity prices are among the highest in Africa, resulting in reduced efficiency and increased operational costs for the economy. Encouraging competition within these sectors could enhance efficiency, lower costs, and promote stronger economic growth in Djibouti. Furthermore, despite recent reforms, SOEs still face challenges related to poor corporate governance, including weak compliance with reporting requirements and a lack of transparency. These issues increase fiscal risks and hinder effective monitoring and decision-making.

The complexities related to SOE management present challenges to the country's efforts to adapt to climate change. Many SOEs currently prioritize employment roles. While this is an important part of the social contract, it can also sometimes lead to inefficiencies and hinder the SOEs' ability to function effectively. For instance, a focus on job creation can result in overstaffing and slow response times during critical situations, particularly in sectors like energy and water where prompt service delivery is essential. Furthermore, enhancing transparency and accountability in SOE governance is crucial to ensuring better decision-making and resource allocation. By addressing these management challenges, Djibouti can

empower its SOEs to become more responsive and resilient. Because SOEs will likely manage some of the country's most important adaptation investments, an improvement in SOE management will ultimately also strengthen the nation's capacity to adapt to climate-related impacts.

To foster economic growth in Djibouti, it is crucial to strengthen the regulatory framework governing SOEs while simultaneously promoting private sector development. This entails clarifying the roles and responsibilities of SOE boards, enhancing accountability and reporting standards, and fortifying the independent regulatory bodies that oversee vital sectors such as energy, transport, and telecommunications. By implementing and enforcing robust competition laws, the country can prevent anti-competitive practices and create a level playing field. In addition, encouraging collaboration between SOEs and private sector companies can drive innovation and improve efficiency within the logistics sector. Public-private partnerships and joint ventures can facilitate knowledge-sharing and technology transfer, ultimately enhancing competitiveness. Thus, a balanced approach that reinforces SOE regulation and stimulates private sector engagement will be instrumental in achieving sustainable economic development in Djibouti.

To ensure that complementary investments enhance resilience and diversification, it is vital to strengthen Djibouti's public investment management system, as highlighted in the 2023 PEFA report. While the country has made significant strides in developing its transport and logistics infrastructure to establish a regional trade platform, critical vulnerabilities remain within the public investment management framework. For example, despite the availability of economic analyses for various projects, these assessments often fall short of national guidelines due to the absence of a robust legal framework governing public investments. To effectively address this gap, it is imperative to implement comprehensive national directives that formalize project selection processes and bolster transparency in the criteria used for selection. Furthermore, adopting a national directive for the economic analysis of investment projects and transitioning to a multi-year budget management approach will not only ensure alignment with the government's strategic priorities but also enhance the efficiency and effectiveness of investments. Such reforms will ultimately optimize the returns on these investments, fostering sustainable and inclusive development across the nation.



Chapter 5 – Conclusion and Recommendations

Development and climate policy for Djibouti can aim to leverage its pivotal position in the region, ensure livability and protect livelihoods promote diversification. In line with Djibouti's development and climate goals, public investment and policy should pursue three goals related to resilience and green growth (see figure 26). First, policies should continue leveraging regional integration to promote gains from trade, while building resilience to regional shocks through domestic capacity. Second, investments to ensure livability for the people and to protect the livelihoods of the poor are needed given increasing heat and more frequent and severe extreme climate events in Djibouti's already harsh climate. Finally, policy should focus on further diversifying the economy through investments that also contribute to resilience.

The CCDR proposes a set of possible priorities among the investments in resilience and green growth targeted in Djibouti's recently revised NDCs. The government of Djibouti recently articulated a well-considered and comprehensive list of climate investments in its revised NDCs. Given current financing constraints, the CCDR suggests a possible focus on investments that enable the productive use of existing major assets or that complement them. The proposed priority investments do not cover all climate investment needs, but aim to address the most pressing adaptation needs and notable opportunities for green growth. Successful reform and capacity building can make additional investments possible, if such progress is met with further concessional support and a growing private sector contribution. Table 8 summarizes priority investments and policies; they are explained in greater detail in Chapter 3 of this report. Chapter 2 provides additional background on recommended climate governance reforms, and Chapter 4 on financial sector and SOE reforms.

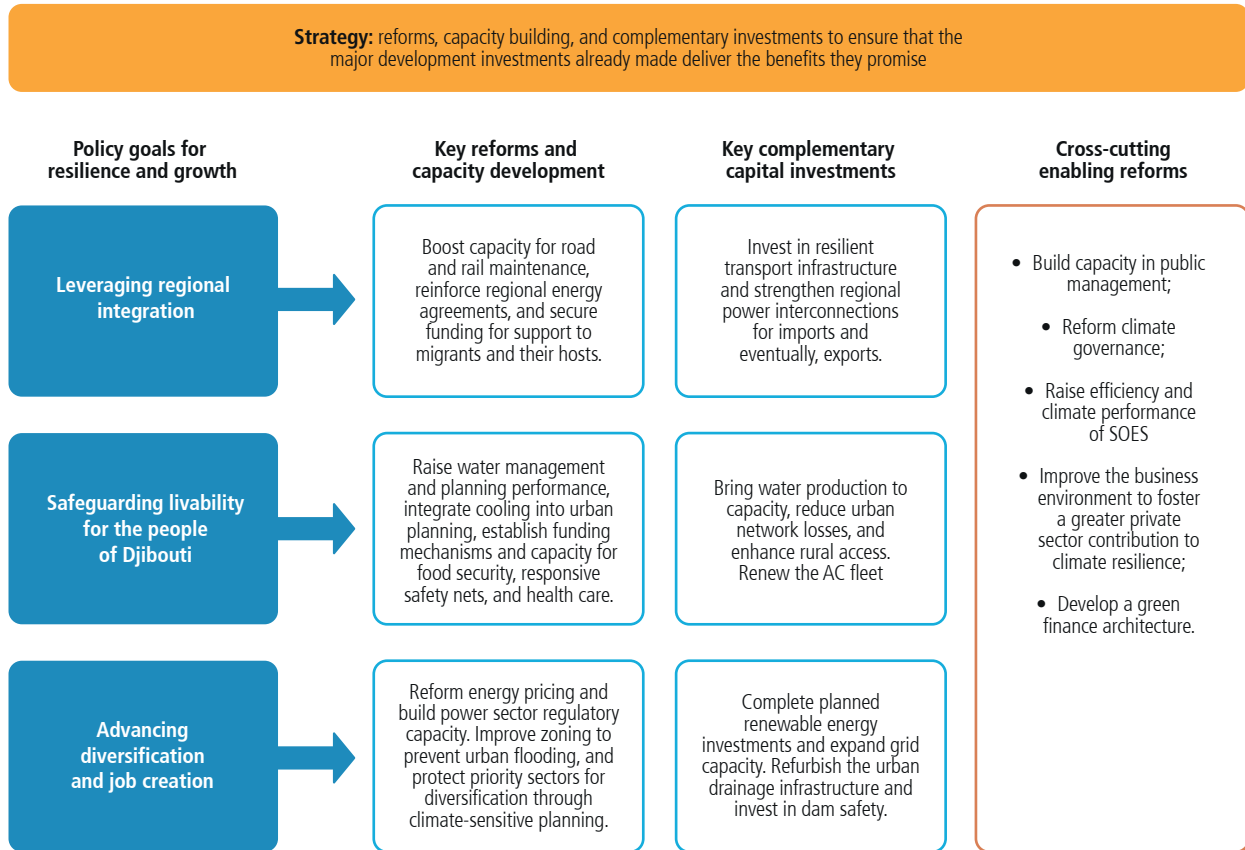
Djibouti has made significant investments in adaptation and growth. Djibouti's historical economic transformation into a regional transport hub represents a very successful diversification effort that has substantially reduced the vulnerabilities to climate change experienced by economies that rely more strongly on the primary sector in arid regions. More recently, Djibouti has made substantial investments in capital to further promote growth as well as resilience. Leading examples include the electricity interconnection with the regional market and renewable electricity capacity, the port's container and petroleum terminals and shipyard infrastructure and the railway connection to Ethiopia, as well as the water pipeline from Ethiopia and desalinization plants.

Economic reform and capacity building in public management are critical parts of the development and adaptation agenda. Recent investments in transport, water, and energy infrastructure position Djibouti well to pursue a resilient development path. However, to succeed in this ambition, it needs to focus on reform efforts and capacity building to ensure that the investment made deliver the benefits envisaged, and to ensure that complementary investments are well-planned and executed. Priority reforms notably include the reform of electricity pricing, improvements in SOE performance—notably in utility SOEs, and steps to enhance the business environment and mobilize meaningful private climate finance. There is also an urgent need to raise the public sector's capacity to manage, operate, and maintain assets in ways that ensure their resilience and economic effectiveness. The potential gains from raising capacity are very significant, for instance, in the maintenance of transport infrastructure, urban flood management, and both rural and urban water management.

New investments should seek to complement and leverage existing capacity and be integrated with efforts to build systems and raise skill levels. Well-crafted adaptation actions should aim to leverage existing capacity, for instance, in consolidating the energy distribution network to ensure good service from domestic renewable energy capacity and the regional interconnections, or in reducing water network losses to make sure water provided from desalinization and the pipeline reaches households. There are also important no-regrets opportunities that complement the existing assets, such as urban and road drainage

infrastructure to reduce flood damage. Such investments need to go hand in hand with the strengthening of systems, for instance, in further boosting the shock-responsiveness of the safety net and in enhancing the capacity of the health system to deal with climate-induced burden of disease. Skills play a fundamental facilitating role both in managing investments better and in ensuring that Djiboutians benefit from resilient jobs and growing incomes.

Figure 26. Policy Goals and Investment Strategy for Development and Resilience



Source: World Bank.

Adaptation actions should emphasize an integrated approach to service delivery, resilience, and green growth in the rural and urban space. Many priorities for successful adaptation center on effective service delivery. Ensuring delivery will require an integrated approach to governance in the urban and rural space. In the urban economy, an integrated planning and implementing approach is needed to raise the performance of key utilities in providing quality access to water, roads, electricity, and network connectivity, as well as protection from flooding. In rural areas, policy for resilient growth should emphasize capacity to deliver better access to water and investments in the productivity and resilience of livestock, fisheries, and select agriculture value chains. In both spheres, access to appropriate shock-responsive services in education, health, and social protection also need to be integrated.

Policies should consistently address pronounced gender imbalances in access to opportunities and hence, in resilience to climate impacts. For instance, actions to improve access to water, energy, shock-responsive safety nets and other services that promote resilience need to consistently consider access for women and female-headed households. In the agriculture sector, women’s access to climate-resilient

technology is an important consideration, as well as sensitivity to women’s economic activities in planning rural water management. Similarly, investments to reduce the exposure of urban workers to flood and heat need to be designed with women’s economic activities in mind and consider the considerable additional obstacles women face while Djibouti can also promote resilience by further advancing girls’ access to education.

Effective climate and development reforms and investments in Djibouti face substantial obstacles, but past investments provide real opportunities, and the potential rewards are potential. Policy formulation must navigate a number of important obstacles. For example, some of the most important opportunities to support resilience and green growth lie in an improved management of key economic assets. Progress on these issues is arguably harder to achieve than the construction of marquee projects, even as their lesser visibility can entail diminished attention and political support. In addition, as shown in Chapter 4, effective climate action will require substantial additional funding. Given the macro-fiscal constraints force a focus on concessional public financing, the paucity of available global resources poses an important obstacle. Access to limited funds could be improved through better coordination and prioritization of actions on the government’s side. Weaknesses in the business environment and financial system also pose challenges to fostering a greater private sector contribution in both funding and implementation. Finally, some important reforms, notably changes in energy pricing and in the management SOEs relate to deep issues of the social contract and of public finance management that require a determined and sustained political effort to resolve.

Table 8. Investment and Policy Priorities

Reforms and capacity development	Complementary capital investments
Leveraging regional integration	
<p>Transport. Emphasize road and rail maintenance and traffic management capacity. Establish a partnership between the Djibouti Road Authority (ADR) and the National Office of Water and Sanitation (ONEAD) to enable the incorporation of hydraulic and hydrological information into road infrastructure design.</p> <p>Power. Explore collaboration, further connectivity, and trade with EAPP market participants to enhance electricity supply and renewable energy integration.</p> <p>Food security. Ensure that there are funds and mechanisms to guarantee food supply during times of regional climate shocks or global price shocks. Encourage diversification of food import sources.</p> <p>Migration. Secure international support to expand access to education, health, social services, and job opportunities for the displaced, migrants, and their host communities.</p>	<p>Transport. Upgrade the resilience of key road corridors and urban thoroughfares to heat and heavy precipitation.</p> <p>Power. Complete the second power system interconnection with Ethiopia and upgrade and densify the transmission infrastructure to ensure that domestic renewable energy can be transmitted from production sites to the main cities.</p>

Reforms and capacity development

Complementary capital investments

Safeguard livability for the people of Djibouti

Water. Invest in maintenance capacity to improve the performance of urban water distribution. In rural areas, build planning capacity for water access and enhance processes for consulting transhumant and other rural communities. To rehabilitate and upgrade borehole headworks, regulate potentially polluting activities in aquifer recharge areas, and disseminate information on increase knowledge about groundwater protection.

Cooling. Integrate green spaces into urban planning to help reduce urban heat islands and promote passive cooling technologies and better thermal insulation in new large buildings.

Food security. Continue to improve the public-private management of food reserves.

Social protection. Establish reliable funding mechanisms to allow for scaled-up support in response to climate shocks. Bolster the responsiveness of the safety net by implementing digital payments and expanding the social registry.

Health. Continue to grow the capacity of medical professionals and laboratories to treat malaria, track its spread, and conduct targeted interventions to combat it.

Water. In addition to an already-financed expansion of desalinization capacity, complete power supply for all wells feeding the aqueduct from Ethiopia in order to ensure usage at capacity. Refurbish the urban distribution network to reduce non-revenue water. Enhance rural water access through construction of boreholes as well as small dams and other storage infrastructure.

Cooling. Finance the renewal of the air conditioner fleet.

Food security. Invest in the resilience of livestock production as well as the development of select competitive food value chains to raise the purchasing power of rural communities.

Health. Improve the resilience of health infrastructure to extreme weather events.

Advancing diversification and job creation

Power. Reform energy pricing to promote growth in the private sector and lower household bills. To enhance the investment climate, establish a single-buyer model, and streamline the procurement of electricity from independent power producers. Establish regulatory capacity to set equitable pricing mechanisms, define quality and reliability standards, and protect consumer interests in order to provide a stable and predictable environment for private investors. Adopt construction standards for power infrastructure that ensure resiliency to climate stress and develop contingency plans for rapid post-disaster recovery.

Urban. Enforce zoning in the Balbala neighborhoods to reduce exposure to flood risk and prevent the emergence of slums. Consider coastal flooding in zoning decisions. Establish capacity to translate zoning decisions into designations for individual parcels and enforce zoning rules. Establish operational readiness in disaster risk management.

Priority sectors for diversification. Implement climate-sensitive planning in the ICT and tourism sectors to protect major assets against climate risk. Develop a fisheries management plan that reflects climate risks.

Power. Complete planned investments in renewable energy. Expand grid capacity. To reduce energy costs, invest in energy-efficient lighting, appliances, and industrial equipment, along with smart grid technologies.

Urban. Fully refurbish the drainage infrastructure in the Presqu'île neighborhoods to prevent losses from flooding. Invest in the maintenance of flood protection infrastructure, notably the safety and functionality of the Friendship Dam. Provide access to alternative housing for disadvantaged groups affected by anti-flood zoning provisions.

Reforms and capacity development

Complementary capital investments

Cross-cutting enabling reforms

Public investment management. To enhance public investment efficiency, establish national directives for formal project selection and improve transparency in criteria. Adopt a directive for economic analysis and transition to multi-year budget management to align investments with government priorities. Make further investments in building skills for public administration.

Governance. Reform the governance of climate policy by establishing clear roles and mandates among Government entities. Reorganize the CNDCC under the Office of the President and strengthen the Ministry of Finance's coordinating role in pursuing climate finance and ensuring consistency with development investments.

Regional cooperation. Bolster regional cooperation on climate finance to ensure the resilience of infrastructure projects of regional importance as well as on the management of shared resources.

Financial markets. Advance the development of bond market regulations and develop central bank guidance on climate finance instruments. Develop a green finance strategy and explore options for financing resilience investments through the *Fonds de Développement Economique* or *Fonds de Garanties*. Continue to apply tailored public-private financing models for flagship investments, building on the Ghoubet wind park model.

State-owned enterprises. Establish a transparent regulatory framework that facilitates collaboration between SOEs and private sector investors to help attract climate finance. This includes providing clear guidelines for public-private partnerships specifically targeted toward climate-related projects. In addition, SOEs should:

- Reform management practices, enhance financial accountability, raise operational efficiency, and establish a standard for climate change reporting;
- Enhance capacity for planning and managing large, climate-resilient infrastructure projects;
- Incorporate climate resilience into operational frameworks, with a view to prioritizing investments in renewable energy, water management, and sustainable agriculture;
- Attract investors and international financial bodies to innovative, climate-focused projects that demonstrate clear environmental benefits and financial viability such as renewable energy generation or coastal resiliency infrastructure;
- Showcase SOE projects that align with global climate goals to attract climate finance specifically for SOEs from climate-focused investment funds, multilateral development banks, or multilateral organizations.

Business environment. Streamline regulations, especially business licensing and permitting. Reduce utilities cost. Improve the general institutional, legal and regulatory framework for private sector investment, enhance the credit infrastructure for MSMEs and strengthen MSME financial literacy, expand digital financial and microfinance services, and develop risk mitigation instruments. Foster public-private partnerships and dialogue for participation in climate investments.

References

A2F Consulting. 2021. “Djibouti MSME Finance Needs Assessment and Policy Recommendations - Final Report.” Washington, D.C. : World Bank.

<https://documents1.worldbank.org/curated/en/289941616568791338/pdf/Djibouti-MSME-Finance-Needs-Assessment-and-Policy-Recommendations.pdf>

African Development Bank. 2023. Compact Djibouti Pour l’Alimentation et l’Agriculture.

<https://www.afdb.org/fr/documents/djibouti-pacte-pour-lalimentation-et-lagriculture>

Agence de Réhabilitation Urbaine et du Logement Social. 2022. Diagnostic du Quartier Warableh 2 et Avantprojet Sommaire (APS) du Plan Général de Restructuration Urbaine Réalisé dans Le Cadre du Projet ISUP P162901.

Agence de Réhabilitation Urbaine et du Logement Social. 2024. Plan d’Action de Réinstallation du Projet Intégré de Résorption de Bidonvilles.

Agence Djiboutienne des Routes (ADR). 2022. Etude sur la Collecte de Données Relatives au Renforcement de la Logistique de Djibouti-Ville – Rapport Définitif.

Agence Française de Développement (AFD). 2021. “Diagnostic et Recommandations pour ne Gestion Intégrée du Risque Inundation sur l’Agglomération de Djibouti.”

Agulles, M., Jordà, G., Jones, B., Agustí, S., and Duarte, C. M. 2020. Temporal Evolution of Temperatures in the Red Sea and the Gulf of Aden Based on in Situ Observations (1958–2017). *Ocean Science*, 16(1), 149-166. DOI: <https://doi.org/10.5194/os-16-149-2020>.

Asariotis, R. 2021. “Climate Change Impacts on Seaports: A Growing Threat to Sustainable Trade and Development.” UN Transport and Trade Facilitation Newsletter n. 90. UNCTAD.

<https://unctad.org/news/climate-change-impacts-seaports-growing-threat-sustainable-trade-and-development>

Becken, S. 2014. “Water equity – Contrasting Tourism Water Use with That of the Local Community.” *Water Resources and Industry*, Volumes 7-8, 9-22.

Bezgrebelna et al. 2021. “Climate Change, Weather, Housing Precarity, and Homelessness: A Systematic Review of Reviews.” *International Journal of Environmental Research and Public Health*, 18(11), 5812.

<https://www.mdpi.com/1660-4601/18/11/5812>

Central Bank of Djibouti. 2023. Quarterly Reports.

ClientEarth. n.d. “Climate Change Inequality: The Unequal Impact of Extreme Weather.” Retrieved from <https://www.clientearth.org/>

Climatewatch. 2022. Climate Watch Historical GHG Emissions. Washington, D.C.: World Resources Institute. Available online at: <https://www.climatewatchdata.org/ghg-emissions>

Cobbing, J. and B. Hiller. 2019. “Waking a Sleeping Giant: Realizing the Potential of Groundwater in Sub-Saharan Africa.” *World Development*, Volume 122.

Davidson, W. “Ethiopia, Somaliland Sign Accord to Boost Use of Berbera Port,” *Bloomberg*, April 4, 2016. <https://www.bloomberg.com/news/articles/2016-04-04/ethiopia-somaliland-sign-accord-to-boost-use-of-berbera-port>

Dawson, R. et al. 2018. “A Systems Framework for National Assessment of Climate Risks to Infrastructure.” *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*. Volume 376 Issue 2121 (June). <https://doi.org/10.1098/rsta.2017.0298>

Direction de l'Aménagement du Territoire, de l'Habitat et de l'Urbanisme. 2022. Etude portant sur l'élaboration des plans détaillés d'aménagement urbain des villes chefs-lieux des cinq régions de la République de Djibouti.

EGIS Group and Gret. 2022. Étude du Marche du Logement et Promotion d'un Habitat Abordable à Djibouti.

Enquête Djiboutienne Auprès des Ménages (EDAM). 2017. Enquête Djiboutienne Auprès des Ménages pour les Indicateurs Sociaux 2017. <https://microdata.worldbank.org/index.php/catalog/3463/related-materials>

Faulde, M.K., Rueda, L.M., Khaireh, B.A. 2014. “First Record of the Asian Malaria Vector *Anopheles Stephensi* and Its Possible Role in the Resurgence of Malaria in Djibouti, Horn of Africa.” *Acta Tropica*. 139:39–43. doi: <https://doi.org/10.1016/j.actatropica.2014.06.016>

Ferrara, L. 2024. “Housing Approaches to Extreme Weather Can Lessen Harms to Community Health.” *Urban.org*. January 31, 2024. Retrieved from <https://housingmatters.urban.org/articles/housing-approaches-extreme-weather-can-lessen-harms-community-health>

Food and Agriculture Organization of the United Nations (FAO). 2024. FAOSTAT Statistical Database. Rome, Italy: FAO.

Global Center on Adaptation. 2023. Rapid Climate Risk Assessment for Urban Adaptation and Resilience: Djibouti City, Djibouti. https://gca.org/wp-content/uploads/2024/08/RCRA-Djibouti-city-Djibouti_web.pdf

Global Hunger Index. 2024. <https://www.globalhungerindex.org/pdf/en/2023/Djibouti.pdf>

Hallegatte, S.; Rentschler, J.; and Rozenberg, J. 2019. *Lifelines: The Resilient Infrastructure Opportunity*. Washington, D.C.: World Bank. <http://hdl.handle.net/10986/31805> License: CC BY 3.0 IGO.”

Humphreys, M. et al. 2019. “Port Development and Competition in East and Southern Africa: Prospects and Challenges (Vol. 2).” *International Development in Focus*. Washington, D.C.: World Bank. <http://hdl.handle.net/10986/31897>

IGAD Centre for Pastoral Areas and Livestock Development. 2015. “La Contribution de l'Elevage à l'Economie de Djibouti.”

INSTAD. 2022. Annuaire Statistique 2022 de l'INSTAD.

INSTAD and International Organization for Migration (IOM). 2022. Rapid Assessments of the Impact of the Drought in the 5 Regions of Djibouti. https://dtm.iom.int/sites/g/files/tmzbdl1461/files/reports/Evaluation%20rapide%20Secheresse%20OIM%20INSTAD%20Septembre%202022_final%20EN.pdf

Integrated Food Security Phase Classification (IPC). 2022. “Djibouti: Acute Food Insecurity Situation March

- June 2022 and Projection for July - December 2022.”

<https://www.ipcinfo.org/ipc-country-analysis/details-map/en/c/1155581/>

International Federation of Red Cross and Red Crescent Societies (IFRC). 2023. “Climate Migration: Climate Crisis and Conflict Push More People to Drought-Stricken Djibouti.” Retrieved January 30, 2024, from <https://www.ifrc.org/article/climate-migration-climate-crisis-and-conflict-push-more-people-drought-stricken-djibouti>

International Finance Corporation (IFC). 2023. “Djibouti Country Private Sector Diagnostic.” Washington, D.C.: World Bank.

<https://www.ifc.org/content/dam/ifc/doc/2023/djibouti-country-private-sector-diagnostic-fr.pdf>
<https://documents.banquemondiale.org/fr/publication/documents-reports/documentdetail/099915403082461424/idu1dfc0ae7212ba814a621a4f81e810ef6406fb>

International Labour Organization. 2019. “Working on a Warmer planet: The Impact of Heat Stress on Labour Productivity and Decent Work.” International Labour Office: Geneva: ILO.

International Monetary Fund (IMFG). 2024. *Country Reports: Djibouti: Selected Issues.*

<https://www.imf.org/en/Publications/CR/Issues/2024/06/04/Djibouti-Selected-Issues-549878>

International Organization for Migration (IOM). 2022. “Rapid Assessments of the Impact of the Drought in 5 Regions of Djibouti.”

Izaguirre, C., Losada, I.J., Camus, P. et al. 2021. “Climate Change Risk to Global Port Operations.” *Nature Climate Change*. 11, 14–20. <https://doi.org/10.1038/s41558-020-00937-z>

Kireyev, A. 2018. “Macro-Fiscal Implications of Climate Change: The Case of Djibouti.” International Monetary Fund (IMF) Working Paper 2018/233.

Malaeb, B., Duplantier, A.M., Maarraoui, G., Fluet, E.S. 2023. “Towards a More Equitable Development: Constraints and Opportunities for Women in Djibouti.” Washington, D.C.: World Bank.

Menzies, N., Almuzaini, A.A.Y., Annandsingh, R., Averchenkova, A., Fozzard, A., Kirchhofer, X. “World Bank Reference Guide to Climate Change Framework Legislation (English).” 2020. Washington, D.C.: World Bank. <http://documents.worldbank.org/curated/en/267111608646003221/World-Bank-Reference-Guide-to-Climate-Change-Framework-Legislation>

Ofleh, B. H. 2012. Etude hydrochimique et isotopique de l’aquifère basaltique de Djibouti: Qualité de l’eau et origine de la salinité de la nappe de Djibouti. Editions universitaires européennes.

Oxford Business Group. 2023. “Djibouti Modernises its Economy amid Global Disruptions.” <https://oxfordbusinessgroup.com/reports/djibouti/2023-report/economy/expansion-plans-djibouti-continues-to-modernise-its-economy-amid-a-challenging-global-macroeconomic-environment-overview/>

Pacific Disaster Center. 2022. Djibouti National Disaster Preparedness Baseline Assessment.

https://www.pdc.org/wp-content/uploads/NDPBA_DJIBOUTI_Report_2023.pdf

Republic of Djibouti. 2011. Evaluation des Dommages, Pertes et Besoins Suite à la Sécheresse en République de Djibouti.

<https://www.gfdr.org/sites/default/files/publication/pda-2011-djibouti-fr.pdf>

Republic of Djibouti Department of Statistics and Demographic Studies. 2009. Djibouti Population and Housing Census.

Republic of Djibouti. 2012. Stratégie Nationale de Développement Urbain de 2012.

Republic of Djibouti. 2017. Stratégie Nationale sur le Changement Climatique.

Republic of Djibouti. 2019. Rapport du gouvernement: Pluies Diluviennes du 21 au 23 Novembre 2019 : Quelques Constats et Actions Principales à Mener.

Republic of Djibouti. 2020. National Development Plan 2020-2024. Djibouti ICI: Inclusion, Connectivity, Institutions.

Republic of Djibouti Fisheries Directorate 2022. Fisheries Directorate Statistics.

Republic of Djibouti. 2023. Contributions Déterminées au Niveau National (NDC) – Version Préliminaire.

Republic of Djibouti Ministry of Agriculture, Water, Fisheries and Livestock. 2017. Rapport Final de l'Enquête Cadre du Secteur de la Pêche à Djibouti.

Republic of Djibouti Ministry of Agriculture, Water, Fisheries and Livestock. 2018. Realisation du Schema Directeur d'Assainissement de l'Agglomération de Djibouti.

Republic of Djibouti Ministry of Budget. Table of Financial Transactions (TOFE), 1999-2022

Republic of Djibouti Ministry of Economy and Finance. 2022. *Annual Report: Economic, Social and Financial Situation.* Ministry of Economy and Finance.

https://direction-economie.gouv.dj/2022/11/Rapport_annuel_sur-la-Situation-économique-sociale-et-financière-2022.pdf

Republic of Djibouti, United Nations, and World Bank. 2020. Evaluation Rapide des Dommages, Pertes et Besoins Post-Inondation (Méthodologie PDNA).

Sandhu, H and S. Raya. 2019. "No Broken Link: The Vulnerability of Telecoms Infrastructure to Natural Hazards." Washington, D.C.: World Bank.

Seyfarth, M., Khaireh B.A., Abdi A.A., Bouh S.M., Faulde M.K. 2019. "Five Years Following First Detection of *Anopheles Stephensi* (Diptera: Culicidae) in Djibouti, Horn of Africa: Populations Established—Malaria Emerging." *Parasitol Res.* 2019;118:725–32

Siebert, S., Henrich, V., Frenken, K., and Burke, J. 2013. Update of the Digital Global Map of Irrigation Areas to Version 5. Rheinische Friedrich-Wilhelms-Universität, Bonn, Germany and Food and Agriculture Organization of the United Nations, Rome, Italy, 10(2.1), 2660-6728.

The Constructor. (n.d.). "Designing Resilient Buildings for Extreme Weather Conditions." Retrieved from <https://theconstructor.org/architecture/designing-resilient-buildings-for-extreme-weather-conditions/571350/>

UN World Tourism Organization Tourism Statistics Database.
<https://www.unwto.org/tourism-statistics/tourism-statistics-database>

UNICEF. 2020. “Youth Boost Knowledge to Reduce Malnutrition in Djibouti.” UNICEF. <https://www.unicef.org/djibouti/recits/les-jeunes-stimulent-les-connaissances-pour-r%C3%A9duire-la-malnutrition-%C3%A0-djibouti>

United Nations Trade and Development (UNCTAD). 2022. “Building Capacity to Manage Risks and Enhance Resilience: A Guidebook for Ports.” <https://unctad.org/publication/building-capacity-manage-risks-and-enhance-resilience-guidebook-ports>

United States Energy Information Administration (USEIA). 2022. Electric Sales, Revenue, and Average Price. https://www.eia.gov/electricity/sales_revenue_price/

von der Goltz, J.; Schuettler, K.; Bousquet, J.; Kebede, T. 2023. “The Labor Market Impact of Forced Displacement: Jobs in Host Communities in Colombia, Ethiopia, Jordan, and Uganda.” Washington D.C.: World Bank.

World Bank. (forthcoming). “Urban Heat Diagnostic for Djibouti City.” Washington, D.C.: World Bank.

World Bank, 2020. « Évaluation Rapide des Dommages, Pertes et Besoins Post-Inondation (Méthodologie PDNA) et Stratégie de Relèvement. » Washington, D.C. : World Bank.

World Bank. 2011. Project Information Document, Djibouti Rural Community Development and Water Mobilization Project / PRODERMO.

World Bank. 2013. “Enterprise surveys : Djibouti country profile 2013 (English).” Washington, D.C.: World Bank Group. <http://documents.worldbank.org/curated/en/998331468026441929/Enterprise-surveys-Djibouti-country-profile-2013?>

World Bank. 2018. Rapid Damage and Needs Assessment of Post-Cyclone Sagar. <https://www.gfdr.org/sites/default/files/publication/Rapport%20du%20RDNA%20de%20Djibouti-FINAL.PDF>

World Bank. 2019. “Challenges to Inclusive Growth: A Poverty and Equity Assessment of Djibouti.” Washington, D.C.: World Bank. <http://hdl.handle.net/10986/33032>

World Bank. 2022. Second Djibouti-Ethiopia Power System Interconnection Project (P173763) Project Appraisal Document.

World Bank. 2023a (forthcoming). “Voices of Refugees, Migrants and Undocumented Population of Djibouti,” Washington, D.C.: World Bank.

World Bank. 2023b. “World Development Report 2023: Migrants, Refugees, and Societies.” Washington, D.C.: World Bank.

World Bank. 2023c. “Djibouti Country Climate Risk Profile.” Washington, D.C.: World Bank. https://climateknowledgeportal.worldbank.org/sites/default/files/country-profiles/16697-WB_Djibouti%20Country%20Profile-WEB.pdf

World Bank. 2024a. “Djibouti Country Economic Memorandum, January 2024 - Djibouti Beyond the Ports and Bases: A Path to Prosperity for All.” Washington, D.C.: World Bank. <http://hdl.handle.net/10986/41036>

World Bank. 2024b. “Choosing our Future: Education for Climate Action.” <https://www.worldbank.org/en/topic/education/publication/education-for-climate-action>

World Bank. 2024c. “Ethiopia Country Climate and Development Report.” Washington, D.C.: World Bank.

World Bank. World Development Indicators. Washington, D.C.: World Bank.

World Food Program (WFP). 2022. “Djibouti: Food Security and Nutrition Monitoring Survey (FSNMS).” Available at:

<https://reliefweb.int/report/djibouti/djibouti-food-security-and-nutrition-monitoring-survey-fsnms-april-2022-data>

World Food Programme. 2022. Djibouti Food Security and Nutrition Monitoring Survey (FSNMS).

World Health Organization (WHOa). 2022. “Guidelines for Drinking-Water Quality Fourth Edition Incorporating First and Second Addenda.” <https://www.who.int/publications/i/item/9789240045064>.

World Health Organization (WHOb). 2022. World Malaria Report 2022. Geneva: WHO.

