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Green Growth Index – A Comparative Assessment of Green Growth Performance in the African Least Developed Countries (LDCs)

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Preface

African Least Developed Countries (LDCs) face the dual challenge of accelerating economic development while addressing persistent structural vulnerabilities. These include high exposure to climate risks, reliance on natural resources, limited fiscal space, and gaps in social inclusion. At the same time, African LDCs are expected to advance national development while meeting global commitments under the Sustainable Development Goals (SDGs) and the Paris Climate Agreement. African LDCs have opportunities to pursue development pathways that are low-carbon, climate-resilient, and inclusive. Green growth offers a practical approach to address these challenges while supporting sustainable development and long-term prosperity.

The Green Growth Index, developed under the Green Growth Performance Measurement (GGPM) Program of the Global Green Growth Institute (GGGI), provides a structured framework to assess countries' progress toward green growth. The Index covers four interlinked dimensions: efficient and sustainable resource use, natural capital protection, green economic opportunities, and social inclusion. It translates complex sustainability data into comparable scores that highlight strengths, gaps, and priority areas across countries and dimensions. The Index is designed to support governments in tracking progress, identifying policy gaps, and informing strategic decisions for the green growth transition. The Green Growth Index framework allows consistent comparisons across countries and over time, supporting learning and policy dialogue at national and regional levels. By aligning indicators with global sustainability targets, including the Sustainable Development Goals, the Paris Climate Agreement, and the Aichi Biodiversity Framework, the Index supports evidence-based policy dialogue and benchmarking at national, regional, and global levels. The selection of indicators reflects national priorities and is informed by engagement with national stakeholders and experts.

GGGI's Africa Regional Office (ARO), under my leadership as former Regional Director for Africa, initiated the development of the Africa LDC Green Growth Index in close collaboration with GGGI country teams and government partners. The framework was applied to eight African LDCs, including Burkina Faso, Ethiopia, Mozambique, Rwanda, Senegal, Togo, Uganda, and Zambia, to assess green growth performance and identify country-specific challenges and opportunities. The analysis integrates a review of national policy frameworks, including Nationally Determined Contributions, National Adaptation Plans, National Biodiversity Strategy and Action Plans, National Development Plans, and sectoral strategies, to strengthen the relevance of the findings for policy formulation and implementation. Through this combined assessment, the Index enables cross-country comparisons that identify policy gaps and alignment challenges affecting the green growth transition across African LDCs, particularly in areas related to economic transformation. The findings indicate that green economic opportunities and gender balance remain underprioritized in national policy frameworks, with limited measures to address green finance, innovation, and inclusive labor markets. Addressing these gaps is essential to achieving more balanced and inclusive green growth transitions across African LDCs.

This report aims to support policymakers, development partners, and practitioners by providing a structured assessment of where countries stand in their green growth transition, where progress has been made, and where targeted actions are needed. The assessment is grounded in the active engagement of 19 relevant ministries across the eight African LDCs, which participated in reviewing and validating the policy relevance of the green growth indicators included in the Index. By highlighting cross-country patterns and country-specific insights, the Africa LDC Green Growth Index informs priority-setting, investment decisions, and the design of integrated policies that advance climate resilience, economic diversification, and social inclusion. The comparative analysis shows that the eight African LDCs that are Members and Partners of GGGI perform relatively well in natural capital protection, reflecting the economic and ecological importance of forests, biodiversity, and ecosystem services. While green growth performance improved moderately between 2010 and 2023, progress has been uneven across dimensions and countries, pointing to persistent institutional and structural challenges to inclusive green transitions. In particular, social inclusion and green economic opportunities remain weaker relative to other LDCs in Asia, the Caribbean, and Latin America, highlighting continued gaps in social protection, gender equality, green investment, and innovation.

The Africa LDC Green Growth Index provides the groundwork for continued analytical work and deeper country-level assessments to support the green growth transition over time. Beyond its analytical role, it serves as a strategic tool to support GGGI's engagement with LDCs in international climate and development processes. By providing a transparent and data-driven assessment of progress and gaps across climate mitigation, adaptation, and sustainable development objectives, the Index strengthens the analytical basis for climate diplomacy, including LDC engagement in global climate negotiations and dialogue with development partners. At the national and regional levels, it informs discussions on investment priorities, program design, and policy reforms, while complementing existing planning and reporting processes. It also helps identify priority areas for climate finance and capacity building, and contributes to clear, evidence-based policy messages on the development and climate needs of African LDCs.

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GGGI would like to express its sincere appreciation to the government partners of the eight African Least Developed Countries covered in this report, including Burkina Faso, Ethiopia, Mozambique, Rwanda, Senegal, Togo, Uganda, and Zambia, for their strong engagement and continued collaboration. In particular, GGGI acknowledges the ministries responsible for planning, environment, finance, energy, and sustainable development for their active participation in reviewing national contexts, validating the policy relevance of the green growth indicators, and providing guidance on national priorities. The engagement of national experts and stakeholders within these institutions was critical to ensure that the Green Growth Index reflects country-specific realities and supports policy-relevant analysis at the national and regional levels.

Notable recognition is extended to the GGGI Country Office teams in Burkina Faso, Ethiopia, Rwanda, Senegal, Togo, Uganda, and Zambia. In Mozambique, the national expert focal point, Mr. Salvo Cossine Feliciano Tchamo, deserves special thanks for serving as GGGI's liaison with relevant ministries. Their technical expertise, sustained engagement with government partners, and coordination support played a central role in facilitating consultations, collecting feedback on the green growth indicators, and supporting the interpretation of country-level results. GGGI also acknowledges the contributions of the Africa Regional Office team, whose strategic leadership and regional oversight were instrumental in ensuring the overall design, implementation, and coherence of the Africa LDC Green Growth Index.

This report was prepared by the Green Growth Performance Measurement (GGPM) Team, in close collaboration with the African Regional and Country Teams. This collaborative analytical work ensured the methodological rigor, consistency, and robustness of the Green Growth Index framework and results. Under the oversight of GGPM Program Manager, Dr. Lilibeth Acosta, the GGPM team led the development of the indicator framework, data compilation and benchmarking, aggregation methods, and comparative analysis across countries and dimensions. The authors are grateful to the internal and external reviewers, including members of the GGGI Publication Committee, for their constructive feedback, which significantly improved the quality, clarity, and policy relevance of the report.

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Acronyms and Abbreviations

AB	Access to Basic Services and Resources
AFOLU	Agriculture, Forestry, and Other Land Use
BE	Biodiversity and Ecosystem Protection
CBD	Convention on Biological Diversity
CNP-TOGO	National Employers Council of Togo
CO2	Carbon Dioxide
CO2eq	Carbon Dioxide equivalent
COVID-19	Coronavirus disease
CPDN	Togolaise Contribution Prévue Déterminée au Niveau National
CRGE	Climate-Resilient Green Economy
CRFLR	Climate Resilient Forest and Landscape Restoration
CSFML	Conservation and Sustainable Management of Forested Landscape
CV	Cultural and Social Value
DAE	direct access entity
DALY	Disability-Adjusted Life Year
EE	Efficient and Sustainable Energy
EQ	Environmental Quality
ESRU	Efficient and Sustainable Resource Use
EW	Efficient and Sustainable Water Use
FAO	Food and Agriculture Organization of the United Nations
FAOSTAT	Food and Agriculture Organization Corporate Statistical Database
FDI	Foreign Direct Investment
FNFI	Fonds National de la Finance Inclusive
GB	Gender Balance
GCF	Green Climate Fund
GDP	Gross Domestic Product
GE	GHG Emissions Reduction
GEO	Green Economic Opportunities
Gg	Gigagram
GGGI	Global Green Growth Institute
GGPM	Green Growth Performance Measurement
GGW	Great Green Wall
GHDx	Global Health Data Exchange
GHG	Greenhouse Gas
GJ	Green Employment
GN	Green Innovation
GT	Green Trade
GV	Green Investment
ICT	Information and Communication Technology
IGREENFIN I	Inclusive Green Financing Initiative
IHME	Institute for Health Metrics and Evaluation
IMF	International Monetary Fund
ISO	International Organization for Standardization
IUCN	International Union for Conservation of Nature
JETP	Just Energy Transition Partnership
KBA	Key Biodiversity Areas
KFS	Korea Forest Service
LDC	Least Developed Countries
LED	Light-Emitting Diode
LT-LEDS	Long-Term Low Emission and Climate Resilient Development Strategy
LWH	Land Husbandry, Water Harvesting, and Hillside Irrigation
MAFRA	Developing Socio-Economic Infrastructure to Sustain Rural Communities Project
ME	Material Use Efficiency
mfg	manufacturing
MRV	measurement, reporting, and verification
MtCO2e	Metric tons of carbon dioxide equivalent
N2O	nitrous oxide
NAP	National Adaptation Plan
NAPA	National Adaptation Programme of Action
NBSAP	National Biodiversity Strategies and Action Plan
NCP	Natural Capital Protection
NDA	National Designated Authority
NDC	National Determined Contributions

Acronyms and Abbreviations

NDP	National Development Plan
NPCC 2016	National Policy on Climate Change
NST	National Strategy for Transformation
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
PA-SD 2023–2025	Action Plan for Stabilization and Development
PANER 2015–2030	National Renewable Energy Action Plan
PANEE 2015–2030	National Energy Efficiency Action Plan
PM2.5	Particulate matter with a diameter of less than 2.5 micrometers
PNA	National d'Adaptation aux Changements Climatiques
PNACC	Plan National d'Adaptation aux Changements Climatiques du Togo
PNCC 2017–2030	National Policy on Climate Change
PNDES	National Economic and Social Development Plan
PND	Togo plan national de developpement
PROGEDE II	Second Sustainable and Participatory Energy Management Project
PRSP 2009–2011	Poverty Reduction Strategy Statement
PS-ASP 2018–2027	Sectoral Agro-Sylvo-Pastoral Policy
PS-EEA 2018–2027	Sectoral Policy on Environment, Water, and Sanitation
PRSP 2009–2011	Poverty Reduction Strategy Paper
PWD	Persons with Disabilities
R&D	Research and Development
REDD	Reducing Emissions from Deforestation and Forest Degradation
REDD+	Reducing Emissions from Deforestation and Forest Degradation, and additional forest-related activities that protect the climate, namely sustainable management of forests and the conservation and enhancement of forest carbon stocks.
RUDP	Rehabilitation of Wetlands under the Rwanda Urban Development Project
SCAPE 2013–2017	Strategy for Accelerated Growth and Employment Promotion
SDGs	Sustainable Development Goals
SDSN	Sustainable Development Solutions Network
SE	Social Equity
SGM	Solar Grandmother
SHK	solar home kits
SI	Social Inclusion
SL	Sustainable Land Use
SMEs	Small and Medium-sized Enterprises
SNADDT 2040	National Plan of Planning and Sustainable Development of the Territory
SN-REDD	Stratégie Nationale – Reducing Emissions from Deforestation and Forest Degradation
SNCT 2018–2027	National Strategy for Culture and Tourism
SNNP	Southern Nation, Nationalities and Peoples
SP	Social Protection
SPANB	Stratégie et Plan d'Action National pour la Biodiversité du Togo
STILTS	Green Climate Fund Readiness for Low-Emission Transport System
SUBA	Improvement of Education Sector Results
SURAGGWA	Scaling-Up Resilience in Africa's Great Green Wall
UIS	United Nations Educational, Scientific and Cultural Organization Institute for Statistics
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNSTATS	United Nations Statistics Division
USD	United States Dollar
WHO	World Health Organization
UGGDS	Uganda Green Growth Development Strategy
UHC	Universal Health Coverage
WB	The World Bank
WHO	World Health Organization
XOF	West African CFA Franc

Executive Summary

1. **About the report:** This report presents the Africa LDC Green Growth Index, a comparative assessment of green growth performance in eight African Least Developed Countries (LDCs) that are Members and Partners of the Global Green Growth Institute (GGGI): Burkina Faso, Ethiopia, Mozambique, Rwanda, Senegal, Togo, Uganda, and Zambia. These countries face considerable economic, social, and environmental challenges, including dependence on low-value-added sectors, high vulnerability to climate impacts, and persistent poverty. The Africa LDC Index provides a data-driven and policy-relevant tool to track their progress toward a green growth transition and to identify common challenges and opportunities.

2. **Methods:** The analytical approach applied in this report follows a four-step process. First, 80 green growth indicators were identified from key national policies, including Nationally Determined Contributions (NDCs), National Adaptation Plans (NAPs), National Biodiversity Strategies and Action Plans (NBSAPs), National Development Plans (NDPs), and long-term visions. Second, the indicators were validated through structured reviews with GGGI Country Offices and government partners. Third, the benchmarked scores for the indicators were normalized, aggregated, and tested for robustness using sensitivity and regression analyses. Finally, the results were analyzed at the national and regional levels to compare performance across eight African LDCs and other LDC regions.

3. **Dimension-level analysis:** The results reveal mixed progress across the eight African LDCs. On average, natural capital protection is the strongest dimension of the Green Growth Index, reflecting advances in biodiversity conservation and environmental quality. Social inclusion shows moderate results, with countries making progress in expanding access to electricity, water, and sanitation but continuing to face gaps in social protection and gender equality. Efficient and sustainable resource use is constrained by persistent inefficiencies in land, water, and energy systems, with scores remaining below sustainability targets. Green economic opportunities remain the weakest dimension across all countries, reflecting limited progress in green investment, trade, innovation, and employment.

4. **Country-level analysis:** The assessment of the eight African LDCs reflects regional patterns of green growth performance. Countries generally performed better in natural capital protection and resource efficiency, while progress in green economic opportunities and social inclusion was more limited. National outcomes varied according to economic structures, policy choices, and levels of external support. Yet, all face common challenges in diversifying their economies, broadening access to essential services, and strengthening social protection. Encouragingly, advances in renewable energy, sustainable agriculture, and green investment show that faster and more inclusive progress is possible when policy frameworks and development initiatives are effectively aligned.

5. **Policy analysis:** An assessment of the policy frameworks indicates that the national strategies and plans in the eight countries provide broad coverage of green growth issues, particularly in environmental sustainability and climate resilience. Nationally Determined Contributions (NDCs), National Adaptation Plans (NAPs), National Biodiversity Strategies and Action Plans (NBSAPs), and long-term visions strongly emphasize climate adaptation, biodiversity conservation, and sustainable resource management, reflecting the high vulnerability of LDCs to climate impacts. However, the analysis of policy "greenness" reveals persistent gaps in economic transformation. Green economic opportunities and gender balance remain the least prioritized areas, with limited policy measures targeting green finance, innovation, and inclusive labor markets. Addressing these gaps is critical to achieving balanced green growth transitions.

6. **Regional analysis:** The comparative analysis across LDC groups shows that the eight African LDCs that are Members and Partners of GGGI perform relatively well in natural capital protection, reflecting the economic and ecological importance of forests, biodiversity, and ecosystem services. However, they lag behind their peers in Asia, the Caribbean, and Latin America in social inclusion and green economic opportunities, where access to social protection, gender equality, green investment, and innovation remain limited. Between 2010 and 2023, the green growth performance of the eight African LDCs improved moderately, but progress was uneven across dimensions and across countries, underscoring persistent institutional and structural challenges to inclusive green transitions.

7. **Key takeaways:** The Africa LDC Green Growth Index highlights structural challenges that need to be addressed to accelerate the green growth transition. Weak institutional capacity for cross-sectoral coordination remains a significant barrier, limiting the integration of climate and environmental priorities into development planning. Access to climate and green finance is still inadequate, constraining investment in renewable energy, resilient infrastructure, and sustainable livelihoods. Data gaps in several indicators hinder effective monitoring, while insufficient social protection systems leave vulnerable groups exposed to climate and economic shocks. At the same time, the Index points to significant opportunities that can accelerate the transition to green growth if adequately supported. These include harnessing the region's abundant renewable energy potential, investing in climate-smart agricultural practices to enhance food security, expanding sustainable tourism as a source of income and biodiversity conservation, and developing green skills programs to prepare the workforce for emerging opportunities in low-carbon and resource-efficient sectors.

8. **Next steps:** Moving forward, the Africa LDC Index this report provides an essential baseline for the development of national Green Growth Indexes. Applying the Index at the country level, as demonstrated in Zambia, Kenya, Ghana, and Togo, shows its practical value in guiding national strategies, benchmarking progress, and identifying priority areas for policy action. Building on this experience, African LDCs can adapt the framework to their specific contexts, ensuring more substantial alignment of development priorities with sustainability goals. This will require concrete actions such as improving the capacity of national statistical systems to generate timely data, establishing stronger mechanisms for cross-sectoral coordination, and designing financing frameworks that can effectively mobilize and channel global climate finance into country-led green growth priorities. The Green Growth Index can support this process by identifying the key challenges and opportunities in the green growth transition, thereby enabling governments to define more targeted, evidence-based priorities and develop coherent pipelines of green projects and investments.

1 Introduction

1.1 Africa LDCs and green growth

This report assesses the green growth performance of the eight African Least Developed Countries (LDCs) that are members and partners of the Global Green Growth Institute (GGGI), including Burkina Faso, Ethiopia, Mozambique, Rwanda, Senegal, Togo, Uganda, and Zambia. These African LDCs are confronted by economic, social, and environmental challenges that negatively impact people's livelihood and well-being, particularly vulnerable groups. Their economies are heavily dependent on primary goods and services, which are typically found in low-value-added sectors and characterized by extensive natural resource extraction.[1] As a result, the key economic sectors are highly vulnerable to climate change impacts. Their societies are facing rapid population growth and high poverty rates, which are exacerbated by limited access to basic services, healthcare, and education systems.[2] These reduce people's climate resilience. Moreover, these hinder the development of human skills that are needed to drive technological innovation and economic diversification. The fragile ecosystems due to deforestation, biodiversity loss, and desertification make the African LDCs very susceptible to the impacts of climate extremes, like droughts and floods.[3]

Green growth offers a sustainable pathway for African LDCs to overcome these challenges and reduce their vulnerabilities to climate change. It emphasizes efficient and sustainable resource use, natural capital protection, green economic opportunities, and social inclusion. Renewable energy, climate-resilient agriculture, and efficient management and use of energy, land, water, and material resources contribute to climate mitigation and adaptation. Protecting natural terrestrial and marine ecosystems supports economic diversification through eco-tourism and, at the same time, enhances biodiversity, which increases resource productivity. Integrating environmental sustainability into national development strategies and climate action plans promotes stable and resilient economies, opening opportunities to create green and high-skilled employment and produce green and high-added-value products and exports. Ultimately, economic and environmental sustainability will improve livelihoods, the standard of living, and social well-being.

However, the African LDCs need enhanced global support and harmonized policy frameworks to realize green growth opportunities. Advocating for equitable climate finance, capacity building, and technology transfer through the LDC Group in international climate negotiations is important to seizing global adaptation support.[4] Aligned with the global Sustainable Development Goals (SDGs), the key policies such as Nationally Determined Contributions (NDCs), National Adaptation Plans (NAPs), National Biodiversity Strategies and Action Plans (NBSAPs), National Development Plans (NDPs), and long-term visions can support the African LDCs green growth transition. These policies emphasize economic diversification, human capital development, and climate resilience in Burkina Faso, Ethiopia, Mozambique, Rwanda, Senegal, Togo, Uganda, and Zambia. However, priorities vary depending on the country-specific context, highlighting the importance of adapting green growth policies to national challenges and opportunities.

1.2 Rationale and objectives

GGGI developed the Green Growth Index for its Member Countries and Partners to track their performance in transitioning to a green growth model and identify challenges and opportunities as they pursue this sustainability pathway. The Green Growth Index provides a comprehensive and data-driven framework that builds on four interlinked dimensions, including efficient and sustainable resource use, natural capital protection, green economic opportunities, and social inclusion. Many green growth indicators used to compute the Green Growth Index scores are SDGs, allowing countries to assess and compare their performance in achieving the SDG and other sustainability targets, including the Paris Climate Agreement and Aichi Biodiversity Targets. GGGI government partners and relevant ministries in Burkina Faso, Ethiopia, Mozambique, Rwanda, Senegal, Togo, Uganda, and Zambia validated the policy relevance of the green growth indicators in this report. The green growth performance assessment of these African LDCs has several objectives:

- Compare key challenges and opportunities in the green growth transition, ensuring that GGGI's green projects and initiatives for the different African LDCs are based on a data-driven framework and policy-relevant green growth indicators;
- Provide background knowledge to guide the discussions on potential projects and initiatives with GGGI's government partners and potential donors, with the aim of capacitating the African LDC Group in climate negotiations;
- Create awareness among African LDC government partners on the GGGI's support to its Member Countries in developing the Green Growth Index to enhance SDG alignment of their mitigation and adaptation actions and green growth strategies; and
- Prepare a scoping document defining the initial list of green growth indicators, with the aim of supporting national experts and stakeholders in developing a National Green Growth Index through a collaborative and participatory approach.

1.3 Structure of the Report

Chapter 1 introduces the importance of green growth to the eight African LDCs, which are GGGI Member Countries and Partners, and the rationale for assessing and comparing their green growth performance.

Chapter 2 presents the analytical approach for collecting feedback on the green growth indicators' policy relevance, benchmarking and aggregating them to calculate the Green Growth Index scores, and validating the robustness of the benchmarked and aggregated scores.

Chapter 3 discusses the country-specific contexts and key policies of the African LDCs, including the NDCs, NAPs, NBSAPs, NDPs, and Visions, and systematically assesses the greenness of these policies.

Chapter 4 presents each country's benchmarked green growth indicators, highlighting areas for improvement and illustrating how GGGI projects contribute to creating green growth opportunities.

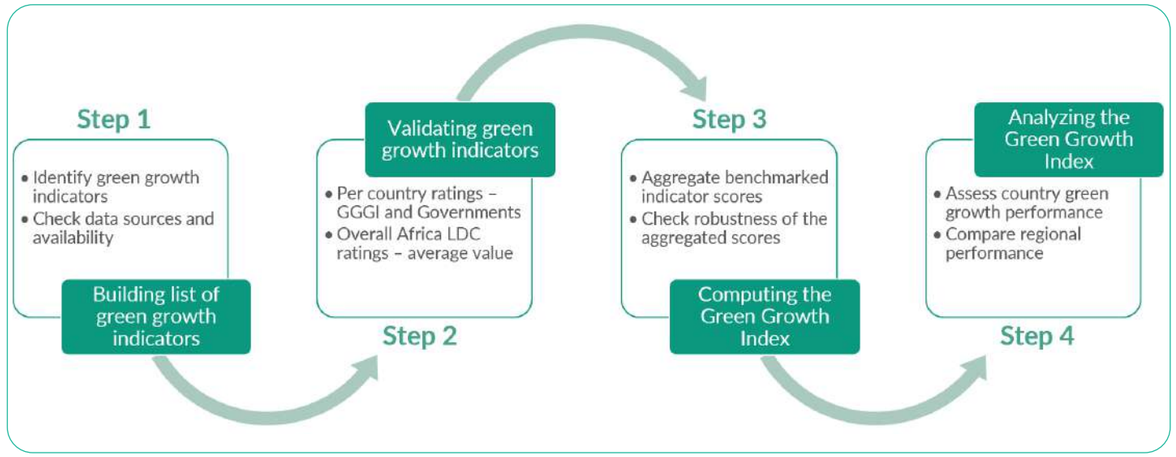
Chapter 5 compares the green growth performance across the eight African LDCs and their overall performance against other LDC groups in other regions.

Chapter 6 concludes the report and suggests the next steps for developing a National Green Growth Index.

2 Analytical approach

This report followed a stepwise approach to develop and analyze the African LDC Green Growth Index, including building and validating the green growth indicators, and computing and analyzing the Green Growth Index (Figure 1). The list of green growth indicators for the Green Growth Index was identified from key policy documents and the available National Green Growth Index, including Zambia, Kenya, and Ghana. Moreover, their data availability was checked from online international databases (Step 1). The policy relevance of the listed green growth indicators was validated by the GGGI Country Offices and their government partners using structured rating sheets (Step 2). The validated indicators were normalized and benchmarked to allow for aggregation, and the robustness of aggregated scores was checked using sensitivity and regression analyses (Step 3). The analysis of the green growth performance based on the Green Growth Index scores was conducted at the country and regional levels (Step 4). These steps are elaborated below.

Figure 1 Stepwise design process



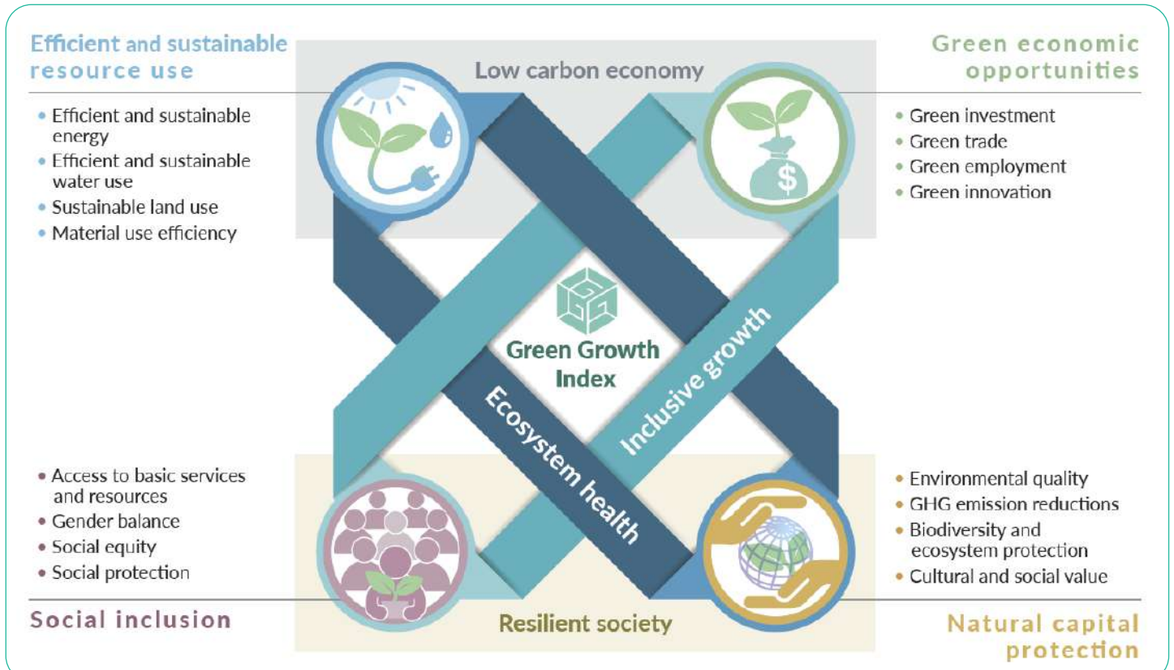
2.1 STEP 1: Building the list of green growth indicators

2.1.1. Identify green growth indicators

The selection of the green growth indicators was guided by the Green Growth Index framework, consisting of four dimensions and four sustainability pillars in each dimension (Figure 2). The interlinkages among the four green growth dimensions were drawn from the concepts of the low carbon economy, resilient society, ecosystem health, and inclusive growth. These concepts guided the determination of four indicator categories that represent each dimension. They serve as the groundwork for green growth, forming the basis for the transition to efficient and sustainable resource use, enhancement of natural capital protection, creation of green economic opportunities, and enablement of social inclusion. Using natural resources efficiently and sustainably will produce more goods and services with fewer resources. It will protect natural capital, including water, energy, land, and materials, as well as the ecosystem services they provide. A healthy ecosystem characterized by, for example, fertile soil, multifunctional forests, productive land and seas, good quality freshwater and clean air, and pollination increases economic productivity and creates new economic opportunities. Green Growth advocates the protection of natural capital because it provides sources of economic growth such as green jobs, trade, and investment. And it emphasizes not only people benefiting from growth but also people contributing to the efficient use and protection of natural resources. This makes social inclusion a key mechanism to both the achievement and distribution of gains from green growth. [5]

GGGI applies this framework to develop the Green Growth Index at the country, region, and global levels. Five green growth indicators are used in each pillar for the country and regional applications, giving the Green Growth Index a total of 80 indicators. In contrast, only three green growth indicators are included in each pillar for the global Green Growth Index, with a total of 48 indicators. Countries within the same regions often share common economic, social, and environmental contexts, enabling the inclusion of more policy-relevant indicators. SDG indicators are given priority when selecting the green growth indicators as it allows using the SDG targets to benchmark them (see Step 3). When building the list of green growth indicators, key national and sectoral policies were considered (see Chapter 3). Moreover, the indicators included in the National Green Growth Index for Zambia, Kenya, and Ghana were also reviewed. Before presenting the list of green growth indicators for reviews by the GGGI Country Offices and Government Partners in Burkina Faso, Ethiopia, Mozambique, Rwanda, Senegal, Togo, Uganda, and Zambia, the data availability was checked to ensure that sufficient databases were available to compute the Green Growth Index for the eight African LDCs.

Figure 2 Green Growth Index framework



2.1.2. Check data sources and availability

Table 1 presents the data sources and availability for the 80 green growth indicators for the eight African LDCs in four dimensions: efficient and sustainable resource use, natural capital protection, green economic opportunities, and social inclusion. Data availability and consistency vary across dimensions and countries.

In the efficient and sustainable resource use dimension, indicators related to energy and water use have wide data coverage. For example, data consistently exists for efficient and sustainable energy indicators such as energy intensity (EE1), renewable energy share (EE2), low-carbon electricity (EE4), and per capita electricity consumption (EE5) from 2000 to 2022 across most countries. However, efficient transport (EE3) shows data gaps, with coverage for some countries only extending up to 2016 or 2018. Similarly, all green growth indicators of efficient and sustainable water use exhibit good coverage from 2000 to 2020 or 2021. Only Ethiopia lacks data for the share of surface irrigation (EW4). Indicators in sustainable land use and waste/material use efficiency have substantial data gaps. For instance, annual forest area change (SL5) had data available only for 2010 and 2020. Similarly, food loss and food waste (ME3) exhibited large data gaps with coverage only from 2014 to 2018. Municipal solid waste recycling (ME4) also has limited data, with 2 or 3 data points per country. The green growth indicators for efficient and sustainable resource use come from sources like the United Nations Statistics Division (UNStats) (energy and water), the Food and Agriculture Organization of the United Nations (FAO) Database (FAOSTAT) (agriculture and land use), and Our World in Data (electricity). Of the 20 indicators in the efficient and sustainable resource use dimension, 12 are SDG indicators.

In natural capital protection, indicators related to environmental quality and GHG emissions reduction exhibit extensive data coverage. For the former pillar, indicators like PM2.5 air pollution (EQ1), DALY rates from unsafe water (EQ2), and urban population with open defecation (EQ4) have consistent data from 2000 to 2022 across most countries. However, solid waste generation (EQ3) and ambient air pollution DALYs (EQ5) show significant data limitations, with only one data point available for 2018 and 2019, respectively. All indicators under GHG emissions reduction have substantial coverage from 2000 to 2022 across all countries, except for Burkina Faso, which lacks data for CO2 emissions per manufacturing value-added (GE5). Similarly, biodiversity and ecosystem protection indicators demonstrate significant data coverage from 2000 to 2022, with only the 2023 data point missing across countries. For cultural and social values, the terrestrial protected areas (CV2) indicator only has data from 2016 onwards. The Red List Index (CV1) offers the most comprehensive timeline, spanning from 2000 to 2023. In contrast, exports of cultural goods (CV5) have shorter years of coverage, with data only covering the period from 2013 to 2019. The data sources for natural capital protection indicators include organizations like UNStats, FAOSTAT, the United Nations Environment Programme (UNEP), and the International Union for Conservation of Nature (IUCN) Red List. Thirteen (13) of the 20 indicators in natural capital protection are SDG indicators.

In the dimension of green economic opportunities, indicators under green investment and green trade display varied data availability. Green investment indicators show comprehensive data coverage across most countries, spanning from 2000 to 2022. New business density (GT4) demonstrates limited data coverage, with Burkina Faso, Ethiopia, and Mozambique having only 2, 3, and 6 data points, respectively. The green growth indicators under green employment (GJ) reveal mixed coverage. Green employment in manufacturing (GJ1) is notably absent for three countries—Burkina Faso, Mozambique, and Togo—and has data coverage only up to 2020 for the remaining countries. However, other indicators show comprehensive coverage from 2000 to 2022. Green innovation indicators present substantial challenges in data consistency. Medium/high-tech manufacturing value-added (GN4) is missing entirely for Burkina Faso, Mozambique, and Togo, while other countries covered only up to 2015 or 2021. Similarly, trademark applications (GN5) lack data for Ethiopia, Togo, and Senegal, although the remaining countries have data extending from 2004 to 2021. The data sources for the green economic opportunities dimension include UNSTATS database, Climate Watch, World Bank, Our World in Data, and datasets from the World Travel & Tourism Council, United Nations Educational, Scientific and Cultural Organization (UNESCO) Institute for Statistics (UIS), and the Institute for Health Metrics and Evaluation GHDx database. Of the 20 indicators in this dimension, 8 are directly aligned with the Sustainable Development Goals indicators.

Regarding social inclusion dimension, green growth indicators under access to basic services and resources show broad data coverage. Access to safe water and sanitation (AB1), electricity and clean fuels (AB2), and property rights (AB5) have data coverage from 2000 to 2022. In contrast, the data for the prevalence of children stunting (AB3) ends in 2020 for some countries, while access to public transport (AB4) only has a single data point (2020) for all countries. Gender balance indicators display mixed data availability. Women in national parliaments (GB1), gender accounts in financial institutions (GB2), and equal gender pay (GB3) have robust coverage extending from 2000 to 2024. Social equity (SE) indicators show sufficient data availability, with most indicators—such as inequality in income (SE1), rural-urban access to electricity (SE2), and youth unemployment disparity (SE3)—extending from 2000 to 2022 across all countries. However, cash benefits for people with disabilities (SE5) show sparse data availability. Uganda has no data, while Rwanda, Senegal, Togo, and Zambia report only a single data point for 2022. Other countries have limited data, requiring significant imputation to address gaps for missing years. Social protection (SP) indicators show varied coverage. Universal health coverage (SP2) and urban population living in slums (SP3) have comprehensive data from 2000 to 2021, but victims of intentional homicides (SP4) and the score of the Hyogo Framework (SP5) are more fragmented. SP4, for example, Togo has no data, and Ethiopia and Senegal have only one data point. Meanwhile, SP5 has coverage starting only from 2014, and Uganda has no data. The social inclusion dimension uses data from global sources like UNStats, World Bank Open Data, World Health Organization (WHO), UNESCO, and the Index for Risk Management. Of the 20 indicators in the social inclusion dimension, 12 are SDGs indicators.

Table 1 Data availability and sources of the green growth indicators

Indicator Code	Short Name	Available Data	Data Downloaded Source	Unit	Data publisher
EFFICIENT AND SUSTAINABLE RESOURCE USE					
EE1	Energy intensity	2000 - 2021	UNSTATS database	Megajoules per constant 2017 purchasing power parity GDP	IEA
EE2	Renewable energy share	2000 - 2021	UNSTATS database	Percent	IEA
EE3	Efficient transport	2007 - 2022	WB Logistics Performance Index	Score (1=low to 5=high)	WB
EE4	Low-carbon electricity	2000 - 2022	Our World in Data	Percent	BP, Ember
EE5	Per capita electricity consumption	1980 - 2022	Our World in Data	Kilowatt-hours per capita	EIA
EW1	Water use efficiency	2000 - 2021	UNSTATS database	United States dollars per cubic meter	FAO
EW2	Level of water stress	2000 - 2021	UNSTATS database	Percent	FAO
EW3	Capture fisheries	1960 - 2023	WB Open Data	Metric tons per current US$	FAO
EW4	Share of surface irrigation	1990 - 2020	FAO Aquastat	Percent	FAO

Table 1 Data availability and sources of the green growth indicators

Indicator Code	Short Name	Available Data	Data Downloaded Source	Unit	Data publisher
EW5	Renewable water resources per capita	1961 - 2020	FAO Aquastat	Cubic meters Per Capita	FAO
ME1	Domestic material consumption	1970 - 2023	UNEP	Nitrogen kilogram per hectare	FAO
ME2	Material footprint	1970 - 2023	UNEP Global Material Flows Database	Percent	FAO
ME3	Food loss and food waste	2014 - 2018	FAOSTAT	Livestock units per hectare	FAO
ME4	Municipal solid waste recycled	2005 - 2023	FAOSTAT	Current thousand US$/ hectare	FAO
ME5	Sewer, septic and latrine coverage	2000 - 2022	WASH Data	Percent	FAO
SL1	Soil nutrient balance	1961 - 2018	FAOSTAT	Kilograms per GDP	USDA
SL2	Organic agriculture area	2005 - 2020	FAOSTAT	Tonnes per capita	OECD, WB
SL3	Share ruminant livestock	1961 - 2020	FAOSTAT	Ratio	UNEP
SL4	Agricultural productivity	2000 - 2020	FAOSTAT	Percent	FAO
SL5	Annual forest area change	2010 - 2020	UNSTATS database	Coverage (%)	WHO, UNICEF
NATURAL CAPITAL PROTECTION					
BE1	Protected key biodiversity areas	2000 - 2023	UNSTATS database	Percent	IUCN, UNEP-WCMC
BE2	Share of forest areas	1990 - 2021	WB Open Data	Percent	FAO
BE3	Forest above-ground biomass	2000 - 2020	UNSTATS database	Tonnes per hectare	FAO
BE4	Forest under certification scheme	2000 - 2023	UNSTATS database	Thousands of hectares	FSC, PEFC
BE5	Change in extent of water ecosystems	2000 - 2022	UNSTATS database	Percent of total land area	UNEP
CV1	Red list index	1993 - 2023	UNSTATS database	Index	BLI and IUCN
CV2	Terrestrial protected area	2016 - 2022	WB Open Data	Percent	WDPA
CV3	Tourism contribution to GDP	1995 - 2023	World Travel & Tourism Council	current US$	WTTC
CV4	Share of employment in services	1991 - 2022	WB Open Data	% of total employment	ILO
CV5	Share of exports of cultural goods	2013 - 2019	UNESCO UIS Data	Percent	UNESCO
EQ1	PM2.5 air pollution	1990 - 2019	WB Open Data	Micrograms per cubic meter	WHO
EQ2	DALY rate from unsafe water	1990 - 2019	Institute for Health Metrics and Evaluation GHDx database	DALY lost per 100,000 persons	IHME
EQ3	Solid waste generation	2018 - 2018	WB What a Waste Global Database	Tonnes per capita	World Bank
EQ4	Urban people with open defecation	2000 - 2022	WB Open Data	% of urban population	WHO, UNICEF

Table 1 Data availability and sources of the green growth indicators

Indicator Code	Short Name	Available Data	Data Downloaded Source	Unit	Data publisher
EQ5	Ambient air pollution DALYs	2019 - 2019	WHO	DALYs per 100 000 population	WHO
GE1	CO2 emissions per capita	1990 - 2023	Climate Watch Data and WB Open Data	Tonnes per capita	Climate Watch, WB
GE2	Non-CO2 per capita excl. AFOLU	1990 - 2023	Climate Watch Data and WB Open Data	CO2eq tons per capita	CAIT, WB
GE3	Non-CO2 emissions in AFOLU	1990 - 2023	Climate Watch Data and WB Open Data	CO2eq tons per capita	CAIT, WB
GE4	Carbon intensity of energy production	1980 - 2019	Our World in Data	kilograms of CO2 per kilowatt-hour	GCP, BP
GE5	CO2 emissions per mfg value-added	2000 - 2021	unsTATS database	(kilogrammes of CO2 per constant 2015 United States dollars)	IEA, UNIDO
GREEN ECONOMIC OPPORTUNITIES					
GV1	Adjusted net savings	2000 - 2022	UNSTATS database	% of GNI, 5 years moving average	WB
GV2	Renewable electricity capacity	2000 - 2022	UNSTATS database	watts per capita	IRENA
GV3	Financial flows for clean energy R&D	2002 - 2022	UNSTATS database	Share to GDP (millions of constant 2020 United States dollars divided by the constant GDP)	OECD, IRENA
GV4	Agriculture orientation index	2017 - 2023	UNSTATS database	Percent	IMF, UNSD
GV5	Transport productive capacity	2001 - 2022	UNSTATS database	Index	UNCTAD
GT1	Exports of environmental goods	2000 - 2019	COMTRADE DATA	Percent	UNCOMTRADE
GT2	Environmental technologies exported	2003 - 2020	UNSTATS database	Percent	UNEP, OECD
GT3	ISO 14001 certificates issued	1999 - 2022	ISO database	Number	ISO
GT4	New business density	2006 - 2022	WB Open Data	Score	WB
GT5	High-technology exports	2008 - 2022	WB Open Data	% of manufactured exports	UN-COMTRADE
GJ1	Green employment in manufacturing	2000 - 2022	Based on methods by de Alba&Todorov (2018)	Percent	UNIDO
GJ2	Employed below poverty line	2000 - 2022	UNSTATS database	Percent	ILO
GJ3	Vulnerable employment	1991 - 2022	WB Open Data	% of total employment	ILOSTAT
GJ4	Firms offering formal training	2006 - 2023	WB Open Data	% of firms	WB
GJ5	ODA flows for scholarships	2006 - 2022	UNSTATS database	millions of constant 2021 United States dollars	OECD

Table 1 Data availability and sources of the green growth indicators

Indicator Code	Short Name	Available Data	Data Downloaded Source	Unit	Data publisher
GN1	Environmental technologies	1977 - 2019	OECD database	Percent	OECD
GN2	Scientific and technical journals	2000 - 2018	Our World in Data	Number per million people	WB, UN
GN3	Researchers per million inhabitants	2003 - 2022	UNSTATS database	per 1,000,000 population	UNESCO
GN4	Medium/high-tech mfg value-added	2000 - 2021	UNSTATS database	1-7 (best)	UNIDO
GN5	Trademark applications	2004 - 2021	WB Open Data	resident, by count	WIPO
SOCIAL INCLUSION					
AB1	Access to safe water and sanitation	2000 - 2023	UNSTATS database	Percent	WHO/ UNICEF
AB2	Access to electricity and clean fuels	2000 - 2023	UNSTATS database	Number	WB, WHO
AB3	Prevalence of children stunting	1986 - 2022	WB Open Data	Percent of children under 5	FAO
AB4	Convenient access to public transport	2020 - 2020	UNSTATS database	Percent	UN-Habitat
AB5	Property rights	1789 - 2023	WB TCdata360	Score	Heritage Foundation
GB1	Women in national parliaments	2000 - 2023	UNSTATS database	% of total number of seats	IPU
GB2	Gender account in financial institution	2000 - 2023	UNSTATS database	Parity ratio	WB, WHO
GB3	Equal gender pay	1971 - 2023	WB Open Data	Score	WB, WHO
GB4	Mothers with maternity cash benefits	2016 - 2022	UNSTATS database	% of women aged 15-49 years	ILO
GB5	School enrollment gender parity	1970 - 2021	WB Open Data	Parity ratio	UNESCO
SE1	Inequality in income	1969 - 2023	WB Open Data	Ratio	WB, WHO
SE2	Rural-urban access to electricity	2000 - 2023	WB Open Data	Ratio	WB, IEA, IRENA, UNSD, WHO

Table 1 Data availability and sources of the green growth indicators

Indicator Code	Short Name	Available Data	Data Downloaded Source	Unit	Data publisher
SE3	Youth unemployment disparity	2000 - 2023	UNSTATS database	Ratio	ILO
SE4	Age dependency ratio	1960 - 2023	WB Open Data	% of working-age population	WB
SE5	Cash benefit for people with disabilities	2015 - 2023	UNSTATS database	Percent	ILO
SP1	Share of old people receiving pension	2000 - 2022	UNSTATS database	Percent	ILO
SP2	Universal health coverage	2000 - 2021	UNSTATS database	Score	WHO
SP3	Population living in slums	2000 - 2022	UNSTATS database	Percent	UN-Habitat
SP4	Victims of intentional homicides	1990 - 2021	WB Open Data	Number per 100,000 population	UNODC
SP5	Score of Hyogo Framework	2014 - 2023	Index for Risk Management database	Score	UNISDR

2.2 STEP 2: Validating green growth indicators

An Excel-based semi-structured survey questionnaire was used to collect feedback on the policy relevance of the green growth indicators to the eight African LDCs' economic, social, and environmental contexts. The GGGI Country Offices worked with their respective government partners to provide ratings for each indicator. In Burkina Faso and Senegal, several ministries were also invited by the government partners to participate in reviewing the green growth indicators. The questionnaire allowed the reviewers to explain the ratings provided.

Figure 3 presents the average ratings on the green growth indicators in each dimension (see Annex 1 for country ratings). Among the four dimensions, efficient and sustainable resource indicators received the best ratings, with the most high and very high ratings. Only efficient transport (EE3) had a moderate rating. The natural capital protection dimension also had many indicators with high and very high ratings. However, it had four indicators with four moderate ratings, including urban people with open defecation (EQ4), forest under certification scheme (BE4), tourism contribution to GDP (CV3), and share of exports of cultural goods (CV5). The green economic opportunities dimension had the fewest indicators receiving very high ratings, only two. Moreover, it was the only dimension with an indicator scoring low, particularly Official Development Assistance (ODA) flows for scholarships (GJ5). Experts in Burkina Faso rated this indicator very low, and those in Ethiopia and Senegal low. The reasons provided for the very low score for this indicator in Burkina Faso was ….(insert reason here). Although the social inclusion dimension had five indicators scoring moderate, no indicator was rated low.

Figure 3 Average ratings on the green growth indicators by dimension

Indicator Code	Indicator Name	Average ratings
EFFICIENT AND SUSTAINABLE RESOURCE USE		
EE1	Energy intensity	Very High
EE2	Renewable energy share	High
EE3	Efficient transport	Moderate
EE4	Low-carbon electricity	High
EE5	Per capita electricity consumption	High
EW1	Water use efficiency	Very High
EW2	Level of water stress	High
EW3	Capture fisheries	High
EW4	Share of surface irrigation	High
EW5	Renewable water resources per capita	High
SL1	Soil nutrient balance	High
SL2	Organic agriculture area	High
SL3	Share ruminant livestock	High
SL4	Agricultural productivity	High
SL5	Annual forest area change	Very High
ME1	Domestic material consumption	High
ME2	Material footprint	High
ME3	Food loss and food waste	High
ME4	Municipal solid waste recycled	High
ME5	Sewer, septic and latrine coverage	High
NATURAL CAPITAL PROTECTION		
EQ1	PM2.5 air pollution	High
EQ2	DALY rate from unsafe water	High
EQ3	Solid waste generation	High
EQ4	Urban people with open defecation	Moderate
EQ5	Ambient air pollution DALYs	High
GE1	CO2 emissions per capita	High
GE2	Non-CO2 per capita excl. AFOLU	High
GE3	Non-CO2 emissions in AFOLU	High
GE4	Carbon intensity of energy production	High
GE5	CO2 emissions per mfg value-added	High
BE1	Protected key biodiversity areas	Very High
BE2	Share of forest areas	High
BE3	Forest above-ground biomass	High
BE4	Forest under certification scheme	Moderate
BE5	Change in extent of water ecosystems	High
CV1	Red list index	High
CV2	Terrestrial protected area	High
CV3	Tourism contribution to GDP	Moderate
CV4	Share of employment in services	High
CV5	Share of exports of cultural goods	Moderate

Figure 3 Average ratings on the green growth indicators by dimension *(continued)*

Indicator Code	Indicator Name	Average ratings
GREEN ECONOMIC OPPORTUNITIES		
GV1	Adjusted net savings	Moderate
GV2	Renewable electricity capacity	High
GV3	Financial flows for clean energy R&D	High
GV4	Agriculture orientation index	High
GV5	Transport productive capacity	High
GT1	Exports of environmental goods	Moderate
GT2	Environmental technologies exported	Moderate
GT3	ISO 14001 certificates issued	High
GT4	New business density	High
GT5	High-technology exports	Moderate
GJ1	Green employment in manufacturing	High
GJ2	Employed beLowpoverty line	High
GJ3	Vulnerable employment	Very High
GJ4	Firms offering formal training	Moderate
GJ5	ODA flows for scholarships	Moderate
GN1	Environmental technologies	Moderate
GN2	Scientific and technical journals	High
GN3	Researchers per million inhabitants	Moderate
GN4	Medium/high-tech mfg value-added	Moderate
GN5	Trademark applications	High
NATURAL CAPITAL PROTECTION		
AB1	Access to safe water and sanitation	Very High
AB2	Access to electricity and clean fuels	High
AB3	Prevalence of children stunting	High
AB4	Convenient access to public transport	High
AB5	Property rights	High
GB1	Women in national parliaments	High
GB2	Gender account in financial institution	High
GB3	Equal gender pay	Moderate
GB4	Mothers with maternity cash benefits	Moderate
GB5	School enrollment gender parity	Very High
SE1	Inequality in income	High
SE2	Rural-urban access to electricity	Very High
SE3	Youth unemployment disparity	High
SE4	Age dependency ratio	Moderate
SE5	Cash benefit for people with disabilities	High
SP1	Share of old people receiving pension	High
SP2	Universal health coverage	High
SP3	Population living in slums	High
SP4	Victims of intentional homicides	Moderate
SP5	Score of Hyogo Framework	High

2.3 STEP 3: Computing the Green Growth Index

2.3.1. Check data sources and availability

The data for the green growth indicators contain different units of measurement (Table 1). They need to be normalized to transform them into a common scale. The following min-max normalization function was applied because it is simple and widely used, facilitating replication; it allows the use of upper and lower bounds, reducing outliers; and it enables benchmarking, directly integrating sustainability targets in the normalization.

$$X_{norm} = a + \frac{X_i - X_{min}}{X_{max} - X_{min}}(b - a)$$

Where:
Xnorm is the normalized indicator
Xi is the ith green growth indicator
Xmax is the maximum value of the indicator
Xmin is the minimum value of the indicator
a is the lower bound, with one (1) as the lowest possible score
b is the upper bound, represented by the sustainability target (X_t)

Based on the above, the Green Growth Index adopts a target-setting approach to benchmarking, which allows the comparison with performance thresholds (upper bound) and reference values (lower bound). The benchmarked Index scores, with a scale between 1 and 100, inform policymakers of areas needing improvement and where opportunities for green growth transition exist. The lower bound of 1 is used because a zero score could be misinterpreted to mean the lack of capacity to perform in a given green growth indicator. The upper bound of 100 is used to imply the achievement of the sustainability target for a given indicator. The added value of using SDG indicators in the Green Growth Index is the availability of targets against which to benchmark the green growth indicators. For SDG indicators, the explicit or implicit SDG targets suggested by the Organisation for Economic Co-operation and Development (OECD) and Sustainable Development Solutions Network (SDSN) were used.[7] However, there are no globally agreed climate targets for some SDG indicators. In this case, like for non-SDG indicators, targets were identified in two ways: (1) suggested targets in scientific literature and reports from international organizations, and (2) the average value of the top five global performing countries. Table 2 presents the sustainability targets applied in this report.

Table 2 Sustainability targets for the green growth indicators *(continued)*

Indicator Code	Short Name	Unstat SDG Indicator	Relationship to the index	Targets	Countries Reaching Targets
EFFICIENT AND SUSTAINABLE RESOURCE USE					
EE1	Energy intensity	yes	negative	5.442 (1)(a)	3
EE2	Renewable energy share	yes	positive	84.17 (1)(a)	2
EE3	Efficient transport	no	positive	2.407603 (1)(a)	1
EE4	Low-carbon electricity	no	positive	84.83932 (1)(a)	3
EE5	Per capita electricity consumption	no	negative	251.855 (1)(a)	4
EW1	Water use efficiency	yes	positive	21.604 (1)(a)	2
EW2	Level of water stress	yes	negative	25.0 - 75.0 (2)(b)	7
EW3	Capture fisheries	no	positive	0.0000129 (1)(a)	2
EW4	Share of surface irrigation	no	negative	79.51939 (1)(a)	1
EW5	Renewable water resources per capita	no	positive	2285.411 (1)(a)	2
ME1	Domestic material consumption	yes	negative	3.503853 (1)(a)	2

Types of Targets (1) Mean top 5 performers; (2) SDG target; (3) Other targets;
Source of targets (a) Method based on Sachs et al. (2019); (b) FAO; (c) Expert opinion; (d)Sachs et al. (2019) ; (e) OECD (2019); (f) WHO 2005; (g) Expert opinion; (h) Highest score; (i) Normative

Table 2 Sustainability targets for the green growth indicators *(continued)*

Indicator Code	Short Name	Unstat SDG Indicator	Relationship to the index	Targets	Countries Reaching Targets
ME2	Material footprint	yes	positive	3.761862 (1)(a)	2
ME3	Food loss and food waste	yes	negative	19.81458 (1)(a)	2
ME4	Municipal solid waste recycled	yes	positive	72.7 (1)(a)	2
ME5	Sewer, septic and latrine coverage	no	positive	21.86154 (1)(a)	2
SL1	Soil nutrient balance	no	negative	5 (3)(c)	1
SL2	Organic agriculture area	yes	negative	0.333064 (1)(a)	3
SL3	Share ruminant livestock	yes	negative	0.36 (1)(a)	2
SL4	Agricultural productivity	yes	positive	26056.79 (1)(a)	2
SL5	Annual forest area change	yes	positive	- 0.228 (1)(a)	1
NATURAL CAPITAL PROTECTION					
BE1	Protected key biodiversity areas	yes	positive	100 (2)(d)	0
BE2	Share of forest areas	yes	positive	17 (2)(e)(d)	5
BE3	Forest above-ground biomass	yes	positive	117.138 (1)(a)	3
BE4	Forest under certification scheme	yes	positive	37.055 (1)(a)	2
BE5	Change in extent of water ecosystems	yes	positive	0.02577 (1)(a)	2
CV1	Red list index	yes	positive	1 (3)(d)(e)	0
CV2	Terrestrial protected area	yes	positive	17 (2)(d)	4
CV3	Tourism contribution to GDP	yes	positive	3.894033 (1)(a)	2
CV4	Share of employment in services	no	positive	39.3994 (1)(a)	2
CV5	Share of exports of cultural goods	no	positive	0.0774 (1)(a)	1
EQ1	PM2.5 air pollution	yes	negative	10 (2)(e)(f)	0
EQ2	DALY rate from unsafe water	no	negative	1791.483 (1)(a)	3
EQ3	Solid waste generation	yes	negative	0.1224 (1)(a)	2
EQ4	Urban people with open defecation	no	negative	1.633181 (1)(a)	3
EQ5	Ambient air pollution DALYs	no	negative	825.66 (1)(a)	5
GE1	CO2 emissions per capita	yes	negative	0.150888 (1)(a)	3
GE2	Non-CO2 per capita excl. AFOLU	yes	negative	0.271412 (1)(a)	2

Types of Targets (1) Mean top 5 performers; (2) SDG target; (3) Other targets;
Source of targets (a) Method based on Sachs et al. (2019); (b) FAO; (c) Expert opinion; (d)Sachs et al. (2019) ; (e) OECD (2019); (f) WHO 2005; (g) Expert opinion; (h) Highest score; (i) Normative

Table 2 Sustainability targets for the green growth indicators *(continued)*

Indicator Code	Short Name	Unstat SDG Indicator	Relationship to the index	Targets	Countries Reaching Targets
GE3	Non-CO2 emissions in AFOLU	yes	negative	0.57496 (1)(a)	2
GE4	Carbon intensity of energy production	no	negative	0.14196 (1)(a)	2
GE5	CO2 emissions per mfg value-added	no	negative	0.2134 (1)(a)	3
GREEN ECONOMIC OPPORTUNITIES					
GV1	Adjusted net savings	no	positive	165.678 (1)(a)	0
GV2	Renewable electricity capacity	yes	positive	60.8 (1)(a)	2
GV3	Financial flows for clean energy R&D	yes	positive	77.61798 (1)(a)	2
GV4	Agriculture orientation index	yes	positive	45.8 (1)(a)	3
GV5	Transport productive capacity	no	positive	0.387 (1)(a)	1
GT1	Exports of environmental goods	no	positive	1.320007 (1)(a)	1
GT2	Environmental technologies exported	yes	positive	0.009752 (1)(a)	1
GT3	ISO 14001 certificates issued	no	positive	24.5 (1)(a)	2
GT4	New business density	no	positive	1.314107 (1)(a)	1
GT5	High-technology exports	no	positive	3.163914 (1)(a)	3
GJ1	Green employment in manufacturing	no	positive	0.03 (1)(a)	3
GJ2	Employed below poverty line	yes	negative	20.432 (1)(a)	3
GJ3	Vulnerable employment	no	negative	68.30751 (1)(a)	2
GJ4	Firms offering formal training	no	positive	33.0425 (1)(a)	3
GJ5	ODA flows for scholarships	yes	positive	8.17745 (1)(a)	1
GN1	Environmental technologies	no	positive	66.37293 (1)(a)	2
GN2	Scientific and technical journals	no	positive	16.9952 (1)(a)	2
GN3	Researchers per million inhabitants	yes	positive	164.1702 (1)(a)	1
GN4	Medium/high-tech mfg value-added	yes	positive	15.065 (1)(a)	2
GN5	Trademark applications	no	positive	1387.6 (1)(a)	3

Types of Targets (1) Mean top 5 performers; (2) SDG target; (3) Other targets;
Source of targets (a) Method based on Sachs et al. (2019); (b) FAO; (c) Expert opinion; (d)Sachs et al. (2019) ; (e) OECD (2019); (f) WHO 2005; (g) Expert opinion; (h) Highest score; (i) Normative

Table 2 Sustainability targets for the green growth indicators *(continued)*

Indicator Code	Short Name	Unstat SDG Indicator	Relationship to the index	Targets	Countries Reaching Targets
SOCIAL INCLUSION					
AB1	Access to safe water and sanitation	yes	positive	100 (2)(a)	0
AB2	Access to electricity and clean fuels	yes	positive	100 (2)(a)	0
AB3	Prevalence of children stunting	no	negative	0 (3)(g)	0
AB4	Convenient access to public transport	yes	positive	100 (3)(h)	0
AB5	Property rights	no	positive	100 (3)(h)	0
GB1	Women in national parliaments	yes	positive	50 (2)(a)	1
GB2	Gender account in financial institution	yes	negative	1 (2)(a)	0
GB3	Equal gender pay	no	positive	100 (3)(h)	4
GB4	Mothers with maternity cash benefits	yes	positive	100 (3)(g)	0
GB5	School enrollment gender parity	no	negative	0.966239 (1)(a)	3
SE1	Inequality in income	no	negative	1.68784 (1)(a)	4
SE2	Rural-urban access to electricity	no	negative	1 (3)(i)	0
SE3	Youth unemployment disparity	yes	negative	1.833397 (1)(a)	2
SE4	Age dependency ratio	no	negative	4.274279 (1)(a)	2
SE5	Cash benefit for people with disabilities	yes	positive	9.14 (1)(a)	2
SP1	Share of old people receiving pension	yes	positive	100 (2)(a)	0
SP2	Universal health coverage	yes	positive	100 (2)(a)	0
SP3	Population living in slums	yes	negative	6.618574 (1)(a)	0
SP4	Victims of intentional homicides	yes	negative	0 (2)(a)	0
SP5	Score of Hyogo Framework	no	positive	3.819933 (1)(a)	2

Types of Targets (1) Mean top 5 performers; (2) SDG target; (3) Other targets;
Source of targets (a) Method based on Sachs et al. (2019); (b) FAO; (c) Expert opinion; (d)Sachs et al. (2019) ; (e) OECD (2019); (f) WHO 2005; (g) Expert opinion; (h) Highest score; (i) Normative

Using the benchmarked scores of the normalized indicators, two methods were applied in the different aggregation models (Figure 4). As the level of aggregation increases, the level of substitutability decreases:

1. Level 1: Arithmetic mean was applied to linearly aggregate the normalized indicators, allowing substitutability of the individual indicators in each pillar. Moreover, at Level 1 of aggregation, countries with more than 25 percent missing values were dropped.

2. Level 2: Geometric aggregation was applied to the indicator categories to allow only partial substitutability between indicators in each dimension. Like in Level 1, the 25 percent rule on missing values was applied to the dimensions.

3. Level 3: Geometric aggregation was applied to the dimensions, but the 25 percent rule on missing values was not used. At this aggregation level, no dimension could be easily substituted for the other dimensions to improve the Green Growth Index.

The scores at the different levels of aggregation are presented in Annex 2.

Figure 4 Methods of aggregation at the indicator, indicator category, and dimension levels

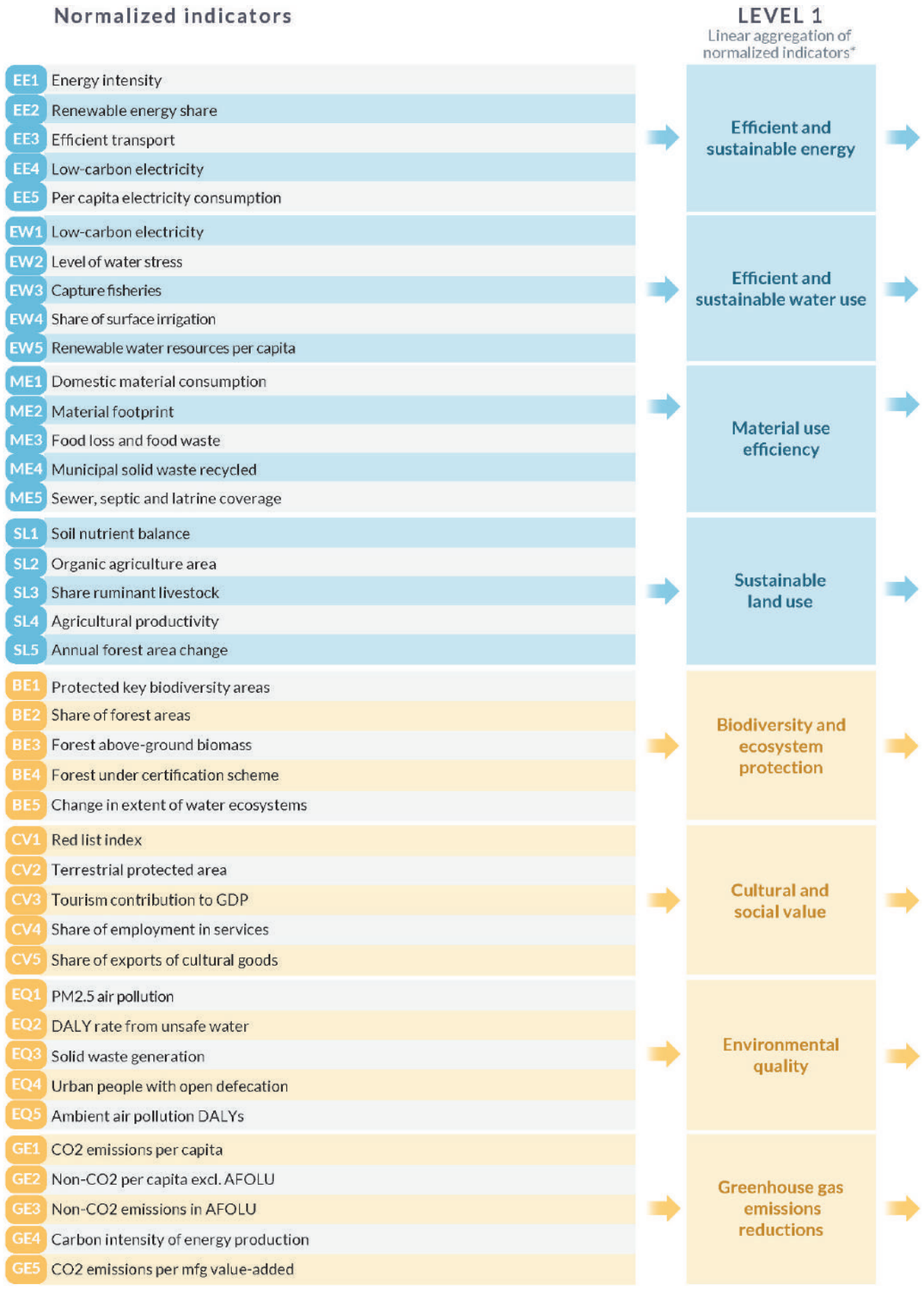


Figure 4 Methods of aggregation at the indicator, indicator category, and dimension levels *(contuned)*

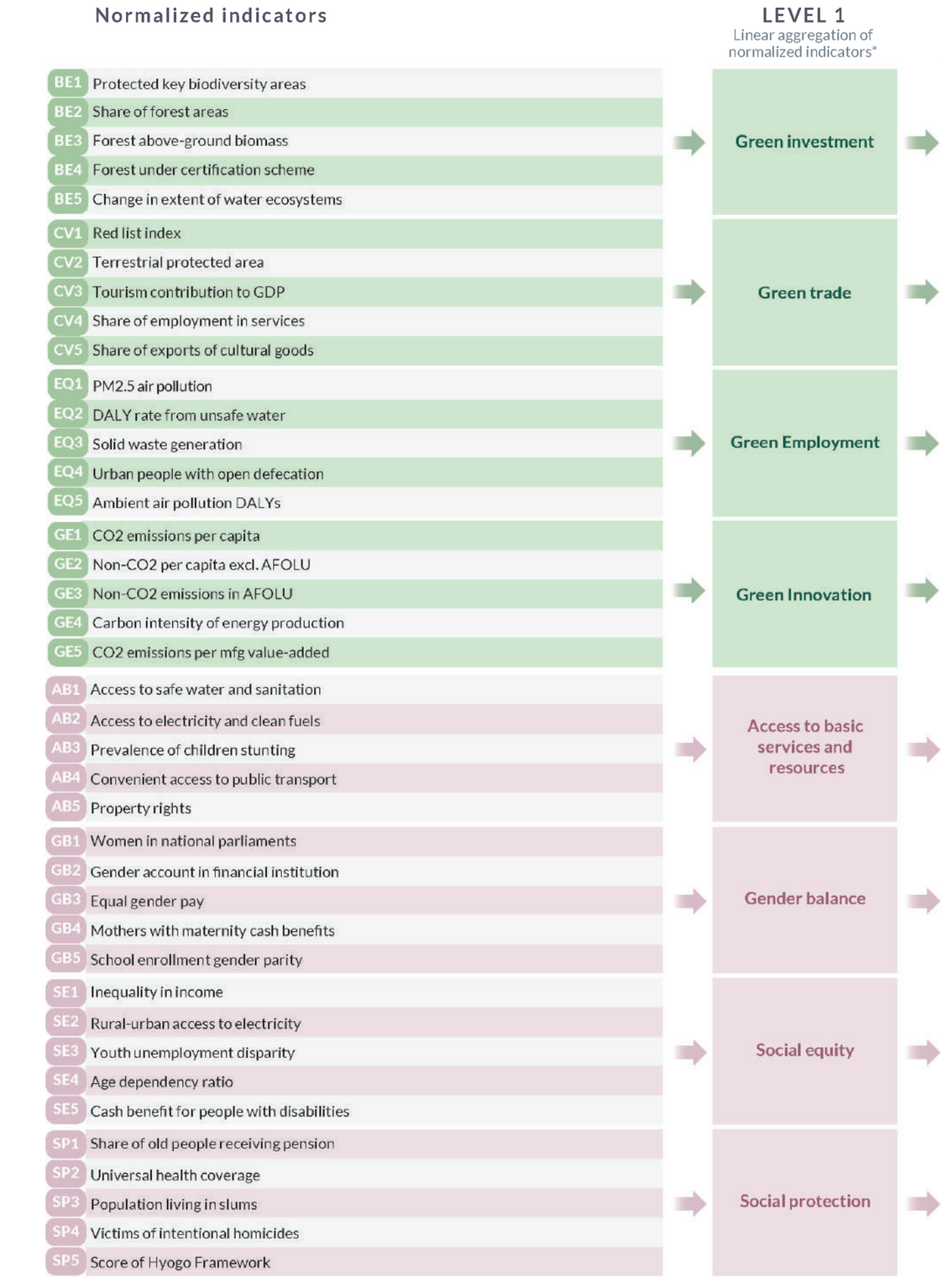
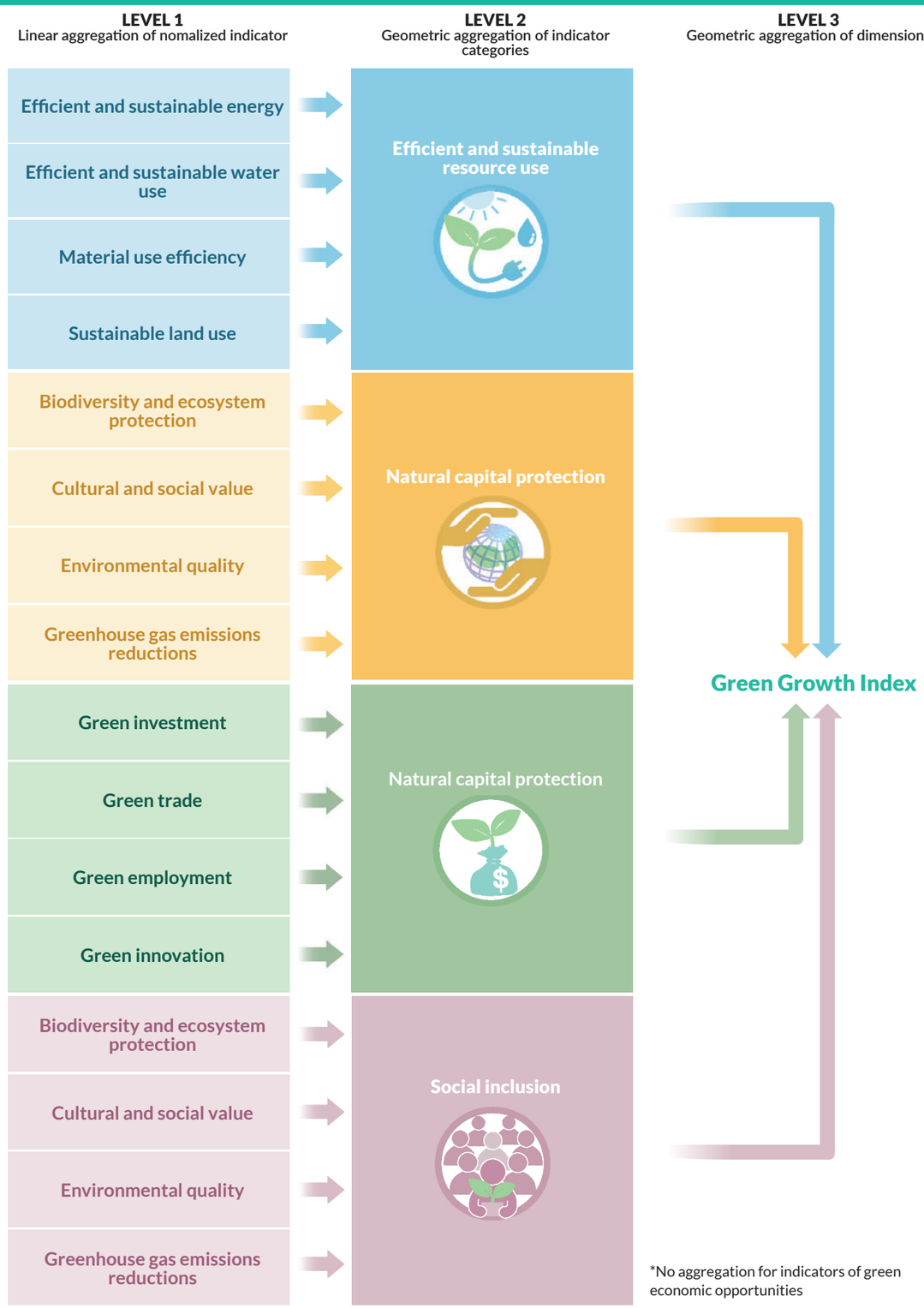


Figure 4 Methods of aggregation at the indicator, indicator category, and dimension levels *(contuned)*



2.3.2 Check the robustness of aggregated scores

A thorough validation process was conducted to ensure the reliability and accuracy of the African LDC Green Growth Index. Composite indices are often criticized for being misleading if poorly constructed or interpreted. Therefore, an essential step in developing a composite index is evaluating the confidence in the model and its underlying assumptions, referred to as the robustness check.

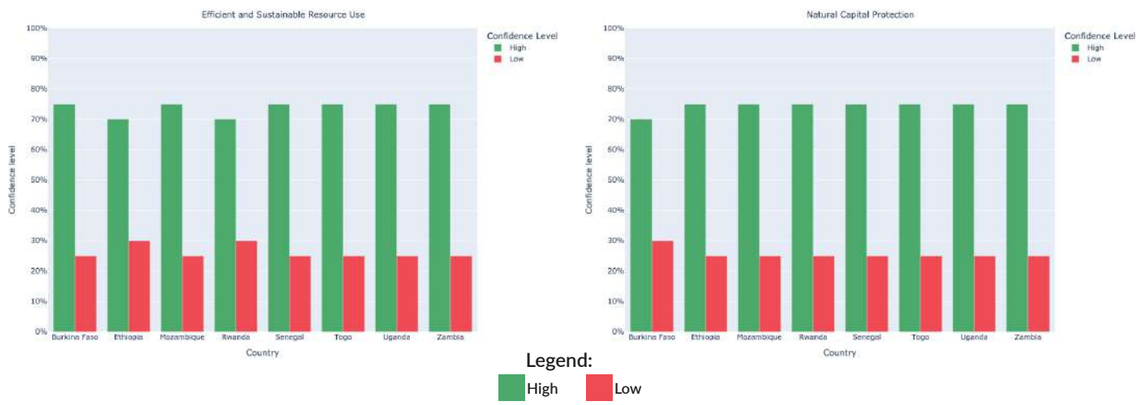
Simple imputation was applied to green growth indicators with data gaps. As data gaps increase, the confidence level of the aggregated scores declines. Figure 5 illustrates the confidence levels for the dimension scores across eight African LDCs. Among the four dimensions, green economic opportunities and social inclusion show a higher frequency of low confidence levels across the countries. Burkina Faso, Mozambique, and Uganda have the highest data gaps in green economic opportunities, while Uganda and Zambia have the highest gaps in social inclusion. Details on the pillars contributing to the low confidence levels are presented in Annex 3.

Moreover, two types of statistical analyses were conducted to validate the robustness of the LDC green growth index:

- Sensitivity analysis using Monte Carlo simulations was applied to analyze the sensitivity of the LDC Index to variations in the input variables of the aggregation model at the indicator level.
- Regression analysis was conducted to assess the ability of the indicators and their aggregated values (i.e., pillars, dimensions) to explain the structure of the Green Growth Index at the pillar and dimension levels.

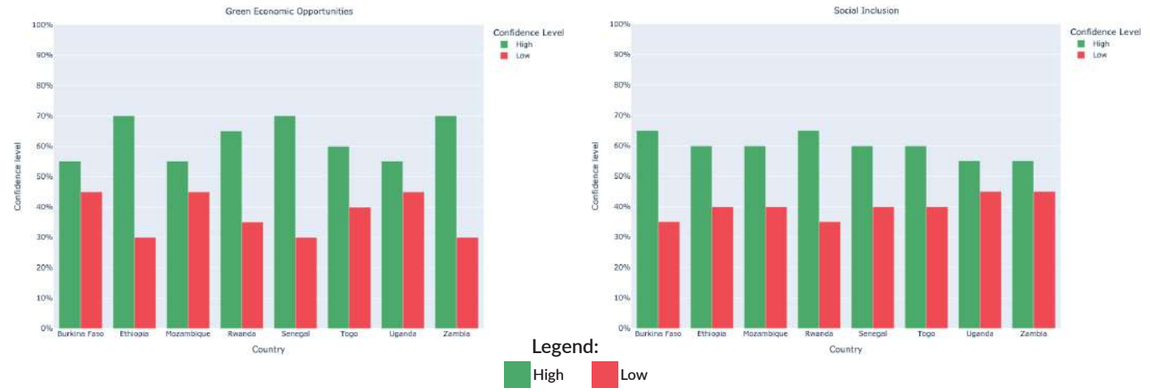
The sensitivity analysis examined the effects of changes in indicator values and missing data on the African LDC Green Growth Index scores. The results proved that the Index remains robust despite fluctuations in model inputs and assumptions. The regression analysis confirmed that the dimensions, pillars, and individual indicators explain sufficient variation in the Index scores. Detailed findings from the robustness checks are discussed in Annex 4.

Figure 5 Distribution of confidence levels based on data availability by region and dimension, 2000-2023



Details on data gaps in each pillar by country are available in Annex 3.

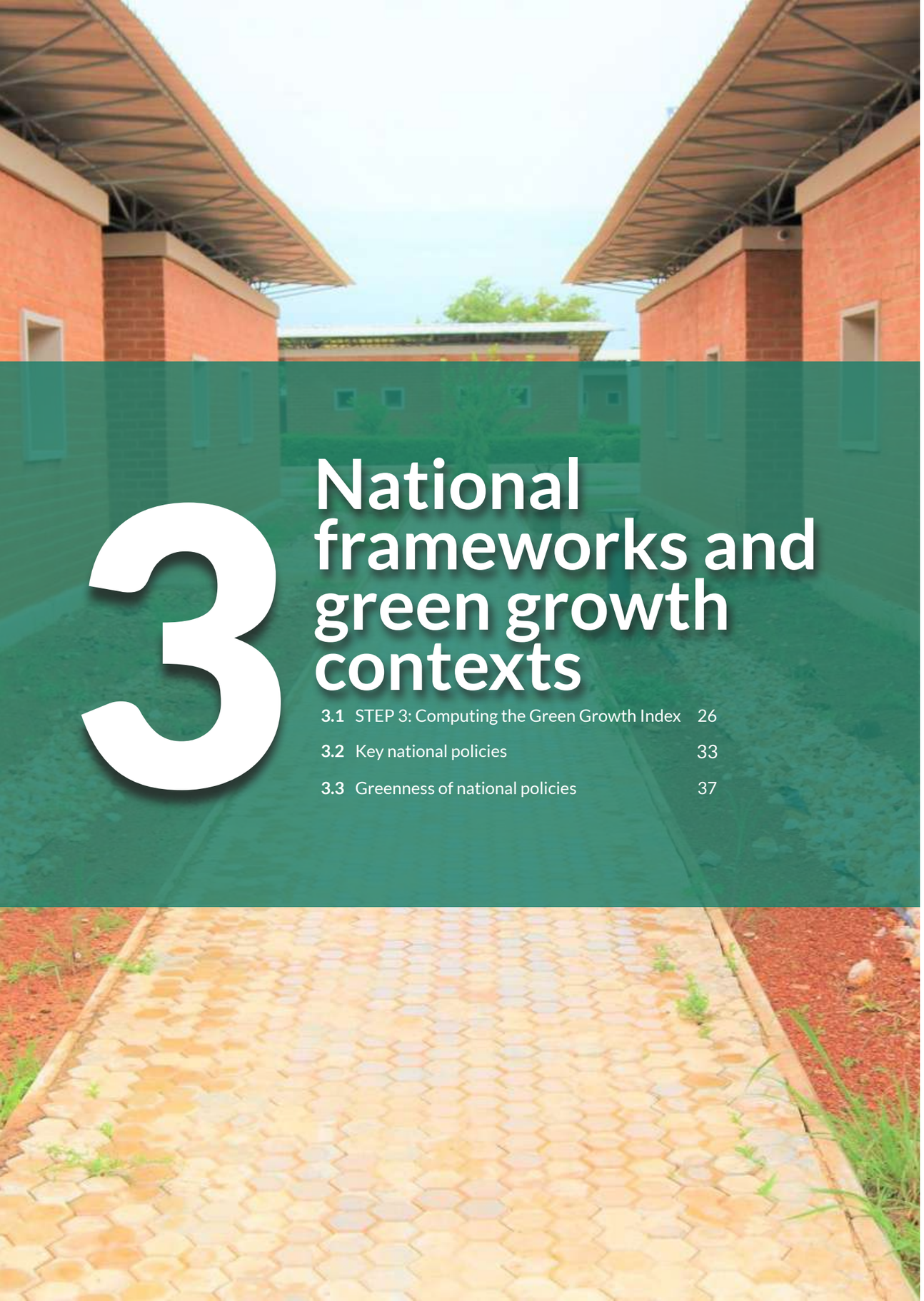
Figure 5 Distribution of confidence levels based on data availability by region and dimension, 2000-2023 *(continuned)*



Details on data gaps in each pillar by country are available in Annex 3.

2.4. STEP 4: Analyzing the Green Growth Index

The results of the Green Growth Index at the country and regional levels. At the country level (see Chapter 4), the benchmarked scores for the normalized indicators, pillars, dimensions, and Green Growth Index were compared to identify the challenges and opportunities in the green growth transition. For the indicators showing low scores, selected amance in these areas were presented. At the regional level (see Chapter 5), the overall green growth performance of the eight African LDCs was compared with those of the regions with LDCs, including Africa, Asia, the Caribbean, and Latin America.



3 National frameworks and green growth contexts

Building on the analytical approach introduced in the previous chapter, this section provides the national context and policy landscape that underpin green growth performance in the eight African LDCs. Understanding each country's economic, social, and environmental conditions and the greenness of its policy frameworks is essential for interpreting the Green Growth Index scores and identifying opportunities for targeted policy interventions. The analysis begins with a review of development contexts and then assesses the alignment of national strategies with green growth dimensions.

3.1 Economic, social, and environmental context

Table 3 presents selected economic, demographic, and environmental features of the eight African LDCs. Ethiopia stood out as the largest economy in terms of GDP, with USD 163 billion in 2023, third in GDP per capita, and second in exports of goods and services valued at USD 10.79 billion in 2023. In contrast, Senegal ranked highest in GDP per capita at USD 1,746, receiving the highest personal remittances that accounted for 9.5 percent of its GDP. In addition, Senegal received the second-highest Foreign Direct Investment (FDI), specifically in the petroleum, natural gas, agribusiness, mining, tourism, manufacturing, and fisheries sectors.8 Zambia, a lower middle-income country, has the second-highest GDP per capita at USD 1,369, showing a 5.8 percent growth in annual GDP while having the lowest FDI at 0.3 percent of its GDP. However, among the eight African LDCs, it performed best in exports of goods and services at 11.48 percent in 2023, albeit primarily copper exports. Rwanda, Togo, and Uganda, which have similar levels of GDP per capita, close to USD 1,000, recorded 8.2, 6.4, and 5.2 percent GDP growth, respectively, in 2023. Personal remittances contributed to Togo's GDP growth, accounting for 7.1 percent of its GDP. Mozambique had the highest FDI inflow at 13 percent of GDP, reflecting investment primarily in agriculture, tourism, infrastructure development, and energy. Mozambique's trade openness is the highest among the eight African LDCs, at 136 percent of GDP, emphasizing its export-oriented economy. The country's top exports are aluminum ingots, coal, electricity, and natural gas.9 However, its GDP per capita was the lowest at USD 608.4 in 2023. Burkina Faso recorded a GDP of USD 17.18 billion in 2023, with a GDP per capita of USD 874.1, the lowest after Mozambique. Prevailing instability and political unrest limit the country's growth, recording only a 3 percent GDP growth rate and a low FDI of 0.4 percent in 2023. Specifically, the current situation disrupted the mining of gold, which accounted for 16 percent of its GDP. 10

Regarding demographic characteristics, Ethiopia has the largest population and land area, with 126 million people and 1,140 thousand km2, respectively (Table 3). In 2023, about 23 percent of its population lived in urban areas. About 64 percent of the urban population were living in slum areas, the highest among the eight African LDCs in 2020. Mozambique and Uganda faced the same demographic challenges, with over half of the urban population living in slums. Half of Senegal's population of about 18 million were living in urban areas in 2023. The urban population living in slums was 32 percent, the second lowest in the eight African LDCs. Unemployment was highest in Rwanda, with about 15 percent of the total labor force in 2023. The seven other African LDCs had an unemployment rate of less than six (6) percent, with Togo recording the lowest rate at 2 percent.

Rwanda had the largest share of land area dedicated to agricultural production, with 81 percent in 2023. Bananas, cassava and sweet potatoes were the top agricultural products of the country.11 Similarly, Togo and Uganda were predominantly agricultural, with over 70 percent of their land area dedicated to this sector. Crops such as cassava, maize, and sugarcane were the top agricultural produce for both countries. However, plantains and cooking bananas were cultivated more in Uganda. In contrast, Zambia has the largest share of the forest-to-land area, at 60 percent, followed by Mozambique and Senegal, with a share of 46 and 42 percent, respectively.

The key economic, social, and environmental challenges and opportunities for green growth transition in each African LDC are discussed below.

Table 3 Economic, social, and environmental contexts in African LDCs

Contexts	Burkina Faso	Ethiopia	Mozambique	Rwanda	Senegal	Togo	Uganda	Zambia
Economy								
Income group[a]	Low income	Low Income	Low Income	Low Income	Lower-middle income	Low Income	Low Income	Lower-middle income
GDP (constant 2015 US$) in billion, 2023[a]	17.18	163.70	20.44	14.01	26.23	8.34	46.46	27.71
GDP per capita (current US$), 2023[a]	874.1	1293.8	608.4	1000.2	1746.0	1013.0	1,014.2	1,369.1
GDP growth (annual %), 2023[a]	3.0	6.5	5.0	8.2	4.6	6.4	5.2	5.8
Foreign direct investment, net inflows (% GDP), 2023[a]	0.4	2.0	13.0	3.3	8.5	0.4	5.9	0.3

Table 3 Results of the regression analysis of pillar and dimension score *(continued)*

Contexts	Burkina Faso	Ethiopia	Mozambique	Rwanda	Senegal	Togo	Uganda	Zambia
Personal remittances received (% of GDP), 2023[a]	2.8	0.3	3.2	3.7	9.5	7.1	2.9	0.9
Exports of goods and services (current US$) in billion, 2023[a]	5.86	10.79	9.67	3.58	7.09	2.19	6.60	11.48
Trade openness (% GDP), 2023[a]	65	21	136	66	69.44	61	37	80
Demographic								
Total population (Million), 2023[a]	23.25	126.53	33.90	14.09	18.13	9.05	48.58	20.57
Population growth (% annual), 2023[a]	2.5	2.5	2.8	2.3	2.4	2.3	2.8	2.7
Urban population (% total population), 2023[a]	33	23	39	18	50	44	27	46
Population living in slums (% urban population), 2020[a]	27	64	55	38	32	39	54	48
Total unemployment (% total labor force), 2023[a]	5.3	3.5	3.5	14.9	2.9	2.0	2.8	5.9
Environment								
Total land area (Thousand sq. km), 2022[a]	273.6	1140**[b]	786.38	24.67	192.53	54.39	200.52	743.39
Agricultural land (% total land area), 2023[a]	46.6	34.2	52.7	81.3	49.4	70.2	71.9	32.1
Forest area (% total land area), 2022	22.4	23.6**[c]	46.4	11.2	41.7	22.2	11.5	60.0

3.1.1 Burkina Faso

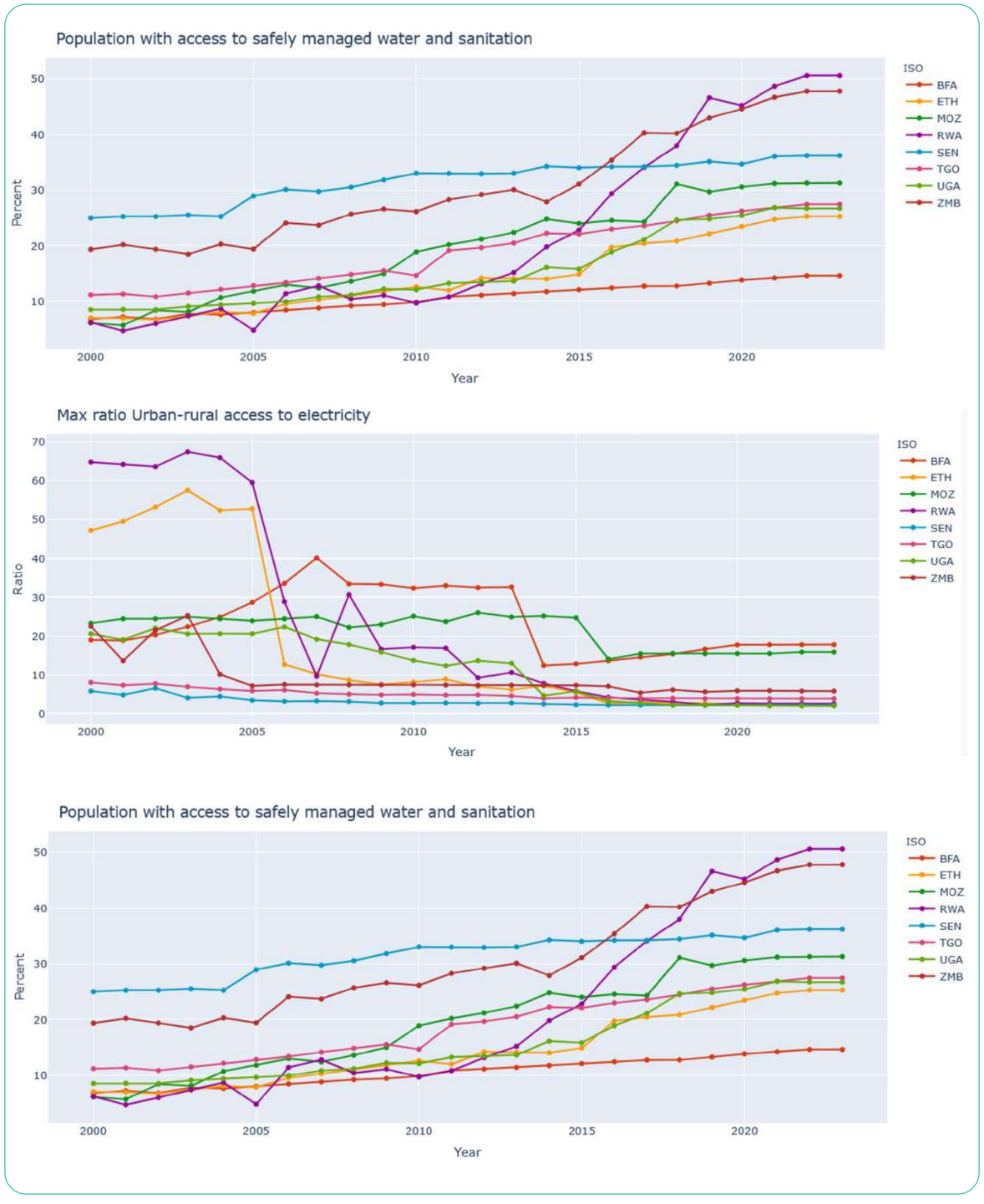
Burkina Faso, a landlocked country in West Africa, is characterized by a diverse climate, including Sahelian, Sudano-Sahelian, and Sudanian zones, and a young, predominantly rural population. In 2024, the population was estimated at 23.4 million, with an annual growth rate of 2.94 percent (Table 3). The country is endowed with considerable natural resources, including arable land, minerals, forests, wildlife, wetlands with 15 sites designated under the Ramsar Convention, and a large and diverse livestock population. These resources support agro-silvo-pastoral livelihoods but are increasingly threatened by climate change and unsustainable land management practices.

The economy remains largely informal and reliant on agriculture and extractives, making it vulnerable to climatic variability, insecurity, and global shocks. In 2023, nominal GDP was estimated at USD 17.18 billion, while GDP per capita was among the lowest of the eight African LDCs, at USD 874.1. GDP growth slowed to 3.0 percent, and the country continued to face high poverty levels, with 43.2 percent of the population living below the national poverty line. Gold mining contributes a significant share of GDP and has been disrupted by ongoing political and security instability.

Access to basic services remains low and highly unequal. Access to safely managed water and sanitation in Burkina Faso remained the lowest among the eight African LDCs, improving only modestly from below 10 percent in 2000 to around 15 percent in 2024 (Figure 6). The urban-rural electricity access ratio has remained high throughout the period, peaking near 40 and narrowing slightly to 17 by 2024. Burkina Faso is still among the countries with the widest gaps in electricity access. In contrast, the country made the most significant progress in reducing food insecurity, with undernourishment declining from about 24 percent in 2000 to 15 percent in 2024, the most significant drop recorded among the eight countries.

To accelerate its green transition, Burkina Faso adopted a National Green Economy Strategy and Action Plan in 2019 aimed at facilitating the shift toward a green and inclusive economy. The strategy targets three key impacts: strengthening the population's resilience to climate change, promoting sustainable production and consumption patterns, and achieving effective governance of the green economy. The transition is pursued across all sectors and supported by complementary policy instruments (see Chapter 3.2.1), the effective implementation of which will require stronger institutional coordination, scaled-up climate finance, and a sustained commitment to inclusive green growth.

Figure 6 Performance in key social indicators in African LDCs, 2010-2023



3.1.2 Ethiopia

Ethiopia, located in the Horn of Africa, is the most populous among the eight African LDCs, with an estimated 126 million people in 2024 and a land area of approximately 1,140 thousand square kilometers (Table 3). The country is endowed with significant natural capital, including 36.3 million hectares of arable land, of which only 15 percent is currently cultivated,[12] an estimated 122 billion cubic meters of renewable freshwater resources,[13] and a hydropower potential of around 45,000 megawatts.[14] These resources provide the foundation for agriculture and energy development but are increasingly under pressure from rapid population growth, land degradation, and climate variability.

The economy remains heavily reliant on agriculture, although the industrial and services sectors have gradually expanded in recent years. As presented in Table 3, Ethiopia had the largest economy among the African LDCs in 2023, with a nominal GDP of USD 163 billion. However, GDP per capita remains modest at USD 1,294. Exports of goods and services totaled USD 10.79 billion, while GDP growth was recorded at 6.5 percent. The country continues investing in trade and manufacturing, including industrial parks, but export diversification is still limited.

Urbanization remains low, with only 23 percent of the population living in urban areas in 2023. Of these, 64 percent resided in slum conditions as of 2020, reflecting significant gaps in access to adequate housing and basic services. Moreover, access to electricity remains a critical constraint to development. However, the urban-rural electricity access ratio dropped sharply around 2007 and remained below 10 thereafter, making Ethiopia one of the top performers in expanding equitable electricity access (Figure 6). Ethiopia showed only gradual improvement in access to safely managed water and sanitation, rising from about 7 percent in 2000 to 25 percent in 2024, placing it in the lower half of the group. However, progress in reducing undernourishment was uneven. After falling to 14 percent in 2015, the rate increased to 23 percent in 2024, placing Ethiopia in the mid-range of the group.

Nonetheless, Ethiopia has made strategic investments to support its green growth transition. The country has prioritized renewable energy development, particularly hydropower and solar, alongside climate-smart agriculture and ecosystem restoration. Its policy frameworks, including the 10-Year Development Plan (2020/21–2029/30), the Climate Resilient Green Economy Strategy, and commitments under its updated Nationally Determined Contribution, aim to integrate sustainability into economic planning and strengthen resilience (see Chapter 3.2.2). Key areas for continued attention include institutional coordination, green finance mobilization, and improving access to services in rural and underserved areas to ensure that the benefits of growth are widely shared.

3.1.3 Mozambique

Mozambique is a coastal country in southeastern Africa, with a population of approximately 34.5 million in 2024 and a land area of 801 thousand square kilometers (Table 3). The country has significant natural resources, including fertile agricultural land, extensive river systems, forest reserves, and deposits of coal, natural gas, and heavy mineral sands. These resources underpin its economic potential but are subject to increasing pressure from climate-related hazards, environmental degradation, and low institutional capacity.

The economy has expanded over the past two decades but remains dependent on a few capital-intensive sectors and vulnerable to external shocks. In 2023, Mozambique's GDP was estimated at USD 20.96 billion, with GDP per capita at USD 608.4, the lowest among the eight African LDCs. GDP growth reached 6.0 percent, driven by investment in extractives, energy, and infrastructure. Foreign direct investment accounted for 13.0 percent of GDP, the highest among the eight countries, reflecting investor interest in natural gas, agriculture, tourism, and transport. Trade openness, measured at 136 percent of GDP, highlights the export-oriented nature of the economy. Aluminium ingots, coal, electricity, and natural gas remain the main export products.

Despite its economic potential, Mozambique faces persistent challenges in achieving inclusive development. The urban-rural electricity access gap remained wide throughout the period, fluctuating around 20–25, with no substantial improvement (Figure 6). Mozambique experienced consistent gains in access to safely managed water and sanitation, rising from around 10 percent in 2000 to nearly 31 percent in 2024, ranking fourth among the eight countries. The prevalence of undernourishment followed an unstable trend, peaking above 40 percent in the mid-2010s and falling to around 26 percent by 2024, the second highest in the group.

Mozambique has adopted a comprehensive set of national strategies and institutional reforms to advance climate resilience and green growth, particularly aiming to mainstream climate and disaster risk considerations into national planning and public investment to strengthen the resilience of people, infrastructure, and institutions (see Chapter 3.2.3). Recent efforts have also focused on integrating climate and green growth indicators into socio-economic plans and budgeting systems to improve monitoring and policy alignment. Despite progress, challenges remain in intersectoral coordination, financing, and private sector engagement, underscoring the need to strengthen implementation of existing frameworks and scale up investment in climate-resilient infrastructure and institutions.

3.1.4 Rwanda

Rwanda is a small, landlocked country in East Africa with a population of approximately 14.1 million in 2024 and a land area of 26 thousand square kilometers (Table 3). The country's economy is predominantly agriculture-based, with most of the population engaged in subsistence farming. This economic structure increases vulnerability to climate variability and natural resource degradation. Recent efforts to promote climate-smart agriculture and expand agroforestry have contributed to building resilience in rural areas. In parallel, green industrial development, including eco-industrial parks, and the expansion of sustainable tourism are supporting diversification and structural transformation.

The country has considerable renewable energy potential from solar, hydropower, geothermal sources, and methane gas extracted from Lake Kivu. These resources could support the expansion of clean energy access, especially in rural areas. However, the high cost of green technologies and the limited availability of domestic financing constrain the full exploitation of these opportunities. In 2023, Rwanda's GDP was estimated at USD 13.67 billion, with GDP per capita at USD 958.4. The economy grew by 8.2 percent, the highest among the eight African LDCs.

Rwanda recorded the most significant increase in access to safely managed water and sanitation, from below 10 percent in 2000 to over 50 percent in 2024, the highest among the eight countries (Figure 6). The urban-rural electricity access ratio dropped sharply after 2006, from above 65 to below 10 by 2024, reflecting rapid rural electrification. The prevalence of undernourishment declined steadily from about 37 percent in 2000 to 33 percent in 2024, placing Rwanda among the countries with modest but consistent improvements in nutrition outcomes.

Urbanization and demographic growth are shaping Rwanda's green growth transition. The urban population accounted for 18 percent of the total in 2023, and the country continues to experience rapid rural-to-urban migration. Sustainable urban planning is essential to reduce pressure on land, water, and waste systems, and to enhance the quality of life in growing cities. Unemployment is high, with an estimated 15 percent of the total labor force unemployed in 2023. Youth unemployment is a persistent challenge, compounded by a growing youth population and limited opportunities in emerging green sectors. Investment in green skills development and education is needed to support future employment growth and economic inclusion.

A strong policy framework supports Rwanda's green transition, including Vision 2050, the National Strategy for Transformation, and the Green Growth and Climate Resilience Strategy (see Chapter 3.2.4). These policies prioritize green agriculture, renewable energy, sustainable land and water resource management, and low-carbon urban development. Since 2005, the government has implemented a range of measures to improve solid waste management, which has helped reduce illegal dumping and improve environmental health, particularly in urban areas. Key environmental challenges include deforestation, land degradation, soil erosion, and urban waste accumulation. The development of sustainable waste management systems is important for managing urban waste. Since 2005, Rwanda has been making efforts to improve solid waste management and prohibit waste dumping outside of private property. [15]

3.1.5 Senegal

Senegal is a coastal West African country with a population of approximately 18.5 million in 2024, covering a land area of 197 thousand square kilometers (Table 3). The economy has a relatively higher income base than other African LDCs, with GDP per capita estimated at USD 1,746 in 2023. Senegal benefits significantly from remittances, which stood at 9.5 percent of GDP, and it has attracted substantial foreign direct investment in key sectors, including petroleum, natural gas, agriculture, fisheries, tourism, mining, and manufacturing.

Agriculture remains essential for livelihoods and national food security, employing about 75 percent of the labor force. However, it contributes only 16 percent to GDP, reflecting low labor and land productivity.[16] Productivity is constrained by reliance on traditional farming practices and limited access to inputs such as fertilizers, improved seeds, and irrigation technologies. Only 17 percent of the estimated 409,000 hectares with irrigation potential are currently equipped, and water-use efficiency remains low, particularly during droughts.[17] Water scarcity also affects agricultural productivity, particularly during drought periods when available surface water does not meet the demand for irrigation water.[18] These challenges hinder the sector's capacity to contribute more substantially to rural income and national growth.

In 2023, Senegal's economy grew by approximately 4.8 percent. Urbanization stands at roughly 50 percent, and access to electricity is comparatively high by LDC standards, with around 70 percent of the population connected. The urban-rural electricity access gap was the smallest among the eight countries, with the ratio remaining below 5 throughout the period (Figure 6). Senegal maintained one of the highest levels of access to safely managed water and sanitation, increasing from about 25 percent in 2000 to 36 percent in 2024. Senegal also recorded the lowest prevalence of undernourishment, which declined steadily from 25 percent in 2000 to below 5 percent in 2024, making it the strongest performer in both basic service access and food security.

Senegal's green growth strategies are anchored in the Plan Sénégal Émergent, the National Strategy for Green Growth, and the country's updated Nationally Determined Contribution (NDC) under the Paris Agreement (See Chapter 3.2.5). The NDC sets targets to reduce greenhouse gas emissions by 5 percent and 7 percent unconditionally, and by 23 percent and 29 percent with external support, by 2025 and 2030, respectively. Key priorities include sustainable agriculture and irrigation investment, solar and wind energy deployment, coastal zone adaptation, blue economy development, and ecotourism. The country continues to rely on imported fossil fuels for electricity generation, which increases exposure to global price fluctuations. Although Senegal has significant renewable energy potential, particularly in solar and wind, large-scale adoption is constrained by limited infrastructure, inadequate financing, and weak grid integration.

3.1.6 Togo

Togo is a small West African country with a population of approximately 9.3 million in 2024 and a land area of 57 thousand square kilometers (Table 3). The economy remains largely dependent on agriculture, with more than 70 percent of the land area devoted to farming. Cassava, maize, and sugarcane are the main crops. In 2023, GDP was estimated at USD 8.72 billion, with GDP per capita at USD 936.4 and GDP growth at 6.4 percent. Remittance contributed 7.1 percent of GDP. Unemployment was low at 2 percent, but energy poverty persists. However, the urban-rural electricity access gap remained consistently low, below seven throughout the period, indicating strong performance in equitable energy access (Figure 6). Togo showed moderate gains in access to safely managed water and sanitation, rising from 11 percent in 2000 to 27 percent in 2024, placing it in the middle range of the eight countries. The prevalence of undernourishment declined steadily from about 31 percent in 2000 to 13 percent in 2024, the second lowest in the group, after Senegal.

Togo has made political and institutional commitments to support green growth and address climate change. The country's revised Nationally Determined Contributions target a 50.57 percent reduction in greenhouse gas emissions by 2030, of which 30.06 percent is conditional on international support. Achieving these targets requires USD 5.4 billion, including USD 2.6 billion for adaptation, USD 2.7 billion for mitigation, and additional technology transfer and capacity building needs. To improve access to climate finance, the government adopted a climate finance strategy in 2022 and nominated two national entities, Togo Invest and Ecobank Togo, for Green Climate Fund accreditation.

Domestically, Togo has established two national funds to mobilize resources for environmental action: the National Environmental Fund and the National Forest Development Fund, created in 2008 and 2009, respectively. These institutions form the foundation of the country's regulatory framework for climate finance, but additional mechanisms are needed to scale up investments in a low-carbon economy. In 2024, the government launched a green budget initiative, initially covering nine pilot ministries with an allocation of XOF 440.4 billion (USD 0.8 billion), equivalent to 26.8 percent of the national budget. Beginning in 2025, the second phase will expand the green budget to 25 ministries and institutions.

Despite recent progress, several challenges continue to constrain access to green finance in Togo. These include limited institutional capacity, weak coordination among sectors, and insufficient integration of climate priorities into national and sectoral development plans. The lack of a green taxation framework limited private sector involvement, and gaps in the preparation and evaluation of climate-related projects also pose barriers. Addressing these issues will require improvements in governance, stronger intersectoral collaboration, and targeted capacity building to support the planning, financing, and implementation of green growth initiatives.

3.1.7 Uganda

Uganda is a landlocked country in East Africa with a population of approximately 48.6 million in 2024 and a land area of 241 thousand square kilometers (Table 3). The economy remains largely dependent on agriculture, which employs most of the labor force and is critical for rural livelihoods. In 2023, GDP was estimated at USD 49.48 billion, with GDP per capita at USD 1,018.2. GDP growth reached 5.2 percent. Exports of goods and services accounted for 10.32 percent of GDP, while personal remittances represented 4.1 percent. Unemployment was estimated at 4.3 percent. Approximately 28 percent of the population lived in urban areas, and more than half of the urban population lived in slum conditions, underscoring infrastructure and housing challenges in growing towns and cities. However, Uganda expanded access to safely managed water and sanitation from about 8 percent in 2000 to nearly 28 percent in 2024, placing it in the upper half among the eight countries (Figure 6). The urban-rural electricity access ratio remained moderate and relatively unchanged, declining only slightly from around 20 to 17, reflecting limited improvement in rural electrification. The prevalence of undernourishment increased from 19 percent in 2000 to 37 percent in 2024, the highest among the eight countries and the only case of consistent deterioration in food security.

The post-COVID-19 economic recovery remains vulnerable to external and climate-related shocks. Natural resources remain vital for the country's development, but are increasingly threatened by environmental degradation and climate change. The Uganda Green Growth Development Strategy (UGGDS) provides a framework for transitioning to a low-carbon and climate-resilient economy. It prioritizes investment in sectors with strong green growth potential to support economic transformation, poverty reduction, and improved human welfare.

The UGGDS focuses on five priority areas: sustainable agriculture through value chain upgrading, irrigation and soil fertility management; natural capital management, including forestry, wetlands, tourism and water resources; planned urbanization through green cities and sustainable procurement; sustainable transport, especially mass transit and regional connectivity; and clean energy from biomass, solar and geothermal sources. The strategy also highlights the need to enhance energy production and use efficiency, and safety.

By 2030, the UGGDS aims to achieve eight development outcomes: increased incomes and employment, food and nutrition security, climate change mitigation and adaptation, efficient use of natural resources, and inclusive and resilient economic growth. Delivering these outcomes will require sustained public and private investment, enhanced policy coherence, and improved institutional coordination. Expanding access to renewable energy, promoting climate-smart agriculture, and supporting green jobs and skills development will be critical to advancing Uganda's green growth agenda.

3.1.8 Zambia

Zambia is a landlocked country in Southern Africa with a population of approximately 20.4 million in 2024 and a land area of 743 thousand square kilometers (Table 3). The economy is highly dependent on mining, particularly copper, which continues to dominate exports. In 2023, Zambia's GDP was estimated at USD 26.86 billion, with GDP per capita at USD 1,369. GDP growth was recorded at 5.8 percent, and exports of goods and services accounted for 11.48 percent of GDP, the highest among the eight African LDCs. However, foreign direct investment remained low at 0.3 percent of GDP. Despite its status as a lower-middle-income country, poverty and inequality remain persistent, particularly in rural areas.

Agriculture employs a large share of the population but contributes relatively little to GDP. Forests are an essential national asset, covering about 60 percent of the land area. However, Zambia has one of the highest deforestation rates in Africa, primarily driven by charcoal production, shifting cultivation, and the expansion of settlements. Deforestation has implications for biodiversity, water regulation, and climate mitigation. At the same time, Zambia possesses significant natural capital, including water bodies, minerals, and fertile soils, which, if sustainably managed, could support green growth.

Zambia made substantial progress in expanding access to safely managed water and sanitation, increasing from about 20 percent in 2000 to nearly 48 percent in 2024, the second highest after Rwanda (Figure 6). The urban-rural electricity access gap declined from over 30 in 2000 to just above 10 in 2024, indicating improved rural coverage. However, the prevalence of undernourishment remained unchanged, at around 50 percent throughout the period (36 in 2024), the highest and most persistent rate among the eight countries.

Zambia's green growth agenda is outlined in its Vision 2030 and the Eighth National Development Plan. The national policy framework promotes diversification of the economy through climate-smart agriculture, renewable energy, sustainable mining, and forest management. In 2022, the government launched the Zambia Green Growth Index report to benchmark progress and inform policy. Key priorities include sustainable land use, protection of ecosystem services, low-carbon energy transition, and improved environmental governance. Realizing the country's green growth ambitions will require targeted investment, strengthened institutional capacity, and access to climate finance.

3.2 Key national policies

The country contexts in the previous section reflect complex development realities that shape green growth performance. This section presents an inventory of key national policies guiding sustainable development and climate action in each African LDC to assess how national planning frameworks respond to these challenges

and opportunities. draws from each country's long-term development visions, medium-term national development plans, and sectoral strategies focused on climate change, biodiversity, and environmental management. While policy frameworks vary in structure and scope, all countries have made notable efforts to align national priorities with global commitments such as the Paris Agreement, the Sustainable Development Goals, and the Convention on Biological Diversity. The review highlights how these policies address economic transformation, climate resilience, and social inclusion, and identifies areas where improved policy coherence, institutional coordination, and implementation support will be essential to accelerate the green transition.

3.2.1 Burkina Faso

Burkina Faso has adopted a broad and evolving policy framework that guides its development priorities toward sustainability, resilience, and inclusive growth. The long-term vision is articulated in the National Prospective Study "Burkina 2025", adopted in 2005, which serves as the reference framework for national planning. It identifies societal transformation drivers, long-term development scenarios, and the institutional pathways to achieve them. This prospective study is currently under revision to define a strategic vision to 2060.

This vision is operationalized through the National Economic and Social Development Plan (PNDES), the country's medium-term strategy. The first phase (2016–2021) was implemented under a difficult security context marked by recurring terrorist attacks. While it led to political, economic, and social progress, results fell short of expectations due to structural weaknesses in governance, production systems, and human capital, as well as external shocks such as the COVID-19 pandemic and regional instability. In response, a second phase (PNDES-II 2021–2025) was adopted, aiming to strengthen resilience, restore peace, and accelerate inclusive economic transformation. The plan is aligned with the SNADDT 2040, the SDGs, and the African Union's Agenda 2063.

The overarching objective of PNDES-II is to restore peace and security, strengthen national resilience, and promote a structural transformation of the Burkinabè economy. Expected impacts include improving human capital, creating 50,000 decent jobs annually, reducing the poverty rate to below 35 percent by 2025, and achieving an average GDP growth rate of 7.1 percent. These objectives are reinforced by the Action Plan for Stabilization and Development (PA-SD 2023–2025), adopted in the context of political instability. This transitional framework prioritizes four pillars: restoring territorial integrity, responding to the humanitarian crisis, rebuilding institutions and governance systems, and promoting national reconciliation.

Green growth is increasingly mainstreamed into national development planning. In 2019, Burkina Faso adopted the National Strategy and Action Plan for the Green Economy, which promotes climate resilience, sustainable consumption and production, and effective governance. This strategy is implemented through sectoral policies in energy, water, forestry, agriculture, and sanitation, including the National REDD+ Strategy (SN-REDD+), the Sectoral Policy on Environment, Water, and Sanitation (PS-EEA 2018–2027), the National Renewable Energy Action Plan (PANER 2015–2030), the National Energy Efficiency Action Plan (PANEE 2015–2030), and the Sectoral Agro-Sylvo-Pastoral Policy (PS-ASP 2018–2027).

The updated Nationally Determined Contributions (NDCs 2021–2025) reinforce Burkina Faso's commitment to reduce emissions by 29.42 percent by 2030 and to enhance climate adaptation. These commitments are complemented by the National Adaptation Plan (NAP 2015), which aims to build resilience across vulnerable sectors and integrate climate risks into development planning. Burkina Faso has also finalized its Long-Term Low Emission Development Strategy (LT-LEDS 2050), supported by GGGI. Although validated by stakeholders, the LT-LEDS is still awaiting formal adoption.

Additional strategies contributing to inclusive development and green transformation include the National Gender Policy, the Sectoral Health Policy (2018–2027), the National Strategy for the Promotion of Entrepreneurship, and the National Strategy for Culture and Tourism (SNCT 2018–2027). The National Biodiversity Strategy and Action Plan (NBSAP) and the National Wetlands Policy provide the foundation for the sustainable management of natural capital.

Together, these frameworks reflect Burkina Faso's commitment to advancing inclusive green growth and climate-resilient development. However, the effective realization of these goals will require strengthened institutional capacity, more coherent coordination mechanisms, and enhanced access to green and climate finance.

3.2.2 Ethiopia

Ethiopia's green growth transition is anchored in a well-integrated policy framework that combines long-term development objectives with ambitious climate and environmental goals. The overarching strategic document is the Ten Years Perspective Development Plan (2021–2030), also referred to as Ethiopia 2030: The Pathway to Prosperity. It articulates the country's vision of becoming an "African Beacon of Prosperity" by 2030 and is structured around ten strategic pillars, including those that prioritize a resilient green economy, shared prosperity, technological advancement, and institutional transformation. The plan emphasizes inclusive development and improved living standards, especially for vulnerable populations.

Complementing this vision, the Homegrown Economic Reform Agenda (2021) outlines a set of macroeconomic, structural, and sectoral reforms aimed at restoring economic stability, strengthening private sector participation, and unlocking growth potential across key sectors such as agriculture, mining, manufacturing, tourism, and the digital economy. Together, these frameworks address structural impediments and lay the foundation for a knowledge-based, inclusive, and climate-resilient economy.

Ethiopia's climate policy builds on the Climate-Resilient Green Economy (CRGE) strategy, which remains the cornerstone of national efforts to pursue low-carbon development. The CRGE provides a strategic framework for reducing greenhouse gas emissions while fostering economic growth, particularly through sustainable land use, renewable energy, and improved water management. The country's updated Nationally Determined Contributions (NDCs) reflect enhanced ambition, targeting a 68.8 percent reduction in emissions by 2030 relative to the business-as-usual scenario. The NDCs are aligned with national development priorities and incorporate cross-cutting enablers such as gender, capacity development, and climate finance.

To support long-term transformation, Ethiopia prepared its Long-Term Low Emission and Climate Resilient Development Strategy (LT-LEDS 2020–2050), which defines the pathway to achieve net-zero emissions while enhancing adaptive capacity in critical economic sectors. The LT-LEDS builds on the CRGE and serves as a strategic reference for integrating mitigation and adaptation into broader economic planning.

The National Adaptation Plan (NAP-ETH) strengthens the country's approach to climate resilience. It builds on earlier efforts under the second Growth and Transformation Plan and the CRGE, as well as sectoral and subnational adaptation strategies. The NAP focuses on reducing vulnerability and building adaptive capacity in agriculture, water, forestry, health, and urban development. It promotes the mainstreaming of adaptation across development sectors and is supported by institutional reforms, improved coordination, and enhanced disaster risk management.

Environmental sustainability is further reinforced through the National Biodiversity Strategy and Action Plan (NBSAP 2015–2020), which addresses drivers of biodiversity loss and integrates conservation goals into national development planning. The NBSAP aligns with international agreements, including the Convention on Biological Diversity and the Nagoya Protocol, and is currently undergoing revision to extend its vision to 2050. Other sectoral strategies, such as the Climate Resilience Strategy for Water and Energy and the National Blue Economy Strategy (2023–2027), support the sustainable use of Ethiopia's natural capital, including freshwater ecosystems and hydropower.

Together, these strategies demonstrate Ethiopia's commitment to aligning climate action with national development priorities. The coherence among its development, climate, and environmental policies supports the country's ambition for inclusive green growth. However, further progress will depend on strengthening institutional capacity, securing sustainable financing, and ensuring consistent implementation across sectors and governance levels.

3.2.3 Mozambique

Mozambique has adopted a series of national strategies and institutional reforms aimed at promoting climate resilience and green growth. These efforts reflect the country's commitment to reducing disaster risks, safeguarding lives and livelihoods, and strengthening the resilience of infrastructure and institutions. At both national and local levels, the government has worked to mainstream climate adaptation and disaster risk management into public investment and development planning processes.

The strategic framework includes key policies such as the National Adaptation Programmes of Action (NAPA), the Climate Change Adaptation and Mitigation Strategy (2013–2025), the Green Economy Action Plan, the Climate Change and Gender Action Plan (2014), and the Master Plan for Risk and Disaster Reduction (2017–2030). These policies collectively aim to enhance institutional preparedness and promote sustainable development in the face of climate variability. The National Climate Change Monitoring and Evaluation Framework provides tools for assessing progress and improving the effectiveness of government interventions.

Mozambique's updated Nationally Determined Contribution (NDC) sets out national priorities for reducing greenhouse gas emissions and building resilience in key sectors, including agriculture, forestry, energy, and coastal zone management. The government has also committed to ambitious climate financing goals. At COP27, Mozambique announced its objective to attract USD 80 billion in investment for energy transition, leveraging its abundant renewable energy resources to improve access and position the country as a sustainable investment destination.

The government is currently developing a long-term National Development Strategy, which aims to integrate blue and green economy principles to achieve sustainable development. This strategy envisions efficient resource use, ecosystem preservation, reduced waste, and the promotion of circular economy practices. It emphasizes climate risk adaptation and low-carbon development as essential components of resilience, while also seeking to build institutional capacity to anticipate and respond to adverse climate events. Mozambique has introduced green and climate indicators into national planning and budgeting systems to monitor the green transition. These indicators facilitate tracking of implementation progress and help inform investment decisions. The government has also established intersectoral coordination mechanisms and is working to strengthen engagement with the private sector.

In summary, Mozambique has put in place robust policy instruments to guide its green growth agenda. Continued progress will require improved coordination across sectors, increased climate finance, and sustained efforts to implement and monitor policy commitments. The integration of environmental and social priorities into national planning demonstrates the country's recognition of the central role of sustainability in achieving inclusive development.

3.2.4 Rwanda

Rwanda's relevance to green growth is embedded in a comprehensive policy framework that includes Vision 2050, the National Strategy for Transformation (NST1 and NST2), the updated Nationally Determined Contribution (NDC), the National Biodiversity Strategy and Action Plan (NBSAP), and the National Strategy for Climate Change and Low Carbon Development (NAP).

Vision 2050 provides the overarching framework for national development. It promotes economic growth and prosperity while placing a strong emphasis on sustainability and quality of life. The vision is structured around five pillars: human development, competitiveness and integration, agriculture for wealth creation, urbanization and agglomeration, and accountable state institutions. Sustainability is integral to all pillars, underscoring the importance of responsible natural resource management and building resilience to climate change.

These priorities are further operationalized through the Green Growth and Climate Resilience Strategy, which aims to drive a national transformation toward a carbon-neutral and climate-resilient economy. The strategy outlines interventions across sectors to reduce greenhouse gas emissions by 38 percent over the next five years, in line with Rwanda's NDC and its commitments under the Paris Agreement.

Medium-term development strategies, particularly NST1 and NST2, have integrated green growth indicators into their design. Environmental sustainability, climate change, social inclusion, and disaster risk management are identified as cross-cutting priorities across the three pillars of transformation: economic, social, and governance. Under the Economic Transformation Pillar, the government focuses on building climate resilience, strengthening sustainable environmental management, and mobilizing climate finance to support low-emissions development and meet national mitigation targets.

The National Biodiversity Strategy and Action Plan supports these efforts by promoting the sustainable use of biodiversity and ecosystem services. It highlights the need for improved coordination among stakeholders and increased financing to address climate change impacts while safeguarding biodiversity. The strategy contributes to national development by enhancing ecosystem-based resilience and improving the quality of life.

Rwanda's policy instruments clearly commit to aligning national development with global sustainable development goals. The country is advancing an inclusive green transition rooted in environmental stewardship and climate action through concrete actions and investment-ready initiatives.

3.2.5 Senegal

Senegal submitted its enhanced Nationally Determined Contribution (NDC) in December 2020, reaffirming its climate commitment under the Paris Agreement. The NDC outlines targets to reduce greenhouse gas emissions by 5 and 7 percent unconditionally, and by 23 and 29 percent with international support, by 2025 and 2030, respectively. The mitigation strategy focuses on increasing carbon sequestration through agriculture and forestry, promoting renewable energy, strengthening energy efficiency, and improving waste and industrial process management. The adaptation component seeks to build the resilience of ecosystems and communities by improving protection against climate risks and strengthening data collection and observation systems for climate, ocean, and coastal conditions. These priorities reflect Senegal's continued efforts to reduce vulnerability and enhance adaptive capacity across sectors.

These efforts build on earlier national planning processes and strategies, including the National Adaptation Plan, the National Biodiversity Strategy and Action Plans, and the National Development Plan for Health and Social Inclusion. These policy documents promote adaptation, biodiversity protection and use, and social inclusion across key sectors. While notable progress has been made, particularly in identifying risk profiles and outlining sectoral responses, further efforts are required to accelerate vulnerability reduction and resilience-building.

Senegal's earlier economic development strategy, the Plan Sénégal Émergent, included an explicit focus on environmental sustainability and climate action. Building on this, the government launched a new strategic framework, Vision Sénégal 2050, in October 2024. This transformative agenda aims to reduce monetary poverty and spatial inequalities by establishing regional economic development hubs. The document places particular emphasis on the efficient use of resources, biodiversity conservation, and sustainable development.

By 2050, the government envisions Senegal among the most equitable societies in the world. The Gini index is expected to improve from the country's 92nd rank in 2023 to the 10th by 2050. The monetary poverty rate is projected to decline from 37 percent to 15 percent over the same period. Vision Sénégal 2050 also outlines the country's approach to promoting gender equality and narrowing wage disparities between men and women. Universal access to high-quality education, health services, clean energy, water and sanitation, and decent housing, regardless of geographic location, is a central goal of this vision.

To support its energy and climate goals, Senegal joined the Just Energy Transition Partnership (JETP) with the G7. This partnership is expected to mobilize significant financial resources to increase the share of renewable energy in Senegal's electricity mix to 40 percent by 2030. The initiative underscores Senegal's commitment to a fair and sustainable energy transition.

3.2.6 Togo

The assessment of Togo's green growth indicators considers several national policy frameworks, including the 2030 Sustainable Development Vision, the Poverty Reduction Strategy Statement (PRSP 2009–2011), the Strategy for Accelerated Growth and Employment Promotion (SCAPE 2013–2017), the National Development Plan (NDP 2018–2022), the Government Roadmap 2020–2025, the National Policy on Climate Change (PNCC 2017–2030), and Togo's Digital Transformation Strategy.

Under Vision 2030, Togo has committed to building a society based on harmonious and environmentally sustainable economic and social development. This vision is part of a long-term strategy to transform Togo into an emerging, stable, and prosperous country by 2030. It reflects the government's ambition to position the country on a path of strong, inclusive, diversified, and sustainable economic growth.

The PRSP 2009–2011 served as a foundational document in the country's development trajectory. It defined key actions to reduce poverty, aligned with international commitments such as the Growth and Poverty Reduction Strategy Paper. The implementation of the PRSP contributed to sustained economic growth, expanded access to education and health, and a decline in poverty.

To build on these gains, the SCAPE strategy was introduced to accelerate growth and job creation. It aimed to address unemployment, foster social inclusion, and strengthen Togo's economic competitiveness through targeted reforms, economic diversification, and infrastructure development.

The National Development Plan, adopted in 2018, provided a roadmap for transforming Togo's economy through 2022, with its strategic orientation extended to 2025. It focuses on promoting inclusive and sustainable growth, reducing spatial and social inequalities, and increasing regional and international competitiveness.

The Government Roadmap 2020–2025 builds on the NDP and prioritizes the modernization of key sectors, aiming to position Togo as an emerging country by 2030. It reflects the country's growing focus on economic resilience, sustainability, and climate adaptation.

Togo began its national climate adaptation efforts with the development of the National Adaptation Programme of Action in 2009. Since 2014, it has expanded this effort through a comprehensive National Adaptation Plan process. Flagship initiatives target key vulnerabilities in agriculture, water, health, infrastructure, and education, with the objective of enhancing community resilience and supporting the transition to sustainable development.

In parallel, the government launched the Togo Digital 2025 Strategy to integrate digital innovation into all aspects of development. The strategy seeks to strengthen digital infrastructure, expand access, and improve public service delivery. It includes nine integrated programs, focusing on identifying individuals and households, accelerating connectivity, digitizing services, and transforming the economy through innovation. The digital transition is viewed as a lever to improve governance, promote economic opportunity, and enhance the well-being of citizens.

Togo's evolving policy landscape reflects a growing commitment to environmental sustainability, economic diversification, and inclusive development. Its combined focus on climate resilience, poverty reduction, and technological innovation provides a strong foundation for advancing green growth.

3.2.7 Uganda

Uganda's policy framework for green growth and sustainable development is grounded in its long-term development vision and supported by national adaptation, biodiversity, and climate strategies. Vision 2040, adopted in 2007, outlines the country's aspiration to transform from a predominantly low-income to a competitive upper-middle-income economy within 30 years. The vision identifies key opportunities in oil and gas, minerals, tourism, agriculture, industrialization, and ICT, which remain underexploited. Achieving this transformation is contingent on strengthening foundational sectors such as infrastructure, energy, science and technology, land management, and urban development.

The Third National Development Plan (NDPIII 2020/21–2024/25) serves as the current medium-term strategy for realizing Vision 2040. It builds on the progress and lessons from earlier plans and was developed in the context of the COVID-19 pandemic, which underscored the need for resilience and inclusive growth. NDPIII sets out clear objectives, interventions, and targets aimed at achieving sustainable socioeconomic transformation.

Uganda's updated Nationally Determined Contribution (NDC) reflects the country's climate commitments under the Paris Agreement. The NDC includes detailed information on national circumstances such as geography, climate, and greenhouse gas (GHG) emissions, as well as key development trends in agriculture, forestry, water, wetlands, and energy. The update process drew on a stocktake of the first NDC, updated data from national climate risk and vulnerability assessments, GHG inventories, and projections through 2050. It outlines new mitigation measures and adaptation actions consistent with Uganda's development priorities and the broader vision of climate-resilient growth.

The National Adaptation Programme of Action (NAPA) was developed to achieve the Millennium Development Goals and align with Uganda's development agenda. Priority concerns included poverty and hunger reduction, gender equity, environmental sustainability, and public health. A participatory rural appraisal approach was used in designing the NAPA to ensure inclusive planning and data collection at the community level.

Uganda's biodiversity policy is anchored in the National Biodiversity Strategy and Action Plan (NBSAP II), which aims to promote the conservation, sustainable use, and equitable sharing of biodiversity benefits by 2025. The strategy contributes to sustainable development, wealth creation, job generation, and improved livelihoods. NBSAP II also provides the national framework for implementing the Convention on Biological Diversity (CBD) and sets national biodiversity targets in line with the Strategic Plan for Biodiversity 2011–2020 and the Aichi Biodiversity Targets. Through its revision process, Uganda integrated gender and social inclusion, aligning with the CBD Gender Plan of Action.

Together, these national policy instruments establish a foundation for climate resilience and inclusive green growth in Uganda. Their successful implementation will depend on strong institutional coordination, financing, and continued integration of climate and biodiversity priorities into development planning.

3.2.8 Zambia

Zambia's national policy framework for green growth is anchored in its long-term Vision 2030 and operationalized through key development, climate, and environmental strategies. Vision 2030 outlines Zambia's ambition to become "a prosperous middle-income nation" by 2030. It emphasizes sustained economic growth of 6–10 percent annually, human development through investment in education and health, and environmental sustainability through integrated water and natural resource management. The vision aligns with the 2030 Agenda for Sustainable Development and sets a strategic direction for inclusive and climate-resilient development.

The Eighth National Development Plan (8NDP 2022–2026) is the country's current medium-term development strategy. It is designed to accelerate progress toward Vision 2030 and the SDGs by promoting inclusive growth, human capital development, and environmental sustainability. The 8NDP integrates green growth principles across sectors, including energy, agriculture, water, and social protection. For the first time in Zambia's history, the plan was formulated through a participatory process that included ward-level engagement. Its theme, "Socio-economic transformation for improved livelihoods," reflects the government's commitment to linking economic growth with poverty reduction and resilience. Key interventions include scaling up access to education, health, and clean water, enhancing social protection systems, and promoting climate-smart agriculture and renewable energy.

Zambia's climate policy is guided by the National Policy on Climate Change (NPCC 2016), which provides a framework for coordinating climate actions to achieve low-carbon and climate-resilient development. The NPCC emphasizes sustainable climate responses that also advance economic growth, poverty alleviation, gender equality, and infrastructure development. Complementary environmental legislation, such as the Forests Act (2015) and the Environmental Management Act (2011), reinforces the country's

commitment to sustainable forest and ecosystem management.

Zambia submitted its updated Nationally Determined Contribution (NDC) to the UNFCCC in 2021, enhancing its climate commitments' scope and ambition. The revised NDC broadens the mitigation focus to include transport, liquid waste, and coal, and elaborates new adaptation measures aligned with national development priorities. Key adaptation areas include agriculture, water, health, and infrastructure, supported by capacity building and technology transfer. Zambia also highlights the mitigation co-benefits of adaptation, particularly in climate-smart agriculture and sustainable forest management.

The National Adaptation Plan (NAP) process, launched in 2021, builds on earlier efforts dating back to 2004. It aims to address increasing climate risks such as droughts, floods, and extreme temperatures, which threaten food and water security and rural livelihoods. The NAP prioritizes improved land management, crop diversification, and urban sanitation resilience as part of its strategy to reduce vulnerability and strengthen adaptive capacity across sectors.

Zambia's Second National Biodiversity Strategy and Action Plan (NBSAP-2 2015–2025) provides a cross-sectoral framework for conserving biodiversity and ecosystem services. Its goals include mainstreaming biodiversity across government and society, reducing direct pressures on biodiversity, safeguarding ecosystems, and promoting equitable sharing of biodiversity benefits. The NBSAP-2 also integrates climate change adaptation into forest management and ecosystem restoration.

These national policies demonstrate Zambia's strong commitment to integrating climate resilience, biodiversity conservation, and sustainable development into its national planning frameworks. The inclusion of green growth objectives in both long-term and medium-term strategies reflects a deliberate shift toward low-emission and inclusive development pathways.

3.3 Greenness of national policies

While the presence of relevant policies is an essential foundation for green growth, the degree to which these policies integrate green growth principles varies across countries. To assess this, a qualitative coding of national documents was conducted using ATLAS.ti to analyze the frequency and thematic relevance of green growth indicators within policy content. This section presents the results of this policy greenness analysis, providing insights into the strengths and gaps in alignment between stated policy goals and the dimensions of green growth. This chapter Specifically, it assesses the extent to which national policies in the eight African LDCs integrate the green growth dimensions of efficient and sustainable resource use, natural capital protection, green economic opportunities, and social inclusion. Using co-occurrence coefficients (c-coefficients) the analysis measures how frequently green growth indicators appear across key policy documents, highlighting the strengths and gaps in mainstreaming them in policies. The results provide insights into where countries are embedding green growth indicators most frequently and where further alignment is needed to advance their green growth transition.

Table 4 summarizes the c-coefficient results for the eight African LDCs. Rwanda recorded the highest values for efficient and sustainable resource use (0.14) and green economic opportunities (0.16), indicating that its policies are the most "green" in these two dimensions. Zambia also achieved notable scores in natural capital protection (0.19) and ranked among the highest in social inclusion (0.14), alongside Burkina Faso and Ethiopia. In contrast, Senegal and Burkina Faso registered the lowest scores, with 0.07 for efficient and sustainable resource use and 0.06 for green economic opportunities. Across the eight countries, national policies are generally least green in the dimensions of efficient and sustainable resource use and green economic opportunities.

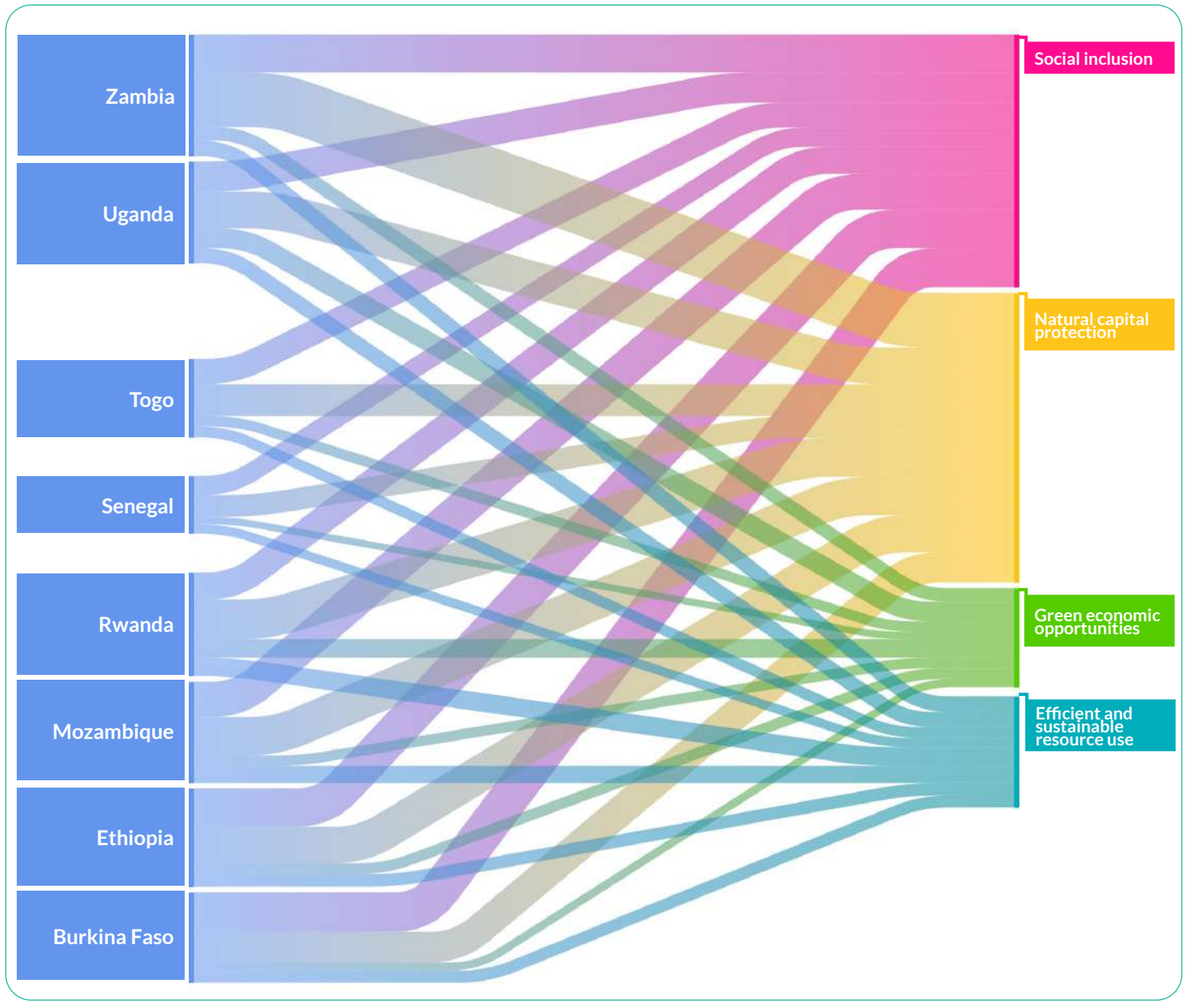
The Sankey diagram provides another perspective on the linkages between green growth dimensions and national policies (Figure 7). Most green growth–related indicators are concentrated in the social inclusion and natural capital protection dimensions. Zambia and Rwanda had the widest connections and the largest number of indicators related to green growth, with both countries focusing heavily on these two dimensions. By contrast, Senegal's national policies displayed the fewest linkages to the green growth dimensions, indicating relatively low integration of green growth principles. Uganda had the highest number of policies linked to green economic opportunities, while Burkina Faso, Ethiopia, and Togo showed similar trends in both the number of connections and the distribution across dimensions. The Sankey results confirm that indicators for efficient and sustainable resource use and green economic opportunities remain underrepresented in the current national policy frameworks.

Table 4 Co-occurrence coefficients of the national policies by dimension and country

	Burkina Faso 582	Ethiopia 620	Mozambique 636	Rwanda 663	Senegal 353	Togo 503	Uganda 655	Zambia 766
Dimension ESRU 732	0.07	0.09	0.11	0.14	0.07	0.08	0.10	0.12
Dimension GEO 655	0.06	0.09	0.08	0.16	0.06	0.09	0.14	0.13
Dimension NCP 1908	0.09	0.12	0.12	0.14	0.07	0.10	0.12	0.19
Dimension SI 1659	0.14	0.14	0.12	0.10	0.07	0.09	0.11	0.14

Note: *The coefficients measure the strength of the relationship between the codes, where a higher value indicates that more reference was made to green growth indicators in a particular dimension in the country's national policies. Turkmenistan was excluded from the assessment because it only has a dimension score only for natural capital protection.*

Figure 7 Sankey visualization of connections between national policies and green growth dimension



3.3.1 Burkina Faso

Table 5, which presents the relative frequencies, shows how green growth indicators are distributed across Burkina Faso's five national policies.

i. **NBSAP:** Burkina Faso Plan d'Action National 2011–2015 for the Implementation of the Convention on Biological Diversity

ii. **NAP:** Plan National d'Adaptation aux Changements Climatiques (PNA) DU BURKINA FASO

iii. **Vision:** Etude nationale prospective, Burkina Faso 2025

iv. **NDP:** Burkina Faso Plan national de développement économique et social 2021-2025 (PNDES-II)

v. **NDC:** Contribution determinee au niveau national(CDN)du Burkina Faso 2021-2025

The NDP 2025 emerges as the greenest document, with 186 coded data points and the most prominent edge in the Sankey diagram (Figure 8). Social inclusion dominates, accounting for 58.92 percent of the policy's green growth references, while green economic opportunities receive the lowest coverage at just 11.35 percent. Within social inclusion, access to basic services and resources and social protection pillars are most prominent, underscored by commitments such as:

"Access for all to a decent living environment, drinking water and quality sanitation is guaranteed. With regard to guaranteeing access for all to a decent living environment, drinking water and quality sanitation, the ambitions mainly aim to increase: …"

"Household access to low-cost electricity is ensured. In order to guarantee access to quality and low-cost energy, public action will aim to increase: …"

The NBSAP 2011 gives the highest attention to natural capital protection, with nearly half (46.85 percent) of its coded data in this dimension, while social inclusion is minimal at only 8.11 percent. It also has one of the strongest shares for efficient and sustainable resource use among Burkina Faso's policies.

The NAP 2015 is more evenly balanced between natural capital protection (37.36 percent) and social inclusion (48.28 percent) indicators. However, indicators for green economic opportunities are the least represented at 4.60 percent, which is the lowest share for this dimension across all the country's policies. The NDC 2021 stands out for its focus on natural capital protection, with more than half (53.33 percent) of its content focused on the green growth indicators for this dimension, particularly in GHG emissions reduction. Examples include:

"With regard to adaptation actions, the country's commitment in terms of GHG reduction, which amounted to 43,707 Gg CO2eq in 2030, was able to reach a level of achievement of 89% in 2020, or a reduction of 38,898 Gg CO2eq of GHG."

"Quantity of greenhouse gases emitted reduced; Area of new agroforestry plantations established, Area of forests under management (for wood production); Number of plants planted, Area of new agroforestry plantations established, …"

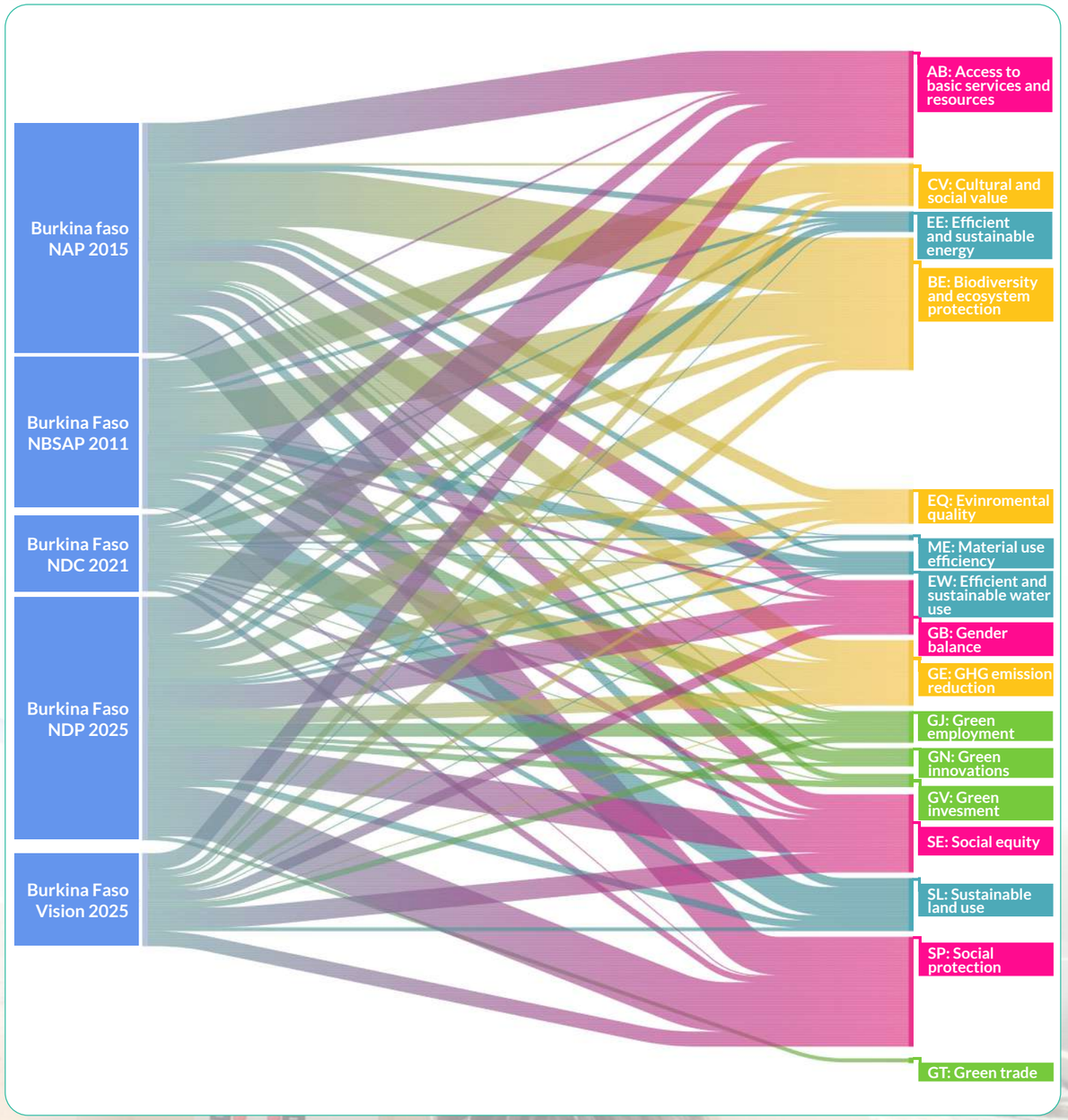
Vision 2025 is the most socially focused policy, with almost two-thirds (64.06 percent) of its content dedicated to social inclusion indicators. However, the green growth indicators for efficient and sustainable resource use and green economic opportunities are both very low at 7.81 percent, indicating a stronger orientation toward social development targets than toward integrated green economy strategies.

The Sankey diagram reflects these patterns, with the NDP 2025 forming the thickest link to social inclusion, the NBSAP 2011 to natural capital protection, and the NDC 2021 to GHG emissions reduction (Figure 8). Across all policies, the least addressed indicators are material use efficiency, green trade, and gender balance, highlighting the need to strengthen efficient and sustainable resource use and green economic opportunities to create a more balanced and comprehensive green growth framework.

Table 5 Relative frequencies of the green growth indicators in national policies by dimension, Burkina Faso

	3: Burkina Faso NBSAP 2011 (104)	41: Burkina Faso NAP 2015 (171)	44: Burkina Faso Vision 2025 (64)	47: Burkina Faso NDP 2025 (186)	50: Burkina Faso NDC 2021 (57)	Totals
Efficient and sustainable resource use (732)	29.73%	9.77%	7.81%	8.65%	15.00%	13.47%
Green economic opportunities (655)	15.32%	4.60%	7.81%	11.35%	5.00%	9.09%
Natural capital protection (1908)	46.85%	37.36%	20.31%	21.08%	53.33%	33.84%
Social inclusion (1659)	8.11%	48.28%	64.06%	58.92%	26.67%	43.60%
Totals	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Figure 8 Sankey visualization of connections between national policies and green growth pillars, Burkina Faso



3.3.2 Ethiopia

Table 6, which presents the relative frequencies, highlights the distribution of green growth indicators within Ethiopia's five national policies.

i. **NBSAP:** Ethiopia's National Biodiversity Action Plan 2015–2020

ii. **iNAP:** Ethiopia Climate Resilient Green Economy – National Adaptation Plan 2019

iii. **Vision:** Digital Ethiopia 2025 – A Strategy for Ethiopia Inclusive Prosperity

iv. **NDP:** Ethiopia's Ten Years Development Plan, A Pathway to Prosperity 2021-2030

v. **NDC:** Ethiopia Updated Nationally Determined Contribution 2021

The NBSAP 2015 stands out as the greenest policy, with 151 coded data points and almost two-thirds of its content (63.29 percent) focused on natural capital protection, particularly biodiversity and ecosystem protection. It also gives relatively strong attention to efficient and sustainable resource use at 20.89 percent, but green economic opportunities are minimal at just 4.43 percent, showing a clear environmental priority over economic integration.

The NAP 2019 has a more balanced profile, with the largest share in social inclusion at 43.41 percent and the smallest in green economic opportunities at 9.30 percent. Its coverage of efficient and sustainable resource use (20.16 percent) is higher than in most other Ethiopian policies, with a particular focus on sustainable land use. Examples include:

"Increase productive capacity and efficiency to reach the economy's productive possibility frontier through rapidly improving the quality, productivity, and competitiveness of productive sectors, especially agriculture and manufacturing industries"

"Enhancing food security through improving agricultural productivity in a climate-smart manner. This adaptation option will focus on enhancing crop and livestock productivity by selecting resistant and tolerant varieties ... Specific to crops, effective systems for increased use of organic fertilizers and appropriate mechanization will be implemented"

Ethiopia Vision 2025 ranks second in the number of coded data points and has the highest share of green economic opportunities at 27.33 percent. Social inclusion is also high at 52.67 percent, while efficient and sustainable resource use receives the least attention at only 4.67 percent. Examples for green economic opportunities include:

"Support and Incentivize Ag-Tech Entrepreneurship An opportunity, which needs focused attention of resources and will likely have significant impact not only on transforming agriculture but also jobs, export and inclusivity, is ensuring a thriving Ag-tech entrepreneurship sector in Ethiopia"

"Attraction of export-oriented FDI into Industrial Parks and maximization of impact on job creation, transfer of technology and exports of value-added products. Efforts will be made to improve the operation and efficiency of industrial parks, including through the application of new technologies"

The NDP 2030 assigns its largest share to social inclusion at 54.48 percent, particularly in the social equity pillar, while efficient and sustainable resource use is lowest at 8.28 percent. Natural capital protection (30.34 percent) remains significant, though not as dominant as in the NBSAP 2015.

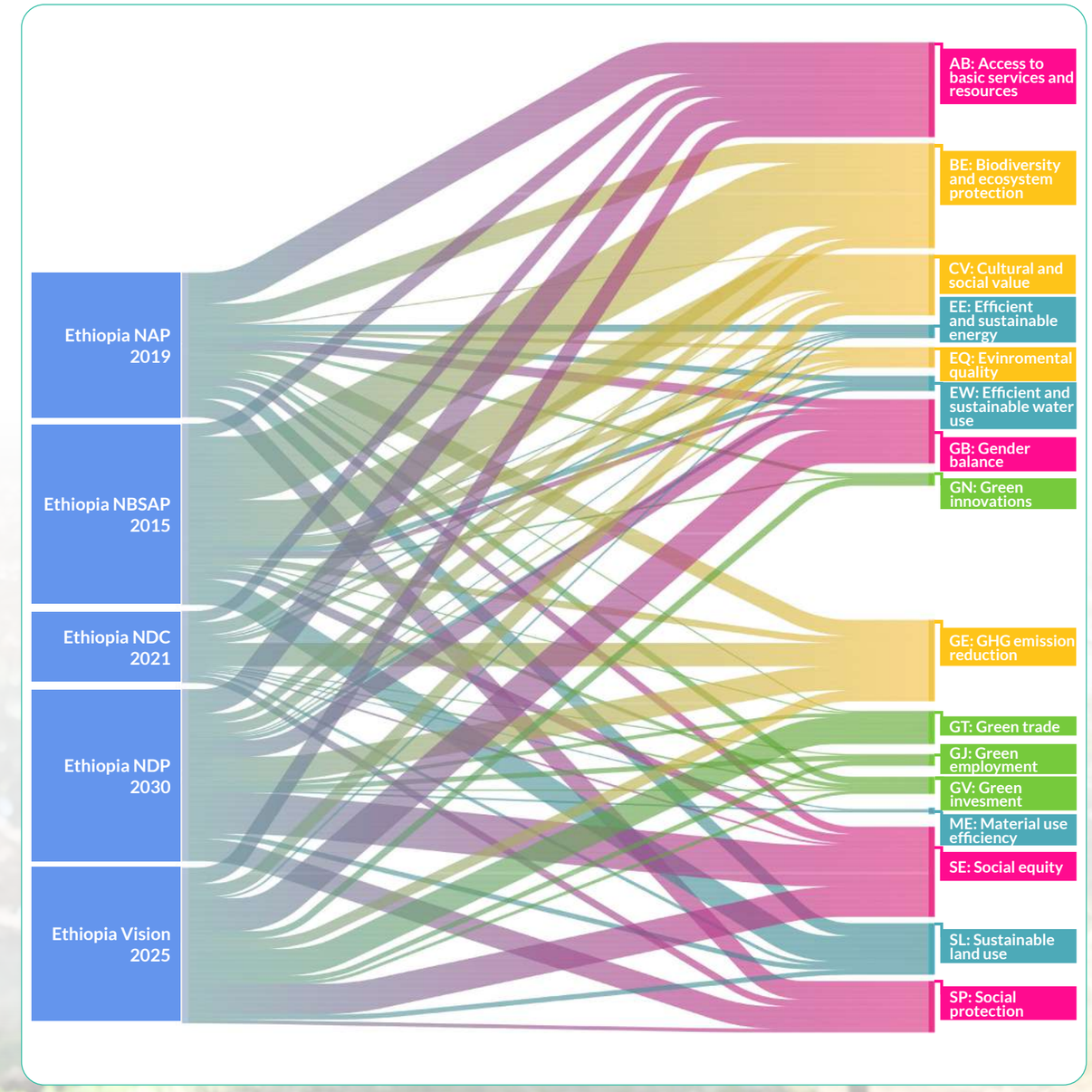
The NDC 2021 has the smallest total number of coded data points (66) but more than half of its content is focused on natural capital protection, mainly in GHG emissions reduction. Green economic opportunities are minimal at 4.48 percent, and efficient and sustainable resource use is also low at 8.96 percent.

The Sankey diagram reflects these patterns, with the NBSAP 2015 most strongly linked to biodiversity and ecosystem protection, the NAP 2019 to sustainable land use, and Vision 2025 to green economic opportunities (Figure 9). The NDP 2030 connects prominently to social equity, while the NDC 2021, but also NDP 2030, link heavily to GHG emissions reduction. Across the policy framework, material use efficiency, green employment, green innovation, and green trade remain underrepresented, indicating the need for stronger integration of economic opportunity indicators to balance Ethiopia's environmental and social priorities.

Table 6 Relative frequencies of the green growth indicators in national policies by dimension, Ethiopia

	1: Ethiopia NBSAP 2015 (151)	9: Ethiopia NAP 2019 (119)	16: Ethiopia Vision 2025 (149)	23: Ethiopia NDP 2030 (135)	31: Ethiopia NDC 2021 (66)	Totals
Efficient and sustainable resource use (732)	20.89%	20.16%	4.67%	8.28%	8.96%	12.94%
Green economic opportunities (655)	4.43%	9.30%	27.33%	6.90%	4.48%	11.25%
Natural capital protection (1908)	63.29%	27.13%	15.33%	30.34%	58.21%	37.13%
Social inclusion (1659)	11.39%	43.41%	52.67%	54.48%	28.36%	38.67%

Figure 9 Sankey visualization of connections between national policies and green growth pillars, Ethiopia



3.3.3 Mozambique

Table 7, which presents the relative frequencies, outlines how green growth indicators appear in Mozambique's five national policies.

i. **NBSAP:** Mozambique National Strategy and Action Plan of Biological Diversity (2015–2035)

ii. **NAP:** Mozambique's National Adaptation Plan 2023

iii. **Vision:** Mozambique's Agenda 2025 – The Nation's Vision and Strategies

iv. **NDP:** REPÚBLICA DE MOÇAMBIQUE ESTRATÉGIA NACIONAL DE DESENVOLVIMENTO (2015-2035)

v. **NDC:** Update of the First Nationally Determined Contribution to the United Nations Framework Convention on Climate Change MOZAMBIQUE Period: 2020-2025

The NAP 2023 is the greenest document, with 198 coded data points and the strongest focus on social inclusion, which accounts for 41.59 percent of its content. Natural capital protection is also substantial at 35.98 percent, while green economic opportunities are the least represented at just 7.01 percent. The most significant Sankey links are to social protection and access to basic resources and services (Figure 10). NAP's 2023 focus on the natural capital protection dimension emphasizes biodiversity and ecosystem protection, raising several issues regarding forests and water resources:

"Mozambique has a considerable area of natural forests and other woody formations, mainly Miombo, Mecrusse and Mopane types. These tropical dry forests are subject to a high rate of deforestation and degradation, due to their fragility and high demand for goods and services to which they are subject and the fact that they are the main livelihood of the poorest population."

"…such as the management of water resources, which should be improved to face the change in water availability, both in terms of quantity and quality, as well as its seasonality"

The NBSAP 2015 has by far the highest share of natural capital protection among Mozambique's policies, at 68.86 percent, but social inclusion is almost absent at only 3.59 percent. Green economic opportunities are also minimal, highlighting a strong environmental orientation with limited integration of social and economic aspects.

Vision 2025 places the greatest emphasis on social inclusion, at 60.93 percent, and records the highest share of green economic opportunities at 17.22 percent. However, efficient and sustainable resource use is the least represented dimension at 8.61 percent, and natural capital protection is also limited. Examples of social protection issues from Vision 2025 include:

"Health coverage decreased to 30% due to the destruction of 25% of the sanitary network, particularly rural health centres and health posts"

"The possibility of conflicts, including armed conflicts, is always a threat to human capital and peace. ... These conflicts may restart due to internal factors such as famine, poor living standard and low salaries, and the ever-growing gap between rich and poor, poverty and ostentation, systemic corruption, ethnic conflicts, phenomena of segregation and asymmetries, partisan struggle and disputes for power, …"

"Capacity for preventing natural disasters, for mitigating them and subsequent rehabilitation. To improve the natural disasters prevention capacity, we should: Approve and enforce appropriate standards and regulations for territorial planning, for construction and planning…; Mobilise all sectors in the society for participating in the prevention of calamities"

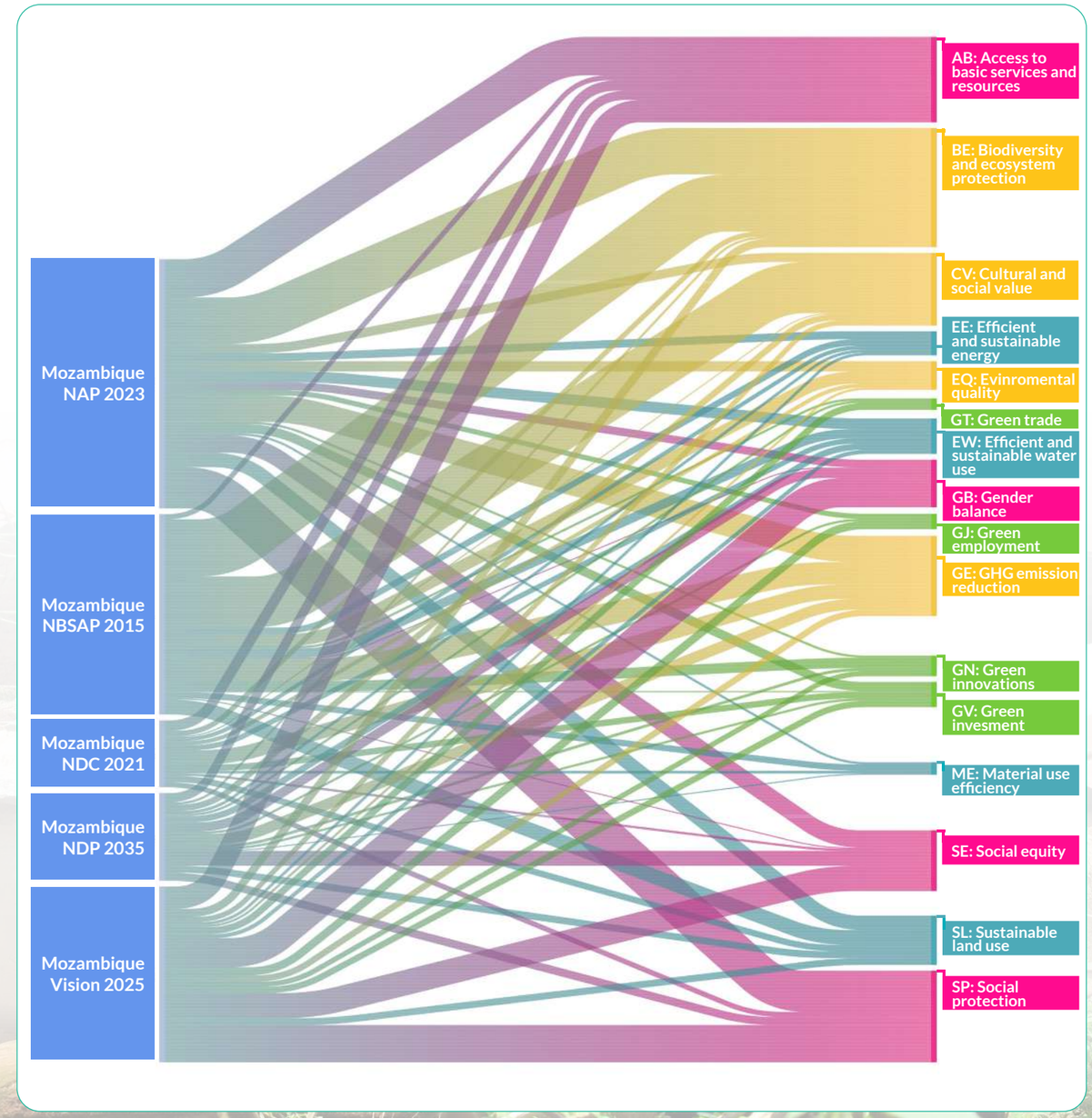
The NDP 2035 is the most balanced policy, with social inclusion at 42.03 percent and no dimension falling below 13 percent. However, environmental quality is not covered at all. The NDC 2021 gives the highest attention to natural capital protection at 38.10 percent and efficient and sustainable resource use at 26.98 percent, while green economic opportunities are the least represented at 9.52 percent.

The Sankey diagram reinforces these observations, showing that the NAP 2023 is most strongly linked to social inclusion and biodiversity and ecosystem protection and the NBSAP 2015 to natural capital protection (Figure 10). Vision 2025 stands out for its higher share of green economic opportunities, while the NDC 2021 features stronger coverage of resource efficiency than other policies. Across the framework, green trade and green innovation remain weak, indicating that stronger integration of economic opportunities is needed to balance environmental and social priorities with economic transformation.

Table 7 Relative frequencies of the green growth indicators in national policies by dimension, Mozambique

	6: Mozambique NBSAP 2015 (159)	11: Mozambique NAP 2023 (198)	17: Mozambique Vision 2025 (150)	22: Mozambique NDP 2035 (69)	35: Mozambique NDC 2021 (60)	Totals
Efficient and sustainable resource use (732)	19.76%	15.42%	8.61%	21.74%	26.98%	16.72%
Green economic opportunities (655)	7.78%	7.01%	17.22%	13.04%	9.52%	10.39%
Natural capital protection (1908)	68.86%	35.98%	13.25%	23.19%	38.10%	37.95%
Social inclusion (1659)	3.59%	41.59%	60.93%	42.03%	25.40%	34.94%
Totals	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Figure 10 Sankey visualization of connections between national policies and green growth pillars, Mozam**bique**



3.3.4 Rwanda

Table 8, which presents the relative frequencies, summarizes the relative focus on green growth indicators across Rwanda's five national policies.

i. **NBSAP:** Rwanda National Biodiversity Strategy and Action Plan 2016

ii. **NAP:** Rwanda National Strategy for Climate Change and Low Carbon Development 2022

iii. **Vision:** Rwanda vision 2050

iv. **NDP:** Rwanda 7 Years Government Programme: National Strategy for Transformation (NST1)

v. **NDC:** Rwanda Updated Nationally Determined Contribution

Rwanda shows a more balanced distribution across the four dimensions than most other African LDCs, although natural capital protection and social inclusion remain the most emphasized overall. The NAP 2022 is the greenest document, with 247 coded data points and a well-integrated profile. The highest share in this policy document is in natural capital protection at 31.13 percent, while efficient and sustainable resource use is the least represented at 17.51 percent. Green investment is an important pillar discussed in the document; some examples are given below:

"A green and resilient economic future is not only about building new infrastructure or physical capital, but also about the conservation of natural capital through the protection and enhancement of ecosystems as part of the broader social and economic landscape. Green Growth and Climate Resilience places the sustainability of the environment and natural resources at the forefront of economic innovation for Rwanda."

"Beyond more renewable energy generation…realizing this goal will require substantial scale-up in the transmission of energy to the grid and the ability to dispatch that electricity to end-users and consumers. …Rwanda will therefore match on-grid generation capacity with transmission and distribution capacity, and leverage off new technologies to utilise smart and intelligent systems, ..."

"A multi-modal transport system for both freight and passenger transport will centre around a low-carbon spine of railways and airports, with efficient links to road transport to reach throughout the country. Investment in resilience of transport networks will be a priority to protect against the risk of localised flooding and landslides."

The NBSAP 2016 gives the highest priority to natural capital protection among all of Rwanda's policies, at 68.54 percent, but social inclusion is minimal at only 5.62 percent. This focus on biodiversity and ecosystem protection, with some attention to sustainable land and water use, results in a narrow environmental orientation.

Vision 2050 takes a strong socio-economic approach, with social inclusion at 49.23 percent and green economic opportunities at 24.62 percent, but natural capital protection is the lowest among all of Rwanda's policies at just 6.15 percent. The NDP 2040 has the highest share of social inclusion at 61.18 percent, while green economic opportunities are lowest at 9.41 percent, reflecting a focus on social equity and protection over economic transformation or environmental measures.

The NDC 2020 combines a strong emphasis on natural capital protection at 43.88 percent with the lowest share in green economic opportunities at 12.43 percent. It also has notable coverage of efficient and sustainable resource use at 21.43 percent. The NDC 2020, in addition to the GHG emissions reduction, discussed several improvements in the energy sector, with some of the benefits linked to the access to basic services and resources pillar. Here are some examples of the topics discussed:

"Increasing investment in generating capacity and improving access to electricity represent important energy policy aims, and recent years have seen major improvements."

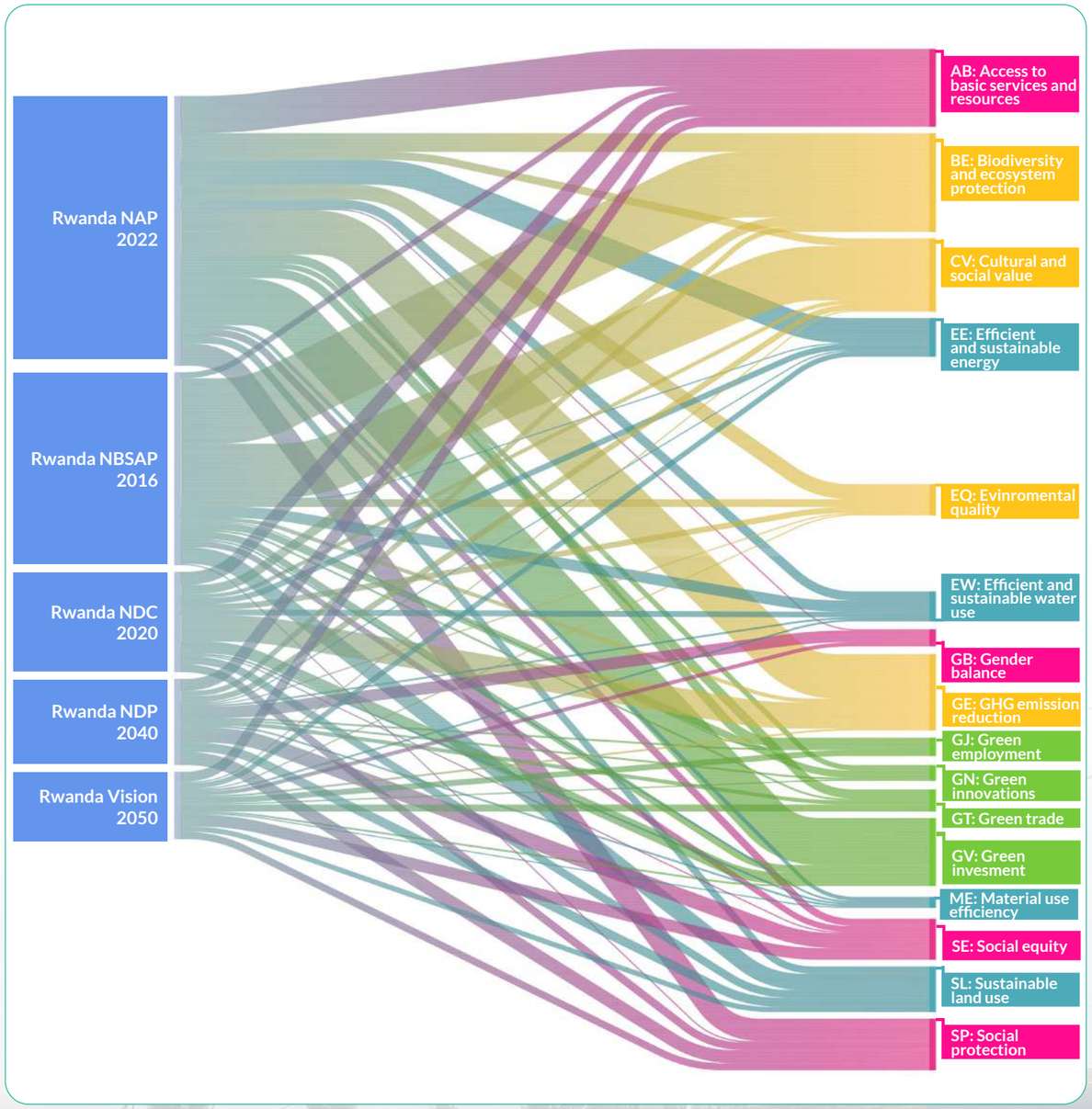
"The e-mobility programme plans for the phased adoption of electric buses, passenger vehicles (cars) and motorcycles from 2020 onwards, resulting in displaced conventional vehicle sales, transport fuel imports and associated GHG emissions"

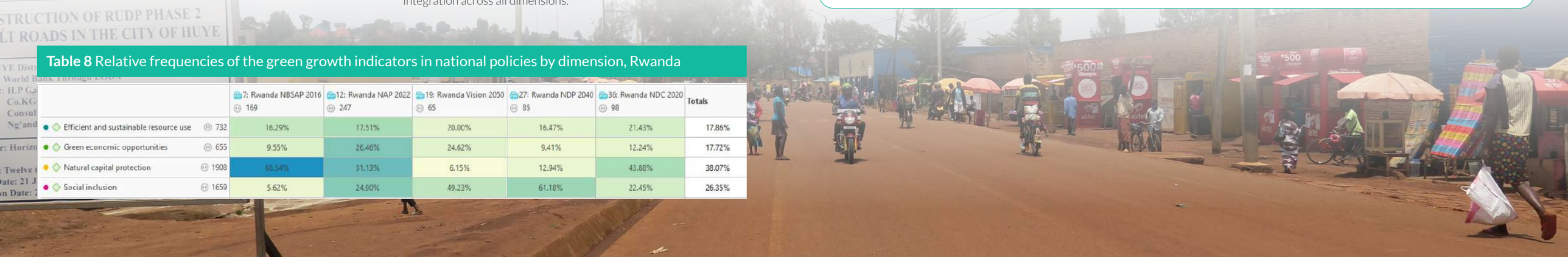
The Sankey diagram (Figure 11) reflects these patterns, with the NAP 2022 showing the widest connections to GHG emissions reduction and green investment, and the NBSAP 2016 linked most strongly to biodiversity and ecosystem protection. Links to the green growth pillars are the least in Vision 2050 and NDP 2040. The NDC 2020 is mainly linked to GHG emissions reduction, but is less significant than the NAP 2022. While Rwanda's policy framework covers most green growth pillars well, persistent gaps in material use efficiency and gender balance suggest areas for improvement to further strengthen integration across all dimensions.

Table 8 Relative frequencies of the green growth indicators in national policies by dimension, Rwanda

	7: Rwanda NBSAP 2016 (169)	12: Rwanda NAP 2022 (247)	19: Rwanda Vision 2050 (65)	27: Rwanda NDP 2040 (85)	36: Rwanda NDC 2020 (98)	Totals
Efficient and sustainable resource use (732)	16.29%	17.51%	20.00%	16.47%	21.43%	17.86%
Green economic opportunities (655)	9.55%	26.46%	24.62%	9.41%	12.24%	17.72%
Natural capital protection (1908)	68.54%	31.13%	6.15%	12.94%	43.88%	38.07%
Social inclusion (1659)	5.62%	24.90%	49.23%	61.18%	22.45%	26.35%

Figure 11 Sankey visualization of connections between national policies and green growth pillars, Rwanda





3.3.5 Senegal

Table 9, which presents the relative frequencies, details the share of green growth indicators found in Senegal's five national policies.

i. **NBSAP:** Senegal Stratégie Nationale & Plan National d'Actions pour la Biodiversité 2015

ii. **NAP:** Senegal, Pour un processus de Plan National d'Adaptation qui répond aux questions de genre

iii. **Vision:** Plan Sénégal Émergent

iv. **NDP:** Senegal Plan National de Développement Sanitaire et Social (PNDSS) 2019-2028

v. **NDC:** Senegal contribution prevue determinee au niveau national (CPDN)

Of all the LDC countries, Senegal recorded the lowest number of coded data on the green growth indicators. The NBSAP 2015 is the most environmentally focused policy, with 60.14 percent of its content dedicated to natural capital protection, the highest share for this dimension among Senegal's policies, and a relatively high share for efficient and sustainable resource use at 21.74 percent. Social inclusion and green economic opportunities are much lower, indicating that environmental priorities are not matched with social and economic integration. The Sankey diagram shows that the cultural and social value pillar had a prominent edge apart from the biodiversity and ecosystems protection (Figure 12). Some of the points discussed in these pillars are the following:

"The importance of biodiversity is not limited to provisioning services. Biodiversity also constitutes a cultural deposit with inestimable spiritual and aesthetic value. The natural supply linked to the diversity of ecosystems makes the tourism sector the second source of foreign currency in Senegal after fishing."

"Rehabilitate wildlife migration corridors to ensure connectivity between high-density biodiversity sites and diversify the gene pool of metapopulations. d) by 2020, establish a national mechanism for the sustainable financing of protected areas."

The NAP 2024 gives its highest attention to social inclusion at 55.70 percent, while green economic opportunities are the least represented at just 8.86 percent. This suggests that measures on gender balance and social protection are not yet strongly linked to job creation or green trade. The NDP 2028 is even more socially focused, with 73.08 percent of its content in social inclusion, the highest share for this dimension across all Senegal policies. In contrast, efficient and sustainable resource use is minimal at 3.85 percent, and natural capital protection at 7.69 percent is also low. Green economic opportunities are relatively stronger at 15.38 percent compared to other policies.

The NDC 2015 prioritizes natural capital protection at 54.90 percent, particularly through GHG emissions reduction, while green economic opportunities are lowest at 11.76 percent.

Vision 2050 takes a more socio-economic orientation, with social inclusion at 41.38 percent and green economic opportunities at 17.24 percent, the second-highest after the NDP 2028. Natural capital protection is moderate, but efficient and sustainable resource use reaches 24.14 percent, the highest share for this dimension among Senegal's policies. It also outlines key risks in green employment, noting:

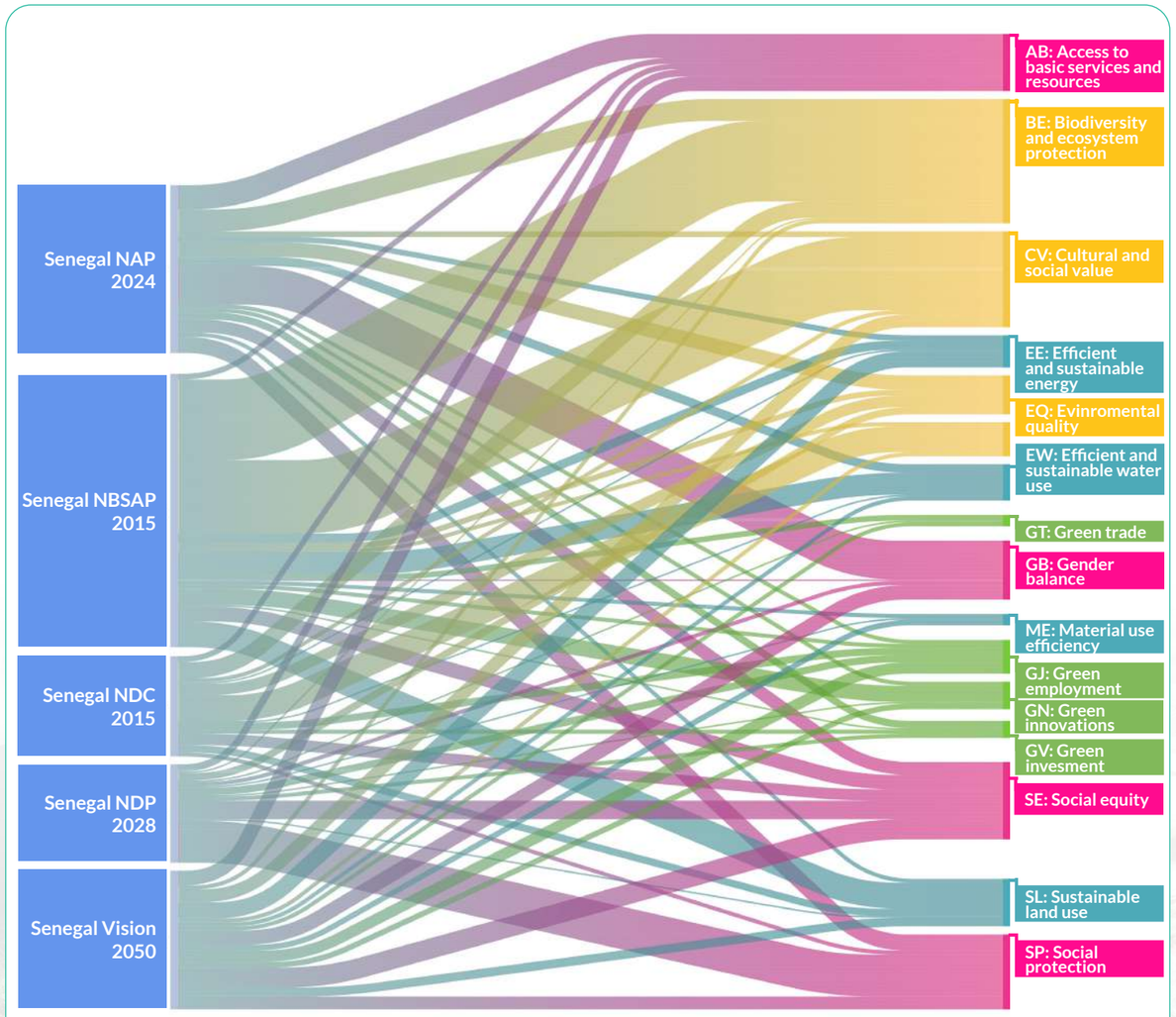
"If the current ratios of assets, employment rates, proportion of informality and unemployment and poverty rates remain the same in twenty-five years, the number of informal workers would increase from 1.8 to 4 million people, the number of unemployed from 1.2 to 2.7 million, and above all the number of adults of working age but living at the expense of others (inactive) would increase from 4.3 to 9.4 million ..."

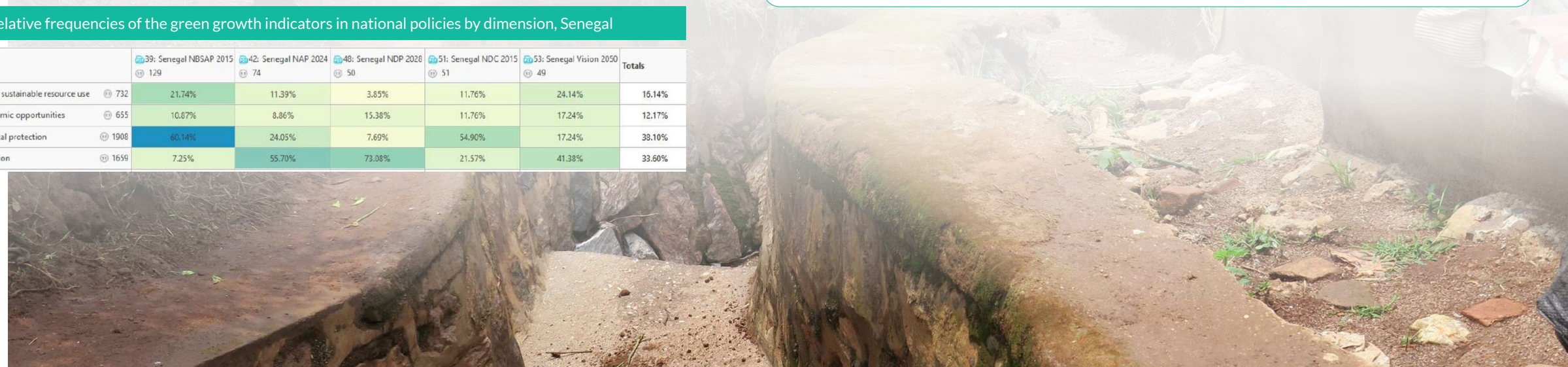
The Sankey diagram reflects these patterns, with the NBSAP 2015 linked most strongly to biodiversity and ecosystem protection, the NDP 2028 and Vision 2050 to social equity and social protection, and the NAP 2024 to gender balance (Figure 12). Across the pillars, GHG emissions reduction, green trade, and material use efficiency are the least integrated, pointing to a need for more comprehensive alignment across national policies.

Table 9 Relative frequencies of the green growth indicators in national policies by dimension, Senegal

	39: Senegal NBSAP 2015 (129)	42: Senegal NAP 2024 (74)	48: Senegal NDP 2028 (50)	51: Senegal NDC 2015 (51)	53: Senegal Vision 2050 (49)	Totals
Efficient and sustainable resource use (732)	21.74%	11.39%	3.85%	11.76%	24.14%	16.14%
Green economic opportunities (655)	10.87%	8.86%	15.38%	11.76%	17.24%	12.17%
Natural capital protection (1908)	60.14%	24.05%	7.69%	54.90%	17.24%	38.10%
Social inclusion (1659)	7.25%	55.70%	73.08%	21.57%	41.38%	33.60%

Figure 12 Sankey visualization of connections between national policies and green growth pillars, Senegal





3.3.6 Togo

Table 10, which presents the relative frequencies, illustrates the distribution of green growth indicators in Togo's five national policies.

i. **NBSAP:** Stratégie et Plan d'Action National pour la Biodiversité du Togo (SPANB) 2011–2020

ii. **NAP:** Plan National d'Adaptation aux Changements Climatiques du Togo (PNACC) 2018

iii. **Vision:** Government Roadmap Togo, 2025

iv. **NDP:** Togo plan national de developpement(PND) 2018-2022

v. **NDC:** Togolaise Contribution Prévue Déterminée au Niveau National (CPDN) dans le cadre de la CCNUCC

The NDP 2022 contains the highest number of coded data points (167) and places its greatest emphasis on social inclusion at 45.03 percent. Efficient and sustainable resource use is the least represented dimension at 12.87 percent, while green economic opportunities have a comparatively strong presence at 20.47 percent, higher than in many other Togo policies. Access to basic services and resources and social equity are the most prominent pillars, with examples including:

"The Gini index was 0.380 in 2015 compared to 0.393 in 2011 (see graph 7). The decline in the Gini index reflects the decline in inequalities, which is partly explained by the government's actions in favor of the poor, through a series of programs initiated by the government in a participatory and inclusive manner."

"With regard to the SDGs, efforts to eliminate poverty in all its forms have continued through improving the living conditions of poor populations in general and the most vulnerable in particular. Social inclusion mechanisms have been strengthened (FNFI), youth employment projects."

The NBSAP 2014 is the most environmentally focused policy, with 67.48 percent of its content referring to the green growth indicators in the natural capital protection dimension. Social inclusion is minimal at 9.82 percent, and green economic opportunities at 8.59 percent are also low, underscoring a narrow environmental orientation with limited socio-economic integration.

Vision 2025 has the highest share of social inclusion among Togo's policies at 62.32 percent, while natural capital protection is the least represented at 11.59 percent. Green economic opportunities are also low at 8.70 percent. This policy focuses heavily on access to basic services and social protection, illustrated by examples such as:

"Priorities: (i) Adoption of the military programming law to protect and strengthen investments in the military sector in order to ensure national security, particularly in the face of the terrorist threat – targeting a defense spending to GDP ratio of 4% (ii) Reduction of the crime rate in the country, (iii) Improvement of the efficiency of the judicial system (eg rate of access to justice at 75% vs. 65% in 2016)"

"Providing an identity and guaranteeing health coverage and access to basic services for all through strengthening access and improving the quality of the health system."

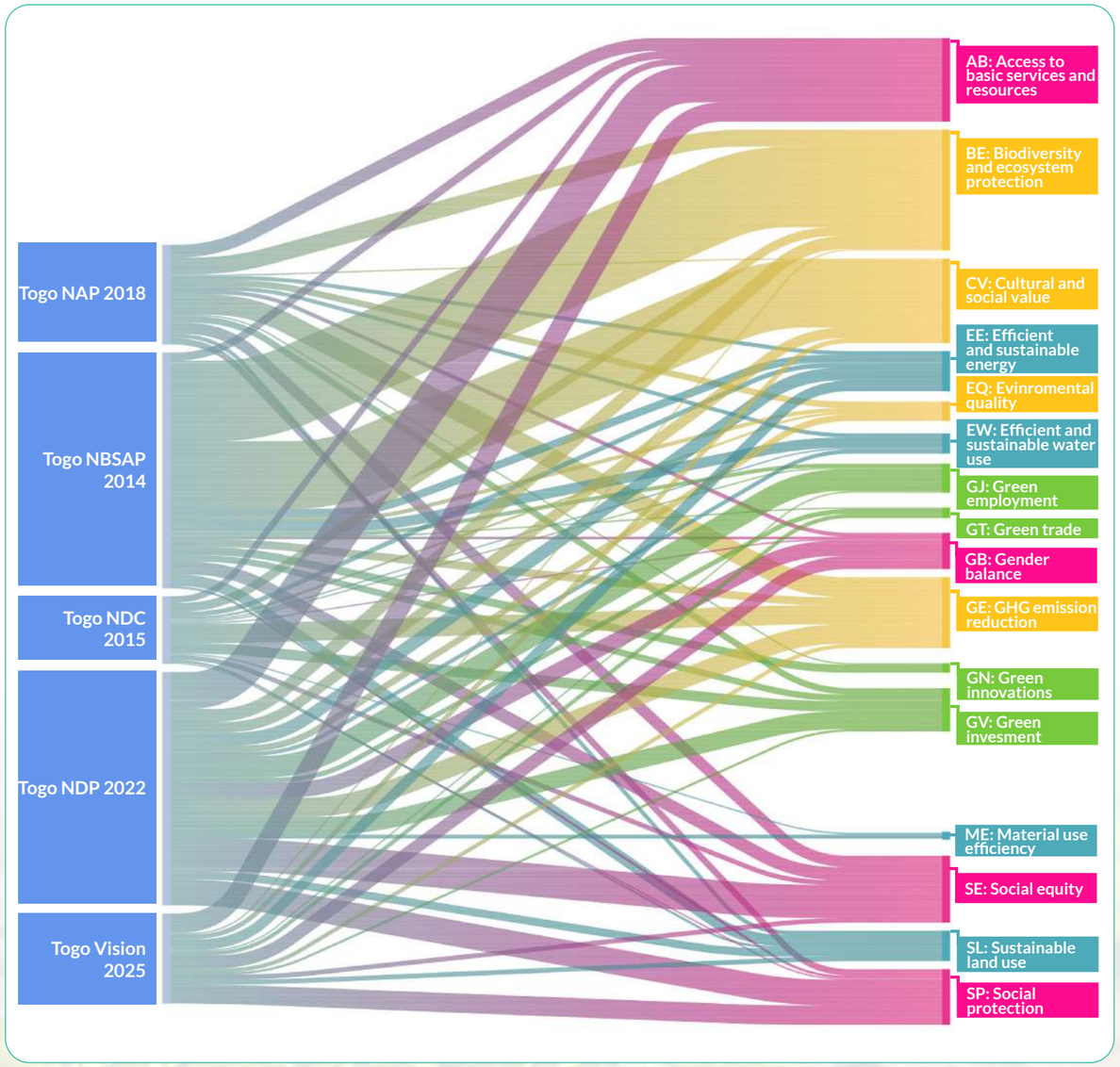
The NDC 2015 is the most balanced policy across the four dimensions, with the largest share in natural capital protection at 44.90 percent and the smallest in efficient and sustainable resource use at 16.33 percent. Despite this balance, it contains the lowest total number of green growth–related codes (48) among the NDCs for the eight African LDCs. Similarly, the NAP 2018 is heavily weighted toward natural capital protection at 48.48 percent, particularly in GHG emissions reduction and biodiversity and ecosystem protection. The green growth indicators for green economic opportunities and efficient and sustainable resource use are only minimally covered.

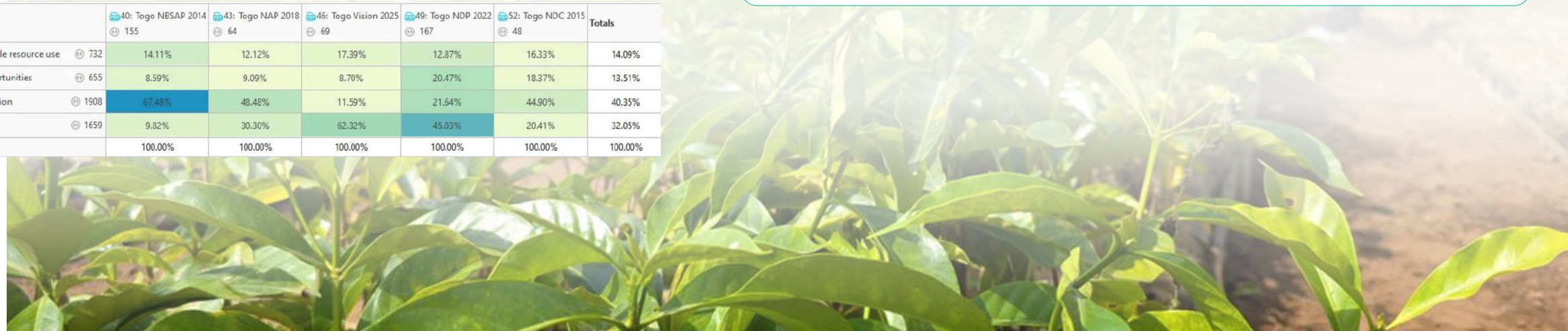
The Sankey diagram reflects these patterns, with strong linkages from the NBSAP 2014 to biodiversity and ecosystem protection, from the NDP 2022 to social equity and access to basic services, and from Vision 2025 to social protection (Figure 13). The NBSAP 2014 and NDP 2022 are the most comprehensive policies covering significant references to the green growth indicators. Across Togo's policies, green trade and material use efficiency remain underrepresented, highlighting the need for greater integration of these pillars to complement the strong emphasis on natural capital protection.

Table 10 Relative frequencies of the green growth indicators in national policies by dimension, Zambia

	40: Togo NBSAP 2014 (155)	43: Togo NAP 2018 (64)	46: Togo Vision 2025 (69)	49: Togo NDP 2022 (167)	52: Togo NDC 2015 (48)	Totals
Efficient and sustainable resource use (732)	14.11%	12.12%	17.39%	12.87%	16.33%	14.09%
Green economic opportunities (655)	8.59%	9.09%	8.70%	20.47%	18.37%	13.51%
Natural capital protection (1908)	67.48%	48.48%	11.59%	21.64%	44.90%	40.35%
Social inclusion (1659)	9.82%	30.30%	62.32%	45.03%	20.41%	32.05%
Totals	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Figure 13 Relative frequencies of the green growth indicators in national policies by dimension, Togo





3.3.7 Uganda

Table 11, which presents the relative frequencies, presents the focus areas for green growth indicators across Uganda's five national policies.

i. **NBSAP:** Uganda National Biodiversity Strategy and Action Plan II (2015–2025)

ii. **NAP:** Uganda National Adaptation Programmes of Action (NAPA) 2007

iii. **Vision:** Uganda vision 2040

iv. **NDP:** Uganda THIRD NATIONAL DEVELOPMENT PLAN (NDPIII) 2020/21 – 2024/25

v. **NDC:** Uganda Updated Nationally Determined Contribution (NDC)

The NDP 2025 contains the highest number of coded data points (242), with social inclusion as the leading dimension at 37.86 percent and efficient and sustainable resource use as the lowest at 8.23 percent. The largest Sankey connections are to access to basic services and resources and social equity, reflecting a strong social orientation (Figure 14). For example, the NDP 2025 highlighted:

"For successful implementation of the NDPIII, the following key development strategies will be pursued…Develop intermodal transport infrastructure to enhance interoperability; x) Increase access to stable, reliable and affordable energy."

"Reduction in the cost of electricity to USD 5 cents for all processing and manufacturing enterprises; Increased households with access to electricity from 21 percent to 60 percent; Increased area covered by broad band services from 41 percent to 90 percent."

The NBSAP 2016 gives most significant attention to natural capital protection at 59.49 percent, the highest among Uganda's policies, with biodiversity and ecosystem protection and cultural and social value as the most prominent pillars. Social inclusion is the least represented at 12.03 percent, while efficient and sustainable resource use and green economic opportunities are moderate. In the document, some key challenges for Uganda in these areas were emphasized:

"NBSAPII addresses the key concerns regarding biodiversity management in Uganda. These include, among others, declining species abundance largely due to over-harvesting and exploitation of biological resources including trees and woody biomass, shrinking habitats especially wetlands and forests. These losses are largely attributed to unsustainable use of biodiversity resources or habitat loss due to conversion of habitats into other commercial land uses or habitat degradation."

"The priority areas for NBSAPII which is also in line with National Vision 2040, the Sustainable Development Goals (SDGs) and the National Development Plan II (NDP II) are: Restoration of degraded ecosystems (wetlands, forests, rangelands, hilly and mountainous areas) 2. Preventing extinction of threatened/endangered species and curbing illegal wildlife trade."

Vision 2040 provides the most balanced profile across dimensions, with social inclusion highest at 38.00 percent and natural capital protection lowest at 20.00 percent. Its strong coverage of green economic opportunities (25.00 percent) and focus on green trade make it one of Uganda's most comprehensive policies regarding green growth indicators.

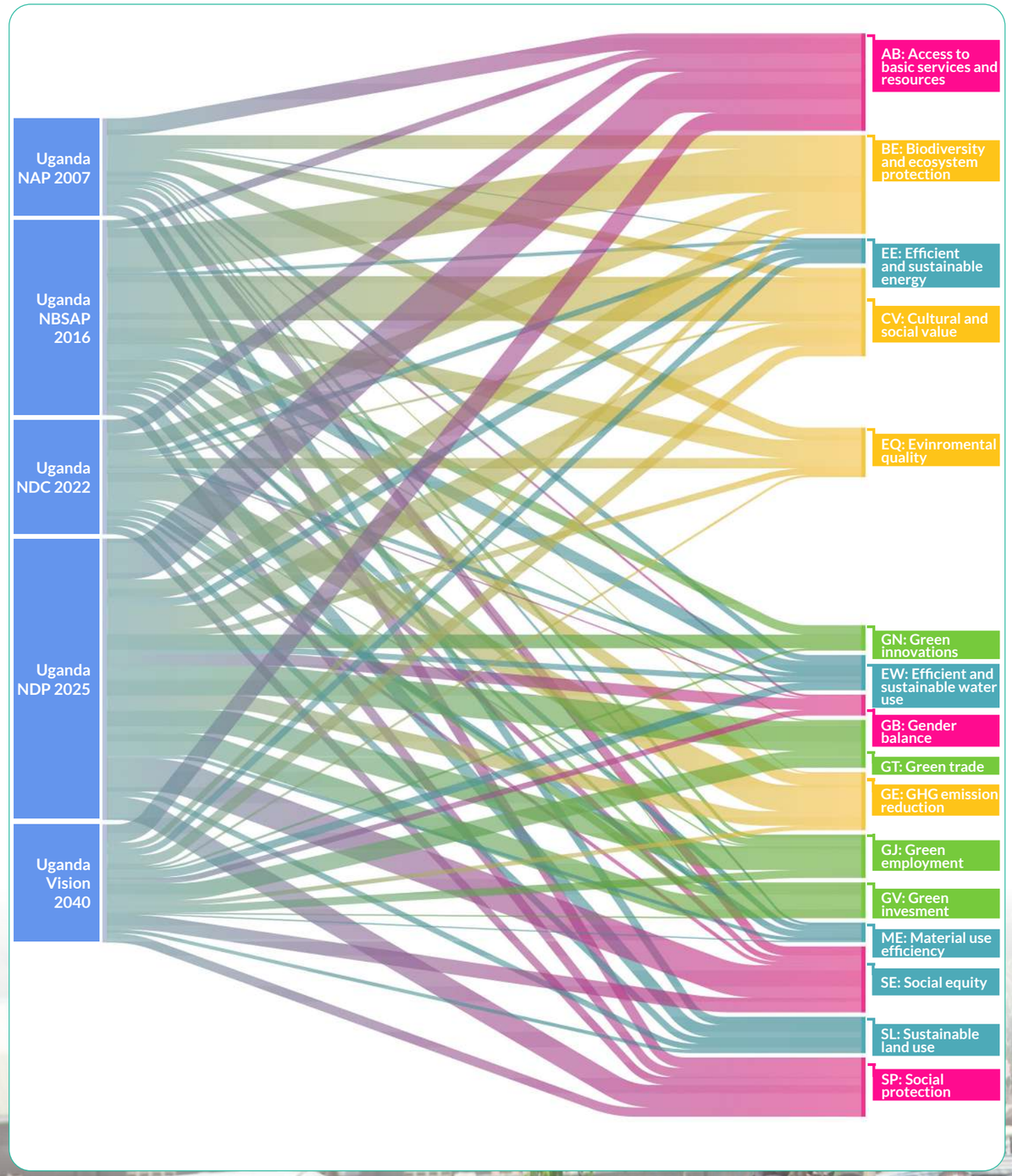
The NAP 2007 prioritizes natural capital protection at 39.74 percent and social inclusion at 35.90 percent, but has the lowest share for green economic opportunities. It does not contain any relevant information about green innovation or green trade. Similarly, the NDC 2022 emphasizes natural capital protection at 46.81 percent, while green economic opportunities remain low at 8.51 percent. Efficient and sustainable resource use shares are relatively high compared to other Uganda policies.

The Sankey diagram reflects these patterns, with the NDP 2025 strongly linked to social inclusion, the NBSAP 2016 to biodiversity and ecosystem protection, and Vision 2040 to green trade and access to basic services and resources (Figure 14). While Uganda's policy framework ranks among the highest in total coded data across the eight African LDCs, strengthening green innovation and green trade, particularly in the NAP 2007 and NDC 2022, would help achieve a more balanced green growth transition.

Table 11 Relative frequencies of the green growth indicators in national policies by dimension, Uganda

	2: Uganda NBSAP 2016 (151)	14: Uganda NAP 2007 (74)	20: Uganda Vision 2040 (98)	29: Uganda NDP 2025 (242)	37: Uganda NDC 2022 (91)	Totals
Efficient and sustainable resource use (732)	18.35%	19.23%	17.00%	8.23%	22.34%	15.16%
Green economic opportunities (655)	10.13%	5.13%	25.00%	32.10%	8.51%	19.47%
Natural capital protection (1908)	59.49%	39.74%	20.00%	21.81%	46.81%	35.96%
Social inclusion (1659)	12.03%	35.90%	38.00%	37.86%	22.34%	29.42%

Figure 14 Sankey visualization of connections between national policies and green growth pillars, Uganda



3.3.8 Zambia

Table 12, which presents the relative frequencies, shows the relative emphasis on green growth indicators within Zambia's five national policies.

i. **NBSAP:** Zambia's Second National Biodiversity Strategy and Action Plan (NBSAP-2) 2015–2025

ii. **NAP:** National Adaptation Plan for Zambia

iii. **Vision:** Zambia vision 2030 – A Prosperous Middle-Income Nation by 2030

iv. **NDP**: Zambia eight national development plan 2022 – 2026

v. **NDC:** NDC Implementation Framework for Zambia 2023–2030

The NBSAP 2015 contains the highest number of coded data points (239) and is strongly oriented toward natural capital protection, with its indicators accounting for 79.20 percent relative frequencies, the highest share for this dimension across all of Zambia's policies. Green economic opportunities are the least represented at just 3.20 percent, while efficient and sustainable resource use and social inclusion also remain low. Figure 15 shows that, under natural capital protection, the most prominent pillar in the NBSAP 2015 is the biodiversity and ecosystem protection pillar, with forest and biodiversity playing a key role in its goals:

"[Strategic goals] Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society… Reduce the direct pressures on biodiversity and promote sustainable use…Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity…Enhance the benefits to all from biodiversity and ecosystem services…Enhance implementation through participatory planning, knowledge management and capacity building."

"Forests are known as a valuable natural and economic resource for supporting natural systems and improving peoples' livelihoods. Zambia's forests are also important repositories of biodiversity and provide a wide range of goods for livelihoods…Overall, harvested forest products make a significant contribution to incomes of the rural poor."

The NAP 2023 adopts a more balanced profile, with social inclusion as the leading dimension at 42.75 percent and green economic opportunities the least represented at 4.58 percent. Its relatively higher share of efficient and sustainable resource use compared to other adaptation plans indicates that its priorities go beyond just the environment.

Vision 2030 places the strongest emphasis on social inclusion, at 52.99 percent, particularly in access to basic services and social protection. The efficient and sustainable resource use and green economic opportunities are both at 11.97 percent, higher than in the NBSAP 2015 but still modest. In contrast, the NDP 2026, which ranks second in the number of coded data points (225), has the highest share of green economic opportunities among Zambia's policies at 25.22 percent. Social inclusion leads at 36.52 percent, while natural capital protection accounts for 30.87 percent. This policy also has one of the longest Sankey edges for gender balance, reflecting a strong equity focus (Figure 14). Key challenges noted in the NDP 2026 include:

"The country continues to record low participation in democratic and political governance processes as well as decision-making by women, the youth and persons with disabilities. … The youth constituted 4 percent of the Members of Parliament and there was only 1 member of Parliament with a disability. ... To achieve gender parity in decision-making positions, reforms will be undertaken to promote the participation of women. Further, participation of youth and PWDs will be encouraged."

"In an effort to reduce developmental disparities, the Government will implement interventions to address gender, income and spatial inequalities. Interventions to promote gender equality will address issues related to the participation of women in decision-making positions at all levels of governance … To address income inequalities, livelihood and empowerment programmes will be enhanced in order to positively impact on incomes."

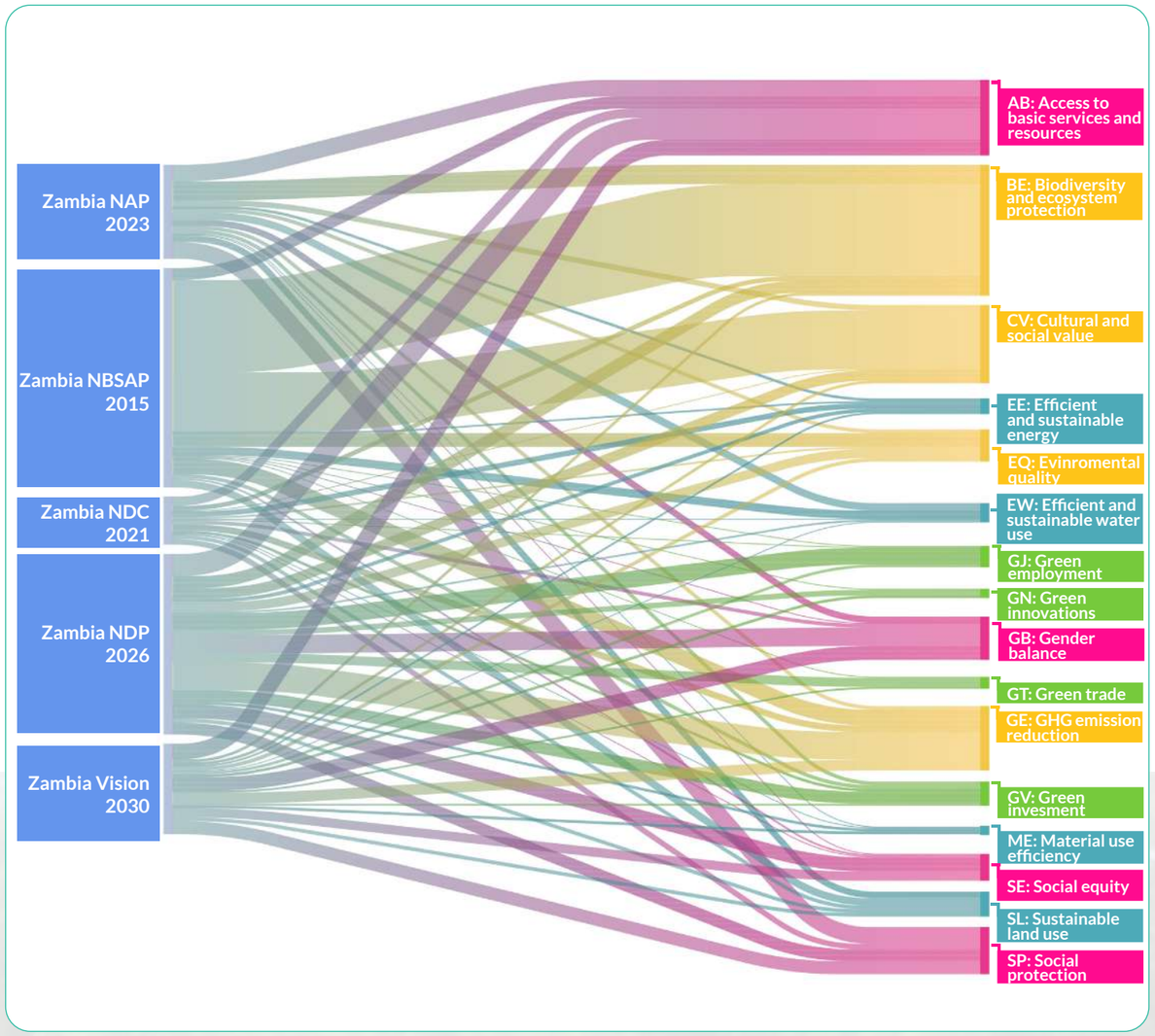
The NDC 2021 pays the highest attention to efficient and sustainable resource use, at 23.88 percent, while green economic opportunities are the lowest, at 7.46 percent. It also has the fewest total coded data points among Zambia's policies, at 64.

The Sankey diagram reflects these patterns, with the NBSAP 2015 linked most strongly to biodiversity and ecosystem protection and the NDP 2026 to access to basic services and gender balance (Figure 15). Vision 2030 places importance on social protection, in addition to access to basic services and gender balance. While green economic opportunities are better represented in the NDP 2026, they remain limited in most other policies, and green innovation and green trade are among the least addressed pillars, showing where future policies can be improved.

Table 12 Relative frequencies of the green growth indicators in national policies by dimension, Zambia

	8: Zambia NBSAP 2015 (239)	15: Zambia NAP 2023 (128)	21: Zambia Vision 2030 (113)	30: Zambia NDP 2026 (225)	38: Zambia NDC 2021 (64)	Totals
Efficient and sustainable resource use (732)	10.40%	19.85%	11.97%	7.39%	23.88%	12.45%
Green economic opportunities (655)	3.20%	4.58%	11.97%	25.22%	7.46%	11.45%
Natural capital protection (1908)	79.20%	32.82%	23.08%	30.87%	29.85%	45.16%
Social inclusion (1659)	7.20%	42.75%	52.99%	36.52%	38.81%	30.94%

Figure 15 Sankey visualization of connections between national policies and green growth pillars, Zambia



4 Africa LDCs green growth performance

The Green Growth Index results for the eight African Least Developed Countries (LDCs), including Burkina Faso, Ethiopia, Mozambique, Rwanda, Senegal, Togo, Uganda, and Zambia, show diverse progress across the four green growth dimensions: efficient and sustainable resource use, natural capital protection, green economic opportunities, and social inclusion. Figure 16 summarizes performance at both the pillar and overall Index levels, showing that no country consistently outperforms across all dimensions. The results highlight unique strengths and challenges in each national context.

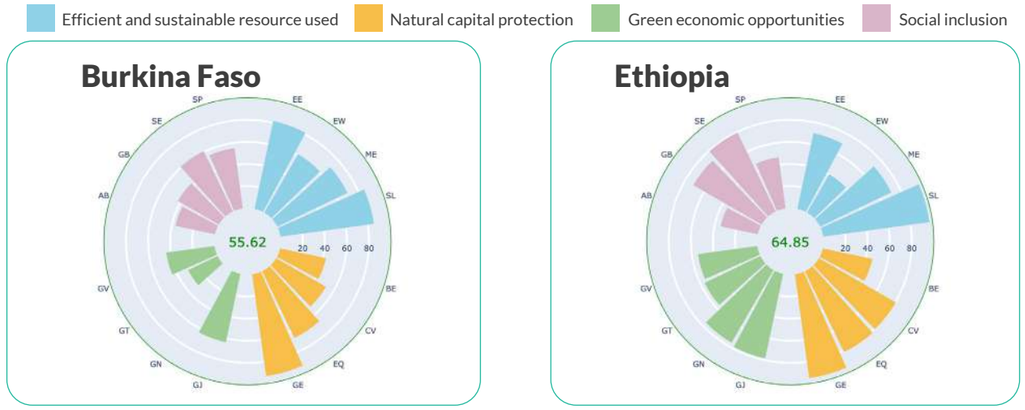
Across the eight African LDCs, efficient and sustainable resource use and natural capital protection tend to record the highest distances to target. Uganda, with the highest overall Index score of 72.29, performs strongly in these two dimensions, together with Senegal at 70.51 and Zambia at 70.00. With scores between 65 and 70, Rwanda and Mozambique also achieve good results, particularly in sustainable resource use. Ethiopia and Togo follow closely, still scoring above 60. Burkina Faso has the lowest overall Index score of 55.62, but it still records relatively higher results in efficient and sustainable resource use. The differences between countries and across pillars within each dimension indicate that even stronger performers still face challenges in reaching their targets.

Green economic opportunities record lower distances to the target for most countries. The highest scores in this dimension are observed in Uganda, Senegal, and Zambia, which contribute to their strong overall Index performance above 70. Rwanda and Mozambique also achieve moderate results, while Ethiopia performs relatively better than Burkina Faso and Togo in several economic opportunity pillars. Burkina Faso, with the lowest overall Index score, also ranks at the bottom in green economic opportunities, indicating that slow progress in enabling conditions for green investment, trade, jobs, and innovation constrains its overall green growth performance.

Social inclusion shows the widest performance gaps among the four dimensions. Ethiopia and Rwanda achieve relatively stronger results in this dimension, supported by higher scores in gender balance and social equity. Mozambique, Togo, and Senegal have moderate social inclusion scores, which align with their overall Index positions in the middle of the group. Burkina Faso, Uganda, and Zambia rank lowest in this dimension, showing that limited progress in inclusion-related outcomes has held back improvements despite stronger results in other dimensions.

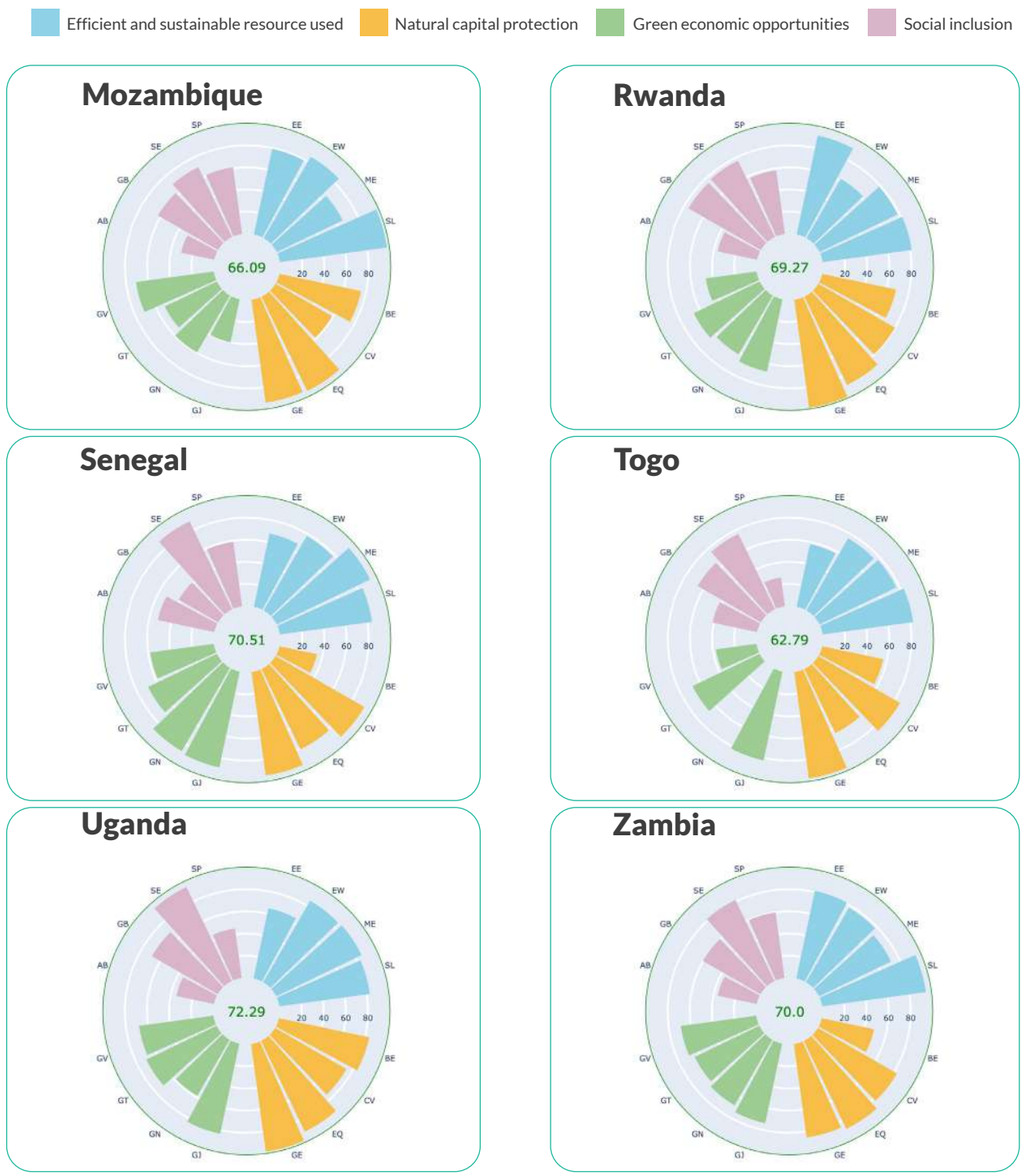
Overall, the Index results show that while several African LDCs are making progress toward their sustainability targets, the pace of advancement is uneven across dimensions. Environmental performance is generally stronger than green economic progress and social inclusiveness, underlining the need for more balanced strategies that integrate economic transformation and social equity with resource efficiency and ecosystem protection. The following sections present the detailed country performance profiles for the green growth indicators, highlighting areas where the countries could improve performance.

Figure 16 Performance at the pillar and Green Growth Index levels in the Africa LDCs



EE – Efficient and sustainable resource use, EW – Efficient and sustainable water use, SL – Sustainable land use, ME – Material use efficiency
EQ – Environmental Quality, GE – GHG emissions reduction, BE – Biodiversity and ecosystem protection, CV – Cultural and social value
GV – Green investment, GT – Green trade, GJ – Green employment, GN – Green innovation
AB – Access to basic services and resources, GB – Gender balance, SE – Social equality, SP – Social protection

Figure 16 Performance at the pillar and Green Growth Index levels in the Africa LDCs *(continued)*



EE – Efficient and sustainable resource use, EW – Efficient and sustainable water use, SL – Sustainable land use, ME – Material use efficiency
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4.1 Burkina Faso

Figure 17 shows that Burkina Faso's green growth performance varies across dimensions. The strongest results are in efficient and sustainable resource use, followed by natural capital protection. The other two dimensions, green economic opportunities and social inclusion, remain weak. Among the four dimensions, Burkina Faso performs best in efficient and sustainable resource use, despite a very low score of 12.34 for capture fisheries as a proportion of GDP (EW3). As a landlocked country, fisheries are limited to rivers, lakes, and reservoirs that are highly vulnerable to droughts and rainfall variability.[19] Unsustainable and inadequate fishing practices further reduce fish stocks and diversity, contributing to this very low score. [20]

Natural capital protection is the second-best dimension for Burkina Faso, but several indicators record very low scores. These include forests under certification schemes (BE4), changes in the extent of water ecosystems (BE5), DALY rates from unsafe water (EQ2), and the share of exports of cultural goods (CV5). The degradation of water ecosystems (BE5) is linked to extreme climate events, conversion of wetlands to agriculture, urban expansion, and industrial activity.[21] Challenges in forest certification (BE4) are associated with widespread deforestation, forest fragmentation, limited technical expertise, and the high costs of certification.[22] Despite progress in access to improved water sources, DALY rates from unsafe water (EQ2) remain high. Armed conflicts have damaged water infrastructure and restricted access to safe water, leaving over 1.74 million internally displaced people vulnerable to waterborne diseases. [23]The very low score in cultural goods exports (CV5) reflects systemic issues in the cultural sector, including limited promotion of cultural activities, weak coordination, insufficient financial support, and low levels of tourism. [24]

Social Inclusion contains the highest number of very low-scoring indicators, with seven spread across different pillars. These include access to safe water and sanitation (AB1) and access to electricity and clean fuels (AB2) under access to basic services and resources, mothers with maternity cash benefits (GB4) under gender balance, rural–urban access to electricity (SE2) and cash benefits for people with disabilities (SE5) under social equity, as well as the share of older people receiving pensions (SP1) and universal health coverage (SP2) under social protection. Among these, social equity indicators perform the worst, with SE2 scoring only 1 and SE5 scoring 4.25. The extremely low score for rural–urban access to electricity (SE2) reflects the challenges of extending electricity to rural areas, including high costs, low returns on investment, and logistical difficulties in reaching dispersed populations.[25] The very low score for cash benefits for people with disabilities (SE5) highlights an underdeveloped social safety net with limited coverage of vulnerable groups.[26] Cultural stigma associated with disabilities further excludes individuals from social protection programs.[27] Weaknesses in the social safety net also explain the very low scores for maternity cash benefits (GB4), which scored 5.65, and pension coverage (SP1), which scored 7.63. However, the expert ratings for GB4 are very low in Burkina Faso (Annex 1) because, while the law guarantees paid maternity leave, a high level of informality in employment excludes many mothers of newborns from benefiting from this right. Moreover, in 2016, the government introduced free healthcare for pregnant women and children aged 0 to 5, although its implementation has encountered significant challenges.

Although the green economic opportunities dimension has fewer very low indicators than social Inclusion, it contains the smallest number of high-performing ones, making it Burkina Faso's weakest dimension. Key challenges are reflected in adjusted net savings (GV1), renewable electricity capacity (GV2), and the export of environmental technologies (GT2). A low savings rate limits capital available for domestic investments, reducing the ability to finance essential water, sanitation, and electricity infrastructure. Adjusted net savings (GV1) are further affected by deforestation and land degradation, which deplete natural capital.[28] Investments in renewable energy (GV2) face obstacles related to weak policy and regulatory frameworks, inconsistent energy policies, bureaucratic hurdles, and political instability, all of which discourage investors.[29] These challenges also affect the export of environmental technologies (GT2), underscoring broader gaps in innovation and competitiveness in green sectors.

Several projects are being implemented in Burkina Faso to address the weakest-performing areas of the Green Growth Index (Table 13). The **Building Resilience in the Kaya-Dori Axis** contributes to improving the situation of vulnerable groups in the Centre-North by combining community livelihood support with renewable energy use and land restoration activities. Its interventions are closely tied to very low scores in safely managed water and sanitation (AB1), access to electricity and clean fuels (AB2), and rural–urban equity in energy access (SE2). The **Solar Irrigation Pumping Systems and Mini-Grids Project** targets renewable energy expansion by replacing diesel pumps with solar-powered systems and decentralized mini-grids. This project directly addresses the country's weak performance in installed renewable capacity (GV2) and also supports access to electricity and clean fuels (AB2). **The Solar Grandmothers Initiative** (see Box 1 for details) demonstrates how community-based training and empowerment of rural women strengthen progress in electricity and clean fuels access (AB2) and improve equity in service delivery between rural and urban areas (SE2). These projects demonstrate alignment with Burkina Faso's lowest-scoring indicators on access to basic services (AB1, AB2), renewable energy capacity (GV2), and rural–urban equity (SE2). Other very low-scoring indicators, such as capture fisheries (EW3), environmentally sound technology exports (GT2), forest certification (BE4), extent of water-related ecosystems (BE5), cultural goods exports (CV5), health outcomes from unsafe water (EQ2), and social protection indicators (GB4, SE5, SP1, SP2), are not addressed by the initiatives in these projects.

Figure 17 Green growth performance by dimensions, Burkina Faso

Definitions:

Efficient and sustainable resource use: **EE1 -** Energy intensity, **EE2 -** Renewable energy share, **EE3** - Efficient transport, **EE4** - Low-carbon electricity, **EE5** - Per capita electricity consumption, **EW1 -** Water use efficiency, **EW2 -** Level of water stress, **EW3 -** Capture fisheries, **EW4 -** Share of surface irrigation, **EW5 -** Renewable water resources, **SL1 -** Soil nutrient balance, **SL2 -** Organic agriculture area, **SL3 -** Share ruminant livestock, **SL4 -** Agricultural productivity, **SL5 -** Annual forest area change, **ME1 -** Domestic material consumption, **ME2 -** Material footprint, **ME3 -** Food loss and food waste, **ME4 -** Municipal solid waste recycled, **ME5 -** Sewer, septic and latrine coverage

Natural capital protection: **EQ1 -** PM2.5 air pollution, **EQ2 -** DALY rate from unsafe water, **EQ3 -** Solid waste generation, **EQ4 -** Urban people with open defecation, **EQ5 -** Ambient air pollution DALYs, **GE1 -** CO2 emissions per capita, **GE2** - Non-CO2 per capita excl. AFOLU, **GE3** - Non-CO2 emissions in AFOLU, **GE4 -** Carbon intensity of energy production, **GE5 -** CO2 emissions per mfg value-added, **BE1 -** Protected key biodiversity areas, **BE2 -** Share of forest areas, **BE3 -** Forest above-ground biomass, BE4 - Forest under certification scheme, **BE5 -** Change in extent of water ecosystems, **CV1 -** Red list index, CV2 - Terrestrial protected area, **CV3 -** Tourism contribution to GDP, **CV4 -** Share of employment in services, **CV5 -** Share of exports of cultural goods

Green economic opportunities: **GV1-** Adjusted net savings, **GV2 -** Renewable electricity capacity, **GV3 -** Financial flows for clean energy R&D, **GV4 -** Agriculture orientation index, **GV5** - Transport productive capacity, **GT1 -** Exports of environmental goods, **GT2 -** Environmental technologies exported, **GT3 -** ISO 14001 certificates issued, **GT4 -** New business density, **GT5 -** High-technology exports, **GJ1 -** Green employment in manufacturing, **GJ2 -** Employed below the poverty line, **GJ3 -** Vulnerable employment, **GJ4 -** Firms offering formal training, **GJ5 -** ODA flows for scholarships, **GN1 -** Environmental technologies, **GN2 -** Scientific and technical journals, **GN3 -** Researchers per million inhabitants, **GN4 -** Medium/high-tech mfg value-added, **GN5 -** Trademark applications

Social Inclusion: **AB1-** Access to safe water and sanitation, **AB2 -** Access to electricity and clean fuels, **AB3 -** Prevalence of children stunting, **AB4 -** Convenient access to public transport, **AB5** - Property rights, **GB1 -** Women in national parliaments, **GB2 -** Gender account in financial institution, **GB3 -** Equal gender pay, **GB4 -** Mothers with maternity cash benefits, **GB5 -** School enrollment gender parity, **SE1 -** Inequality in income, **SE2 -** Rural-urban access to electricity, **SE3 -** Youth unemployment disparity, **SE4 -** Age dependency ratio, **SE5 -** Cash benefit for people with disabilities, **SP1 -** Share of old people receiving pension, SP2 - Universal health coverage, **SP3 -** Population living in slums, **SP4 -** Victims of intentional homicides, **SP5 -** Score of Hyogo Framework

Table 13 Highlights of projects enhancing green growth performance in Burkina Faso

Name of project	Place and year of implementation	Project description	Relevance to very low-scoring indicators
(1) BF19 Building resilience in the Kaya-Dori axis in Burkina Faso	Center North of Burkina Faso January 2023 to December 2026	This project aims to improve the living conditions of vulnerable populations in the Centre-North region, particularly women and youth, who have been severely affected by climate, security, and humanitarian crises, by strengthening community livelihoods, restoring local productive assets, and promoting innovative and resilient agriculture. The project activities also include the restoration of degraded lands, the distribution of solar kits to reduce wood consumption, training in green jobs, the creation of nutritious gardens, and more.	AB1, AB2, GV2
(2) BF15: Promoting Solar Irrigation Pumping Systems and Mini-grids in Burkina Faso	The intervention areas of the project covered 5 regions in Burkina Faso: Centre, Centre-Ouest, Nord, Centre Nord and Hauts Bassins January 2021 to June 2023	The project aims to support Burkina Faso having a more climate-resilient communities, Empowered women in Green Entrepreneurship, a more stable food supply, clean and energy-efficient alternative to diesel-run irrigation pumps, contributing to poverty reduction, new green jobs, improved nutrition and health, and reduced GHG emissions.	GV2
(3) ROC02: Solar Grandmothers in Burkina Faso	The project intervention areas covered 7 regions in Burkina Faso: Centre, centre-ouest, Hauts-Bassins, cascades, nord, sahel and the East region. January 2022 to August 2024	The project aimed at empowering elderly women to contribute to the reduction of the negative environmental impacts from the use of fossil fuels in Burkina Faso through the promotion of clean technologies and low-carbon energy source.	GV2, AB2, SE2

Note: The online sources for the projects are available in Annex 5.

Box 1. Solar Grandmothers Project in Burkina Faso

In alignment with Burkina Faso's National Strategy for the Creation of Ecovillages (2018–2027), the Global Green Growth Institute (GGGI) implemented the "Solar Grandmothers in Burkina Faso" project from January 2022 to December 2023. Funded by the Prince Albert II of Monaco Foundation, Barefoot College Training Center, and GGGI, with a total budget of USD 443,000, the project aimed to promote clean energy and reduce fossil fuel reliance by empowering elderly rural women.

The initiative trained 30 semi-literate or illiterate women from 30 rural villages (each with a population of at least 1,000) in assembling, installing, maintaining, and operating solar home kits (SHKs). Each woman, called a "Solar Grandmother" (SGM), trained an assistant and established a workshop, enabling the distribution of 100 SHKs.

Evaluation interviews highlighted several positive outcomes:

- Improved household and community living standards through SHKs, such as LED lighting for studying, TVs for news and education, and enhanced livelihoods for home-based businesses.
- Empowerment of women in rural areas by increasing confidence, leadership, and decision-making roles, while reducing gender barriers in technical fields.
- Enhanced women's financial independence and community participation.

The project was delivered through partnerships with the Barefoot College Training Center and a government-selected SHK supplier. It successfully demonstrated the nexus of sustainable energy, gender empowerment, and environmental impact reduction.

4.2 Ethiopia

Figure 18 highlights Ethiopia's diverse performance across the green growth dimensions. It demonstrates significant strengths in resource efficiency and conservation while underscoring the need for improvement in fostering an equitable society and advancing a green economy. Among the dimensions, natural capital protection and efficient and sustainable resource use stand out as the highest-scoring areas, with approximately 12 indicators achieving a very high score (80–100). The other two dimensions, green economic opportunities and social inclusion, remain weak.

Natural capital protection is one of Ethiopia's strongest dimensions, particularly in forest biomass and terrestrial protection. However, several indicators score very low. These include forests under certification schemes (BE4) and protected key biodiversity areas (BE1). Like Burkina Faso, Ethiopia faces significant barriers to forest certification (BE4). The high cost of certification, which is unaffordable for smallholder farmers and community-managed forests, limits adoption.[30] However, Ethiopia has introduced a participatory forest management system that has proven effective in conserving and managing forests. This approach, which has already been integrated into two forestry projects supported by GGGI, demonstrates the potential of community-based models to complement national efforts and strengthen sustainable forest management. Awareness of certification benefits is also low, while weak institutional frameworks and insufficient technical expertise further hinder progress.[31] Deforestation driven by agricultural expansion and fuelwood use continues to undermine forest sustainability.[32] Ethiopia's very low score in protected key biodiversity areas (BE1) reflects underfunded and poorly managed protected areas. Many sites harbor limited biodiversity and lack adequate infrastructure for conservation.[33] Inconsistent policy implementation and limited political commitment compound these issues, while climate change accelerates habitat loss and degradation.[34]

Ethiopia excels in renewable energy and agricultural productivity within efficient and sustainable resource use, but faces critical challenges in electricity access, sanitation, and water resource management. The lowest-scoring indicators in this dimension are sewer, septic, and latrine coverage (ME5) with a score of 1, per capita electricity consumption (EE5) with 4.9, and sustainable fisheries (EW3) with 5.8. The very low score in sanitation (ME5) is linked to insufficient investment, low technical capacity, and the limited purchasing power of households, particularly in rural areas.[35]

Overlapping agency mandates and weak policies hinder progress, while low public awareness reduces demand for improved systems.[36] Very low per capita electricity consumption (EE5) reflects limited electricity access, especially in rural areas. Grid expansion remains slow and costly, and even electrified households often consume little electricity due to poverty, relying instead on traditional fuels such as wood and dung.[37] Addressing this challenge requires expanding generation, diversifying energy sources, and investing in decentralized renewable energy.[38] Ethiopia's very low score in sustainable fisheries (EW3) is partly explained by its landlocked geography. Inland fisheries are undermined by poor resource management, weak enforcement of fishing regulations, overfishing, and the impacts of climate change on rainfall and water levels.[39] Lack of investment in sustainable practices and technologies further constrains performance.[40]

Green economic opportunities show strengths in green employment and financial flows, but record very low results in adjusted net savings (GV1), which scored 1.93, and ease of doing business (GT4), with 20.27. Low adjusted net savings (GV1) reflect overexploitation of natural resources, including deforestation and unsustainable land and water use.[41] Weak investment in sustainable resource management and rapid population growth exacerbate the pressure on natural capital.[42] Ethiopia's low score in ease of doing business (GT4) reflects inadequate infrastructure, high land costs, and weak financial systems.[43] SMEs face stringent collateral requirements and limited financial inclusion, while bureaucratic hurdles in business registration and property acquisition disproportionately constrain smaller enterprises.[44] Overlapping institutional responsibilities and inconsistent policy enforcement further reduce investor confidence, creating inefficiencies and uncertainty in the business environment.[45]

In social inclusion, Ethiopia has achieved some progress in empowerment and gender inclusion. However, it records very low scores in rural–urban access to electricity (SE2) with 1, the share of older people receiving pensions (SP1) with 4.86, universal health coverage (SP2) with 11.83, and cash benefits for people with disabilities (SE5) with 15.08. The low score in SE2 reflects the high costs and logistical challenges of extending electricity to rural areas, leaving households dependent on biomass energy.[46] Even in urban areas, power outages and unreliable supply remain common, while the high costs of renewable energy systems and limited financing options further constrain access.[47] The very low score in SP2 is driven by systemic challenges in health care, including high turnover of health workers, poor infrastructure in rural areas, low insurance coverage, and affordability constraints.[48] Pension coverage (SP1) remains very low because of limited inclusion of informal workers, insufficient

funding, and administrative inefficiencies.[49] Cash benefits for people with disabilities (SE5) are also underfunded and concentrated in urban areas, leaving most rural households without support.[50] These results highlight persistent inequities in Ethiopia's social protection system and access to services.

Several projects are being implemented in Ethiopia to address these low-scoring indicators (Table 14 and Box 2). The **Conservation and Sustainable Management of Forested Landscape (CSMFL) Project** supports biodiversity-rich forest landscapes in Southwest Ethiopia through gender-transformative and socially inclusive approaches. By targeting protected biodiversity areas (BE1), per capita electricity consumption (EE5), and adjusted net savings (GV1), it addresses weaknesses in biodiversity protection, energy access, and sustainable wealth creation. The **Climate Resilient Forest and Landscape Restoration (CRFLR) Project** aims to restore 15 million hectares of degraded land by promoting community-based restoration, sustainable land management, and value chain development. It responds directly to weaknesses in adjusted net savings (GV1) and ease of doing business (GT4) by creating opportunities in sustainable enterprises and improving the enabling environment. The **Agroforestry for People, Peace, and Prosperity Project** supports coffee-based agroforestry systems in Oromia and SNNP regions. Enhancing forest restoration, reducing emissions, improving coffee quality, and strengthening cooperatives contribute to progress in rural–urban electricity access (SE2) and green trade (GT4). The projects undertaken in Ethiopia show strong connections to the country's lowest-scoring indicators, including BE1, BE4, EE5, ME5, EW3, GV1, GT4, and SE2. They contribute to addressing challenges in biodiversity protection, renewable energy deployment, and strengthening economic opportunities. The very low-scoring green growth indicators not sufficiently covered by current initiatives include sanitation (ME5) and social protection (SP1, SP2, SE5).

Figure 18 Green growth performance by dimensions, Ethiopia

Definitions:

Efficient and sustainable resource use: **EE1 -** Energy intensity, **EE2 -** Renewable energy share, **EE3** - Efficient transport, **EE4 -** Low-carbon electricity, **EE5 -** Per capita electricity consumption, **EW1 -** Water use efficiency, **EW2 -** Level of water stress, **EW3 -** Capture fisheries, **EW4 -** Share of surface irrigation, **EW5 -** Renewable water resources, **SL1 -** Soil nutrient balance, **SL2 -** Organic agriculture area, **SL3 -** Share ruminant livestock, **SL4 -** Agricultural productivity, **SL5 -** Annual forest area change, **ME1 -** Domestic material consumption, **ME2 -** Material footprint, **ME3 -** Food loss and food waste, **ME4 -** Municipal solid waste recycled, **ME5 -** Sewer, septic and latrine coverage

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Green economic opportunities: GV1- Adjusted net savings, **GV2 -** Renewable electricity capacity, **GV3 -** Financial flows for clean energy R&D, **GV4 -** Agriculture orientation index, **GV5** - Transport productive capacity, **GT1 -** Exports of environmental goods, **GT2 -** Environmental technologies exported, **GT3 -** ISO 14001 certificates issued, **GT4 -** New business density, **GT5 -** High-technology exports, **GJ1 -** Green employment in manufacturing, **GJ2 -** Employed below the poverty line, **GJ3 -** Vulnerable employment, **GJ4 -** Firms offering formal training, **GJ5 -** ODA flows for scholarships, **GN1 -** Environmental technologies, **GN2 -** Scientific and technical journals, **GN3 -** Researchers per million inhabitants, **GN4 -** Medium/high-tech mfg value-added, **GN5 -** Trademark applications

Social Inclusion: **AB1-** Access to safe water and sanitation, **AB2 -** Access to electricity and clean fuels, **AB3 -** Prevalence of children stunting, **AB4 -** Convenient access to public transport, **AB5** - Property rights, **GB1 -** Women in national parliaments, **GB2 -** Gender account in financial institution, **GB3 -** Equal gender pay, **GB4 -** Mothers with maternity cash benefits, **GB5 -** School enrollment gender parity, **SE1 -** Inequality in income, **SE2 -** Rural-urban access to electricity, **SE3 -** Youth unemployment disparity, **SE4 -** Age dependency ratio, **SE5 -** Cash benefit for people with disabilities, **SP1 -** Share of old people receiving pension, S**P2 -** Universal health coverage, **SP3 -** Population living in slums, **SP4 -** Victims of intentional homicides, **SP5 -** Score of Hyogo Framework

Table 14 Highlights of projects enhancing green growth performance in Ethiopia

Name of project	Place and year of implementation	Project description	Relevance to very low-scoring indicators
(1) Conservation and Sustainable Management of Forested Landscape (CSMFL) Project	Southwest Ethiopia, Oromia, and the Southwest people's region	The project is designed to contribute to the sustainable management and conservation of forested landscapes in the Southwest Ethiopia for their climate, biodiversity, ecosystem services and economic benefits through gender transformative and socially inclusive approach. The project will contribute to reduction of GHG emissions from deforestation and forest degradation, conservation of key biodiversity areas (KBAs), improving production practices of non-timber forest products (forest coffee, honey, spices), increasing access to markets, and building capacities of institutions and practitioners. The overall objective of the project is to contribute to the sustainable management of biodiversity rich natural forests of the Southwest Ethiopia region for enhancing ecosystem services and livelihoods improvement of communities living in and around the forest landscapes.	BE1, EE5, GV1
(2) Ethiopia's Climate Resilient Forest and Landscape Restoration (CRFLR) Project	Sidama region and Oromia region	The Climate Resilient Forest and Landscape Restoration (CRFLR) Project is designed to contribute to Ethiopia's efforts to restore 15 million hectares of degraded land. The CRFLR Project introduces a new Holistic Landscape Restoration Approach, working in both forest land and adjacent farmland. The project will establish community-based organization led forest land restoration and sustainable farmland management systems. The project also focuses on forest and farm product value chain and business enterprise development.	GV1 & GT4
(3) Agroforestry for People, Peace and Prosperity Project	Oromia and Southern Nation, Nationalities and Peoples (SNNP) regional states,	The project is designed to contribute to restoration of productive forest and agroforest landscape and improvement of community livelihoods in coffee growing regions in southern Ethiopia. The project will contribute to reduction of GHG emissions from deforestation and forest degradation, increases emission removals through restoration of degraded forests and coffee agroforests, while improving production practices and quality of coffee, building resources and cooperatives governance capacity and linking assess to market.	SE2 & GT4

Note: The online sources for the projects are available in Annex 5.

Box 2. Forest and Landscape Restoration Projects in Ethiopia

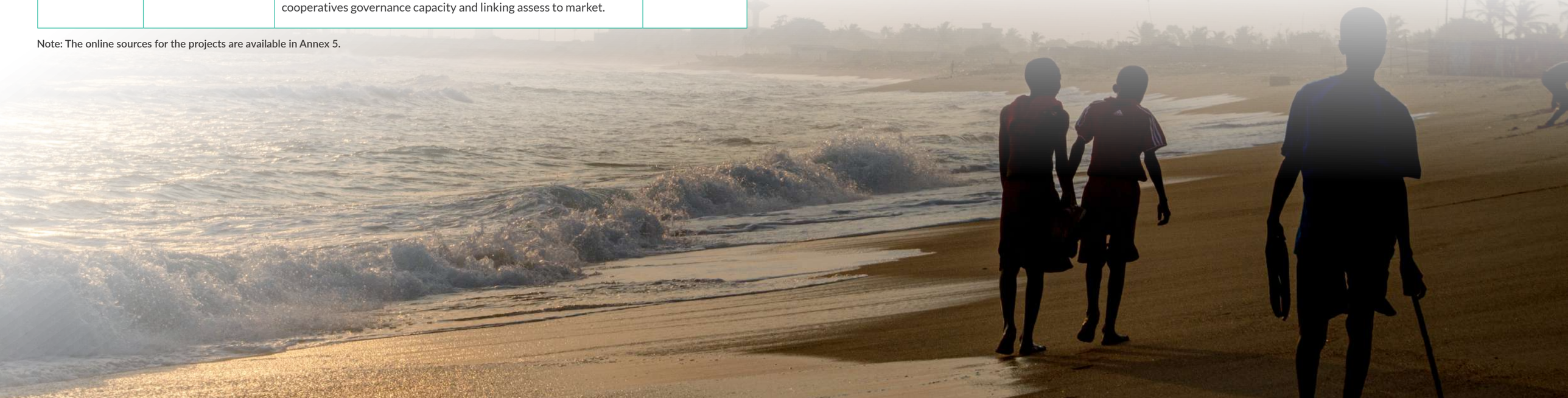
The **Conservation and Sustainable Management of Forested Landscape (CSMFL) Project** is being implemented in the Southwest Ethiopia People's Region and Oromia. The overall objective is to ensure the sustainable management of biodiversity-rich natural forests to enhance ecosystem services and improve the livelihoods of surrounding communities. The forests in this region are part of the Eastern Afromontane Biodiversity Hotspot, globally recognized as the center of origin and diversity for Arabica coffee and many other crops. The project integrates participatory forest management and UNESCO biosphere models, aligning with Ethiopia's biodiversity conservation targets and global commitments.

The CSMFL Project combines biodiversity conservation with livelihood improvement. Activities include reducing emissions from deforestation and forest degradation, conserving key biodiversity areas (BE1), and improving the production and market access of non-timber forest products such as forest coffee, honey, and spices. In addition, the project promotes renewable energy solutions, such as solar home systems for about 500 households and solar-powered irrigation for 150 hectares of farmland. These interventions aim to expand per capita electricity consumption (EE5), diversify incomes, and reduce dependence on fuelwood. The project also contributes to adjusted net savings (GV1) by integrating sustainable land management and alternative energy solutions into community livelihoods.

The **Climate Resilient Forest and Landscape Restoration (CRFLR) Project** is being implemented in Sidama and Oromia from 2021 to 2025. The project supports Ethiopia's goal to restore 15 million hectares of degraded land through a holistic approach that integrates ecological restoration with livelihood development. Restoration activities target degraded forest land, communal areas, and adjacent farmland. They are carried out by community-based organizations such as forest management cooperatives and watershed user cooperatives.

The CRFLR Project emphasizes soil and water conservation, agroforestry, and enrichment planting, combined with value chain and enterprise development. By supporting forest and farm product cooperatives, particularly those involving women and youth, the project creates opportunities for small businesses and improves market linkages. Training is provided to strengthen technical skills, cooperative governance, and extension services, thereby addressing capacity constraints at both community and institutional levels. The project contributes to improved adjusted net savings (GV1) by reducing resource depletion and supports progress on ease of doing business (GT4) through the promotion of forest-based enterprises and value chains.

These two projects illustrate best practices for addressing Ethiopia's lowest-scoring indicators, particularly BE1, EE5, GV1, and GT4. By linking biodiversity conservation with renewable energy access, sustainable land management, and enterprise development, they provide integrated solutions to strengthen environmental sustainability, resilience, and livelihoods in vulnerable forest landscapes.



4.3 Mozambique

Figure 19 shows that Mozambique's green growth performance varies across dimensions. The strongest results are in natural capital protection and efficient and sustainable resource use, while green economic opportunities show limited progress, and social inclusion records some of the lowest scores.

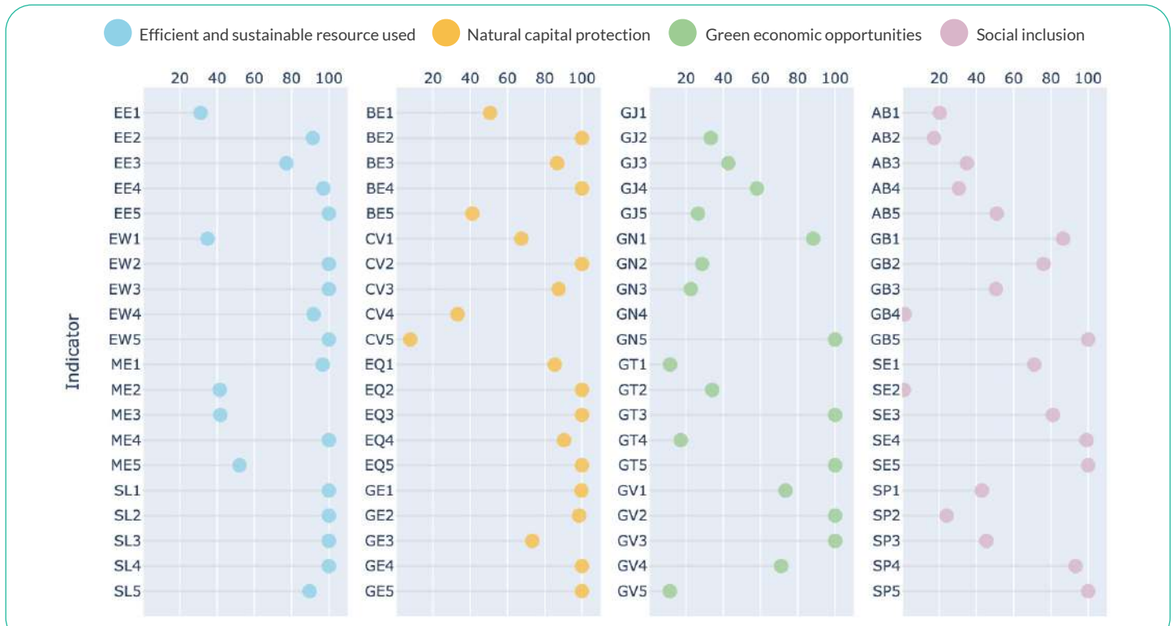
Efficient and sustainable resource use shows strong green growth performance, with 14 indicators scoring very high (80–100) and no indicator in the very low range (1–20). The lowest scores fall in the moderate range, including energy intensity (EE1) at 31.13 and water use efficiency (EW1) at 34.89. Mozambique's moderate result for energy intensity (EE1) reflects outdated energy systems with high transmission losses, combined with an economy dominated by energy-intensive extractive industries and limited diversification.[51] These structural constraints significantly reduce energy productivity and hinder improvements in efficiency. Weak governance and inadequate incentives for efficiency investments, together with slow technological adoption, further limit progress across sectors.[52] Although Mozambique has considerable renewable energy potential, but the integration of hydro and solar resources remains slow. Moreover, regulatory frameworks for renewable adoption and distributed systems remain inefficient, constraining opportunities to reduce energy intensity and deliver broader economic benefits.[53] The moderate water use efficiency (EW1) score is linked to structural and climatic challenges. Agriculture, which dominates water demand, relies mainly on traditional irrigation methods such as flood and furrow systems, with very limited access to modern water-saving technologies.[54] Financial barriers and the absence of supportive incentives restrict investment in such systems, while climate variability, including recurrent droughts and irregular rainfall patterns intensified by the El Niño Southern Oscillation, further undermines efficiency.[55] Inadequate water governance, fragmented coordination, and weak integrated water resource management aggravate these issues, leading to resource misallocation and reduced resilience.[56] Mozambique's performance in water use efficiency, therefore, underscores the need for stronger governance, improved financing, and community-based approaches to expand adoption of modern and sustainable practices.

Like in the efficient and sustainable resource use dimension, Mozambique performs strongly in natural capital protection, with 14 indicators scoring very high (80–100), particularly in environmental quality and GHG emissions reduction. Unlike the former dimension, however, one indicator scores very low, the share of exports of cultural goods (CV5) at 7.84, while the share of employment in services (CV4) is also low at 33.19. These results strongly emphasize environmental conservation but reveal that cultural and ecological resources are underutilized for economic diversification. Mozambique's very low score in cultural goods exports (CV5) reflects an underdeveloped cultural industry constrained by insufficient investment, poor infrastructure, and a lack of recognition of culture as a public good.[57] Weak branding, inadequate marketing and distribution systems, and limited access to production facilities and digital platforms further reduce competitiveness.[58] Heritage assets remain disconnected from modern creative industries due to inadequate funding, weak legal frameworks, and slow adaptation to global creative trends such as digitalization. Similarly, the low score in employment in services (CV4) reflects an economy still heavily reliant on agriculture and extractive industries, where job opportunities are concentrated in low-wage and informal activities.[59] Service sectors such as finance, tourism, and IT face constraints from weak infrastructure, unreliable electricity, and low investment.[60] A pronounced skills gap, worsened by limited vocational training and upskilling programs, leaves the workforce ill-prepared for service-oriented roles.[61] High informality and weak labor regulations further hinder the development of quality jobs, especially for women and youth, limiting the potential of the service sector to support economic diversification.[62]

Mozambique performs poorly in Green Economic Opportunities, with only five indicators scoring very high (80–100) and three indicators scoring very low (1–20). It excels in trademark applications, ISO certifications, and renewable energy capacity (all scoring 100), but struggles in transport productive capacity (GV5) at 11.23, exports of environmental goods (GT1) at 11.36, and ease of doing business (GT4) at 17.17. The very low score in transport productive capacity (GV5) reflects underdeveloped and aging infrastructure, insufficient rural connectivity, high logistical costs, and weak governance. Outdated systems contribute to "transport poverty," with high costs, delays, and limited port access constraining trade competitiveness and discouraging investment.[63] Poor planning and limited investment leave rural areas isolated from markets, while fragmented governance frameworks obstruct the development of sustainable transport and green initiatives.[64] Exports of environmental goods (GT1) are also very low, reflecting limited industrial capacity, weak integration into value chains, and reliance on outdated technologies. Mozambique's export base remains concentrated in primary commodities, with little value addition or diversification into green industries.[65] Low domestic demand, inadequate financial systems, and insufficient policy support hinder investment and innovation.[66] Weak regulatory frameworks and limited institutional coordination further restrict access to regional and global markets, undermining competitiveness.[67] Ease of doing business (GT4) highlights systemic barriers across infrastructure, financing, and regulation. Weak transport networks, unreliable electricity, and limited internet connectivity increase costs and reduce efficiency.[68] Access to credit is constrained by high financing costs, underdeveloped financial markets, and stringent collateral requirements, leaving small and medium enterprises unable to expand.[69] Trade barriers, including high logistics costs and inefficient customs procedures, further isolate producers and reduce participation in value chains.[70] A bureaucratic and inconsistent regulatory environment discourages entrepreneurship and drives informality, while corruption and weak governance erode investor confidence and limit competitiveness.[71]

Social Inclusion in Mozambique shows mixed performance, with some indicators scoring very high (80–100) but others among the lowest in the Index. Strong results are recorded in school enrollment gender parity (GB5), cash benefits for people with disabilities (SE5), and disaster risk preparedness (SP5), all scoring 100. However, very low scores are observed in access to electricity and clean fuels (AB2) at 17.23, rural–urban access to electricity (SE2) at 1, and mothers with maternity cash benefits (GB4) at 1.4. Mozambique's very low score in access to electricity and clean fuels (AB2) reflects persistent challenges in expanding modern energy services. Rural communities continue to rely heavily on firewood and charcoal because of slow grid expansion, limited investment in off-grid solutions, and high tariffs. In urban areas, electricity supply is unreliable, with frequent power cuts caused by aging infrastructure.[72] High poverty levels further restrict households' ability to afford clean energy systems such as LPG and solar, limiting the transition away from traditional fuels. The extremely low score in rural–urban access to electricity (SE2) highlights the stark disparities between urban and rural populations. Rural electrification projects face high development costs, low returns on investment, and logistical barriers to extending networks into sparsely populated areas.[73] Limited financing options and weak institutional coordination slow progress, while household-level affordability constraints remain a major obstacle to expanding access.[74] The very low score in maternity cash benefits (GB4) reflects the weaknesses of Mozambique's social protection system. Maternity benefits are largely confined to women in formal employment, excluding the majority who work in agriculture and the informal sector.[75] Rural women are particularly disadvantaged by inadequate infrastructure, high travel costs, and weak outreach services.[76] Institutional shortcomings, including insufficient funding and fragmented program delivery, further undermine access and coverage.[77]

Figure 19 Green growth performance by dimensions, Mozambique



Definitions:

Efficient and sustainable resource use: **EE1 -** Energy intensity, **EE2 -** Renewable energy share, **EE3** - Efficient transport, **EE4** - Low-carbon electricity, **EE5 -** Per capita electricity consumption, **EW1 -** Water use efficiency, **EW2 -** Level of water stress, **EW3 -** Capture fisheries, **EW4 -** Share of surface irrigation, **EW5 -** Renewable water resources, **SL1 -** Soil nutrient balance, **SL2 -** Organic agriculture area, **SL3 -** Share ruminant livestock, **SL4 -** Agricultural productivity, **SL5 -** Annual forest area change, **ME1 -** Domestic material consumption, **ME2 -** Material footprint, **ME3 -** Food loss and food waste, **ME4 -** Municipal solid waste recycled, **ME5 -** Sewer, septic and latrine coverage

Natural capital protection: **EQ1 -** PM2.5 air pollution, **EQ2 -** DALY rate from unsafe water, **EQ3 -** Solid waste generation, **EQ4 -** Urban people with open defecation, **EQ5 -** Ambient air pollution DALYs, **GE1 -** CO2 emissions per capita, **GE2** - Non-CO2 per capita excl. AFOLU, **GE3** - Non-CO2 emissions in AFOLU, **GE4 -** Carbon intensity of energy production, **GE5 -** CO2 emissions per mfg value-added, **BE1 -** Protected key biodiversity areas, **BE2 -** Share of forest areas, **BE3 -** Forest above-ground biomass, BE4 - Forest under certification scheme, **BE5 -** Change in extent of water ecosystems, **CV1 -** Red list index, C**V2 -** Terrestrial protected area, **CV3 -** Tourism contribution to GDP, **CV4 -** Share of employment in services, **CV5 -** Share of exports of cultural goods

Green economic opportunities: **GV1-** Adjusted net savings, **GV2 -** Renewable electricity capacity, **GV3 -** Financial flows for clean energy R&D, **GV4 -** Agriculture orientation index, **GV5** - Transport productive capacity, **GT1 -** Exports of environmental goods, **GT2 -** Environmental technologies exported, **GT3 -** ISO 14001 certificates issued, **GT4 -** New business density, **GT5 -** High-technology exports, **GJ1 -** Green employment in manufacturing, **GJ2 -** Employed below the poverty line, **GJ3 -** Vulnerable employment, **GJ4 -** Firms offering formal training, **GJ5 -** ODA flows for scholarships, **GN1 -** Environmental technologies, **GN2 -** Scientific and technical journals, **GN3 -** Researchers per million inhabitants, **GN4 -** Medium/high-tech mfg value-added, **GN5 -** Trademark applications

Social Inclusion: **AB1-** Access to safe water and sanitation, **AB2 -** Access to electricity and clean fuels, **AB3 -** Prevalence of children stunting, **AB4 -** Convenient access to public transport, **AB5** - Property rights, **GB1 -** Women in national parliaments, **GB2 -** Gender account in financial institution, **GB3 -** Equal gender pay, **GB4 -** Mothers with maternity cash benefits, **GB5 -** School enrollment gender parity, **SE1 -** Inequality in income, **SE2 -** Rural-urban access to electricity, **SE3 -** Youth unemployment disparity, **SE4 -** Age dependency ratio, **SE5 -** Cash benefit for people with disabilities, **SP1 -** Share of old people receiving pension, S**P2 -** Universal health coverage, **SP3 -** Population living in slums, **SP4 -** Victims of intentional homicides, **SP5 -** Score of Hyogo Framework

4.4 Rwanda

Figure 20 shows that Rwanda's green growth performance varies across dimensions. The strongest results are in natural capital protection, with no scores below 20. It is followed by efficient and sustainable resource use and social inclusion, with the green economic opportunities performing the least among the four green growth dimensions.

With 14 indicators scoring very high (80–100) and only one indicator in the very low range (1–20), efficient and sustainable resource use is Rwanda's best-performing green growth dimension. Within this dimension, agricultural production per hectare (SL4) records a very low score of 7.88, reflecting systemic structural and environmental constraints. Rwanda's agriculture is dominated by smallholder farmers, with average farm sizes below one hectare, leading to extreme land fragmentation that limits mechanization and economies of scale.[78] This fragmentation forces reliance on subsistence farming and constrains productivity growth. Soil degradation and erosion, driven by the country's steep terrain and intensive land use, further reduce fertility and yields. [79] Despite national programs promoting terracing, agroforestry, and soil conservation, land degradation continues to pose a significant challenge for sustainable agriculture. Adoption of improved technologies and modern farming practices also remains limited, particularly among smallholder farmers. Managerial gaps and low levels of agricultural training hinder efficiency, while financial and institutional barriers restrict access to improved inputs and irrigation systems. [80] In many rural areas, traditional farming dominates, and the uptake of innovations such as high-yield seed varieties, fertilizers, and climate-smart techniques is constrained by limited extension services and affordability barriers. These constraints are compounded by high population pressure, which drives further land subdivision and intensification of fragile plots.

In the Social Inclusion dimension, Rwanda has 10 green growth indicators with very high scores (80-100) and three with very low scores. The latter includes maternity cash benefits for mothers (GB4) at 2.29, disability cash benefits (SE5) at 14, and pension coverage for the elderly (SP1) at 4.07. The very low score for maternity cash benefits (GB4) reflects limited access to formal social insurance. In Rwanda, most women are employed in the informal sector, where they are excluded from contributory social security schemes.[81] While labor laws provide for maternity protection, coverage is concentrated in formal employment, leaving the majority of mothers without access to income replacement during maternity leave. Disability cash benefits (SE5) also perform poorly, as coverage is constrained by inadequate funding and limited program reach.[82] Existing schemes target only a fraction of people with disabilities, with many excluded due to strict eligibility criteria and limited administrative capacity. The absence of robust data and weak delivery systems further undermines effective targeting and reduces the inclusiveness of disability support programs. Pension coverage for older persons (SP1) is similarly limited. Rwanda's pension system is designed primarily for workers in the formal sector, excluding the majority of older people who worked in informal or subsistence activities.[83] The absence of a universal social pension leaves large numbers of the elderly without income security. Demographic change and population ageing are expected to intensify these challenges, as the proportion of older persons grows while existing schemes remain narrow in scope.[84]

Compared with the social inclusion dimension, the green economic opportunities dimension records only seven green growth indicators with very high scores (80-100) and has three indicators with very low scores, including green employment in manufacturing (GJ1) at 6.02, adjusted net savings including particulate damage (GV1) at 18.35, and renewable energy-generating capacity (GV2) at 18.75. Rwanda's manufacturing sector remains narrow in scope and has not significantly diversified toward green industries. The economy is still dominated by agriculture and services, limiting the expansion of green manufacturing employment opportunities.[85] Financial barriers, including limited access to long-term financing and weak incentives for private sector participation, further constrain investment in green industries. The low score for adjusted net savings (GV1) reflects Rwanda's low domestic savings rate, which restricts the capacity to invest in sustainable infrastructure.[86] Household and private sector savings remain insufficient to finance the levels of investment needed for structural transformation. In addition, high particulate matter emissions from urban transportation and household cooking contribute to reduced adjusted net savings. The widespread use of biomass for cooking in rural areas and congestion from rapidly growing urban traffic increase air pollution and related health and economic costs, eroding Rwanda's adjusted net savings. Renewable energy-generating capacity (GV2) also remains very low despite Rwanda's strong ambitions in energy transition. The slow pace of growth is largely due to infrastructural and technical constraints, including limited grid capacity, high transmission costs, and continued reliance on traditional energy sources such as firewood and charcoal, particularly in rural areas.[87] While the potential for hydro and solar energy is substantial, this capacity remains underutilized because of regulatory hurdles, investment challenges, and slow implementation of projects.[88]

Several projects are supporting Rwanda in addressing its lowest-scoring indicators in the Green Growth Index (Table 15). The **Land Husbandry, Water Harvesting, and Hillside Irrigation (LWH) Project** directly responds to the very low score in agricultural production per hectare (SL4). By introducing improved land husbandry technologies, expanding hillside irrigation, and protecting farmland from soil erosion, the project significantly increased yields and reduced land degradation, thereby improving productivity in areas most affected by fragmentation and erosion. The use of **solar-powered irrigation systems** under the Solar Pumping for Irrigation initiative further complements these efforts, replacing diesel pumps with renewable alternatives, reducing fossil fuel dependence, and improving agricultural resilience and food security. The **Promotion of On-Farm Biogas Project** addresses Rwanda's low performance in renewable energy capacity (GV2) and adjusted net savings (GV1). By expanding the use of bio-digesters, the project reduces reliance on firewood and charcoal, alleviates pressure on forests, and provides households with cleaner and more affordable energy alternatives. These interventions also reduce particulate matter emissions from household cooking, which negatively affect GV1, while contributing to increased renewable capacity under GV2. The **Rehabilitation of Wetlands under the Rwanda Urban Development Project (RUDP)** is also linked to weaknesses in adjusted net savings (GV1). By restoring degraded wetlands and introducing a GHG accounting and monitoring system, the project reduces flood risks, enhances biodiversity, and improves water quality (Box 3). These measures help safeguard ecosystem services and improve climate resilience, offsetting losses from unsustainable resource use. While these projects support improvements in SL4, GV1, and GV2, none directly target Rwanda's very low scores in social inclusion, including maternity benefits (GB4), disability support (SE5), and pension coverage (SP1).

Figure 20 Green growth performance by dimensions, Rwanda

Definitions:

Efficient and sustainable resource use: **EE1 -** Energy intensity**, EE2 -** Renewable energy share**, EE3** - Efficient transport, **EE4 -** Low-carbon electricity, **EE5 -** Per capita electricity consumption, **EW1 -** Water use efficiency, **EW2 -** Level of water stress, **EW3 -** Capture fisheries, **EW4 -** Share of surface irrigation, **EW5 -** Renewable water resources, **SL1 -** Soil nutrient balance, **SL2 -** Organic agriculture area, **SL3 -** Share ruminant livestock, **SL4 -** Agricultural productivity, **SL5** - Annual forest area change, **ME1** - Domestic material consumption**, ME2 -** Material footprint, **ME3 -** Food loss and food waste, **ME4 -** Municipal solid waste recycled, **ME5 -** Sewer, septic and latrine coverage

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Table 15 Highlights of projects enhancing green growth performance in Rwanda

Name of project	Place and year of implementation	Project description	Relevance to very low-scoring indicators
(1) Solar pumping for Irrigation	2020-2025	Solar water pumping systems for irrigation within agricultural production are used to replace diesel pumps, displacing fossil fuel use and associated GHG emissions. Reduced dependence on imported energy and increased food security. (285 million USD)	SL4
(2) Promotion of on-farm biogas for energy		Increased use of on-farm anaerobic digestion of manure for bioenergy (bio-digestors). Reduced dependence on the availability of traditional biomass fuels, which are vulnerable to climate variability. Reduced pressure on forests and forest biodiversity, and food security. (62 million USD)	GV1, GV2
(3) Land Husbandry, Water Harvesting, and Hillside Irrigation (LWH)	Rwamagana, 2009-2017	The project was designed to support the Rwandan Government in addressing the critical agenda of hillside intensification through improved land husbandry and increased productivity in 101 pilot watersheds covering 30,250 ha of land. It developed 20,601 ha with land husbandry technologies, increased the productivity of the target irrigated command area from 492$/ha to 5,143$/ha, increased the productivity of the target non-irrigated command area from 469 to 2,571 $/ha, and increased the proportion of land protected against soil erosion in project areas from 26% to 103%.	SL4
(4) Rehabilitation of Wetlands under the Rwanda Urban Development Project (RUDP)	City of Kigali, 2020-2025	Rehabilitation of five wetlands under the Rwanda Urban Development Project (RUDP, 2020–2025), funded by the World Bank and Nordic Development Fund and implemented by REMA, aims to reduce flood risks, restore biodiversity, improve water quality, and enhance urban landscapes. The project will rehabilitate 358 ha of wetlands in Kigali, directly benefiting about 169,311 people and supporting carbon sequestration, soil protection, and climate resilience.	GV1

Note: The online sources for the projects are available in Annex 5.

Box 3. Rehabilitation of Wetlands under the Rwanda Urban Development Project (RUDP)

The Rehabilitation of Wetlands under the Second Rwanda Urban Development Project (RUDP) is funded by the World Bank and the Nordic Development Fund and implemented by the Rwanda Environment Management Authority (REMA). The project, which runs from 2020 to 2025, aims to reduce flood risks, restore biodiversity, improve water quality, and enhance urban landscapes and recreational opportunities. It is expected to benefit approximately 220,500 people directly and indirectly, including 169,311 residents of Kigali who will gain from flood risk reduction and wetland rehabilitation interventions.

The project contributes to multiple global benefits by advancing decarbonization, improving biodiversity conservation, and reducing land degradation. Wetland restoration protects the city and its residents from increasing risks of extreme rainfall and floods while safeguarding existing soil carbon stocks threatened by encroachment and degradation. Restoration also promotes carbon sequestration and enhances climate resilience.

Beyond climate benefits, the rehabilitation of the target wetlands supports urban sustainability by improving water quality and creating new green spaces, recreational facilities, and additional vegetation areas. Sustainable management practices, including soil erosion control, bank protection, and the establishment of buffer zones, further reduce land degradation and help mitigate the impact of increasingly frequent droughts.

Key outcomes expected from the project include:

- Development and operationalization of a greenhouse gas (GHG) accounting, monitoring, and reporting framework.
- Rehabilitation of 358 hectares of wetlands in the City of Kigali.
- Provision of flood risk reduction and wetland rehabilitation benefits to an estimated 169,311 people in Kigali.

The RUDP wetland rehabilitation demonstrates how targeted urban resilience investments can deliver multiple co-benefits by protecting ecosystems, reducing disaster risks, and improving the quality of life for urban populations.

4.5 Senegal

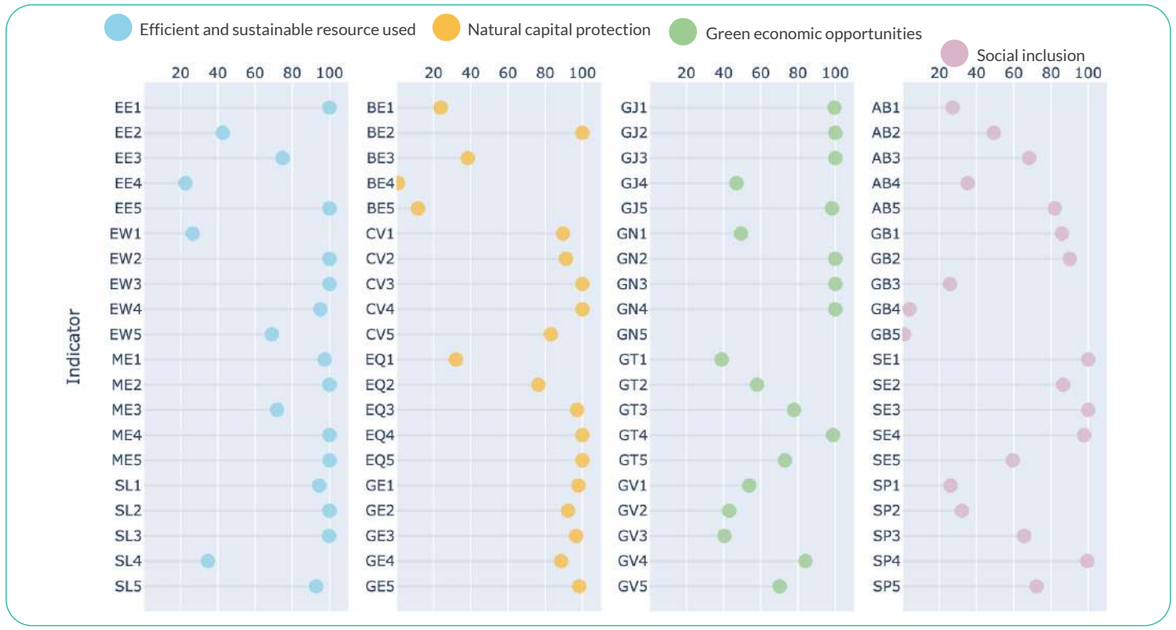
Figure 21 shows that Senegal's green growth performance varies significantly across dimensions. The highest-performing dimensions are efficient and sustainable resource use and green economic opportunities, with no very low-scoring green growth indicators. However, although the Natural Capital Protection dimension contains the most significant number of very high-scoring indicators (80-100), it has two green growth indicators with very low scores.

In the Natural Capital Protection dimension, the forest area under an independently verified forest management certification scheme (BE4) scores just 1, indicating minimal certified coverage. Senegal faces persistent challenges in forest management due to a combination of anthropogenic and climatic factors. High demand for firewood and charcoal, driven by reliance on biomass for household energy, has contributed to extensive deforestation and degradation of forest resources.[89] Forest fragmentation and unsustainable exploitation, together with weak institutional enforcement and limited technical capacity, further hinder progress in sustainable forest management.[90] Although Senegal has adopted national forest programs to promote conservation and sustainable use, the implementation of forest certification schemes remains very limited. The high cost and complexity of certification procedures, low levels of awareness, and inadequate support for local forest stakeholders restrict uptake.[91] These barriers, combined with pressures from population growth and increasing energy needs, continue to constrain the country's ability to expand independently verified forest certification. The change in the extent of water-related ecosystems over time, specifically lakes and rivers permanent water areas (BE5), is another low-performing indicator with a score of 11.64. Multiple pressures contribute to the degradation of aquatic ecosystems, including increased agricultural runoff, urban pollution, and over-abstraction of water for irrigation and domestic use.[92] The Dakar–Mbour–Thiès triangle, where a significant portion of the population resides, is experiencing rapid urbanization and industrialization that strain freshwater systems. Wetland areas and natural floodplains are increasingly being converted for settlement and farming, leading to the loss of ecosystem services and reduced water retention capacity.[93]

Within the Social Inclusion dimension, two green growth indicators record very low scores, including mothers receiving maternity cash benefits (GB4) and gender parity index in primary school enrollment (GB5). The GB4 score is only 2.29 and reflects limited social protection coverage, particularly for informal workers who constitute the majority of Senegal's labor force. Although maternity protection is legally mandated, programs are underfunded, and enforcement mechanisms are weak. The social protection system remains fragmented, with contributory schemes covering only a small minority of salaried workers, leaving most women without access to income replacement during maternity.[94] Administrative challenges in identifying and enrolling eligible women, together with weak monitoring systems, further constrain implementation. The gender parity index in primary school enrollment (GB5) also scores very low at 1, highlighting persistent disparities in educational access. While Senegal has made progress in expanding overall enrollment, socio-cultural norms continue to impede girls' participation, especially in rural and underserved areas.[95] Early marriage remains common, and girls are often expected to contribute to household labor, which contributes to school absenteeism and early dropout. Economic hardship is another factor, as poor households face difficulties covering school-related expenses, even when education is officially free. In addition, the distance to schools in rural areas disproportionately affects girls, who are more vulnerable to safety concerns during long commutes.[96] These factors combine to sustain lower rates of completion for girls relative to boys. International assessments also emphasize that poverty and inequality exacerbate education gaps. The International Monetary Fund (IMF) noted that while access to education has expanded, quality and retention remain low, and gender disparities are particularly evident at the primary and secondary levels.[97] Girls in rural areas face multiple disadvantages that reinforce early dropout, limiting the progress toward universal primary education and gender parity.

Several projects are underway in Senegal that address the country's lowest-scoring indicators in the Green Growth Index (Table 16 and Box 4). The **Scaling-Up Resilience in Africa's Great Green Wall (SURAGGWA) and the Sustainable Forest Management in the Priority Vulnerable Forest Ecosystems of Senegal** projects target the challenges reflected in forest certification (BE4) and the extent of water-related ecosystems (BE5). By restoring degraded lands, promoting sustainable forest management, and protecting vulnerable ecosystems, these initiatives help reduce forest fragmentation and degradation while strengthening the resilience of water-related ecosystems. The **Solar-Powered Irrigation for Climate-Smart Agriculture Project** also contributes to BE5 by reducing pressures on water resources through more efficient irrigation systems, thereby supporting ecosystem conservation. In the Social Inclusion dimension, the **Project for the Improvement of Education Sector Results (SUBA)** directly responds to Senegal's very low score in gender parity in primary school enrollment (GB5). By improving quality, equity, and access in the education sector, this project addresses persistent barriers to girls' participation in school, especially in rural areas. **The Inclusive Green Financing Initiative (IGREENFIN I) and the Second Sustainable and Participatory Energy Management Project (PROGEDE II)** also incorporate gender-responsive approaches that indirectly support progress on social inclusion. PROGEDE II in particular contributes to reducing pressure on forests while empowering women through the diversification of household fuel and alternative livelihood activities. These projects demonstrate clear linkages with Senegal's lowest-scoring indicators, addressing weaknesses in BE4, BE5, and GB5. However, gaps remain in maternity cash benefits (GB4), where none of the current initiatives directly respond to the limited social protection coverage for women in the informal sector.

Figure 21 Green growth performance by dimensions, Senegal



Definitions:

Efficient and sustainable resource use: **EE1 -** Energy intensity, **EE2 -** Renewable energy share, **EE3** - Efficient transport, **EE4** - Low-carbon electricity, **EE5 -** Per capita electricity consumption, **EW1 -** Water use efficiency, **EW2 -** Level of water stress, **EW3 -** Capture fisheries, **EW4 -** Share of surface irrigation, **EW5 -** Renewable water resources, **SL1 -** Soil nutrient balance, **SL2 -** Organic agriculture area, **SL3 -** Share ruminant livestock, **SL4 -** Agricultural productivity, **SL5 -** Annual forest area change, **ME1 -** Domestic material consumption, **ME2 -** Material footprint, **ME3 -** Food loss and food waste, **ME4 -** Municipal solid waste recycled, **ME5 -** Sewer, septic and latrine coverage

Natural capital protection: **EQ1 -** PM2.5 air pollution, **EQ2 -** DALY rate from unsafe water, **EQ3 -** Solid waste generation, **EQ4 -** Urban people with open defecation, **EQ5 -** Ambient air pollution DALYs, **GE1 -** CO2 emissions per capita, **GE2** - Non-CO2 per capita excl. AFOLU, **GE3** - Non-CO2 emissions in AFOLU, **GE4 -** Carbon intensity of energy production, **GE5 -** CO2 emissions per mfg value-added, **BE1 -** Protected key biodiversity areas, **BE2 -** Share of forest areas, **BE3 -** Forest above-ground biomass, BE4 - Forest under certification scheme, **BE5 -** Change in extent of water ecosystems, **CV1 -** Red list index, C**V2 -** Terrestrial protected area, **CV3 -** Tourism contribution to GDP, **CV4 -** Share of employment in services, **CV5 -** Share of exports of cultural goods

Green economic opportunities: **GV1-** Adjusted net savings, **GV2 -** Renewable electricity capacity, **GV3 -** Financial flows for clean energy R&D, **GV4 -** Agriculture orientation index, **GV5** - Transport productive capacity, **GT1 -** Exports of environmental goods, **GT2 -** Environmental technologies exported, **GT3 -** ISO 14001 certificates issued, **GT4 -** New business density, **GT5 -** High-technology exports, **GJ1 -** Green employment in manufacturing, **GJ2 -** Employed below the poverty line, **GJ3 -** Vulnerable employment, **GJ4 -** Firms offering formal training, **GJ5 -** ODA flows for scholarships, **GN1 -** Environmental technologies, **GN2 -** Scientific and technical journals, **GN3 -** Researchers per million inhabitants, **GN4 -** Medium/high-tech mfg value-added, **GN5 -** Trademark applications

Social Inclusion: **AB1-** Access to safe water and sanitation, **AB2 -** Access to electricity and clean fuels, **AB3 -** Prevalence of children stunting, **AB4 -** Convenient access to public transport, **AB5** - Property rights, **GB1 -** Women in national parliaments, **GB2 -** Gender account in financial institution, **GB3 -** Equal gender pay, **GB4 -** Mothers with maternity cash benefits, **GB5 -** School enrollment gender parity, **SE1 -** Inequality in income, **SE2 -** Rural-urban access to electricity, **SE3 -** Youth unemployment disparity, **SE4 -** Age dependency ratio, **SE5 -** Cash benefit for people with disabilities, **SP1 -** Share of old people receiving pension, S**P2 -** Universal health coverage, **SP3 -** Population living in slums, **SP4 -** Victims of intentional homicides, **SP5 -** Score of Hyogo Framework

Table 16 Highlights of projects enhancing green growth performance in Senegal

Name of project	Place and year of implementation	Project description	Relevance to very low-scoring indicators
(1) Scaling-Up Resilience in Africa's Great Green Wall (SURAGGWA) | Green Climate Fund.	Senegal and other African countries	The project is currently under review by the Green Climate Fund, and the process is expected to be finalized in the coming months, with approval by July 2025. It plans to restore up to 2 million hectares of degraded agro-sylvo-pastoral lands during the next 10 years, benefiting more than 3 million rural community farmers directly, and support regional monitoring across the GGW countries. Other target outcomes: 5.5 tons CO2 eq/ha per year. Over the 10-year duration of the project, from year 7 onwards, capitalization after the first 3 years of implementation; 77 million tons CO2 eq cumulative increase from the 2.0 million ha restored dryland that will sequester (5.5 x 7yr x 2 mn = 77 MtCO2) in landscape carbon stocks in 10 years.	BE4, BE5
(1) Scaling-Up Resilience in Africa's Great Green Wall (SURAGGWA) | Green Climate Fund.	Senegal and other African countries	The project is currently under review by the Green Climate Fund, and the process is expected to be finalized in the coming months, with approval by July 2025. It plans to restore up to 2 million hectares of degraded agro-sylvo-pastoral lands during the next 10 years, benefiting more than 3 million rural community farmers directly, and support regional monitoring across the GGW countries. Other target outcomes: 5.5 tons CO2 eq/ha per year. Over the 10-year duration of the project, from year 7 onwards, capitalization after the first 3 years of implementation; 77 million tons CO2 eq cumulative increase from the 2.0 million ha restored dryland that will sequester (5.5 x 7yr x 2 mn = 77 MtCO2) in landscape carbon stocks in 10 years.	BE4, BE5
(3) Sustainable Forest Management in the Priority Vulnerable Forest Ecosystems of Senegal to enhance Ecosystem Services for Climate Resilience in Senegal, GCF	Senegal	The Project will enable the Government of Senegal to valorize the ecosystem services provided by the protective forest ecosystem network that shelters the vulnerable rural population of Senegal from the effects of climate change. The overall objective of the project is to ensure sustainable management of the network of forest ecosystems for climate change mitigation and adaptation, conservation of biodiversity and improved resilience of livelihoods of local populations that live in and adjacent to this network.	BE4, BE5
(4) Solar-Powered Irrigation for Climate-Smart Agriculture in the Senegal River Valley (SN14)	Senegal River Valley	The project will address the nexus between water, energy, climate change, and irrigated rice productivity in the Senegal River Valley	BE5
(5) Project for the Improvement of Education Sector Results (SUBA)	Senegal	The proposed project development objective is to improve quality, equity, and access in the education sector.	GB5

Table 16 Highlights of projects enhancing green growth performance in Senegal

Name of project	Place and year of implementation	Project description	Relevance to very low-scoring indicators
(6) Improving Gender equality and Rural livelihoods in Senegal through Sustainable and Participatory energy management: Senegal's PRoGeDe II Project	Senegal	Launched in 2011, the Second Sustainable and Participatory Energy Management Project for Senegal has been hailed for effectively mainstreaming a gender perspective into an energy project. Under the project, women have participated more in decision-making; developed skills in technical production, entrepreneurship, and organizational management; and benefited from increased incomes	GB2

Note: The online sources for the projects are available in Annex 5.

Box 4. Projects to Enhance Ecosystem Services and Education Outcomes in Senegal

The **Sustainable Forest Management in the Priority Vulnerable Forest Ecosystems of Senegal Project** aims to valorize ecosystem services provided by Senegal's protective forest ecosystem network, which shields vulnerable rural populations from the impacts of climate change. Recent events along the coast have underscored the importance of this network, as climate projections suggest rising risks of climate-induced events that could harm productive agricultural zones and the communities that depend on them. The project contributes to Senegal's Nationally Determined Contribution under the UNFCCC by supporting reforestation and improved forest land management.

The project's primary impact is improved resilience of ecosystems to climate change, which enhances the livelihoods of vulnerable people, communities, and regions. This will be achieved by strengthening adaptive and mitigative capacity to respond to climate risks in the priority forest zones. Approximately 47,000 people living in or near these areas will benefit directly from structured local development planning, capacity building, and the increased protective and productive capacity of the ecosystems. An additional 376,000 people are expected to benefit indirectly through the learning generated by the project.

The **Project for the Improvement of Education Sector Results (SUBA, P169916)** addresses systemic challenges in Senegal's education sector, including low enrollment and completion rates, low learning outcomes, and poor learning conditions. Between 2010 and 2018, gross enrollment rates declined at the primary and lower secondary levels, while the Primary Completion Rate stood at only 56 percent. In contrast, the Gender Parity Index (GPI) improved at nearly all levels, with parity achieved in primary and secondary education, though gaps remain at the tertiary level.

The project seeks to improve instructional leadership, teaching quality, and equity of access. Key interventions include training "coaches" to strengthen early-grade literacy instruction, reforming pre-service teacher training at regional centers to focus on bilingual education, disabilities, inclusion, and digital skills, and expanding access for out-of-school children and vulnerable populations through an "open schooling" approach. The project also supports decentralization and good governance practices in the education sector through performance-based grants. Direct beneficiaries include students, teachers, and administrators across Senegal, with particular benefits for out-of-school youth and girls who will gain new opportunities for learning.

4.6 Togo

Figure 22 shows that Togo's green growth performance differs considerably across the four dimensions. Natural capital protection is the highest-performing dimension, with a concentration of very high-scoring indicators (80–100). Efficient and sustainable resource use also demonstrates several strong results, although it includes indicators with moderate and low scores. Green economic opportunities display fewer very high values and several very low-scoring indicators (below 20), reflecting gaps in innovation, technology, and investment. Social inclusion records the widest disparities, combining some high results with the largest cluster of very low scores across all dimensions.

Within the Natural Capital Protection dimension, Togo performs poorly on indicators such as forest area under an independently verified forest management certification scheme (BE4) and changes in the extent of water-related ecosystems (BE5). Togo's forests face significant threats from illegal logging, shifting cultivation, and the overuse of wood for fuel, which remains the dominant source of household energy.[98] Despite national commitments to sustainable

forestry, weak institutional frameworks and limited technical capacity have constrained efforts to implement forest certification schemes. As a result, deforestation continues to accelerate biodiversity loss and land degradation, further weakening prospects for sustainable forest management. Water-related ecosystems are also under severe stress, as indicated by the very low score for BE5 (1.73). Permanent water areas of rivers and lakes are shrinking due to climate-related pressures, including increased drought frequency, irregular rainfall patterns, and rising temperatures that are projected to intensify under future scenarios.[99] Agricultural expansion, overgrazing, and upstream dam construction further alter hydrological systems and reduce the extent and function of wetlands. These pressures diminish water availability and ecosystem services, leaving vulnerable communities exposed to higher risks of water insecurity. The burden of unsafe water sources remains high, reflected in the Disability-Adjusted Life Year (DALY) rates due to waterborne diseases (EQ2), with a very low score of 1. Outbreaks of cholera and diarrhea continue to affect vulnerable groups, particularly children and the elderly, underscoring the public health impacts of inadequate water and sanitation access.[100]

The Social Inclusion dimension records a number of critically low-scoring indicators. The proportion of the population with access to safely managed water and sanitation (AB1) remains very low, particularly in rural regions. Only seven cities, including Lomé, Tsévié, Notsè, Atakpamé, Sokodé, Kara, and Dapaong, currently have sanitation master plans.[101] The rest of the country lacks coordinated infrastructure development, leading to poor access and inadequate maintenance of sanitation facilities. Weak water resource governance and limited investment in water infrastructure have further hindered progress.[102] Access to social protection is also limited. The proportion of persons with severe disabilities receiving disability cash benefits (SE5) is extremely low, reflecting weak inclusion of people with disabilities in public policy and insufficient targeting mechanisms in social programs.[103] Financial constraints and competing policy priorities have limited the expansion and sustainability of cash transfer programs. Pension coverage (SP1) is similarly low, as pensions are largely restricted to formal sector workers. With the majority of the workforce employed in informal and rural activities, most elderly people remain without reliable income support.[104] Maternity cash benefits (GB4) also record very low scores. Coverage is minimal, particularly for informal and rural workers who are excluded from contributory social security schemes. Social security institutions remain under-resourced and unable to provide the full range of maternal health and financial support services.[105] Disaster risk preparedness (SP5) is the lowest-scoring social inclusion indicator, with a score of only 1. Despite efforts under initiatives such as the Integrated Disaster and Land Management Project, recurrent floods and droughts continue to expose the lack of comprehensive systems for disaster risk preparedness and community resilience.[106]

The Green Economic Opportunities dimension records poor performance, with several indicators scoring very low. High-technology exports as a share of manufactured exports (GT5) are among the weakest, reflecting the structure of Togo's industrial sector, which is dominated by low-tech and low-value-added activities.[107] The lack of infrastructure, limited investment climate, and shortage of skilled labor constrain the country's ability to develop and scale up green technologies or compete in high-tech export markets. These structural limitations restrict opportunities for diversification and technology-driven growth. Adjusted net savings, including particulate emission damage (GV1), record the lowest scores in this dimension. National savings levels remain low, reducing the capacity to finance long-term development. At the same time, environmental degradation, including deforestation, soil erosion, and air pollution, erodes natural capital and diminishes productive assets.[108] This combination of weak savings and environmental losses underscores the country's limited progress in creating conditions for sustainable economic growth.

In the efficient and sustainable resource use dimension, Togo's performance is constrained by very low per capita electricity consumption (EE5), with a score of 19.1. This reflects limited electricity generation capacity, dependence on imports, and high costs that restrict access for much of the population. Rural areas are most affected, with poor grid connectivity and affordability challenges leaving many households dependent on non-electrified sources for lighting and cooking.[109] Agricultural productivity, measured by agricultural production per hectare (SL4), also scores poorly at 15.51. Over the past three decades, agriculture has mainly remained subsistence-based, characterized by low mechanization, poor infrastructure, and limited access to inputs such as fertilizers and irrigation.[110] Structural and climatic constraints, including unpredictable rainfall and declining soil fertility, have further limited yields and reduced the potential for growth in agricultural productivity.

Several projects are being implemented in Togo to address the lowest-scoring indicators in the Green Growth Index (Table 17). The **GCF Readiness Programme for Climate Finance Access** supports progress on per capita electricity consumption (EE5), agricultural production per hectare (SL4), and adjusted net savings (GV1) by enhancing institutional capacity to access climate finance for energy, agriculture, and land-use initiatives. The **GCF Readiness for Low-Emission Transport System (STILTS)** is directly linked to EE5, GV1, and GHG emissions (GE1), by strengthening institutional coordination, establishing MRV systems for transport, and developing financial strategies to support green mobility. The **Developing Socio-Economic Infrastructure to Sustain Rural Communities Project (MAFRA)** contributes to SL4 through agro-processing and improved postharvest solutions, while also addressing access to safe water (AB1) and gender equality (GB2) by promoting water harvesting systems and supporting rural women's cooperatives. **The Strengthening Resilience to Climate Change of Vulnerable Populations through Sustainable Forestry Resources Management (Shea Project)** addresses very low results in forest certification (BE4) and adjusted net savings (GV1) through the expansion of shea parklands and sustainable agroforestry. It also contributes to green employment (GJ1) and gender equality (GB2) by creating 5,000 green jobs and improving the incomes of women and youth engaged in shea production and processing. Although the ongoing projects address several very low-scoring indicators, including EE5, SL4, GV1, BE4, AB1, GB2, GJ1, and GE1, other areas remain largely uncovered. They include the extent of water-related ecosystems (BE5), health impacts from unsafe water (EQ2), maternity cash benefits (GB4), disability cash benefits (SE5), pension coverage (SP1), and disaster risk preparedness (SP5).

Figure 22 Green growth performance by dimensions, Togo *(continued)*

Definitions:

Efficient and sustainable resource use: **EE1 -** Energy intensity, **EE2 -** Renewable energy share, **EE3** - Efficient transport, **EE4 -** Low-carbon electricity, **EE5 -** Per capita electricity consumption, **EW1 -** Water use efficiency, **EW2 -** Level of water stress, **EW3 -** Capture fisheries, **EW4 -** Share of surface irrigation, **EW5 -** Renewable water resources, **SL1 -** Soil nutrient balance, **SL2 -** Organic agriculture area, **SL3 -** Share ruminant livestock, **SL4 -** Agricultural productivity, **SL5 -** Annual forest area change, **ME1 -** Domestic material consumption, **ME2 -** Material footprint, **ME3 -** Food loss and food waste, **ME4 -** Municipal solid waste recycled, **ME5 -** Sewer, septic and latrine coverage

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Green economic opportunities: GV1- Adjusted net savings, **GV2 -** Renewable electricity capacity, **GV3 -** Financial flows for clean energy R&D, **GV4 -** Agriculture orientation index, **GV5** - Transport productive capacity, **GT1 -** Exports of environmental goods, **GT2 -** Environmental technologies exported, **GT3 -** ISO 14001 certificates issued, **GT4 -** New business density, **GT5 -** High-technology exports, **GJ1 -** Green employment in manufacturing, **GJ2 -** Employed below the poverty line, **GJ3 -** Vulnerable employment, **GJ4 -** Firms offering formal training, **GJ5 -** ODA flows for scholarships, **GN1 -** Environmental technologies, **GN2 -** Scientific and technical journals, **GN3 -** Researchers per million inhabitants, **GN4 -** Medium/high-tech mfg value-added, **GN5 -** Trademark applications

Social Inclusion: **AB1-** Access to safe water and sanitation, **AB2 -** Access to electricity and clean fuels, **AB3 -** Prevalence of children stunting, **AB4 -** Convenient access to public transport, **AB5** - Property rights, **GB1 -** Women in national parliaments, **GB2 -** Gender account in financial institution, **GB3 -** Equal gender pay, **GB4 -** Mothers with maternity cash benefits, **GB5 -** School enrollment gender parity, **SE1 -** Inequality in income, **SE2 -** Rural-urban access to electricity, **SE3 -** Youth unemployment disparity, **SE4 -** Age dependency ratio, **SE5 -** Cash benefit for people with disabilities, **SP1 -** Share of old people receiving pension, S**P2 -** Universal health coverage, **SP3 -** Population living in slums, **SP4 -** Victims of intentional homicides, **SP5 -** Score of Hyogo Framework

Table 17 Highlights of projects enhancing green growth performance in Togo

Name of project	Place and year of implementation	Project description	Relevance to very low-scoring indicators
(1) Enhancing Togo's Direct Access to GCF and Support for the Development of Climate Finance Strategy, GCF Readiness	Togo, 2021-2022	The Readiness grant supports Togo in enhancing national capacity to directly access Green Climate Fund (GCF) financing for climate action. It aims to identify, nominate, and support accreditation of a potential national direct access entity (DAE), strengthen the National Employers Council of Togo (CNP-TOGO) on climate change knowledge and green policies, and develop a national Climate Finance Strategy with private sector engagement. The grant will also support the preparation of project concept notes aligned with the National Development Plan (2018–2022), focusing on sectors such as agribusiness, infrastructure, and health. Beneficiaries include the Ministry of Environment/NDA, CNP-TOGO, potential national DAE, and government agencies responsible for NDC implementation.	EE5, SL4, GV1
(2) Strengthening Togo's Institutional Capacity for a Low-carbon Transport System (STILTS), GCF Readiness	Ongoing	This Readiness project aims to strengthen Togo's institutional capacity to implement a low-carbon emission transport system. The transport sector is one of the country's fastest-growing sources of GHG emissions, with a 278% increase between 1995 and 2018, and a major contributor to urban air pollution in Lomé and other cities. The readiness will establish a coordination mechanism for low-emission mobility, strengthen stakeholder engagement, and build capacity in ministries to monitor and plan transport emissions. Key outcomes include an operational MRV system for the transport sector, development of a financial strategy for green mobility, and improved knowledge of low-carbon options for freight and urban transport. The readiness will also raise awareness among national and local stakeholders on the impacts of transport emissions and the benefits of low-carbon mobility.	EE5, GV1, GE1
(3) Developing Socio-Economic Infrastructure to Sustain Rural Communities in Togo, MAFRA	Ongoing	This project seeks to reduce inequalities between urban and rural populations by promoting agro-processing solutions and eco-friendly essential infrastructure in rural areas. It aims to increase agricultural value addition through improved postharvest systems, ensure access to clean water with improved harvesting technologies, and strengthen rural livelihoods by developing eco-friendly social infrastructure. The initiative will also empower women and youth through training and cooperative support, fostering gender equality and inclusive rural development. By addressing deficits in safe water, sanitation, education, and income-generating opportunities, the project will contribute to transforming rural areas into zones with sustainable and profitable solutions for local communities.	SL4, AB1, GB2
(4) Strengthening Resilience to Climate Change of Vulnerable Population through sustainable Forestry Resources Management, KFS	Ongoing	This project focuses on developing the shea industry in Togo to alleviate poverty and enhance food security and socio-economic conditions. It aims to benefit 15,000 women and youth engaged in shea production, collection, and processing, creating 5,000 green jobs through improved organizational structures, expanded shea parklands, and strengthened value chains for production, processing, and market access. By increasing plantation areas and productivity, the project will significantly raise collector incomes and promote sustainable agroforestry systems that act as carbon sinks, while contributing to the resilience of rural communities to climate change.	BE4, GV1, GJ1, GB2

Note: The online sources for the projects are available in Annex 5.

Box 5. GCF Readiness Projects Supporting Climate Finance and Low-Carbon Development in Togo

Between 2021 and 2024, GGGI supported the National Designated Authority (NDA) of Togo in implementing the Green Climate Fund (GCF) Readiness preparatory support entitled ***Enhancing Togo's Direct Access to GCF and Support for the Development of Climate Finance Strategy.*** The goal of this project was to build institutional capacity, develop a strategic framework, and prepare a pipeline of projects to enhance the country's ability to access climate finance to achieve its NDC targets. Through this readiness, GGGI developed new collaboration and created synergies with other government priorities to promote climate resilience and green growth in Togo. The project contributed to the development and validation of the National Climate Finance Strategy, which aims to strengthen policy frameworks, strategies, and institutional arrangements to integrate green growth and climate action into national planning and to increase climate finance mobilization. It also enabled a collaborative environment and partnerships with government stakeholders and supported two national institutions, one from the public sector and one from the private sector, to begin the accreditation process to the Green Climate Fund.

In addition, GGGI supported Togo's NDA in mobilizing funding for another GCF Readiness preparatory support entitled ***Strengthening Togo's Institutional Capacity for a Low-Carbon Transport System (STILTS).*** The purpose of this project is to strengthen the country's institutional capacity to implement a low-emission transport system, one of the key priorities for achieving its NDC targets. The project aims to establish a coordination mechanism for the NDA and relevant ministries, develop a stakeholder engagement plan, and build technical capacity to evaluate transport emissions, design and monitor low-emission mobility programs, and integrate urban planning with low-carbon mobility. The GCF Readiness also supports the development of a financial strategy for green mobility and the establishment of a measurement, reporting, and verification (MRV) system for transport. It further seeks to improve knowledge of low-carbon transport options for freight, build awareness among national and local stakeholders of the impacts of transport emissions and the benefits of sustainable mobility, and update operational platforms to ensure capacity building and knowledge transfer. Through these interventions, STILTS aims to lay the groundwork for a pipeline of projects that will advance low-carbon transport and support climate resilience and inclusive green growth in Togo.

4.7 Uganda

Figure 23 shows that Uganda's green growth performance varies across dimensions. The highest-performing dimensions are natural capital protection and efficient and sustainable resource use, each with many indicators scoring very high (80–100). However, while the latter dimension has one very low-scoring indicator, the former has none. Green economic opportunities also include several very high-scoring indicators, but with fewer than the first two dimensions. By contrast, the social inclusion dimension contains the most significant number of very low-scoring indicators (below 20), highlighting persistent gaps in access to basic services and social protection despite progress in other areas.

In the Green Economic Opportunities dimension, Uganda performs poorly on the share of patent publications in environmental technology to total patents (GN1) and researchers per million inhabitants (GN3). The very low performance for GN1, with a score of 15.56, reflects structural weaknesses in the intellectual property system. Uganda's legal and institutional framework for intellectual property is relatively recent, and the system remains underdeveloped in its ability to stimulate innovation and support the commercialization of patents.[111] The number of patent applications filed domestically is low, and local innovators face challenges in accessing technical and financial support to move from research to market-ready technologies. Weak institutional linkages between universities, research centers, and the private sector further limit the capacity to generate and commercialize environmental technologies.[112] The very low score of 12.79 for GN3 highlights the scarcity of researchers in Uganda. Despite steady growth in tertiary education, the density of researchers per million inhabitants remains well below regional and global averages.[113] Public funding for research is limited, and universities rely heavily on donor support for research activities. Inadequate infrastructure and weak career incentives contribute to low retention of skilled researchers, while the country experiences persistent brain drain, as many professionals seek opportunities abroad. These constraints leave Uganda's research system unable to respond to national development priorities fully or to generate innovations that could support green growth.

In the Social Inclusion dimension, the proportion of mothers with newborns receiving maternity cash benefits (GB4) is one of the lowest-scoring indicators at 8.23. Social protection mechanisms for maternity income in Uganda are minimal, particularly for women working in the informal sector who are excluded from contributory schemes.[114] Coverage is concentrated on formal employment, leaving most mothers without income replacement during maternity, and forcing reliance on personal savings or informal family networks. The proportion of the population above the statutory pensionable age receiving a pension (SP1) is also very low, with a score of 19.12. Uganda's pension system is designed primarily for formal sector workers, while the informal sector, which accounts for the largest share of the workforce, remains uncovered.[115] Although reforms and pilot initiatives have been introduced to expand coverage, progress has been limited by low awareness, weak trust in financial institutions, and affordability constraints that discourage contributions. Another very low-scoring indicator is the proportion of the population with convenient access to public transport (AB4), with a score of 15.33. Uganda's public transport systems are underdeveloped, fragmented, and unsafe, particularly in rural areas and the outskirts of major cities.[116] Infrastructure planning has not kept pace with rapid urbanization, and investment in mass transit is limited. Heavy dependence on informal transport modes, such as motorcycle taxis (boda-bodas), further reduces mobility and restricts access to employment opportunities and essential services.

Uganda also faces challenges in the Efficient and Sustainable Resource Use dimension. Per capita electricity consumption (EE5) is the lowest-performing indicator across dimensions, with a score of only 5.23, reflecting structural constraints in generation, distribution, and affordability. Although access to electricity has expanded in recent years, rural electrification remains limited, with many communities continuing to depend on biomass for energy.[117] country's heavy reliance on natural resource extraction, particularly copper mining, which accounts for a large share of export earnings and government revenue. Low consumption levels also reflect the weak demand from industry and the high costs of connection, which remain unaffordable for many households and small businesses.

Several projects are supporting Uganda in addressing some of the lowest-scoring indicators in the Green Growth Index (Table 18). The **National Clean Cooking Unit at the Ministry of Energy** contributes to improving per capita electricity consumption (EE5) by promoting modern energy access and reducing reliance on traditional biomass through stronger sector coordination, private sector participation, and mobilization of investment in clean cooking solutions. The **Greening Uganda's Urbanization and Industrialization Project** responds to the very low score on convenient access to public transport (AB4) by supporting integrated urban planning and investments in green urban centers and industrial parks. It also strengthens the policy environment for innovation and green industry, which indirectly supports progress in patent publications in environmental technologies (GN1) and researchers per million inhabitants (GN3). However, these projects do not address the very low scores for maternity cash benefits (GB4) and pension coverage (SP1).

Figure 23 Green growth performance by dimensions, Uganda

Definitions:

Efficient and sustainable resource use: **EE1 -** Energy intensity, **EE2 -** Renewable energy share, **EE3** - Efficient transport, **EE4 -** Low-carbon electricity, **EE5 -** Per capita electricity consumption, **EW1 -** Water use efficiency, **EW2 -** Level of water stress, **EW3 -** Capture fisheries, **EW4 -** Share of surface irrigation, **EW5 -** Renewable water resources, **SL1 -** Soil nutrient balance, **SL2 -** Organic agriculture area, **SL3 -** Share ruminant livestock, **SL4 -** Agricultural productivity, **SL5 -** Annual forest area change, **ME1 -** Domestic material consumption, **ME2 -** Material footprint, **ME3 -** Food loss and food waste, **ME4 -** Municipal solid waste recycled, **ME5 -** Sewer, septic and latrine coverage

Natural capital protection: **EQ1 -** PM2.5 air pollution, **EQ2 -** DALY rate from unsafe water, **EQ3 -** Solid waste generation, **EQ4 -** Urban people with open defecation, **EQ5 -** Ambient air pollution DALYs, **GE1 -** CO2 emissions per capita, **GE2** - Non-CO2 per capita excl. AFOLU, **GE3** - Non-CO2 emissions in AFOLU, **GE4 -** Carbon intensity of energy production, **GE5 -** CO2 emissions per mfg value-added, **BE1 -** Protected key biodiversity areas, **BE2 -** Share of forest areas, **BE3 -** Forest above-ground biomass, BE4 - Forest under certification scheme, **BE5 -** Change in extent of water ecosystems, **CV1 -** Red list index, CV2 - Terrestrial protected area, **CV3 -** Tourism contribution to GDP, **CV4 -** Share of employment in services, **CV5 -** Share of exports of cultural goods

Green economic opportunities: **GV1-** Adjusted net savings, **GV2 -** Renewable electricity capacity, **GV3 -** Financial flows for clean energy R&D, **GV4 -** Agriculture orientation index, **GV5** - Transport productive capacity, **GT1 -** Exports of environmental goods, **GT2 -** Environmental technologies exported, **GT3 -** ISO 14001 certificates issued, **GT4 -** New business density, **GT5 -** High-technology exports, **GJ1 -** Green employment in manufacturing, **GJ2 -** Employed below the poverty line, **GJ3 -** Vulnerable employment, **GJ4 -** Firms offering formal training, **GJ5 -** ODA flows for scholarships, **GN1 -** Environmental technologies, **GN2 -** Scientific and technical journals, **GN3 -** Researchers per million inhabitants, **GN4 -** Medium/high-tech mfg value-added, **GN5 -** Trademark applications

Social Inclusion: **AB1-** Access to safe water and sanitation, **AB2 -** Access to electricity and clean fuels, **AB3 -** Prevalence of children stunting, **AB4 -** Convenient access to public transport, **AB5** - Property rights, **GB1 -** Women in national parliaments, **GB2 -** Gender account in financial institution, **GB3 -** Equal gender pay, **GB4 -** Mothers with maternity cash benefits, **GB5 -** School enrollment gender parity, **SE1 -** Inequality in income, **SE2 -** Rural-urban access to electricity, **SE3 -** Youth unemployment disparity, **SE4 -** Age dependency ratio, **SE5 -** Cash benefit for people with disabilities, **SP1 -** Share of old people receiving pension, **SP2 -** Universal health coverage, **SP3 -** Population living in slums, **SP4 -** Victims of intentional homicides, **SP5 -** Score of Hyogo Framework

Table 18 Highlights of projects enhancing green growth performance in Uganda

Name of project	Place and year of implementation	Project description	Relevance to very low-scoring indicators
(1) Setting up of a national clean cooking unit at the Ministry of Energy	Uganda National - 2024/2026	The project supports the establishment of a dedicated clean cooking unit within the Ministry of Energy and Mineral Development to lead Uganda's clean cooking agenda. It focuses on strengthening sector coordination, mobilizing financing, and promoting private sector participation to accelerate the adoption of clean cooking solutions. The initiative aims to reduce reliance on traditional biomass, improve health outcomes, and contribute to sustainable energy access.	EE5
(2) Greening Uganda's Urbanization and Industrialization	Uganda – 2020/2024	The project supports Uganda's transition toward sustainable urban growth and green industrial development. It strengthens policy frameworks, promotes integrated urban planning, and mobilizes green investments in secondary cities and industrial parks. The initiative also aims to improve access to basic services, enhance resource efficiency, and create green jobs, contributing to more inclusive and resilient urbanization.	AB4

Note: The online sources for the projects are available in Annex 5.

Box 6. Greening Uganda's Urbanization and Industrialization Project

The Greening Uganda's Urbanization and Industrialization Project supported Uganda's ambition of becoming a modern middle-income economy by 2040. The project demonstrated green city development in four secondary city locations, including Gulu, Arua, Jinja, and Mbarara, and supported industrialization through the development of policy proposals for green industrial parks and free zones to be implemented in Gulu, Soroti, Pakwach, and Entebbe.

Under the urbanization outcome, GGGI supported the government in greening the national building code and establishing a research center to promote green urban city development. Two green physical development plans were prepared for the annexed areas in the secondary cities of Arua and Gulu, providing a roadmap for city development and associated infrastructure investment. Green infrastructure investment plans were also developed for each of the four cities to serve as a tool for mobilizing financing for implementation. Under the industrialization outcome, guidelines were developed for setting up green industrial parks and free zones. These guidelines informed the preparation of master plans, infrastructure plans, and investment teasers for three industrial locations.

The project also delivered a waste management outcome. A Waste Management Strategy was developed for Greater Kampala, alongside two investment teasers for the valorization of oil and e-waste streams. In collaboration with funding from KOICA, the project supported the development of intervention practices for waste diversion and fecal sludge management in Greater Kampala. The final outcome of the project was the integration of greening indicators into government budgeting and reporting practices, strengthening the mainstreaming of green growth in national planning processes.

4.8 Zambia

Figure 24 shows that Zambia's green growth performance differs across the four dimensions. Natural capital protection and efficient and sustainable resource use stand out with the largest number of very high-scoring indicators (80–100). Green economic opportunities also include several high results but alongside a mix of low and very low scores, reflecting uneven progress in this dimension. Social inclusion records the widest performance gaps, with the highest concentration of very low-scoring indicators (below 20), pointing to continuing weaknesses in social protection and access to basic services.

In the Green Economic Opportunities dimension, Zambia's performance is visibly weak in adjusted net savings, including particulate emission damage as a percentage of GNI (GV1), with a score of 15.23. This reflects the country's heavy reliance on natural resource extraction, particularly copper mining, which accounts for a large share of export earnings and government revenue.[118] The limited reinvestment of resource rents into renewable natural capital constrains long-term sustainability. Mining activities contribute to environmental degradation through land disturbance, air pollution, and deforestation, while the expansion of agriculture and infrastructure has placed additional pressure on forests and water resources. Investments in sustainable practices do not adequately offset the depletion of natural capital, and weak diversification beyond mining leaves the economy vulnerable to commodity price fluctuations. Natural capital accounted for 40 percent of Zambia's total wealth in 2014, with renewable resources making up 73 percent of this value.[119] Yet, renewable natural capital has declined due to deforestation and resource depletion between 1995 and 2014. This trend underscores the imbalance between growth from non-renewable capital and the degradation of renewable resources, which could explain the very low score in GV1.

In Natural Capital Protection, the forest area under an independently verified forest management certification scheme (BE4) is one of the lowest-scoring indicators. Although forests form a critical part of Zambia's natural capital, the adoption of certification standards has been slow. High certification costs, weak institutional capacity, and limited awareness among stakeholders have constrained uptake, particularly among smallholders and community-managed forests.[120] Weak market incentives and insufficient technical expertise further reduce the potential for scaling up certification. Zambia also faces one of the highest deforestation rates in Africa, estimated at 250,000 to 300,000 hectares per year, mainly due to agricultural expansion, unsustainable charcoal production, logging, and infrastructure development.[121] Deforestation is particularly severe in areas with shifting cultivation practices and high demand for wood fuel. Population growth and urbanization have increased the pressure on forest resources, while enforcement of forest protection measures remains weak. The REDD+ National Strategy highlights that forest degradation and deforestation not only reduce biodiversity but also contribute significantly to greenhouse gas emissions.[122]

In the Social Inclusion dimension, the proportion of the population with convenient access to public transport (AB4) is very low, with a score of 13.06. The lack of reliable and efficient public transport in Zambia's urban centers, particularly Lusaka, limits mobility for a large share of the population. Congestion, inadequate infrastructure, and safety concerns further reduce the effectiveness and accessibility of public transport services.[123] Although policies have been introduced to improve mobility, challenges remain in public transport's quality, affordability, and safety, especially for residents of informal settlements and peri-urban areas. The absence of adequate infrastructure for non-motorized transport also restricts mobility options and reinforces barriers to access.[124] Another very low-performing indicator is the proportion of mothers with newborns receiving maternity cash benefits (GB4), scoring only 4.46. In Zambia's formal employment sector, the two-year continuous service requirement excludes a significant portion of the population, especially women in informal employment, from maternity benefit coverage.[125] The informal sector employs many women and provides little or no access to social protection mechanisms. Maternity benefits in Zambia are not universal and remain inaccessible for most women due to limited coverage, weak enforcement, and insufficient financing mechanisms. Expanding maternity protection to informal workers continues to be a major challenge, and most mothers rely on family networks or informal arrangements during maternity.[126]

Figure 24 Green growth performance by dimensions, Zambia

Definitions:

Efficient and sustainable resource use: **EE1 -** Energy intensity, **EE2 -** Renewable energy share, **EE3** - Efficient transport, **EE4** - Low-carbon electricity, **EE5** - Per capita electricity consumption, **EW1 -** Water use efficiency, **EW2 -** Level of water stress, **EW3 -** Capture fisheries, **EW4 -** Share of surface irrigation, **EW5 -** Renewable water resources, **SL1 -** Soil nutrient balance, **SL2 -** Organic agriculture area, **SL3 -** Share ruminant livestock, **SL4 -** Agricultural productivity, **SL5 -** Annual forest area change, **ME1 -** Domestic material consumption, **ME2 -** Material footprint, **ME3 -** Food loss and food waste, **ME4 -** Municipal solid waste recycled, **ME5 -** Sewer, septic and latrine coverage

Natural capital protection: **EQ1 -** PM2.5 air pollution, **EQ2 -** DALY rate from unsafe water, **EQ3 -** Solid waste generation, **EQ4 -** Urban people with open defecation, **EQ5 -** Ambient air pollution DALYs, **GE1 -** CO2 emissions per capita, **GE2** - Non-CO2 per capita excl. AFOLU, **GE3** - Non-CO2 emissions in AFOLU, **GE4 -** Carbon intensity of energy production, **GE5 -** CO2 emissions per mfg value-added, **BE1 -** Protected key biodiversity areas, **BE2 -** Share of forest areas, **BE3 -** Forest above-ground biomass, BE4 - Forest under certification scheme, **BE5 -** Change in extent of water ecosystems, **CV1 -** Red list index, C**V2 -** Terrestrial protected area, **CV3 -** Tourism contribution to GDP, **CV4 -** Share of employment in services, **CV5 -** Share of exports of cultural goods

Green economic opportunities: GV1- Adjusted net savings, **GV2 -** Renewable electricity capacity, **GV3 -** Financial flows for clean energy R&D, **GV4 -** Agriculture orientation index, **GV5** - Transport productive capacity, **GT1 -** Exports of environmental goods, **GT2 -** Environmental technologies exported, **GT3 -** ISO 14001 certificates issued, **GT4 -** New business density, **GT5 -** High-technology exports, **GJ1 -** Green employment in manufacturing, **GJ2 -** Employed below the poverty line, **GJ3 -** Vulnerable employment, **GJ4 -** Firms offering formal training, **GJ5 -** ODA flows for scholarships, **GN1 -** Environmental technologies, **GN2 -** Scientific and technical journals, **GN3 -** Researchers per million inhabitants, **GN4 -** Medium/high-tech mfg value-added, **GN5 -** Trademark applications

Social Inclusion: AB1- Access to safe water and sanitation, **AB2 -** Access to electricity and clean fuels, **AB3 -** Prevalence of children stunting, **AB4 -** Convenient access to public transport, **AB5** - Property rights, **GB1 -** Women in national parliaments, **GB2 -** Gender account in financial institution, **GB3 -** Equal gender pay, **GB4 -** Mothers with maternity cash benefits, **GB5 -** School enrollment gender parity, **SE1 -** Inequality in income, **SE2 -** Rural-urban access to electricity, **SE3 -** Youth unemployment disparity, **SE4 -** Age dependency ratio, **SE5 -** Cash benefit for people with disabilities, **SP1 -** Share of old people receiving pension, SP2 - Universal health coverage, **SP3 -** Population living in slums, **SP4 -** Victims of intentional homicides, **SP5 -** Score of Hyogo Framework

5 LDCs comparative green growth performance

5.1. Cross-country performance

This section provides a comparative analysis of green growth performance among the eight African LDCs. The first part discusses country results at the Index and dimension levels in 2023, highlighting relative strengths, weaknesses, and policy-performance linkages. The second part examines changes in performance between 2010 and 2023, focusing on overall trends and identifying the dimensions that contributed most to improvements over time. The analyses in this section give a comprehensive picture of each country's relative position and the drivers of change in their green growth transition.

5.1.1 Green growth dimensions

The Green Growth Index (GGI) scores varied widely across the eight African LDCs. Uganda (72.3), Senegal (70.5), and Zambia (70.0) achieved the highest overall performance, while Burkina Faso (55.6) remained the weakest (Figure 25). The results show that top performers progress more evenly across dimensions, while the lowest performer faces significant constraints.

In efficient and sustainable resource use, Mozambique, Zambia, and Senegal recorded the strongest results, with scores of at least 80, reflecting gains in managing energy, water, and land resources. The very high scores in Mozambique and Zambia were mainly driven by sustainable land use (SL), while Senegal's performance was supported by material use efficiency (ME) (Figure 16). Ethiopia, with 66.8, was the lowest performer in this dimension, mainly due to weak results in efficient and sustainable water use (EW).

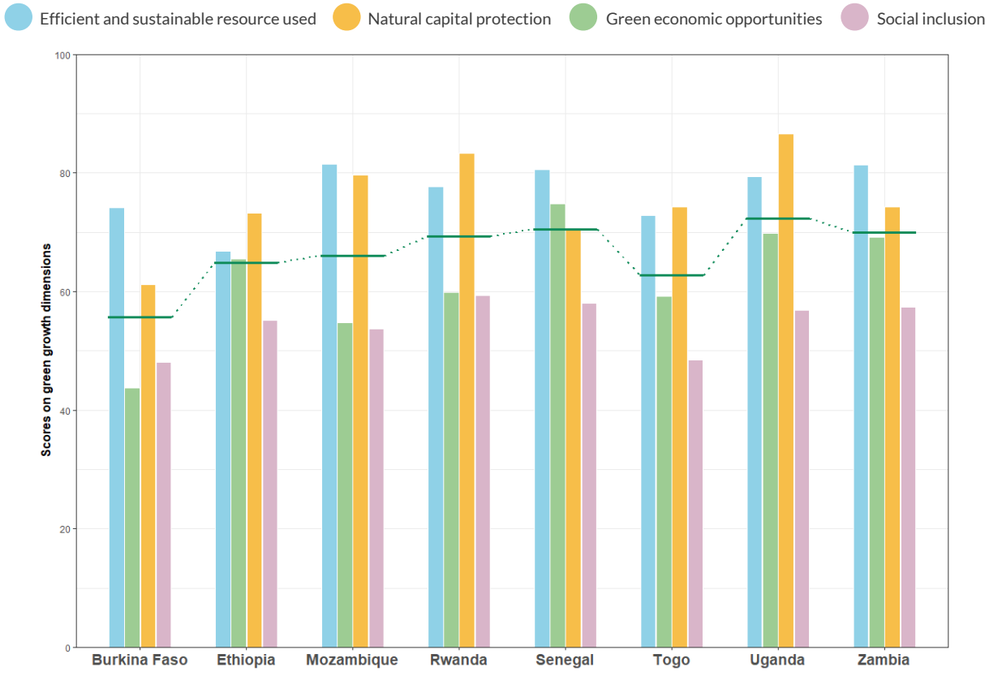
Uganda (86.7) and Rwanda (83.4) recorded the highest scores in natural capital protection. Strong performance in GHG emissions reduction (GE) and environmental quality (EQ) contributed to these very high results, reflecting advances in biodiversity conservation and climate policies. Burkina Faso, with 61.2, remained the lowest performer. Although it achieved a very high score in GE, only moderate results in biodiversity and ecosystem protection (BE) and cultural and social value (CV) pulled down its overall performance in this dimension.

In green economic opportunities, Senegal (74.8), Uganda (69.8), and Zambia (69.2) achieved the highest scores, reflecting progress in creating opportunities for green investment, trade, and employment. Senegal's strong results were driven by green innovation (GN) and green employment (GJ), while GJ also contributed significantly to the scores in Uganda and Zambia. Burkina Faso, with 43.8, was the weakest performer in this dimension, mainly due to a very low score in green trade (GT). The absence of data for GN further contributed to its low performance.

Social inclusion scores were lowest across all dimensions and almost all countries. Rwanda (59.4), Senegal (58.0), and Zambia (57.3) ranked the highest, though their results remained modest. Stronger outcomes in gender balance (GB) and social equity (SE) contributed to Rwanda's performance, while SE was the main driver for Senegal and Zambia. At the lower end, Togo (48.4) and Burkina Faso (48.1) reflected persistent gaps in social inclusion. Togo's very low score in social protection (SP) and Burkina Faso's moderate results across all four pillars explain their weak performance in this dimension.

Overall, the comparison shows that while most African LDCs are advancing in efficient and sustainable resource use and natural capital protection, progress in social inclusion and green economic opportunities is uneven. Addressing these gaps is essential to sustain their green growth transition.

Figure 25 Comparison of green growth performance in the eight Africa LDCs



The scatter plot in Figure 26 provides insight into the relationship between policy emphasis and performance across the four green growth dimensions. Higher c-coefficients indicate more substantial alignment between policy frameworks and outcomes, while lower coefficients suggest weaker policy connections to performance results.

With a score of 81.4 and a coefficient of 0.12, Zambia showed the strongest policy-performance linkages in efficient and sustainable resource use. This result reinforces the earlier observation in Figure 25, where Zambia was among the countries with the highest scores in this dimension, driven by very strong outcomes in sustainable land use (SL) (Figure 16). The consistency between its high score and relatively strong coefficient indicates that Zambia's policy frameworks on land management are effectively aligned with outcomes. By contrast, Burkina Faso (74.2; 0.07) and Senegal (80.6; 0.07) also recorded relatively strong scores in this dimension but had much lower coefficients. This divergence suggests that the underlying policy linkages are weak while performance levels appear positive. In these countries, policy focus is not fully translating into tangible results, indicating that structural conditions, external drivers, or uneven implementation may contribute more to their outcomes than the strength of their policy frameworks.

In natural capital protection, Rwanda, the second top performer in this dimension, demonstrates strong policy alignment with a c-coefficient of 0.14. This result underscores the effective integration of biodiversity conservation, climate, and ecosystem management into national frameworks. Zambia recorded an even higher c-coefficient of 0.19, with very high performance in GHG emissions reduction (GE), environmental quality (EQ), and cultural and social value (CV) (Figure 16). However, national policies had less impact on biodiversity and ecosystem protection (BE), where Zambia achieved only a moderate score. At the lower end, Burkina Faso, which had the lowest score in this dimension, also recorded one of the weakest c-coefficients. This indicates that environmental policies are not well linked to outcomes, particularly in BE and CV, where performance remained only moderate.

For green economic opportunities, out of the three top-performing countries, Senegal, Uganda, and Zambia, only Uganda stands out with strong c-coefficients at 0.14, indicating that policy frameworks on investment, employment, and trade are closely tied to actual outcomes. Yet its scores remain modest, pointing to the need for scaling up implementation, particularly in green innovation (GN) (Figure 16). Rwanda showed strong policy connections (0.16 coefficient), even though Rwanda's score was only moderate at 59.8. This suggests that stronger implementation could quickly translate into higher performance. In contrast, Burkina Faso (43.8; 0.06) recorded the lowest coefficient at 0.06 and the lowest score at 43.8, indicating that weak policy implementation translates into poor performance. Senegal presents a different case, with the highest score (74.8) but one of the lowest coefficients (0.06). This indicates that its strong results in green innovation (GN) and green employment (GJ) are less driven by national policy frameworks and more by specific sectoral initiatives and external support (e.g., National Strategy for the Promotion of Green Jobs, Creation of Green Job Opportunities).[127]

In social inclusion, Zambia recorded higher c-coefficients (0.14) than Rwanda and Senegal, even though the latter two countries achieved the highest scores in this dimension. In Zambia, social equity (SE) is the pillar showing the strongest policy-performance linkages, while access to basic services and resources (AB) does not follow the same pattern (Figure 16). Despite stronger policy connections in SE, Zambia's low score in AB highlights persistent structural constraints in access to services and equity. Burkina Faso and Ethiopia also recorded coefficients at the same level as Zambia (0.14) but with lower overall scores. This outcome reflects difficulties translating policy alignment into higher performance, with weak results in AB and gender balance (GB) in Burkina Faso and in AB and social protection (SP) in Ethiopia. In contrast, Senegal, the second-highest performer in social inclusion, recorded the lowest coefficient (0.07). This divergence suggests that while its performance levels appear favorable, the underlying policy linkages are weak. Moreover, only SE achieved a very high score in Senegal, pointing to a skewed policy focus that does not extend evenly across all pillars of social inclusion.

Figure 26 highlights that Zambia and Rwanda consistently show strong alignment between policies and outcomes, while Burkina Faso and Senegal exhibit weaker linkages. These findings emphasize that policy design and emphasis alone are not sufficient. Effective implementation is critical to ensure that higher policy relevance translates into stronger performance across all pillars and dimensions of green growth.

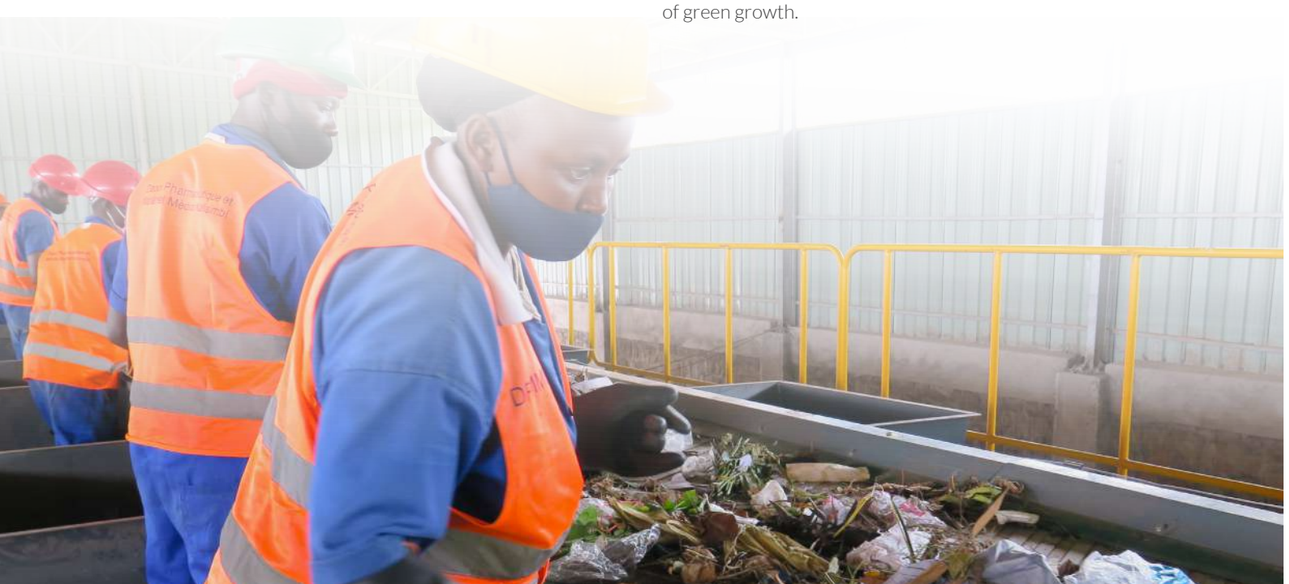
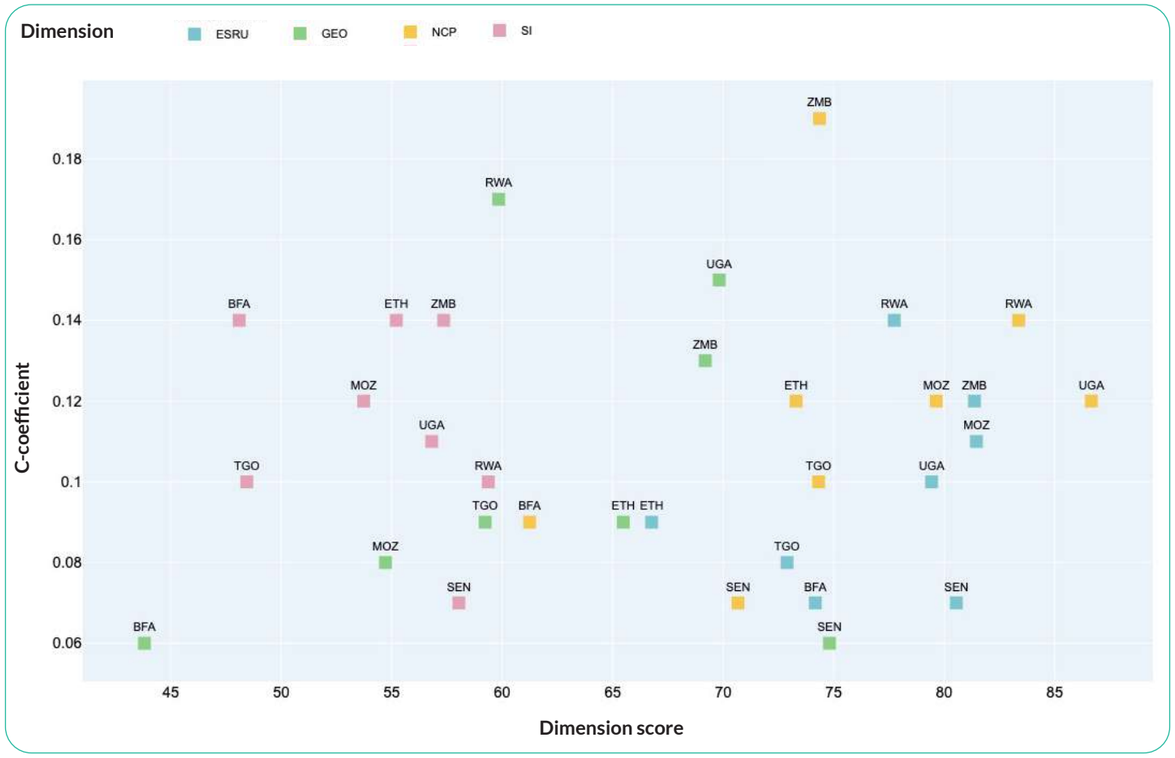


Figure 26 Scatter plot of the c-coefficients and dimension scores in the eight Africa LDCs



Definitions: Burkina Faso (BFA), Ethiopia (ETH), Mozambique (MOZ), Rwanda (RWA), Senegal (SEN), Togo (TGO), Uganda (UGA), Zambia (ZMB)

5.1.2 Trend in green growth performance

The overall green growth performance of the African LDCs increased between 2010 and 2023 (Figure 27). Progress was recorded in all countries, but the pace of change differed, with some achieving rapid improvements while others advanced more gradually. The results show that countries leading in multiple dimensions were able to accelerate their growth, while those with more limited progress maintained lower scores. The analysis also points to persistent disparities between the strongest and weakest performers, underlining the importance of continued efforts to sustain balanced progress across all dimensions of green growth.

Rwanda achieved the fastest growth, with its score rising from 56.4 in 2010 to 69.1 in 2023, equivalent to a 22.8 percent increase. Its progress was driven mainly by the most significant absolute improvement among all countries in green economic opportunities (+21.3 points) and substantial gains in social inclusion and natural capital protection. Rwanda recorded a more modest increase of +4.4 points in efficient and sustainable resource use. As discussed in Section 4, several initiatives are helping to address low-scoring indicators in this dimension. The Land Husbandry, Water Harvesting, and Hillside Irrigation (LWH) Project has supported improved land husbandry, hillside irrigation, and soil protection, directly targeting very low scores in agricultural productivity (SL4). The Solar Pumping for Irrigation Project has replaced diesel pumps with solar systems, enhancing agricultural resilience and reducing fossil fuel dependence, also contributing to improvements in SL4. In addition, the Promotion of On-Farm Biogas Project has expanded biogas use to address low renewable energy capacity (GV2) and adjusted net savings (GV1), while reducing reliance on firewood and charcoal. Together, these projects provide opportunities to strengthen Rwanda's efficient and sustainable resource use performance, complementing its broader gains in other dimensions. Rwanda led or was among the strongest improvers in three out of four dimensions, explaining its rapid overall growth (Figure 28).

Ethiopia recorded the second-highest increase, improving by 17.4 percent from 55.2 in 2010 to 64.8 in 2023. Its growth was driven by substantial gains of 16.9 points in green economic opportunities during this period. Ethiopia also achieved one of the highest increases in efficient and sustainable resource use (+9.8 points). Overall, Ethiopia shared the top group with Rwanda regarding improvements in green economic opportunities and social inclusion. However, performance in natural capital protection was limited to only +1.2 points during 2010-2023, leaving Ethiopia behind other countries in this dimension. GGGI-supported initiatives such as the Conservation and Sustainable Management of Forested Landscape (CSMFL) Project and the Climate Resilient Forest and Landscape Restoration (CRFLR) Project are well placed to address Ethiopia's low scores in natural capital protection (see Section 4), particularly in protected biodiversity areas (BE1) and forest certification (BE4). The CSMFL Project promotes biodiversity conservation, participatory forest management, and alternative livelihoods, while the CRFLR Project

focuses on ecosystem restoration and green enterprise development. By focusing on biodiversity conservation, restoration, and green enterprises, these projects are helping Ethiopia seize opportunities to strengthen performance in areas where progress has so far been modest.

Togo followed with a 13.2 percent increase, reaching 63.1 in 2023. The country recorded one of the largest absolute improvements in green economic opportunities, at a significant 20.5 points, albeit second only to Rwanda. It has progressed more slowly in efficient and sustainable resource use and natural capital protection. However, it was the only country to register a decline in social inclusion (-0.5 points), constraining its overall growth. Section 4 discussed two GGGI projects that are relevant to improving social inclusion. First, the Developing Socio-Economic Infrastructure to Sustain Rural Communities (MAFRA) Project promotes agro-processing, clean water access, eco-friendly infrastructure, and rural livelihoods. This project directly contributes to social inclusion by targeting access to safe water and sanitation (AB1) and women's participation in financial institutions (GB2). Second, the Shea Project on sustainable forestry and green jobs develops the shea industry to create 5,000 green jobs, expand shea parklands, and strengthen value chains. It supports improvements in green employment (GJ1) and women's participation in finance (GB2). These initiatives are well-positioned to help Togo improve social inclusion and complement the substantial gains already achieved in green economic opportunities.

Uganda improved by 11.9 percent, consistently recording the highest scores throughout the period and reaching 72.3 in 2023. Its progress was driven by a significant increase in green economic opportunities (+17.2 points) and social inclusion (+9.0 points). However, Uganda was the only country with a decline in efficient and sustainable resource use (-0.8 points), and its gains in natural capital protection were negligible, by only +0.2 points. This profile shows that green economic opportunities and social inclusion sustained Uganda's leadership at the Index level, but its future performance can be strengthened by projects that address environmental dimensions. For example, the National Clean Cooking Unit Project, discussed in Section 4, targets this gap by promoting modern energy solutions to reduce reliance on traditional biomass, improve health outcomes, and expand access to clean energy (EE5). Addressing one of Uganda's weakest indicators, this initiative creates new opportunities to strengthen efficient and sustainable resource use and complement the gains already achieved in green economic opportunities and social inclusion.

Burkina Faso increased by 10.4 percent, scoring from 50.4 in 2010 to 55.6 in 2023. Its growth came mainly from one of the most substantial improvements in efficient and sustainable resource use (+9.2 points), close to Ethiopia's result, and from green economic opportunities (+10.4 points). However, progress in social inclusion was minimal, and natural capital protection even declined by -1.7 points, making Burkina Faso the only country with negative performance in the latter dimension. As discussed in Section 4, the Building Resilience in the Kaya-Dori Axis Project addresses this gap by restoring degraded lands, promoting climate-resilient livelihoods, and supporting women and youth in conflict-affected areas. In addition, the Solar Irrigation Pumping Systems and Mini-Grids Project and the Solar Grandmothers Project contribute to social inclusion by expanding energy access, creating green jobs, empowering women, and improving rural–urban equity. Such initiatives can play a critical role in strengthening social inclusion and natural capital protection performance, where Burkina Faso has made limited progress. As a result, it remained the weakest overall performer.

Zambia improved by 9.9 percent to reach 70.0 in 2023. Growth was explained mainly by significant increases in green economic opportunities (13.0 points) and social inclusion (6.6 points). In contrast, 3 points of improvement in resource use and natural capital protection were less significant. This shows that Zambia's recent progress aligned more with socio-economic rather than environmental dimensions.

Mozambique followed Zambia with an 8.1 percent increase, reaching 69.0 in 2023. The country's gains were spread across dimensions, led by green economic opportunities (7.9 points), moderate progress in natural capital protection (4.5 points), and smaller gains in social inclusion and resource use (both with less than 4 points). While Mozambique did not record the most significant improvement in any single dimension, its balanced growth across all four dimensions allowed steady progress at the Index level.

Senegal recorded the smallest increase, improving by only 7.4 percent, reaching a score of 70.5 in 2023. Its growth was driven primarily by green economic opportunities, 12.7 points from 2010 to 2023. Gains in resource use by 1.7 points were marginal. The increase in social inclusion and natural capital protection was negligible, between 0.4 and 0.5 points only. Section 4 discussed GGGI projects that contribute to improving these two low-performing dimensions. On the one hand, the Inclusive Green Financing Initiative (IGREENFIN I), which expands access to credit and technical assistance for farmers and cooperatives, and the Project for the Improvement of Education Sector Results (SUBA), which improves access to and equity in education, are contributing to social inclusion. Moreover, the Improving Gender Equality and Rural Livelihoods through Sustainable and Participatory Energy Management (PROGEDE II) also supports women's empowerment through alternative livelihoods and financial inclusion. On the other hand, for natural capital protection, projects such as the Scaling-Up Resilience in Africa's Great Green Wall (SURAGGWA), which restores degraded lands and ecosystems, the IGREENFIN I initiative, which promotes climate-resilient and low-emission agriculture, and the Solar-Powered Irrigation for Climate-Smart Agriculture Project, which supports efficient irrigation systems in the Senegal River Valley, are addressing weak performance in biodiversity and ecosystem conservation. These projects create opportunities to strengthen both social inclusion and natural capital protection, where Senegal's progress has so far been minimal. Unlike Rwanda or Ethiopia, Senegal did not lead in improvements in any dimension, showing that its consistently high scores are based on earlier achievements rather than recent acceleration.

In summary, Rwanda and Ethiopia recorded the most dynamic growth, each leading in multiple dimensions. Their progress was supported by initiatives that addressed gaps in resource use, renewable energy, and ecosystem restoration, creating opportunities to sustain substantial gains in green economic opportunities and social inclusion. Uganda maintained its top Index position but with limited progress in environmental dimensions; ongoing efforts to expand clean energy access and improve efficiency are expected to strengthen its performance in the future. Togo made considerable gains in green economic opportunities. Still, it fell behind in social inclusion, although current initiatives on rural infrastructure, green jobs, and women's empowerment are targeted to close these gaps. Burkina Faso remained the weakest performer due to its decline in natural capital protection, but investments in land restoration, renewable energy, and women's participation in energy access create opportunities to reverse this trend. Zambia, Mozambique, and Senegal improved modestly. In Senegal, where recent progress was the slowest, ongoing initiatives in ecosystem restoration, climate-resilient agriculture, and inclusive finance are supporting areas where performance has so far remained limited, providing a basis for stronger growth despite already high scores.

Figure 27 Trend in Green Growth Index score in the eight Africa LDCs, 2010-2023

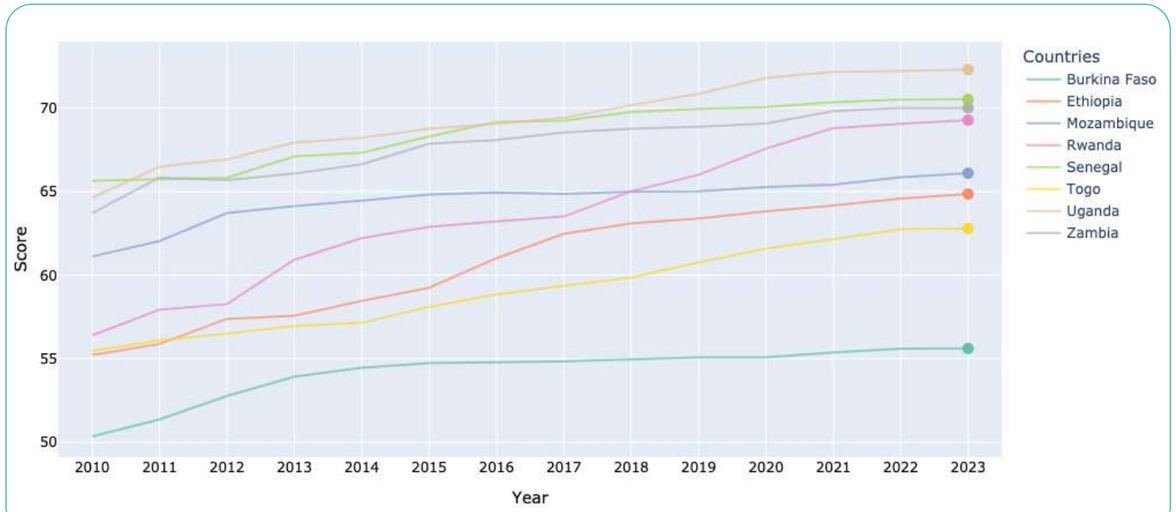
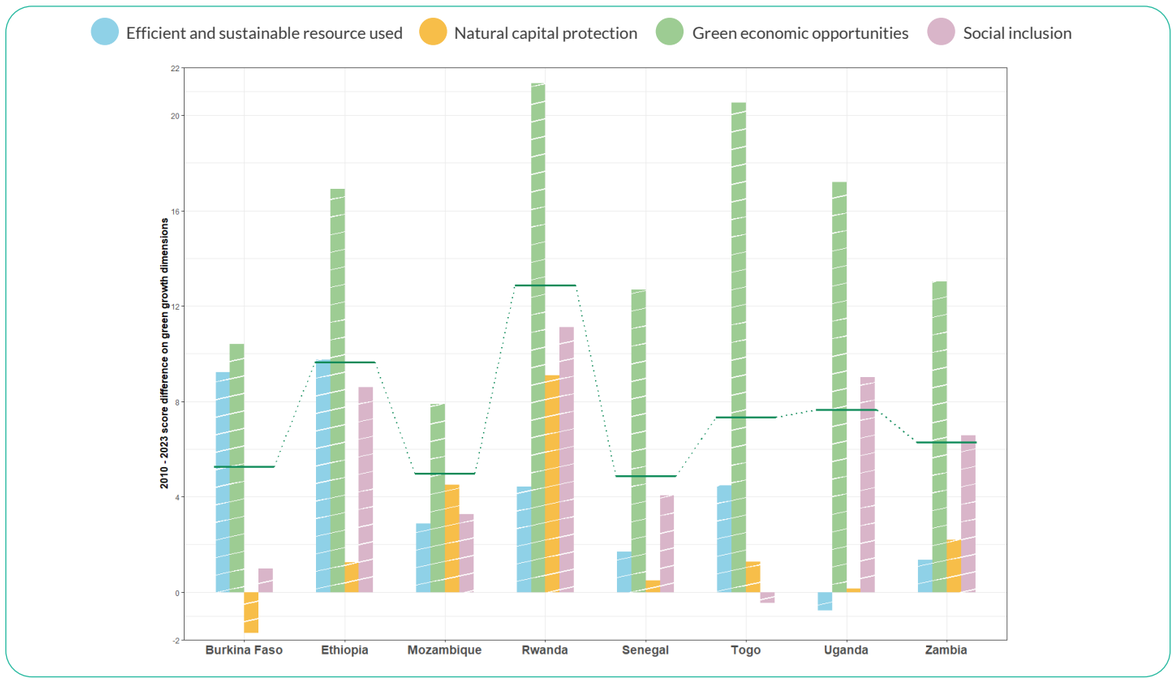


Figure 28 Difference in the green growth scores in the eight Africa LDCs by dimension between 2010 and 2023



5.2 Regional performance

The comparison of regional LDC groups shows important variations in green growth performance. Africa LDCs (GGGI Members) achieved the highest score at the Index level, ahead of Asia LDCs and Africa LDCs overall (Figure 29). Due to limited data coverage, no Index scores could be computed for Caribbean and Latin America LDCs, restricting the comparison for these two regions to the dimension level only. Over time, all three regions with available data recorded steady progress. Between 2010 and 2023, Africa LDCs (GGGI Members) improved from 59.1 to 66.4, the most significant increase among the groups at 12.5 percent (Figure 30). Asia LDCs also rose steadily from 56.1 to 61.6 (9.9 percent), slightly outperforming the broader group of Africa LDCs, which grew by 9.6 percent from 54.2 in 2010. These results confirm that African LDCs with GGGI engagement have outpaced both the African average and Asia LDCs in improving their green growth performance.

At the dimension level, Africa LDCs (GGGI Members) consistently outperformed the broader group of African LDCs. They recorded higher performance in efficient and sustainable resource use and natural capital protection, with scores of at least 75. The score in green economic opportunities is also higher at 62.1. These results highlight the added value of targeted programs and stronger policy frameworks to support the green growth transition. Figure 31 confirms that this progress was largely driven by significant improvements in green economic opportunities, which increased by about 15 points from 2010 to 2023. The other dimensions increased by less than 6 points in this period.

Asia LDCs performed more strongly in social inclusion (58.2) than other LDC groups. Although its scores for efficient and sustainable resource use and natural capital protection are higher than social inclusion, at 68.7 and 66.7, respectively, they were closer to or below those of Africa. Their relative strength in social inclusion reflects steady progress since 2010, gaining 6.6 points until 2023, the highest across all regions. However, Asia's LDCs did not keep pace with Africa (GGGI Members) regarding efficient and sustainable resource use or green economic opportunities. They even recorded a decline of 2.3 points in efficient and sustainable resource use from 2010 to 2023.

Caribbean LDCs showed contrasting outcomes, with relatively strong results in natural capital protection (71.8) but the weakest in social inclusion (42.0). Figure 31 further indicates that their progress was uneven over time: while natural capital protection improved by about 6.2 points from 2010 to 2023, declines of 8.3 points in efficient and sustainable resource use and 4.0 points in social inclusion offset these gains, limiting overall performance.

Latin America LDCs displayed modest performance. They scored high in natural capital protection (64.0) and moderate in social inclusion (52.5). Performance is weakest in green economic opportunities, at 41.1, the lowest score across LDC groups in 2023. This dimension improved only slightly by 5.4 points from 2010, significantly lower than the Africa and Asia LDC groups, which recorded an increase of at least 10 points. Data limitations for efficient and sustainable resource use restrict further conclusions on this region's overall green growth performance.

In summary, Africa LDCs (GGGI Members) performed better than the average for the continent. Also, they demonstrated stronger growth over time than Asia LDCs, particularly in efficient and sustainable resource use and green economic opportunities. Asia LDCs led social inclusion, while Caribbean LDCs relied on relative strength in natural capital protection. Latin American LDCs remained weak regarding green economic opportunities and lacked sufficient data for efficient and sustainable resource use. At the Index level, comparisons were possible only for Africa and Asia LDCs, with results confirming the faster progress of African LDCs with GGGI engagement.

Figure 29 Comparison of green growth performance in the regional LDCs, 2023

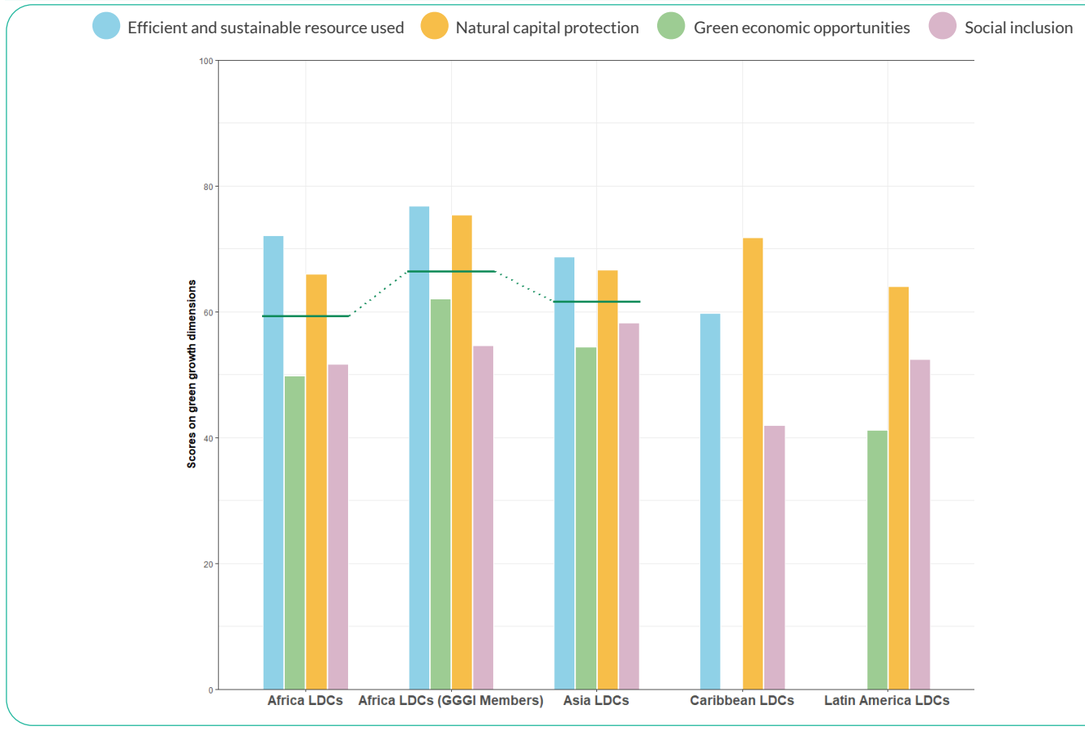


Figure 30 Trend in Green Growth Index score in the regional LDCs, 2010-2023

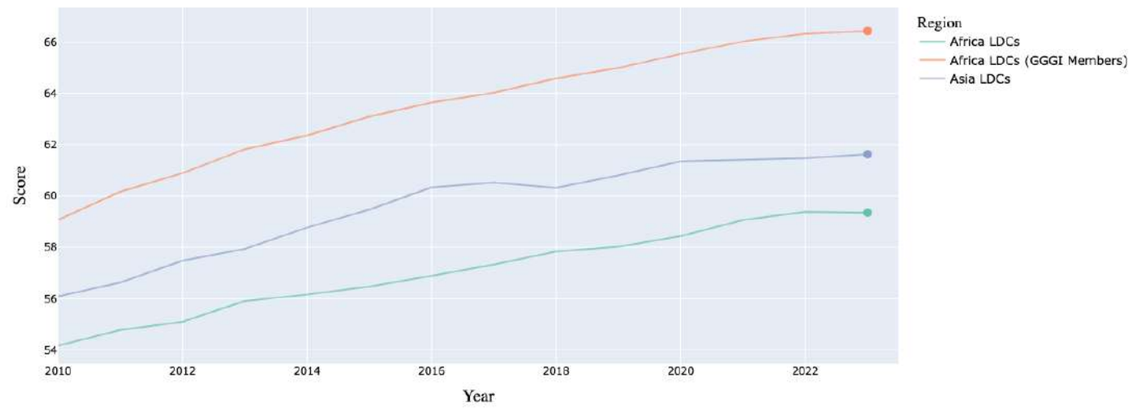
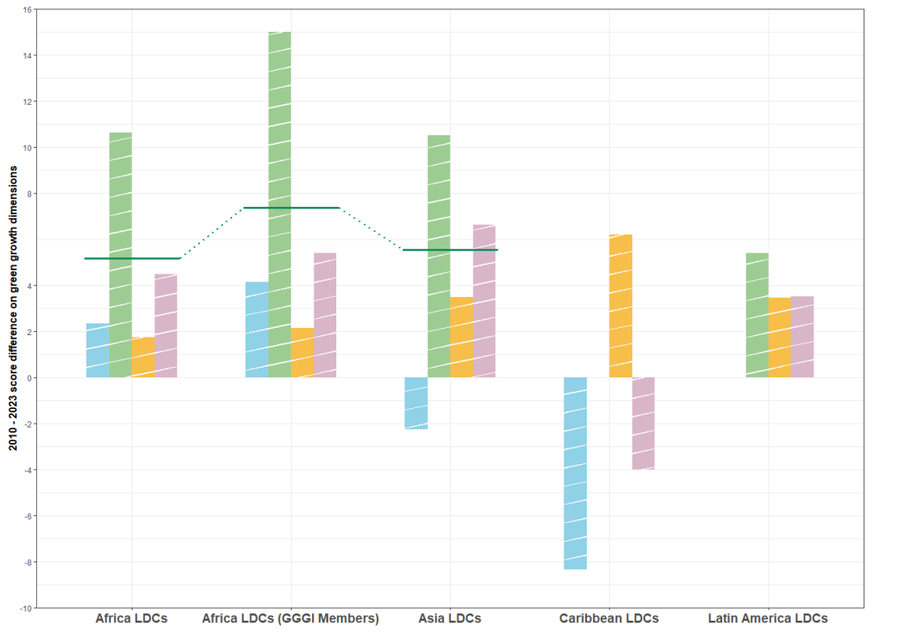


Figure 31 Difference in the green growth scores in the in the regional LDCs by dimension between 2010 and 2023



6 Conclusions

6.1 Overall Insights

The Africa LDC Index assessed green growth performance in eight least developed countries, including Burkina Faso, Ethiopia, Mozambique, Rwanda, Senegal, Togo, Uganda, and Zambia, using 80 indicators across four dimensions: efficient and sustainable resource use, natural capital protection, green economic opportunities, and social inclusion. The results highlight meaningful progress in some dimensions, particularly in natural capital protection and social inclusion, but also reveal weaknesses in efficient and sustainable resource use and green economic opportunities. At the dimension level, the following are the specific insights:

- **Efficient and sustainable resource use.** Progress was limited across most countries due to heavy reliance on biomass and fossil fuels, low irrigation coverage, and poor waste management systems. While renewable energy capacity is growing in countries such as Ethiopia and Zambia, efficiency gains remain slow, constraining low-carbon transitions.

- **Natural capital protection.** This dimension showed the most consistent progress, with improved biodiversity conservation, REDD+ initiatives, and forest management. However, continued pressures from deforestation, soil erosion, and climate-related disasters limit the effectiveness of policy measures, particularly in Mozambique and Burkina Faso.

- **Green economic** opportunities. All countries scored lowest in this dimension. Limited green investment, weak innovation capacity, and dependence on extractive industries restrict structural transformation. Emerging opportunities in eco-tourism, renewable energy, and sustainable trade, visible in Rwanda, Senegal, and Ethiopia, remain underdeveloped.

- **Social inclusion.** Access to electricity, water, and sanitation improved across several LDCs, with Rwanda and Senegal recording significant gains. However, inequalities persist between urban and rural populations, while gender equity and social protection indicators remain weak across most countries.

Performance varied significantly across countries, reflecting differences in policy frameworks, institutional capacity, and levels of external support. The policy analysis revealed more substantial alignment with natural capital protection and efficient and sustainable resource use than green economic opportunities and social inclusion. Nationally Determined Contributions (NDCs), National Adaptation Plans (NAPs), and Biodiversity Strategies (NBSAPs) generally address environmental concerns, but policies are less comprehensive in tackling issues of green innovation, trade, employment, and social protection. This imbalance underscores the need to expand the scope of national frameworks to support the green growth transition.

These regional insights provide the backdrop for the country-level analysis that follows, examining in greater detail the specific contexts, policy priorities, and performance outcomes of each African LDC.

6.2 Country-level Findings

Burkina Faso: Burkina Faso's economy is heavily dependent on agriculture and gold mining, leaving livelihoods exposed to climatic shocks and political instability. The country has made progress in reducing hunger, yet access to clean water, sanitation, and electricity is still among the weakest among the eight African LDCs, reflecting persistent inequalities between urban and rural areas. National strategies place strong emphasis on environmental protection, which provides an important foundation for sustainable agriculture and green industries. A stronger focus on implementation in this area could also help reverse the decline in natural capital protection, where Burkina Faso is the only one among the eight African LDCs to show negative progress since 2010.

At the same time, however, policies offer limited direction for expanding green economic opportunities or improving access to basic services. Burkina Faso ranks lowest on policy alignment in these areas. Despite this gap, the country recorded a ten-point increase in green economic opportunities between 2010 and 2023, indicating potential for growth from a low baseline. Challenges remain in social inclusion, where little progress has been achieved over the past two decades. Ongoing GGGI projects contribute to addressing these gaps by improving productivity through restoration of degraded land, expanding solar energy for households and irrigation, empowering rural women, and linking environmental action with livelihoods, energy access, and green jobs. Burkina Faso is the lowest performer among the eight African LDCs, but its emerging potential in green economic opportunities and projects that strengthen social inclusion could help accelerate progress in the dimensions where it currently lags.

Ethiopia: Ethiopia has the largest economy among the eight African LDCs, but growth continues to rely on agriculture, with limited diversification in exports and industries. The country also has the most significant natural asset base, i.e., abundant arable land and freshwater reserves, and vast hydropower potential. Yet, these resources are under growing pressure from rapid population growth, soil degradation, and recurring climate variability. While progress has been made in renewable energy and agricultural productivity, rising undernourishment, weak water and sanitation services, and widespread slums in urban areas continue to constrain social development. The policy analysis shows that Ethiopia's comprehensive frameworks emphasize biodiversity and social priorities more than green economic opportunities or efficient resource use. The country recorded significant momentum in these latter two dimensions between 2010 and 2023, with green economic opportunities rising by 16.9 points and resource efficiency by 9.8 points. Hence, sustaining current priorities on biodiversity and ecosystems, alongside expanding access to basic services, will support a more balanced green growth transition across all four dimensions.

Both priorities are also reflected and interlinked in GGGI's ongoing projects in Ethiopia. The CSMFL Project supports biodiversity-rich forests and promotes gender-inclusive approaches, directly strengthening ecosystem protection while improving energy access through small-scale renewable systems. The CRFLR Project restores large areas of degraded land, which enhances soil fertility and water regulation while creating sustainable enterprises that provide income and jobs. Similarly, the Agroforestry for People, Peace, and Prosperity Project applies coffee-based agroforestry systems to conserve biodiversity and improve rural livelihoods, while also reducing rural–urban electricity gaps and strengthening market opportunities for farmers. They will help enhance natural capital protection and social inclusion performance, which have progressed more slowly than green economic opportunities and efficient and sustainable resource use since 2010.

Mozambique: Mozambique's economy is shaped by extractive industries and export-oriented growth, with aluminum, coal, electricity, and natural gas dominating trade and investment. At the same time, high exposure to climate shocks, persistent food insecurity, and inadequate urban infrastructure, where more than half of city residents live in slum conditions, underline the fragility of livelihoods and the need for more inclusive development. National policies reflect these challenges by placing strong emphasis on natural capital protection and social resilience, but they provide limited guidance on creating new green economic opportunities or improving the efficiency of resource use. This imbalance is evident in the country's

performance, with high scores in natural capital protection in 2023, compared with very low results in green economic opportunities. Although green economic opportunities recorded the most significant gains in the last two decades, Mozambique's progress remains the weakest among the eight African LDCs.

Gains in efficient and sustainable resource use were negligible, but the country, together with Zambia, already registered the highest score in this dimension in 2023. Mozambique has the highest level of foreign direct investment among the eight African LDCs, supporting its relatively strong performance in green economic opportunities and efficient resource use, particularly in agriculture, tourism, infrastructure, and energy sectors. By contrast, social inclusion not only remained the weakest performing dimension but also recorded the lowest improvements since 2010. Persistent deficits in access to basic services, maternity cash benefits, and universal health coverage continue to compound the vulnerability of food-insecure populations living in precarious urban settlements. However, effective implementation of the NDP (2015–2035) and the NAP (2023), both of which place strong emphasis on social inclusion, is expected to help improve outcomes in this dimension.

Rwanda: Rwanda has sustained one of the fastest GDP growth rates among the eight African LDCs, but the economy remains heavily reliant on smallholder agriculture, leaving livelihoods vulnerable to land degradation, soil erosion, and climate variability. Rapid urbanization and high youth unemployment further underscore the need to diversify the economy and invest in sustainable infrastructure, including renewable energy, to ensure that growth translates into inclusive development. National policy frameworks respond to these challenges with a strong emphasis on natural capital protection and social inclusion. Although efficient resource use and green economic opportunities were less frequently referenced in policy documents, Rwanda achieved a high score in efficient and sustainable resource use in 2023 and the most significant increase in green economic opportunities since 2010 (21.3 points, the highest in the eight African LDCs), reflecting well-balanced implementation across the four green growth dimensions.

The impacts of these efforts are evident in performance outcomes. Rwanda recorded the second-highest score in natural capital protection after Uganda and the highest score in social inclusion among the eight African LDCs in 2023. Social inclusion also improved more than in any other country, rising by 11.1 points since 2010, and contributing significantly to Rwanda's overall Index growth of 22.8 points, the fastest in the group. Nonetheless, as in most of the African LDCs, social inclusion remains the lowest-performing dimension, pointing to the challenges ahead. Several ongoing GGGI projects contribute to addressing these gaps by expanding access to services, improving livelihoods, and reducing inequalities. The Land Husbandry, Water Harvesting, and Hillside Irrigation Project has strengthened food security while reducing soil erosion, supporting both nutrition and income in rural communities. Solar pumping initiatives for irrigation have lowered costs for farmers and increased resilience in food systems. The on-farm biogas program has provided households with cleaner cooking energy, reducing health risks and easing the burden of fuelwood collection, particularly for women. Likewise, the Kigali Wetlands rehabilitation project has restored ecosystems while reducing flood risks and improving living conditions for more than 160,000 urban residents.

Senegal: Senegal has the highest income level among the eight African LDCs, supported by significant remittance inflows and foreign investment in petroleum, natural gas, and other key sectors. However, low productivity and water scarcity in agriculture, which employs most of the labor force, and growing pressure on forests and ecosystems continue to constrain livelihoods, particularly as half of the population now resides in rapidly urbanizing areas. Natural capital protection and social inclusion dominate national policies, addressing the country's significant challenges. Senegal performed lower in these dimensions than in efficient and sustainable resource use and green economic opportunities in 2023. Gains have also not been substantial since 2010, particularly in natural capital protection, contributing to slower growth in green growth performance than Uganda, which replaced Senegal as the top Index performer among the eight African LDCs in 2023. Despite less emphasis on national policies, the scores for efficient and sustainable resource use and green economic opportunities were higher in 2023. Foreign direct investment and development finance play a pivotal role in Senegal's green infrastructure, innovation, and employment.

Several ongoing GGGI projects in Senegal contribute directly to natural capital protection while generating social benefits. The SURAGGWA and Sustainable Forest Management projects restore degraded land and strengthen forest ecosystems, which enhance carbon sequestration and biodiversity conservation while supporting the resilience of local communities. Solar-powered irrigation systems in the Senegal River Valley improve water management and promote climate-smart agriculture, increasing productivity and food security for smallholder farmers. Social inclusion is also advanced through initiatives such as the Education Sector Results Project, which expands equitable access to education, and the IGREENFIN program, which provides credit to smallholder farmers and empowers women in financial inclusion. Similarly, the PROGEDE II project reduces reliance on fuelwood by introducing cleaner energy alternatives, alleviating pressure on forests while creating opportunities for women in alternative livelihoods. Together, these initiatives illustrate how investments in ecosystems and natural resources can be closely linked with improvements in education, livelihoods, and gender equity.

Togo: Togo's economy remains in agriculture, with more than two-thirds of land devoted to farming, making rural livelihoods sensitive to soil degradation and climate shocks. Despite steady GDP growth and low unemployment, widespread poverty, limited access to clean water and sanitation, and persistent energy poverty constrain inclusive development. National policies strongly focus on social inclusion and natural capital protection, which is necessary to reverse the performance decline in the former dimension and improve the limited increase in the latter dimension from 2010 to 2023. As a result, Togo has struggled to catch up with the other African LDCs in overall green growth performance, recording a score of 62.8, the second lowest in the group. While the natural capital score achieved a high score in 2023, social inclusion remained one of the lowest among the eight African LDCs. Although efficient and sustainable resource use and green economic opportunities were not equally prioritized across major national policies, they have received sufficient attention in policies dedicated to climate change action (e.g., National Climate Change Policy, Nationally Determined Contribution) and green economy (e.g., Vision 2030, Government Roadmap 2020–2025). This contributed to a high score in efficient and sustainable resource use in 2023 and a significant gain in green economic opportunities score from 2010, although the score remained at a moderate level in 2023.

Among the four green growth dimensions, the scores for social inclusion and green economic opportunities are the lowest in Togo. Several GGGI projects in Togo link environmental action with creating opportunities for improving economic diversification and social inclusion. The GCF Readiness project strengthens institutional capacity to access climate finance, creating pathways for investment in renewable energy and agriculture, which expands green business and employment opportunities. The STILTS initiative on low-carbon transport promotes new financial mechanisms and awareness programs, opening space for innovation and greener urban mobility, while also improving access to services for urban residents. The MAFRA project supports agro-processing, postharvest systems, and rural infrastructure, enhancing productivity and income for farmers while empowering women's cooperatives through access to resources and markets. The Shea project expands shea parklands and value chains, generating 5,000 green jobs for women and youth and strengthening agroforestry systems that provide both climate resilience and sustainable livelihoods.

Uganda: Uganda has one of the fastest-growing populations in Africa, and this demographic pressure intensifies demands on land, food systems, and natural resources in a country where agriculture remains at the center of the economy. Rapid population growth, combined with inadequate urban infrastructure and more than half of urban residents living in slums, underscores the importance of expanding access to basic services and diversifying the economy. These challenges are reflected in the country's national policies, with significant focus on natural capital protection and social inclusion. Uganda, the top-performer in green growth performance among the eight African LDCs in recent years, excelled in natural capital protection, but its social inclusion scores, like those of the other countries, remained moderate in 2023. Nonetheless, it gained nine points in the social inclusion score since 2010, the second highest in the group after Rwanda. Implementing policies directly focusing on green growth (i.e., Green Growth Development Strategy) tended to enhance performance in green economic opportunities with a significant score gain of about 17 points in the period 2010-2023. However, despite a high score in efficient and sustainable resource use in 2023, this dimension recorded a negligible one-point decline since 2010.

GGGI's Greening Urbanization and Industrialization Project promotes integrated planning and the development of eco-industrial parks, which foster green jobs and inclusive urban services. By improving access to sustainable transport, water, and energy in growing cities, this project not only reduces resource inefficiencies but also strengthens equitable service delivery. Moreover, the National Clean Cooking Unit Project supports social inclusion by shifting away from traditional biomass toward cleaner cooking solutions, reducing household air pollution, improving health outcomes, and easing the burden of fuel collection, especially for women and children.

Zambia: Zambia's economy relies on copper mining, and deforestation rates remain among the highest in Africa. Agriculture employs most of the labor force but contributes little to economic growth, leaving poverty and inequality a considerable challenge in rural areas. Despite progress in expanding access to clean water, sanitation, and electricity, undernourishment persists at levels significantly higher than in the other eight African LDCs. Zambia's policy frameworks seek to address these structural vulnerabilities by promoting diversification and resilience through climate-smart agriculture, renewable energy, sustainable forest management, and expanded access to basic services. Consequently, it ranked third in overall green growth performance among the eight African LDCS in 2023, but very close to Senegal's score, which occupied second.

Zambia scored highest in efficient and sustainable resource use, occupying the first rank together with Mozambique. However, performance improvement in this dimension was only negligible from 2010 to 2023. Green economic opportunities and social inclusion, particularly green investment and access to basic services, drove the high green growth performance. Many national and sectoral policies support creating green economic opportunities, for example, by committing to diversifying the economy (Vision 2030), integrating green growth principles (8NDP), enabling carbon finance and eco-tourism (Forest Policy, REDD+ Strategy), etc. In addition, the National Green Growth Strategy (2024–2030), developed with GGGI's support and informed by the National Green Growth Index, provides Zambia with a solid framework for economic diversification, low-carbon industrialization, and green job creation. Meanwhile, in addition to Vision 2030 and 8NDP's strong focus on social inclusion, climate strategies (e.g., National Policy on Climate Change, National Adaptation Plan, Nationally Determined Contribution) incorporate cross-cutting social objectives, prioritize reducing vulnerability for the most at-risk groups, and highlight gender and social equity as enabling conditions.

Across the eight African LDCs, country results confirm the broader trends observed at the regional level: natural capital protection and efficient resource use often recorded stronger performance. At the same time, green economic opportunities and social inclusion remained the weakest dimensions. Each country displayed unique pathways shaped by its economic structure, policy orientation, and external support, but common challenges persist in diversifying economies, expanding access to basic services, and strengthening social protection. At the same time, recent improvements in green investment, renewable energy, and agricultural productivity illustrate the potential for accelerated progress when policies and initiatives align well with developmental needs.

6.3 Next Steps Forward

The Africa LDC Index provides a regional benchmark, but its most significant value lies in its application at the national level. Each of the eight countries assessed, including Burkina Faso, Ethiopia, Mozambique, Rwanda, Senegal, Togo, Uganda, and Zambia, can use the Index to strengthen their transition to green and inclusive growth. The National Green Growth Index was developed in Zambia in 2022 and in Togo in 2025. Kenya and Ghana are non-LDC African countries, and their national indices were developed in 2024. Moving forward, three key actions are recommended for the other countries:

- **Institutionalize the Green Growth Index at the national level.** Countries should establish or update their own National Green Growth Indices, using the Africa LDC Index as a foundation. Developing a country-specific Index through a participatory process with line ministries, research institutions, and civil society ensures that the indicators are policy-relevant, context-sensitive, and aligned with national development frameworks such as NDCs, NAPs, NBSAPs, and long-term visions.

- **Build capacity for monitoring and data systems.** Applying the Green Growth Index requires strengthening national statistical systems and enhancing technical skills in data collection, management, and analysis. Capacity building should focus on bridging data gaps in low-scoring dimensions, particularly green economic opportunities and social inclusion, while promoting collaboration across institutions to improve data quality and accessibility. Over time, building technical expertise within government agencies will enable countries to update the Index and track progress toward sustainability targets regularly.

- **Use the Index to guide planning, budgeting, and policy priorities.** By linking the Index results to policy frameworks, governments can prioritize low-performing indicators in their planning and resource allocation. For example, weak scores in efficient and sustainable resource use highlight the need for investment in renewable energy and water efficiency, while gaps in social inclusion call for expanded access to basic services and stronger gender and social protection policies. Embedding the Index in national planning and budgeting cycles will ensure that green growth priorities are mainstreamed into decision-making processes.

In conclusion, the Africa LDC Index should not be viewed as a one-time assessment but as a living tool for evidence-based policymaking. By institutionalizing the Index, building technical capacity, and integrating its results into national planning, African LDCs can strengthen their readiness to achieve sustainable and inclusive development.

Annexes

Annex 1

Ratings on the green growth indicators by dimension and country

Indicator Code	Indicator Name	Burkina Faso	Rwanda	Uganda	Ethiopia	Senegal	Togo	Zambia	Mozambique	Average
EFFICIENT AND SUSTAINABLE RESOURCE USE										
EE1	Energy intensity	Very High	Very High	Very High	High	Very High	Very High	High	High	Very High
EE2	Renewable energy share	Very High	Very High	Very High	Very High	High	High	High	Moderate	High
EE3	Efficient transport	Moderate	Moderate	Moderate	Moderate	High	High	High	Low	Moderate
EE4	Low-carbon electricity	Very High	Very High	Very High	High	Very High	High	High	Low	High
EE5	Per capita electricity consumption	High	Very High	Very High	High	Very High	Very High	High	Low	High
EW1	Water use effi-ciency	Very High	Very High	Moderate	Very High	High	Very High	High	Very High	Very High
EW2	Level of water stress	Very High	High	High	High	High	High	High	High	High
EW3	Capture fisheries	Moderate	Moderate	Moderate	Moderate	Very High	High	Moderate	High	High
EW4	Share of surface irrigation	Very High	Moderate	Moderate	High	Low	High	Moderate	High	High
EW5	Renewable water resources per capita	Very High	High	Moderate	Very High	High	Moderate	Very High	Moderate	High
SL1	Soil nutrient balance	Very High	Moderate	Very High	High	Moderate	Very High	High	Moderate	High
SL2	Organic agriculture area	High	High	Moderate	Low	High	Very High	Moderate	Very High	High
SL3	Share ruminant livestock	Very low	High	High	High	High	High	High	High	High
SL4	Agricultural pro-ductivity	Very High	High	Very High	High	High	Moderate	High	High	High
SL5	Annual forest area change	Very High	Very High	Very High	Very High	High	High	Very High	Very High	Very High
ME1	Domestic material consumption	High	High	Very High	High	Moderate	Moderate	Moderate	Moderate	High
ME2	Material footprint	High	Moderate	Very High	High	Moderate	Very High	Moderate	High	High
ME3	Food loss and food waste	Very High	High	Very High	Very High	High	High	High	Moderate	High
ME4	Municipal solid waste recycled	Moderate	High	High	High	Very High	High	High	High	High
ME5	Sewer, septic and latrine coverage	Very High	Moderate	High	High	Very High	High	Very High	High	High
NATURAL CAPITAL PROTECTION										
EQ1	PM2.5 air pollution	Low	Very High	Very High	High	Very High	High	High	Moderate	High
EQ2	DALY rate from unsafe water	Very High	Very low	Very High	Very High	Very High	High	Moderate	High	High
EQ3	Solid waste generation	High	Very High	Very High	Very High	High	High	High	Moderate	High
EQ4	Urban people with open defecation	Very High	Not relevant	Low	High	High	Moderate	High	High	Moderate
EQ5	Ambient air pollution DALYs	High	Very High	High	Very High	High	High	Low	Low	High
GE1	CO2 emissions per capita	High	Very High	Very High	Very High	High	Very High	High	Moderate	High
GE2	Non-CO2 per capita excl. AFOLU	Moderate	Moderate	Very High	Very High	High	High	Moderate	Moderate	High

Indicator Code	Indicator Name	Burkina Faso	Rwanda	Uganda	Ethiopia	Senegal	Togo	Zambia	Mozambique	Average
GE3	Non-CO2 emissions in AFOLU	Moderate	Moderate	Very High	Very High	High	High	High	Moderate	High
GE4	Carbon intensity of energy production	High	High	Very High	High	High	High	Moderate	Low	High
GE5	CO2 emissions per mfg value-added	Moderate	High	Very High	High	Very High	Very High	Moderate	low	High
BE1	Protected key biodiversity areas	Very High	Very High	Very High	Very High	Very High	High	High	High	Very High
BE2	Share of forest areas	Very High	Very High	Moderate	Very High	Very High	High	High	High	High
BE3	Forest above-ground biomass	Very High	Very High	Very High	Very High	Moderate	High	High	High	High
BE4	Forest under certi-fication scheme	Not relevant	High	Very High	Low	Low	High	Moderate	Moderate	Moderate
BE5	Change in extent of water ecosystems	Very High	High	Very High	Very High	High	Moderate	High	High	High
CV1	Red list index	High	Very High	Moderate	High	High	High	Moderate	High	High
CV2	Terrestrial protected area	High	High	Very High	Very High	High	High	High	Moderate	High
CV3	Tourism contribu-tion to GDP	Low	High	Moderate	High	Low	High	High	Moderate	Moderate
CV4	Share of employment in services	Low	High	Very High	Very High	Moderate	High	High	Low	High
CV5	Share of exports of cultural goods	Low	High	Moderate	Moderate	Moderate	High	Low	Low	Moderate
GREEN GROWTH OPPORTUNITIES										
GV1	Adjusted net savings	Low	Moderate	High	High	High	High	High	Low	Moderate
GV2	Renewable electricity capacity	High	Moderate	Moderate	High	High	High	High	Moderate	High
GV3	Financial flows for clean energy R&D	High	Moderate	Moderate	High	High	High	High	High	High
GV4	Agriculture orientation index	Very High	High	Very High	High	High	High	High	Moderate	High
GV5	Transport productive capacity	High	High	Very High	High	High	High	Low	High	High
GT1	Exports of environmental goods	Low	Moderate	Moderate	Moderate	Moderate	Very High	Moderate	Moderate	Moderate
GT2	Environmental technologies exported	Low	Moderate	Very low	Moderate	Moderate	Very High	Low	Moderate	Moderate
GT3	ISO 14001 certificates issued	High	Very High	Very High	Moderate	Moderate	High	Moderate	Moderate	High
GT4	New business density	High	Very High	Very High	Very High	Very High	High	High	Moderate	High
GT5	High-technology exports	Low	Very High	Moderate	High	High	Moderate	Low	Low	Moderate
GJ1	Green employment in manufacturing	High	High	Moderate	Very High	Very High	Very High	High	High	High
GJ2	Employed beLowpoverty line	Very low	Moderate	Very High	High	High	High	High	Very High	High
GJ3	Vulnerable employment	Very High	Moderate	Very High	Very High	Very High	High	High	Very High	Very High

Indicator Code	Indicator Name	Burkina Faso	Rwanda	Uganda	Ethiopia	Senegal	Togo	Zambia	Mozambique	Average
GJ4	Firms offering formal training	Very low	High	Moderate	Low	Low	Very High	High	Moderate	Moderate
GJ5	ODA flows for scholarships	High	Moderate	Moderate	Not relevant	Not relevant	High	High	Low	Moderate
GN1	Environmental technologies	Low	Moderate	Moderate	High	High	High	High	Low	Moderate
GN2	Scientific and technical journals	High	Moderate	Moderate	High	High	Very High	Low	Moderate	High
GN3	Researchers per million inhabitants	High	Moderate	Low	High	High	High	Moderate	Low	Moderate
GN4	Medium/high-tech mfg value-added	Low	Moderate	High	High	High	High	Moderate	Low	Moderate
GN5	Trademark applications	High	Moderate	High	High	High	High	Low	Moderate	High
SOCIAL INCLUSION										
AB1	Access to safe wa-ter and sanitation	Very High	High	Very High	Very High	Very High	High	High	Very High	Very High
AB2	Access to electricity and clean fuels	Very High	High	Very High	Very High	Very High	Very High	High	Low	High
AB3	Prevalence of children stunting	Very High	Very High	High	High	Not relevant	High	High	Very High	High
AB4	Convenient access to public transport	High	High	High	High	Very High	High	Moderate	High	High
AB5	Property rights	Moderate	High	Very High	Moderate	Moderate	High	High	Moderate	High
GB1	Women in national parliaments	High	Very High	Moderate	Very High	High	Moderate	Moderate	Very High	High
GB2	Gender account in financial institution	High	Moderate	Moderate	High	High	Moderate	Very High	Low	High
GB3	Equal gender pay	Very low	Moderate	Very High	High	High	Moderate	High	Low	Moderate
GB4	Mothers with maternity cash benefits	Very low	Moderate	High	Low	Moderate	Very High	Moderate	Moderate	Moderate
GB5	School enrollment gender parity	Very High	High	Very High	Very High	Very High	High	High	High	Very High
SE1	Inequality in income	High	Moderate	Very High	Very High	High	High	High	Moderate	High
SE2	Rural-urban access to electricity	Very High	High	Very High	High	Very High	High	High	Very High	Very High
SE3	Youth unemployment disparity	Moderate	High	Very High	Very High	Low	Very High	Moderate	Very High	High
SE4	Age dependency ratio	High	Moderate	Very High	Low	Low	Moderate	Moderate	Very High	Moderate
SE5	Cash benefit for people with disabilities	High	Moderate	Very High	High	High	Very High	High	High	High
SP1	Share of old people receiving pension	High	High	High	Moderate	High	Moderate	High	Moderate	High
SP2	Universal health coverage	Low	High	Not relevant	High	Very High	High	Very High	Very High	High
SP3	Population living in slums	High	High	High	High	Very High	High	Very High	Very High	High
SP4	Victims of intentional homicides	High	Low	Low	High	Not relevant	Moderate	High	Very High	Moderate
SP5	Score of Hyogo Framework	Very High	High	Very High	Very High	High	Moderate	High	High	High

Annex 2

Statistical tables of the green growth indicators, pillars, and dimensions

Table A2.1 Green growth dimension sub-indices and Green Growth Index and ranks

Country	Sub-region	Dimension				Green Growth Index		
		Efficient and Sustainable Resource Use	Natural Capital Protection	Green Economic Opportunities	Social Inclusion	Scores	Level	Rank
Uganda	Eastern Africa	79.43	86.66	69.82	56.81	72.29	High	1
Senegal	Western Africa	80.55	70.67	74.81	58.04	70.51	High	2
Zambia	Eastern Africa	81.37	74.36	69.19	57.35	70	High	3
Rwanda	Eastern Africa	77.74	83.37	59.84	59.37	69.27	High	4
Mozambique	Eastern Africa	81.46	79.64	54.72	53.73	66.09	High	5
Ethiopia	Eastern Africa	66.76	73.3	65.48	55.21	64.85	High	6
Togo	Western Africa	72.89	74.32	59.23	48.44	62.79	High	7
Burkina Faso	Western Africa	74.17	61.24	43.81	48.1	55.62	Moderate	8

Table A2.2 Scores on pillars for efficient and sustainable resource use by region and rank

Country	Regional rank	Efficient and Sustainable Resource Use	Indicator categories			
			Efficient and Sustainable Energy	Efficient and Sustainable Water Use	Sustainable Land Use	Material Use Efficiency
Mozambique	1	81.46	79.38	85.33	97.94	66.37
Zambia	2	81.37	81.27	78.08	95.04	72.71
Senegal	3	80.55	68.03	78.15	84.35	93.87
Uganda	4	79.43	65.25	85.34	83.03	86.08
Rwanda	5	77.74	91.69	62.23	81.43	78.61
Burkina Faso	6	74.17	81.53	61.31	85.63	70.7
Togo	7	72.89	58.16	75.69	82.83	77.42
Ethiopia	8	66.76	70.35	40.43	97.34	71.74

Table A.2.3 Scores on pillars for natural capital protection by region and rank

Country	Regional rank	Natural Capital Protection	Indicator categories			
			Environmental Quality	GHG Emissions Reductions	Biodiversity and Ecosystem Protection	Cultural and Social Value
Uganda	1	86.66	91.38	98.38	83.85	74.83
Rwanda	2	83.37	89.07	98.91	68.5	80.07
Mozambique	3	79.64	95.17	94.32	75.71	59.2
Zambia	4	74.36	88.54	85.48	48.76	82.85
Togo	5	74.32	64.69	97.41	56.69	85.4
Ethiopia	6	73.3	81.57	95.21	46.13	80.58
Senegal	7	70.67	81.11	94.75	34.98	92.76
Burkina Faso	8	61.24	67.4	93.32	42.81	52.23

Table A.2.4 Scores on pillars for natural capital protection by region and rank

Country	Regional rank	Green Economic Opportunities	Indicator categories			
			Green Investment	Green Trade	Green Employment	Green Innovation
Senegal	1	74.81	58.21	69.27	88.91	87.34
Uganda	2	69.82	68.24	70.84	83.63	58.77
Zambia	3	69.19	69.26	65.24	73.86	68.68
Ethiopia	4	65.48	54.48	56.36	78.55	76.23
Rwanda	5	59.84	46.52	66.33	67.23	61.82
Togo	6	59.23	37.34	67.55	82.38	0
Mozambique	7	54.72	71.14	52.52	40.11	59.85
Burkina Faso	8	43.81	44.41	29.79	63.56	0

Table A.2.5 Scores on pillars for social inclusion by region and rank

Country	Regional rank	Social Inclusion	Indicator categories			
			Access to Basic Services and Resources	Gender Balance	Social Equity	Social Protection
Rwanda	1	59.37	36.61	75.69	76.91	58.28
Senegal	2	58.04	52.36	41.32	88.75	59.09
Zambia	3	57.35	36.36	60.54	81.78	60.08
Uganda	4	56.81	35.02	69.13	94.76	45.41
Ethiopia	5	55.21	34.68	71.58	79.59	47.02
Mozambique	6	53.73	30.79	62.88	70.45	61.09
Togo	7	48.44	41.39	66.12	76.09	26.44
Burkina Faso	8	48.1	36.92	43.05	60.86	55.35

Table A.2.6 Normalized values of green growth indicators for natural capital protection

index	Mozambique	Zambia	Senegal	Uganda	Rwanda	Burkina Faso	Togo	Ethiopia
Regional rank	1	2	3	4	5	6	7	8
ESRU	81.46	81.37	80.55	79.43	77.74	74.17	72.89	66.76
EE1	31.13	74.84	100	49.65	100	100	66.58	85.74
EE2	91.4	98.67	42.66	100	94.35	84.7	89.37	100
EE3	77.24	85.56	74.82	70.79	100	85.56	85.56	61.09
EE4	97.14	100	22.65	100	64.11	37.37	30.17	100
EE5	100	47.28	100	5.83	100	100	19.1	4.9
EW1	34.89	66.23	26.59	100	62.42	68.07	100	24.19
EW2	100	100	100	100	100	100	100	85.63
EW3	100	30.82	100	88.41	24.46	12.34	22.2	5.8
EW4	91.78	93.34	95.13	99.25	91.98	100	96.23	
EW5	100	100	69	39.05	32.3	26.16	60.01	46.1
ME1	96.72	73.75	97.5	98.88	100	76.43	100	87.39
ME2	41.41	57.34	100	100	85.75	31.22	50.29	88.11
ME3	41.73	90.08	71.86	100	81.44	100	88.97	87.05
ME4	100	58.26	100	88.4	25.86	61.42	86.89	95.18
ME5	52	84.11	100	43.14	100	84.44	60.95	1
SL1	100	88.81	94.47	99.48	99.92	97.27	99.95	94.1
SL2	100	100	100	99.83	99.99	99.81	99.06	99.69
SL3	100	100	99.73	99.38	99.35	99.35	99.98	98.39
SL4	100	91.56	34.73	55.77	7.88	47.14	15.51	100
SL5	89.71	94.83	92.84	60.71	100	84.59	99.66	94.54

Table A.2.7 Normalized values of green growth indicators for natural capital protection

index	Uganda	Rwanda	Mozambique	Zambia	Togo	Ethiopia	Senegal	Burkina Faso
Regional rank	1	2	3	4	5	6	7	8
NCP	86.66	83.37	79.64	74.36	74.32	73.3	70.67	61.24
BE1	69.44	48.28	50.7	56.53	80.7	18.05	23.88	69.07
BE2	67.7	66.39	100	100	100	88.7	100	100
BE3	82.14	100	86.67	38.19	100	100	38.4	41.39
BE4	100	27.82	100	1	1	1	1	1
BE5	100	100	41.18	48.06	1.73	22.92	11.64	2.61
CV1	61.1	82.17	67.5	80.5	79.78	75.95	89.59	97.77
CV2	94.54	54.02	100	100	100	100	91.17	96.66
CV3	68.29	100	87.48	81.5	96.97	58.23	100	26.08
CV4	53.48	64.71	33.19	74.65	100	68.72	100	25.96
CV5	96.72	99.45	7.84	77.57	50.23	100	83.04	14.67
EQ1	65.89	64.59	85.43	78.46	51.03	67.84	32.09	40.94
EQ2	100	100	100	79.25	1	56.2	76.36	8.09
EQ3	93.86	80.75	100	95.26	97.57	100	97.11	98.45
EQ4	99.65	100	90.4	100	73.87	95.58	100	89.5
EQ5	97.51	100	100	89.72	100	88.22	100	100
GE1	100	100	99.72	98.8	99.46	100	97.88	99.78
GE2	95.72	100	98.5	95.29	97.08	97.37	92.34	100
GE3	96.98	100	73.37	34.09	100	85.6	96.63	81.72
GE4	99.21	95.37	100	100	90.52	98.71	88.6	91.78
GE5	100	99.17	100	99.21	100	94.38	98.28	0

Table A.2.8 Normalized values of green growth indicators for green economic opportunities

index	Senegal	Uganda	Zambia	Ethiopia	Rwanda	Togo	Mozambique	Burkina Faso
Regional rank	1	2	3	4	5	6	7	8
GEO	74.81	69.82	69.19	65.48	59.84	59.23	54.72	43.81
GJ1	99.47	100	100	100	6.02	0	0	0
GJ2	100	75.87	41.57	100	66.85	100	33.27	87.38
GJ3	100	73.42	96.34	34.35	100	90.52	42.66	41.38
GJ4	46.86	100	100	58.41	98.88	100	58.07	72
GJ5	98.23	68.87	31.42	100	64.43	38.99	26.43	53.49
GN1	49.37	15.56	100	28.74	100	76.55	88.23	67.59
GN2	100	95.44	70.59	100	79.8	63.3	28.57	72.98
GN3	100	12.79	21.63	52.4	31.96	22.88	22.59	24.4
GN4	100	70.08	66.67	100	47.81	0	0	0
GN5	0	100	84.51	100	49.55	0	100	0
GT1	38.92	40.34	81.33	59.23	21.17	100	11.36	21.75
GT2	57.96	72.7	75.35	24.51	83.21	100	34.08	18.14
GT3	77.78	100	49.49	77.78	27.27	45.45	100	25.24
GT4	98.77	66.69	90.21	20.27	100	81.86	17.17	23.64
GT5	72.92	74.47	29.81	100	100	10.42	100	60.21
GV1	53.8	99.41	15.23	1.93	18.35	3.34	73.38	6.07
GV2	42.96	43.13	100	66.35	18.75	23.79	100	7.93
GV3	40.35	72.11	39.28	100	57.39	27.64	100	84
GV4	83.88	100	91.79	80.11	100	56.75	71.07	100
GV5	70.07	26.58	100	24.02	38.09	75.19	11.23	24.02

Table A.2.9 Normalized values of green growth indicators for social inclusion

index	Uganda	Rwanda	Mozambique	Zambia	Togo	Ethiopia	Senegal	Burkina Faso
Regional rank	1	2	3	4	5	6	7	8
SI	59.37	58.04	57.35	56.81	55.21	53.73	48.44	48.1
AB1	55.87	27.15	37.49	30.08	20.77	20.27	18.63	7.91
AB2	28.22	49.23	27.15	20.76	30.91	17.23	33.41	16.92
AB3	41.27	68.24	38.61	54.93	34.71	34.88	57.77	59.9
AB4	27.69	35.22	13.06	15.33	24.01	30.56	21.16	25.38
AB5	29.99	81.97	65.48	53.98	62.98	50.98	75.98	74.48
GB1	100	85.85	34.2	69.47	77.74	86.54	37.99	25.17
GB2	90	90.04	93.05	98.83	82.84	75.96	89.73	84.14
GB3	100	25.75	100	100	25.75	50.5	100	25.75
GB4	2.29	3.97	4.46	8.23	0	1.4	2.88	5.65
GB5	86.17	1	70.99	69.14	100	100	100	74.56
SE1	89.49	100	65.9	91.54	100	71.07	100	100
SE2	82.78	86.52	47.2	88.94	86.95	1	68.54	1
SE3	100	100	95.83	98.56	97.76	81.04	94.23	99.85
SE4	98.3	97.77	100	100	98.18	99.16	98.25	99.21
SE5	14	59.49	100	0	15.08	100	19.41	4.25
SP1	4.07	26.05	26.54	19.12	4.86	42.88	16.74	7.63
SP2	30.79	32.15	40.27	30.79	11.83	24.02	24.02	18.61
SP3	64.13	65.56	52.93	47.93	34.78	45.36	64.01	56.99
SP4	93.18	99.49	90.03	83.8	83.61	93.21	0	97.63
SP5	99.21	72.19	90.63	0	100	100	1	95.92

Annex 3

Data gaps in the green growth indicators

Table A3.1 Data gaps in indicators by dimension and across all indicators

Country	Regional rank	Missing Indicators in each Dimension				Missing across all Indicators	
		Efficient and Sustainable Resource Use	Natural Capital Protection	Green Economic Opportunities	Social Inclusion	Number	Percent
Uganda	1	0	0	0	2	2	2.50%
Senegal	2	0	0	1	0	1	1.25%
Zambia	3	0	0	0	0	0	0.00%
Rwanda	4	0	0	0	0	0	0.00%
Mozambique	5	0	0	2	0	2	2.50%
Ethiopia	6	1	0	0	1	2	2.50%
Togo	7	0	0	3	1	4	5.00%
Burkina Faso	8	0	1	3	0	4	5.00%

Annex 4
Robustness check

Two methods were applied to check the robustness of the LDC Green Growth Index: Sensitivity analysis and regression analyses. The results from the robustness checks, including sensitivity and regression analyses, confirm the reliability and explanatory power of the LDC Green Growth Index.

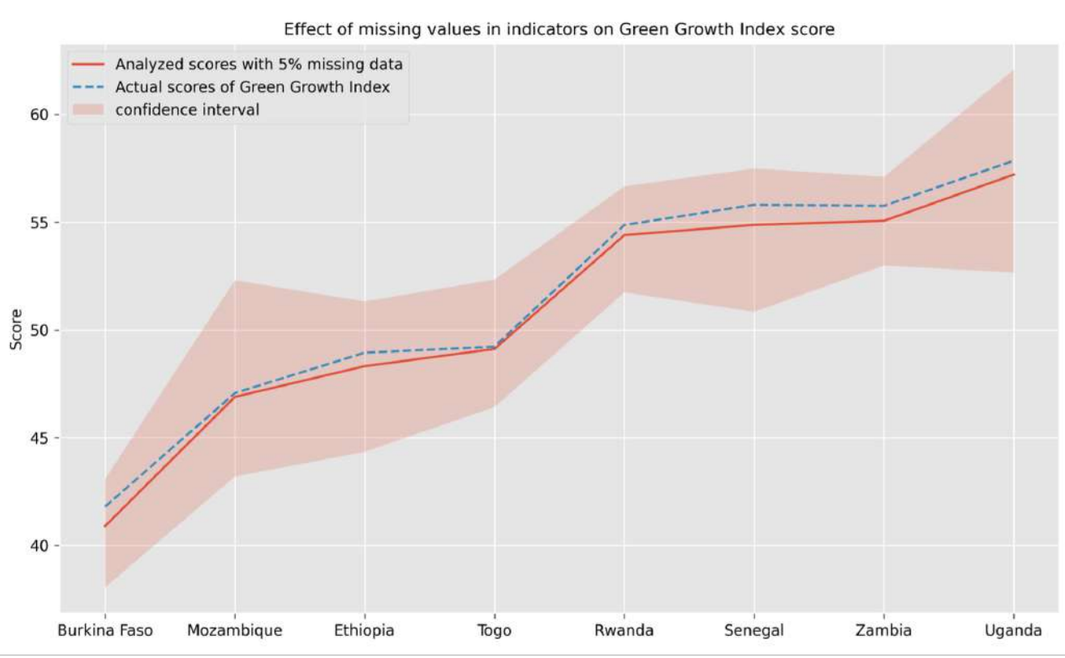
a. Sensitivity analysis

Monte Carlo simulations, a widely used technique for sensitivity analysis, involve running repeated random experiments to assess how changes in input variables affect model outcomes. In this analysis, we simulate perturbations to the LDC Green Growth Index to estimate its sensitivity to the changes in the values and missing values of the indicators. The analysis involved 1,000 iterations of Monte Carlo simulations for each scenario, ensuring statistically robust results. Two types of perturbations were introduced: change in values and missing values, along with a combined scenario where both were applied simultaneously.

1. Missing values of indicators

The first scenario investigates how the index scores respond to missing data in the indicators. 5% of the data points were randomly removed from the dataset to simulate missing data. The next step used the modified dataset to compute the Green Growth Index. This process was repeated 1000 times to assess the variability in the Index scores due to missing data.

Figure A.1. Effect of missing values of indicators on the Green Growth Index score

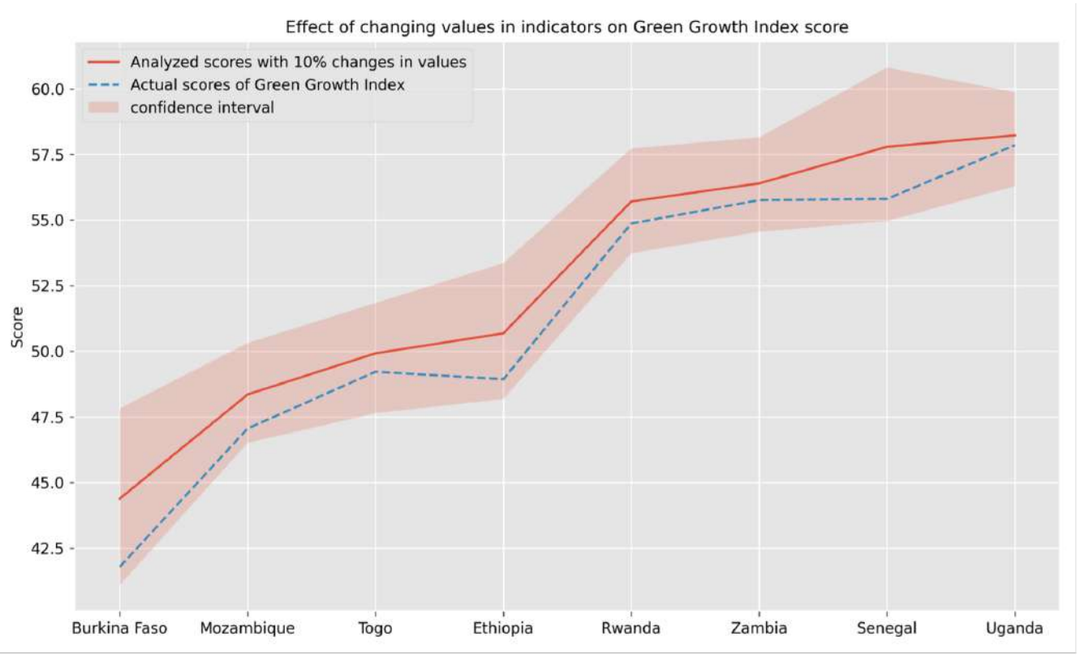


The results are presented in Figure A.5, where the average score with 5% missing data and the 95% confidence intervals are shown for 1000 iterations. The average score with 5% missing data, shown in red, deviates only slightly from the actual score, represented by the blue dashed line. The findings indicate moderate effects on the scores across countries, with score changes ranging from a minimum decrease of 0.04 points (Uganda) to a maximum decrease of 0.47 points (Burkina Faso). These results suggest that the Green Growth Index is relatively robust to missing data, with only minor variations in the scores across countries.

2. Changes in values of indicators

The second scenario explores how the index scores respond to the addition of 10% Gaussian noise to the indicator values. In this experiment, random noise was sampled from a Gaussian distribution with a mean of zero and a standard deviation equal to 10% of the original indicator value. The modified dataset, with noise added, was used to compute the Green Growth Index. This process was repeated 1000 times to assess the variability in the Index scores due to the added noise.

Figure A.2. Effect of changing values of indicators on the Green Growth Index score

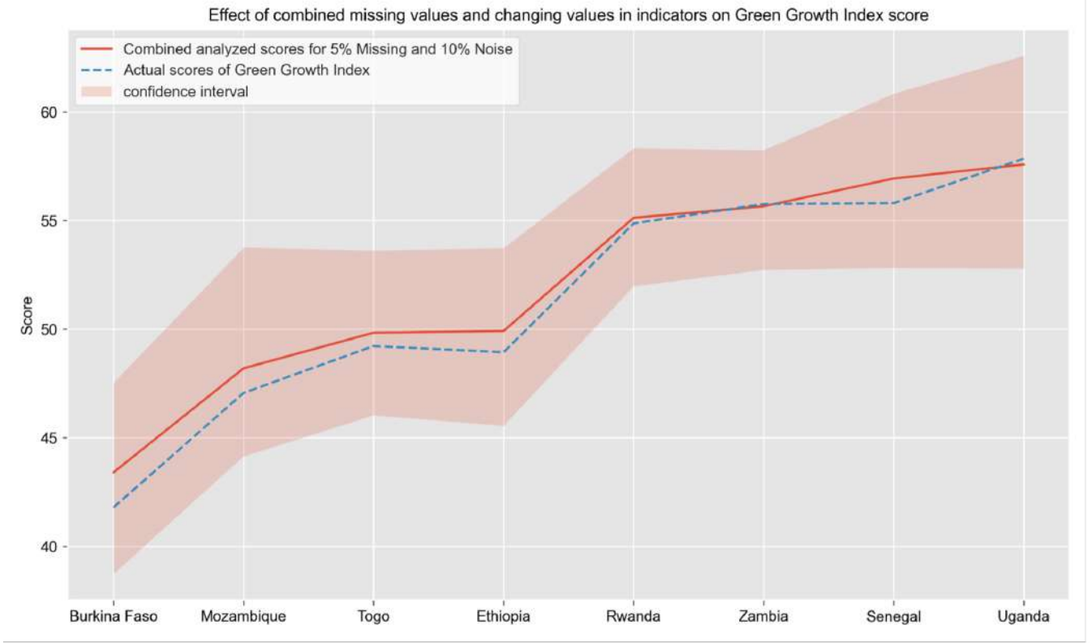


The results are presented in Figure A.2, where the average score with 10% Gaussian noise and the 95% confidence intervals are shown for 1000 iterations. The average score with noise, shown in red, deviates slightly from the actual score, represented by the blue dashed line. The findings show that the Green Growth Index is relatively robust to the addition of noise, with score changes ranging from a minimum decrease of 0.16 points (Mozambique) to a maximum increase of 2.6 points (Burkina Faso). These results suggest that while the Green Growth Index is sensitive to changes in indicator values due to noise, the overall impact on the scores is minimal, indicating the Index's robustness to such perturbations.

3. Combined effect of missing and change in values

The third scenario examines the combined effect of both missing data and the addition of 10% Gaussian noise on the index scores. In this case, 5% of the data points were randomly removed from the dataset to simulate missing values, and 10% Gaussian noise was then added to the remaining values. The modified dataset was used to compute the Green Growth Index, and the process was repeated 1000 times to assess the variability in the index scores due to both missing data and noise.

Figure A.3. Effect of combined missing data (5%) and change in values (10%) on the Green Growth Index score.



The results are presented in Figure A.3, where the average score with 5% missing data and 10% noise and the 95% confidence intervals are shown for 1000 iterations. The average score with combined missing data and noise, shown in red, deviates slightly from the actual score, represented by the blue dashed line. The findings indicate that the Green Growth Index is still robust to the combined perturbations, with score changes ranging from a minimum decrease of 0.04 points (Uganda) to a maximum increase of 2.17 points (Burkina Faso). These results suggest that while the Green Growth Index shows some sensitivity to the combined effects of missing data and noise, the overall impact on the scores remains limited, indicating the Index's robustness to such combined perturbations.

b. Regression analysis

A regression analysis was conducted to evaluate the explanatory power of green growth indicators, represented by aggregated scores at the pillar level within their respective dimensions. The aim was to determine how well the green growth indicators explain the Green Growth Index scores. Panel data analysis was carried out using cross-sectional and longitudinal data from 2010 to 2023 from 8 African LDC countries including Burkina Faso, Ethiopia, Mozambique, Rwanda, Senegal, Togo, Uganda, and Zambia. The regression model was conducted on efficient and sustainable resource use, green economic opportunities, natural capital protection, and social inclusion green growth dimensions.

The results, shown in Table 3, indicate that the P-values for all indicators were below 0.05, meaning that the relationships between green growth pillars (independent variables) and the green growth dimensions (dependent variables) were statistically significant. The R-squared values, which show how much of the variation in the Green Growth Index can be explained by these independent variables, range from 96.4 to 99.8 percent. This means that the indicators explain almost all of the variation in the Green Growth Index, confirming that the index is robust.

Table A2-1 Results of the regression analysis of pillar and dimension scores

Table A.4.1 Results of the regression analysis of pillar and dimension score

Codes	Pillar Names	Coefficient	Standard Error	P-Value
MODEL 1 EFFICIENT AND SUSTAINABLE RESOURCE USE: R2 = 0.998, ADJ. R2 = 0.998				
EE	Efficient and Sustainable Energy	0.2963	0.002	0.000
EW	Efficient and Sustainable Water Use	0.2540	0.003	0.000
SL	Sustainable Land Use	0.2023	0.005	0.000
ME	Material Use Efficiency	0.2789	0.003	0.000
MODEL 2 NATURAL CAPITAL PROTECTION: R2 = 0.990, ADJ. R2 = 0.990				
EQ	Environmental Quality	0.2156	0.037	0.000
GE	Greenhouse Gas Emissions Reduction	0.1963	0.007	0.000
BE	Biodiversity and Ecosystem Protection	0.3616	0.027	0.000
CV	Cultural and Social Value	0.2831	0.005	0.000
MODEL 3 GREEN ECONOMIC OPPORTUNITIES: R2 = 0.964, ADJ. R2 = 0.963				
GV	Green Investment	0.2788	0.018	0.000
GT	Green Trade	0.2115	0.016	0.000
GJ	Green Employment	0.3258	0.016	0.000
GN	Green Innovation	0.0855	0.008	0.000
MODEL 4 SOCIAL INCLUSION: R2 = 0.988, ADJ. R2 = 0.987				
AB	Access to Basic Services and Resources	0.2979	0.011	0.000
GB	Gender Balance	0.2375	0.006	0.000
SE	Social Equity	0.1822	0.006	0.000
SP	Social Protection	0.2938	0.005	0.000

Annex 5

List of GGGI projects addressing low-scoring green growth indicators

Burkina Faso:

(1) BF19 Building resilience in the Kaya-Dori axis in Burkina Faso - https://gggi.org/project/bf19-building-resilience-in-the-kaya-dori-axis-in-burkina-faso/

(2) BF15: Promoting Solar Irrigation Pumping Systems and Mini-grids in Burkina Faso - https://gggi.org/project/bf15-promoting-solar-irrigation-pumping-systems-and-mini-grids-in-burkina-faso/

(3) ROC02: Solar Grandmothers in Burkina Faso - https://gggi.org/?report=end-project-evaluation-of-the-solar-grandmothers-in-burkina-faso-project-roc02

Ethiopia:

(1) Conservation and Sustainable Management of Forested Landscape (CSMFL) Project - https://gggi.org/project/conservation-and-sustainable-management-of-forested-landscapes-csmfl-in-southwestern-ethiopia/

(2) Ethiopia's Climate Resilient Forest and Landscape Restoration (CRFLR) Project - https://gggi.org/project/climate-resilient-forest-an-landscape-restoration-crflr-program/

(3) Agroforestry for People, Peace and Prosperity Project - https://gggi.org/project/agroforestry-for-people-peace-and-prosperity-project-in-ethiopia/

Rwanda:

(1) Solar pumping for Irrigation

https://environment.prod.risa.rw/fileadmin/user_upload/Moe/Rwanda_Updated_NDC_May__2020_.pdf

(2) Promotion of on-farm biogas for energy - https://environment.prod.risa.rw/fileadmin/user_upload/Moe/Rwanda_Updated_NDC_May__2020_.pdf

(3) Land Husbandry, Water Harvesting, and Hillside Irrigation (LWH) - https://www.gafspfund.org/projects/land-husbandry-water-harvesting-and-hillside-irrigation-project-lwh

(4) Rehabilitation of Wetlands under the Rwanda Urban Development Project (RUDP) -https://www.rema.gov.rw/our-work/projects/rudp-ii

Senegal:

(1) Scaling-Up Resilience in Africa's Great Green Wall (SURAGGWA) | Green Climate Fund - https://www.greenclimate.fund/document/scaling-resilience-africa-s-great-green-wall-suraggwa

(2) FP183: Inclusive Green Financing Initiative (IGREENFIN I) - https://www.greenclimate.fund/project/fp183

(3) Sustainable Forest Management in the Priority Vulnerable Forest Ecosystems of Senegal to enhance Ecosystem Services for Climate Resilience in Senegal, GCF - https://www.greenclimate.fund/document/sustainable-forest-management-priority-vulnerable-forest-ecosystems-senegal-enhance

(4) Solar-Powered Irrigation for Climate-Smart Agriculture in the Senegal River Valley (SN14) - https://gggi.org/project/sn14-solar-powered-irrigation-for-climate-smart-agriculture-in-the-senegal-river-valley/

(5) Project for the Improvement of Education Sector Results (SUBA) - https://documents1.worldbank.org/curated/en/723991626177988593/pdf/Concept-Project-Information-Document-PID-Project-for-the-Improvement-of-Education-Sector-Results-SUBA-P169916.pdf

(6) Improving Gender equality and Rural livelihoods in Senegal through Sustainable and Participatory energy management: Senegal's PRoGeDe II Project - https://documents.worldbank.org/en/publication/documents-reports/documentdetail/850931467998193048/improving-gender-equality-and-rural-livelihoods-in-senegal-through-sustainable-and-participatory-energy-management-senegals-progede-ii-project

Togo:

(1) Enhancing Togo's Direct Access to GCF and Support for the Development of Climate Finance Strategy, GCF Readiness - https://gggi.org/project/strengthening-resilience-to-climate-change-of-vulnerable-population-through-sustainable-forestry-resources-management-togo/

(2) Strengthening Togo's Institutional Capacity for a Low-carbon Transport System (STILTS), GCF Readiness - https://gggi.org/project/strengthening-togos-institutional-capacity-for-a-low-carbon-transport-system-stilts/

(3) Developing Socio-Economic Infrastructure to Sustain Rural Communities in Togo, MAFRA - https://gggi.org/project/developing-socio-economic-infrastructure-to-sustain-rural-communities-in-togo/

(4) Strengthening Resilience to Climate Change of Vulnerable Population through sustainable Forestry Resources Management, KFS - https://gggi.org/project/tg01-enhancing-togos-direct-access-to-gcf-and-support-for-the-development-of-climate-finance-strategy/

Uganda:

(1) Setting up of a national clean cooking unit at the Ministry of Energy - https://gggi.org/launch-of-clean-cooking-programme-transforming-ugandas-energy-sector/

(2) Greening Uganda's Urbanization and Industrialization - https://gggi.org/wp-content/uploads/2021/01/Brochure-Greening-Ugandas-Urbanization-and-Industrialization.pdf

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[127] Senegal's strong performance in green economic opportunities is supported by sector-specific initiatives that foster both innovation and employment. The National Strategy for the Promotion of Green Jobs (SNEV, Stratégie Nationale pour l'Emploi Vert) and its implementation through the Support Programme for the Creation of Green Job Opportunities (PACEV, Programme d'Appui à la Création d'Emplois Verts), backed by the United Nations Development Programme (UNDP) and the Partnership for Action on Green Economy (PAGE), have already generated thousands of jobs in sectors such as recycling, aquaculture, forestry, and solar energy. In addition, International Labour Organization (ILO) initiatives to advance green employment have promoted greater participation of youth and women in green value chains, further reinforcing Senegal's progress in green innovation and job creation. [International Labour Organization. (n.d.). Senegal: Towards a green jobs strategy. ILO. https://www.ilo.org/projects-and-partnerships/projects/senegal-towards-green-jobs-strategy; United Nations Partnership for Action on Green Economy (UN-PAGE). (n.d.). Senegal. UN-PAGE. https://www.un-page.org/countries/senegal; World Future Council. (2019). Senegal's National Strategy for the Promotion of Green Jobs (SNEV Strategy). Future Policy. https://www.futurepolicy.org/global/senegals-national-strategy-for-the-promotion-of-green-jobs-snev-strategy/; Switch to Green. (2021). Circular economy in Senegal. SWITCH to Green Facility. https://www.switchtogreen.eu/wp-content/uploads/2021/09/CE_process-Senegal.pdf]

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