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Measuring performance
in achieving SDG targets

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Preface

The Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (AR6) published in March 2023 reminded policymakers and societies once more of the earth and its inhabitants' grim future should climate change mitigation and adaptation fail. We are already living in a world filled with climate-induced crises – floods and landslides, hurricanes and tornadoes, droughts and fires, causing an array of vast property and human losses and damages. The World Meteorological Organization's (WMO) provisional State of the Global Climate report published in November 2023 warned policymakers and societies that this year is set to be the warmest year on record, with greenhouse gas levels, global temperatures, and sea levels rising at record highs while Antarctic sea ice is at record low. Responding to this report, the United Nations Secretary-General António Guterres said, "[w]e are living through climate collapse in real time — and the impact is devastating." He thus "urged leaders to commit to urgent action" at the 28th Conference of the Parties (COP28) of the United Nations Framework Convention on Climate Change (UNFCCC), held on 30 November-12 December in Dubai, United Arab Emirates.

What happened at COP28, was it a success? There was at least one early and quite tangible success: Last year's decision to establish a Loss and Damage Fund was operationalized, with the World Bank initially hosting it. Countries committed to putting some $700 million into the fund, a small sum compared to the losses and damages developing countries already experience, but it is a start and was highly appreciated. The big deal at COP28 was a fight over the language expressing that the world needs to get over the use of fossil fuels – as it obviously must, according to all science. The COP28 agreement on December 13, while not turning the page on the fossil fuel era, marked the beginning of its end. GGGI is committed to contributing to the transition away from fossil fuels and the implementation of loss and damage support. It will continue to promote an accelerated green transformation and combine its green growth development work with humanitarian support to address these issues. GGGI has developed a suite of measurement tools for understanding the impacts of climate mitigation and adaptation and transitioning to green growth. The Green Growth Index is one of these tools, measuring performance in achieving sustainability targets for the Sustainable Development Goals (SDGs), the Paris Climate Agreement, and the Aichi Biodiversity Targets.

This year, GGGI is publishing the fifth global edition of the Green Growth Index report, covering scores and ranks for 157 countries. The country coverage increased from 147 countries compared with the previous edition. Moreover, since the first publication of the Global Green Growth Index in 2019, an equal number of green growth indicators for the four dimensions of green growth – efficient and sustainable resource use, natural capital protection, green economic opportunities, and social inclusion, have been achieved this year. Eight new green growth indicators were added to the green economic opportunities dimension, significantly improving the Index's ability to measure country performance across all green growth dimensions. Forty-one (41) members of the international expert group, representing 32 institutions, continue to support the annual review of the Global Green Growth Index, and many of them participated in the review of the changes in the green economic opportunities for this year's Index. I am grateful to the new experts participating in the review process from the Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ) – Mr. Yan Chen, Mrs. Clara Weskamm, and Maja Rotter.

The Africa Regional Office deserves utmost gratitude for supporting the National Green Growth Index development for Kenya and Ghana, featured in this report. Both African countries joined GGGI as Partners in 2023. The active partnership of Dr. Malle Fofana, Director and Head of Programs, and Mrs. Nagnouma Kone, Senior Regional Business Development Officer, with the government partners in Kenya and Ghana contributed to the successful completion of the Index through the dedicated participation of national experts in the design process. They managed to mobilize 54 experts from 24 institutions through close collaboration with the National Treasury and Economic Planning (TNT&EP) in Kenya and 39 experts from 30 institutions through close collaboration with Ghana's Ministry of Environment, Science, Technology & Innovation (MESTI). I thank the TNT&EP for actively disseminating the Kenya Green Growth Index. During COP28, in a panel discussion on the "NDC delivery lab: an innovative approach towards unlocking finance for climate action in the most gender and climate vulnerable hotspots of Kenya" in Kenya Pavilion, Mr. Peter Odhengo, Head of the TNT&EP's Climate Finance & Green Economy Unit, lauded GGGI's initiative in supporting the country to develop its first National Green Growth Index. The Green Growth Index design process facilitated the sharing of knowledge and expertise among the national experts and simultaneously building their capacity to develop and use their own national Green Growth Index for policy and planning.

GGGI continues partnering with other international organizations to apply and disseminate the Green Growth Index. The Asian Development Bank (ADB) partnered with the GGGI to develop the regional Green Growth Index for the Central Asian Countries and Azerbaijan (CA+1). The ADB and GGGI co-organized the session on "Green Growth Index - A Policy Tool to Mainstream Green Growth Indicators in Planning Process and Capacity-Building" to disseminate the results of the CA+1 Green Growth Index during the Global Green Growth Week in October 2023. I thank Dr. Lei Lei Song, Director of the Economic Analysis and Operational Support Division in the ADB, for emphasizing the value of the Green Growth Index in tracking the performances of the CA+1 in their green growth transition during the session. The CA countries and Azerbaijan actively pursue green growth policies and request GGGI's support. Uzbekistan, Kyrgyzstan, Turkmenistan, and Kazakhstan recently joined GGGI, Tajikistan will submit the accession document early next year, and Azerbaijan expressed interest in joining GGGI. The CA+1 countries will benefit from the knowledge gained on their green growth performance using the regional Green Growth Index.

Next year, GGGI plans to further apply the National Green Growth Index in its Member Countries and Partners to measure and track their green growth performance. Moreover, the Green Growth Simulation will be used to assess SDG co-benefits of adaptation measures in the National Adaptation Plan. GGGI's Green Growth Performance Measurement (GGPM) Global Program, under the leadership of Dr. Lilibeth Acosta, is responsible for developing and applying the Green Growth Index and Simulation Tool.

Dr. Frank Rijsberman
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Acknowledgement

The Green Growth Performance Measurement (GGPM) team expresses its deepest gratitude to the GGGI country teams and their government partners who have facilitated the application and dissemination of the Green Growth Index and its Simulation Tool in various projects in 2023. For the projects in Kenya and Ghana, several colleagues and experts provided very valuable support: (1) GGGI Africa Regional Office Team in Côte d'Ivoire, including Dr. Malle Fofana, Director and Head of Programs; Ms. Nagnouma Kone, Senior Regional Business Development Officer; Ms. Flaviour Sisala Chanda, Program Officer; Mr. Yassia Savadogo, Admin and Finance, Senior Operations Associate; Mr. Amon Jean-Marc Anoh and Yeonju Song, Interns; (2) The national consultants, including Mr. Philip Omondi in Kenya and Richard Amfo-Out in Ghana; (3) The National Treasury and Economic Planning (TNT&EP) in Kenya, including Peter Odhengo, Head of the Climate Finance & Green Economy Unit as well as Mr. Hillary Korir, Senior Economist, and Mrs. Saada Mohamed, Economist, Climate Finance & Green Economy Unit; (4) Mr. Oliver Boachie, Special Advisor, Minister of Environment, Science, Technology & Innovation (MESTI) in Ghana; and (5) Dr. Felix Addo-Yobo, Director, SDG Advisory Office, Office of the President in Ghana. For the project in Lao PDR, the colleagues in the Country Office deserve our deepest gratitude for their continued support to developing the National Green Growth Index, including Mr. Rowan Fraser, Country Representative; Mr. Bounma Thor, Program Officer; and Ms. Antyka Xayaphone, consultant. Moreover, the GGPM and Lao PDR Country teams would like to thank Mrs. Sisavanh Didaravong from the Ministry of Planning and Investment for her commitment to mobilizing national experts and coordinating the design process of the Lao PDR Green Growth Index with the other ministries and line agencies.

The GGGI Africa Regional Office and GGPM team are very thankful for the dedication of the national experts to contributing to the development of the Kenya and Ghana Green Growth Index. In Kenya, 54 experts from 24 institutions shared their knowledge and expertise, including Ministry of Agriculture and Livestock Development (MoALD); Ministry of Agriculture and Livestock Development, Climate Change Unit (MOALDCCU); Ministry of Energy and Petroleum (MoEP); Ministry of Foreign & Diaspora Affairs (MFDA); Ministry of Mining, Blue Economy and Maritime Affairs (MoMBEMA); State Department for Blue Economy and Fisheries (SDBE&F); Ministry of Water, Sanitation and Irrigation (MoWSI); State Department for Economic Planning (SDEP); State Department for ICT & Digital Economy (SDIDE); State Department for Transport (SDT); State Department of Housing and Urban Development (SDHUD); The Kenya Institute for Public Policy Research and Analysis (KIPPRA); National Environment Management Authority (NEMA); Centre for Training and Integrated Research in ASAL Development (CETRAD); Kenya Agricultural and Livestock Research Organization (KALRO); Kenya Electricity Generating Company PLC (KenGen); Kenya Forest Service (KFS); Kenya Industrial Research and Development Institute (KIRDI); Kenya Association of Manufacturers (KAM); Kenya Private Sector Alliance (KEPSA); Sustainable Energy for All (SE4ALL); and University of Nairobi (UoN).

In Ghana, 39 experts from 30 institutions enthusiastically contributed to the development of the Global Green Growth Index, including Ministry of Environment, Science, Technology & Innovation (MESTI); SDG Advisory Unit, Office of the President (SDGAU-OP); National Development Planning Commission (NDPC); Ministry of Sanitation and Water Resources (MSWR-GASSLIP); Ministry of Sanitation and Water Resources (MSWR); Ghana National Cleaner Production Centre (GNCPC-EPA); Ministry Of Works and Housing (MWH); Ghana Standards Authority (GSA); Ministry Of Tourism, Arts and Culture (MTAC); Council For Scientific and Industrial Research- Science and Technology Policy Research Institute (CSIR-STEPRI); Community Water & Sanitation Agency (CWSA); Ministry of Roads and Highways, Accra (MRH); Ministry of Local Government, Decentralization and Rural Development (MLGDRD); Ghana Statistical Service (GSS); Centre For Environmental Impact Analysis (CEIA)

Ghana Climate Innovation Centre (GCIC); Lion Clubs International (LCI); Friedrich-Ebert-Stiftung, Ghana office (FES); Environmental Services Providers Association (ESPA); World Energy Council's Future Energy Leaders (WECFEL); A Rocha Ghana Federation of Plastics Manufacturers Recyclers Association, Ghana (FPMRA); Kwame Nkrumah University of Science and Technology (KNUST); University of Energy and Natural Resources (UENR); University of Environment and Sustainable Development (UESD); Africa Environmental Sanitation Consult (AESC); Stark Energy Ltd (SEL); Medical Waste Services Limited (MWSL-Jospong Group); Ghana Real Estate Developers Association (GREDA); and Zoomlion Ghana Limited (ZGL).

This year, the "Green Growth Index - A Policy Tool to Mainstream Green Growth Indicators in Planning Process and Capacity-Building" session during the Global Green Growth Index 2023 was co-organized by GGGI and the Asian Development Bank (ADB). GGGI would like to thank Dr. Aimee Hampel-Milagrosa, Urban Development Specialist, Water Supply and Urban Development Sector Group in the ADB, for the collaboration on this event to present the outcome of the ADB-GGGI joint project on Azerbaijan and Central Asian countries' inclusive and green growth transition. Dr. Lei Lei Song, Director of the Economic Analysis and Operational Support Division, and Ms. Candice Mcdeigan, Country Director of the ADB Azerbaijan Resident Mission in Azerbaijan, participated in the session and reviewed the project's technical report. They also deserve GGGI's sincerest appreciation for their support.

GGGI expresses its deepest gratitude to the members of the international expert group formed in 2019 to support the design of the Global Green Growth Index for their continuous support in the annual review of the Index. The GGPM Team is pleased to welcome new experts from the Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ) – Mr. Yan Chen, Mrs. Clara Weskamm, and Maja Rotter; the World Bank – Mrs. Sisay Nune Hailemariam and Mr. Richard Damania; Economic Commission for Latin America and the Caribbean (UNECLAC) – Mrs. Georgina Alcantara Lopez; for participating in this year's review of the new green growth indicators for the green economic opportunities dimension. Several colleagues from GGGI kindly supported the international expert consultation on these green growth indicators, deserving of most profound gratitude, including Mr. Kyung Nam, Jieun Lee, Basil Oberholzer, Diana Kupper, Dereje Senshaw, Shivenes Shammugam, and Siddhartha Nauduri.

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Acronyms and Abbreviations

AB	Access to Basic Services and Resources
ADB	Asian Development Bank
AfDB	African Development Bank
AfES	Africa Environmental Sanitation Consult
AFOLU	Agriculture, Forestry, and Other Land Use
APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
BAU	Business as usual
BE	Biodiversity and Ecosystem Protection
BLI	Bird Life International
BOS	Bureau Opérationnel de Suivi du Plan Sénégal Émergent
BP	British Petroleum Company plc
C2E2	Copenhagen Centre on Energy Efficiency
CAID	Climate Action and Inclusive Development
CAIT	Climate Analysis Indicators Tool
CEIA	Centre For Environmental Impact Analysis
CETRAD	Centre for Training and Integrated Research in ASAL Development
CH_4	Methane
CO_2	Carbon Dioxide
CO_2eq	Carbon Dioxide equivalent
COMESA	Common Market for Eastern and Southern Africa
COVID-19	Coronavirus disease
COP 28	The 28th Conference of the Parties to the UN Framework Convention on Climate Change
CPF	Country Planning Framework
CSIR-STEPRI	Council For Scientific and Industrial Research- Science and Technology Policy Research Institute
CV	Cultural and Social Value
CW	Climate Watch
CWSA	Community Water & Sanitation Agency
DALY	Disability-Adjusted Life Year
DMC	Domestic Material Consumption
DRI	Development Research Institute
EA	Early Action
EE	Efficient and Sustainable Energy
EEA	European Environment Agency
EIA	U.S. Energy Information
EMBER	Ember Climate Organization
EQ	Environmental Quality
ESPA	Environmental Services Providers Association
ESRU	Efficient and Sustainable Resource Use
EU	European Union
EW	Efficient and Sustainable Water Use
F-gas	Fluorinated gases
FAO	Food and Agriculture Organization of the United Nations
FAOSTAT	Food and Agriculture Organization Corporate Statistical Database
FES	Friedrich-Ebert-Stiftung
FLLoCA	Financing locally-led climate action program
FOLU	Forestry, and Other Land Use
FSC	Forest Certification Organizations
GB	Gender Balance
GCB	Global Carbon Budget
GCIC	Ghana Climate Innovation Centre
GCP	Global Carbon Project
GDHx	Global Health Data Exchange
GDP	Gross Domestic Product
GE	GHG Emissions Reduction
GESIP	Green Economy Strategy and Implementation Plan
GEO	Green Economic Opportunities
GEP	Green Economy Progress
GG	Green Growth
GGI	Green Growth Index
GGGI	Global Green Growth Institute
GGKP	Green Growth Knowledge Partnership
GGPM	Green Growth Performance Measurement
GGSim	Green Growth Simulation Tool
GHG	Greenhouse Gas
GJ	Green Employment
GN	Green Innovation
GNCPC	Ghana National Cleaner Production Centre
GNI	Gross National Income
GPI	Gender Parity Index
GREDA	Ghana Real Estate Developers Association
GSS	Ghana Statistical Service
GT	Green Trade
GV	Green Investment
GW	Gigawatt
HF	Heritage Foundation
IEA	International Energy Agency
IHME	Institute for Health Metrics and Evaluation
ILO	International Labour Organization
IMF	International Monetary Fund
IISD	International Institute for Sustainable Development
IPBES	Intergovernmental Platform on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
IPU	Inter-Parliamentary Union
IRENA	International Renewable Energy Agency
ISO	International Organization for Standardization
ITUC	International Trade Union Confederation
IUCN	International Union for Conservation of Nature
KALRO	Kenya Agricultural and Livestock Research Organization
KAM	Kenya Association of Manufacturers
KBA	Key Biodiversity Areas
KIPPRA	The Kenya Institute for Public Policy Research and Analysis
KenGen	Kenya Electricity Generating Company PLC
KEPSA	Kenya Private Sector Alliance

KFS	Kenya Forest Service
KIRDI	Kenya Industrial Research and Development Institute
KNUST	Kwame Nkrumah University of Science and Technology
KNBS	Kenya National Bureau of Statistics
LCI	Lion Clubs International
LEDS	Low Emission Development Strategies
LPI	Logistics Performance Index
ME	Material Use Efficiency
MERCOSU	Mercado Común del Sur
MESTI	Ministry of Environment, Science, Technology, and Innovation
MF	Material Footprint
MJ	Megajoule
MLGRD	Ministry of Local Government, Decentralization and Rural Development
MoALD	Ministry of Agriculture and Livestock Development
MOALDCCU	Ministry of Agriculture and Livestock Development, Climate Change Unit
MoEP	Ministry of Energy and Petroleum
MoFA	Ministry of Foreign & Diaspora Affairs
MoGEE	Ministry of Economy and Environment
MoMBEMA	Ministry of Mining, Blue Economy and Maritime Affairs
MoTAC	Ministry Of Tourism, Arts and Culture
MoWSI	Ministry of Water, Sanitation and Irrigation
MPI	Ministry of Planning and Investment
MRH	Ministry of Roads and Highways
MSW	Municipal solid waste
MSWR	Ministry of Sanitation and Water Resources
MT	Metric ton
MTDP	Medium-Term Development Plan
MWH	Ministry Of Works and Housing
N_2O	Nitrous Oxide
NAFTA	North American Free Trade Agreement
NBSAP	National Biodiversity Strategy and Action Plan
NCP	Natural Capital Protection
NCCAS	National Climate Change Adaptation Strategy
NCCAP	National Climate Change Action Plan
NCCP	National Climate Change Policy
NDC	National Determined Contributions
NEMA	National Environment Management Authority
NGO	Non-government organizations
NDPC	National Development Planning Commission
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
OECS	Organisation of Eastern Caribbean States
OHI	Ocean Health Index
PA	Protected Area
PAGE	Partnership for Action on Green Economy
PEFC	Programme for the Endorsement of Forest Certification
$PM_{2.5}$	Particulate matter with a diameter of less than 2.5 micrometers
PPP	Purchasing power parity
PSE	Green Emerging Senegal Plan
R&D	Research and Development
SAARC	South Asian Association for Regional Cooperation
SDEP	State Department for Economic Planning
SDGs	Sustainable Development Goals
SDHUD	State Department of Housing and Urban Development
SDIDE	State Department for ICT & Digital Economy
SDSN	Sustainable Development Solutions Network
SDT	State Department for Transport
SE	Social Equity
SEA	Strategic Environmental Assessment
SE4ALL	Sustainable Energy for All
SI	Social Inclusion
SL	Sustainable Land Use
SP	Social Protection
SPV	Solar Photovoltaic Systems
Sum4All	Sustainable Mobility for All
TNT&EP	The National Treasury and Economic Planning
UCLG	United Cities and Local Governments
UENR	University of Energy and Natural Resources
UESD	University of Environment and Sustainable Development
UHC	Universal Health Coverage
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UN COMTRADE	United Nations International Trade Statistics Database
UNDP	United Nations Development Programme
UNDRR	United Nations Office for Disaster Risk Reduction
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNEP	The United Nations Environment Programme
UNEP-WCMC	UN Environment Programme World Conservation Monitoring Centre
UN-Habitat	United Nations Human Settlements Programme
UNICEF	United Nations International Children's Emergency Fund
UNIDO	United Nations Industrial Development Organization
UNISDR	United Nations International Strategy for Disaster Reduction Secretariat
UNODC	United Nations Office on Drugs and Crime
UNSD	United Nations Statistics Division
UNSTATS	United Nations Statistics Division
UoN	University of Nairobi
USD	United States Dollar
USDA	United States Department for Agriculture
WB	World Bank
WB WBL	Word Bank Women Business and Law
WDPA	World Database on Protected Areas
WEC-FEL	World Energy Council's Future Energy Leaders
WIPO	World Intellectual Property Organization
WHO	World Health Organization
WTTC	World Travel & Tourism Council
ZL	Zoomlion Ghana Limited

Executive Summary

1

The Green Growth Index measures a country's performance in achieving sustainability targets, including Sustainable Development Goals (SDGs), the Paris Climate Agreement, and Aichi Biodiversity Targets. Its framework, which GGGI developed with over 300 international experts from 2017 to 2019, consists of four green growth dimensions, including efficient and sustainable resource use, natural capital protection, green economic opportunities, and social inclusion. The Green Growth Index scores range from 1 to 100, classifying 1-20 as very low, 21-40 as low, 41-60 as moderate, 61-80 as high, and 81-100 as very high green growth performance. The highest score of 100 indicates that sustainability targets were achieved because the green growth indicators were benchmarked against these targets. In this year's Green Growth Index, the top-ranking countries by region are Switzerland in Europe with a score of 77.53, Japan in Asia with a score of 65.85, The United States of America in the Americas with a score of 63.72, New Zealand in Oceania with a score of 61.89, and Gabon in Africa with a score of 61.49. The scores reveal that no country has reached a very high score, and the highest score of the top-ranking country in Europe is still far from reaching the sustainability target.

The 2023 Green Growth Index presents scores from 2010 to 2022. This year, eight new green growth indicators were added to the green economic opportunities dimension. International experts reviewed and validated the policy relevance of these new indicators through an online survey and a workshop in September 2023. Unlike in the previous green growth indices, the number of green growth indicators in this year's Green Growth Index is equal across the four dimensions, now totaling 48 indicators. While the indicators in other dimensions remained the same, their data availability improved, increasing the country covered in the Green Growth Index from 147 last year to 157 this year. In the following years, the experts will continue to review the green growth indicators to replace proxy variables with SDG indicators.

2

The 2023 Green Growth Index presents scores for 189 countries in efficient and sustainable resource use, 200 countries in natural capital protection, 158 countries in green economic opportunities, and 182 countries in social inclusion. About 52 percent of the 189 countries with efficient and sustainable resource use scores have very high (4 countries) or high (95 countries) performance. The natural capital protection dimension is dominated by high scores, with 124 countries, or 62 percent of the 200 countries with scores for this dimension. The green economic opportunities dimension has the highest number of countries with low scores, 46 percent of the 158 countries. Moreover, it is the only dimension where no country scores very high. With 42 countries scoring above 80, social inclusion has the highest number of countries with very high scores.

The four green growth dimensions are equally important, so the Green Growth Index scores were not computed for countries with missing scores for at least one dimension. No country scores very low or very high on the 2023 Green Growth Index. Of the 157 countries with Green Growth Index scores, 46 (29 percent) have high scores, and 97 (62 percent) have moderate scores. The remaining 14 countries have low Green Growth Index scores, mainly in Asia. The lowest-performing country is Syria, with only a 28.68 score. Between 2010 and 2022, the countries showing above five percent increase in scores were predominantly in Africa (17 countries) and Asia (16 countries)

3

The regional distribution of the 157 ranked countries (i.e., with Green Growth Index scores) are as follows: 43 in Africa, 26 in the Americas, 45 in Asia, 39 in Europe, and 4 in Oceania. The Green Growth Index scores in the five African subregions, i.e., Eastern, Middle, Northern, Southern, and Western, were moderate, ranging between 43.06 and 51.38. Between 2010 and 2022, the score gain was highest for social inclusion, particularly in Northern Africa, with at least a 5-point increase. The Americas and its four subregions, including the Caribbean, Central America, Northern America, and South America, also showed moderate Green Growth Index scores between 53.13 and 58.02 in 2022. The most significant score increase in the region was in social inclusion, with about a 4.7 score gain in the Central Americas from 2010 to 2022. The Central, Eastern, South-eastern, Southern, and Western Asian subregions scored between 45.91 and 57.16 on the Green Growth Index in 2022. Social inclusion also showed the most significant score gain, as high as 8 points in Southern Asia. Europe's Eastern, Northern, Southern, and Western subregions Oceania countries, with Green Growth Index scores available only for Australia, New Zealand, Fiji, and Papua New Guinea. The scores for these Oceania countries ranged from 43 to 62 in 2022, with Fiji gaining the highest score of more than 10 in social inclusion from 2010. Social inclusion scores across all regions increased from 2010 to 2022, particularly in many developing countries like Asia and Africa.

Looking into regional economic groups, including the European Union (EU), North American Free Trade Agreement (NAFTA), Mercado Común del Sur (MERCOSUR), Common Market for Eastern and Southern Africa (COMESA), Association of Southeast Asian Nations (ASEAN), and South Asian Association for Regional Cooperation (SAARC), the EU scored the highest in Green Growth Index, mainly due to its high performance in natural capital protection and very high performance in social inclusion. With an overall score of about 66, the EU's performance is in the high range in 2022. Despite NAFTA having a slightly higher score than the EU in green economic opportunities, the EU achieved significantly higher scores in social inclusion, natural capital protection, and efficient and sustainable resource use. This contrast can be clarified by examining the country-specific pillar scores. NAFTA's more robust performance in green economic opportunities can be attributed to the higher score for green employment in the United States, which, at 76.29, surpasses the EU average. MERCOSUR and ASEAN remained to have moderate scores from 2010 to 2022, with ASEAN's scores in social inclusion lagging behind those of MERCOSUR. COMESA and SAARC were the least-performing economic groups with low scores in the last decade.

4

The country-level scatter analysis of the Green Growth Index scores by region showed that scores for most European countries gathered around the high range of scores, between 60 and 80, in 2022. This contrasts with the African and Asian countries, whose scores gathered around the moderate range, between 40 and 60. There were six African countries with scores below 40, including Madagascar, Sudan, Egypt, DR Congo, Central African Republic, and Libya. Compared with Africa, more countries in Asia had scores below 40. These Asian countries include Pakistan, Afghanistan, Bahrain, Kuwait, Iran, Iraq, Yemen, and Syria. Gabon and Cabo Verde were the only African countries with high scores, above 60. Japan and China had high scores in Asia, but countries like Laos, Thailand, Bhutan, Georgia, and Nepal also showed scores above 60. The scores for the Americas and Oceania countries tended to split above and below 60, corresponding to high and moderate performance, respectively. In Oceania, Papua New Guinea's score was farther from the other scores in the scatter diagram. Trinidad and Tobago and Barbados were farthest from the other countries in the Americas. Nonetheless, these countries in Oceania and the Americas performed moderately, unlike many countries in Africa and Asia, which showed low performance.

Green growth performance diverged in the regional top-ranking countries. Switzerland, Europe's top-ranking country, had a very high green growth performance, topping the regional and global rankings. It progressed closer to achieving all its targets in social inclusion, with a score of 94.01. However, Switzerland occupied only the second rank in social inclusion, with Sweden occupying the first. Japan, Asia's top-ranking country, scored 77.52 in social inclusion, corresponding to the 7th rank in Asia. Scores for social inclusion pillars were high, except for gender balance, which had a moderate score of 48.6. Japan ranked 9th in natural capital protection, scoring 70.2, and 5th in efficient and sustainable resource use, scoring 61.95. The United States of America's (USA) top-ranking country in the Americas, performance in green economic opportunities measures 64.64 and is highest in the region and globally. It scored 86.27 for social inclusion but occupied the second rank after Canada. The country's efficient and sustainable resource use performance was only 47.08, corresponding to one of the lowest in the Americas. New Zealand, the top-ranking country in Oceania, scored 87.98 for social inclusion in 2022 but only ranked second after Australia. The country also performed highly in natural capital protection, occupying the 1st and 2nd ranks in cultural and social value (CV) and biodiversity and ecosystems protection (BE), respectively, in Oceania. New Zealand ranked second in green economic opportunities in the region. Gabon, the top-ranking African country, had an Index score of 61.48, only a few points away from New Zealand's due to its relatively high scores in all dimensions except for green economic opportunities. With a score of 77.78 in efficient and sustainable resource use, it outperforms all the top-performing countries in other regions, except for Switzerland in Europe. Creating green economic opportunities will help further improve the country's green growth performance. Gabon lacks data on the share of green manufacturing employment in total manufacturing employment (GJ1), hindering a more accurate comparison of its performance vis-à-vis top performers in the other regions.

5

The 2023 Green Growth Index features Kenya and Ghana's National Green Growth Index. The GGGI supports the government in these countries through collaborative projects to benchmark the country's green growth performance and establish its readiness to transition to a green economy growth model using GGGI's Green Growth Performance Measurement (GGPM) framework and tools, including the Green Growth Index. The Kenya and Ghana Green Growth Index includes 80 green growth indicators identified by national experts, including 54 experts from 24 institutions in Kenya and 39 experts from 30 institutions in Ghana. The indicators were aligned with the green growth framework, representing 20 indicators (5 for every four pillars) in each dimension. The indicators were selected through a participatory process consisting of two workshops, two webinars, two online surveys, and several targeted consultations. In addition to selecting and mobilizing the national experts, GGGI's government partners, The National Treasury and Economic Planning in Kenya and the Ministry of Environment (TNT&EP), Science, Technology, and Innovation (MESTI) in Ghana, supported the dissemination of the National Green Growth Index. They presented the Index during the Global Green Growth Week in October 2023. In addition. TNT&EP disseminated it during the COP28 in December 2023.

This year's report compares Kenya and Ghana's Green Growth Index scores and distances to sustainability targets for the different green growth pillars at the national and global levels in 2022. The National and Global Green Growth Index scores for the two countries were moderate (i.e., between 41 and 60). The score was 47.95 in Kenya, 6.62 points higher than in Ghana. The pillar scores show that Kenya and Ghana performed least in the green economic opportunities dimension, with scores below 40 except for green employment. In the natural capital protection dimension, Kenya performed lowest in biodiversity and ecosystem protection and Ghana in cultural and social value, with scores below 40. In the social inclusion dimension, access to basic services and resources had the lowest score in Kenya and social protection in Ghana. Opportunities to improve green growth performance thus differ in these countries. The trend of the Green Growth Index in Kenya and Ghana from 2010 to 2022 shows that the scores in the former were higher than those in the latter country throughout this period. Moreover, while the Green Growth Index scores showed an increasing trend, the rate of increase was faster in Kenya than in Ghana. The Green Growth Index scores gap between Kenya and Ghana was thus more significant in 2022 than in 2010.

6

GGGI continuously improved the Global Green Growth Index in collaboration with international experts. However, additional efforts lie ahead to improve it further. Of the 48 green growth indicators in the Global Green Growth Index, 22 (46 percent) are highly relevant to green growth, 13 (27 percent) indicators have moderate relevance (i.e., needing conceptual or data coverage improvement), and 13 (27 percent) are proxy variables. The latter indicators that need replacement due to low relevance to green growth are mostly natural capital protection and green economic opportunities. The 2023 Green Growth Index reported the confidence level for the dimensions by region based on data availability from 2020 to 2022. The confidence levels for natural capital protection are high for most countries in all regions, about 70 percent of the countries globally, indicating a high data availability for the indicators in this dimension. With regard to green economic opportunities, only the Americas have the most significant countries with a high level of confidence, albeit low at about 45 percent. The confidence level results emphasize the need to improve data availability in many countries across dimensions to improve the ability of the Green Growth Index to track performance in the green growth transition. In Oceania, half of the ranked countries have a low confidence level, indicating a need for more data for efficient and sustainable resource use indicators. For this reason, GGGI annually assesses data availability for the indicators, particularly from the SDGs, to improve the Green Growth Index for many countries. Of the 48 indicators in the Green Growth Index, 34 (or 71 percent) are SDG indicators. The natural capital protection dimension has the most significant number of SDG indicators, while the green economic opportunities dimension has the least. Half of the eight new green economic opportunities indicators are SDGs. The sustainability targets were essential inputs to the computation of the Green Growth Index, benchmarking the green growth indicators to allow the Index scores to measure their distance to targets, i.e., a score of 100 implies that the sustainability targets were achieved. The targets were grouped into three types, including (i) SDG targets, (ii) other targets whose sources are not from the SDG indicators, and (iii) the mean of the top five performers. Twenty targets for the 48 green growth indicators are based on the mean values of the top five performing countries, allowing countries to reach the targets regardless of their performance on a given indicator. Almost 90 percent of the 157 countries reached the target for the 17 percent share of forest area to total land area (BE2), an SDG target. The other indicator with the many countries reaching the target, over 75 percent, was the share of freshwater withdrawal to available freshwater resources (EW2). The FAO suggested a target between 25 and 75 percent for this indicator.

7

The GGPM framework and tools were applied to different projects in 2023. At the regional level, in collaboration with the ADB, the framework was used for a comparative assessment of the inclusive and green growth transitions of Azerbaijan and Central Asian countries. At the national level, the Green Growth Index framework was applied to identify green growth indicators that can be used to track key progress in achieving the Qatar National Vision 2030 goals and other relevant national policies. Moreover, it was also used to develop the Lao PDR Green Growth Index in collaboration with the Ministry of Planning and Investment to guide the updating of the National Green Growth Strategy; the Kenya Green Growth Index in collaboration with The National Treasury and Economic Planning to identify key green project pipelines; and the Ghana Green Growth Index in collaboration with the Ministry of Environment, Science, Technology, and Innovation to support the preparation of the Country Planning Framework and development of a green growth strategy. This year, for the first time, the Green Growth Index was used to guide the development of a sustainable tourism framework for the pilot Strategic Environmental Assessment (SEA) of the free tourist zone in Charvak, Uzbekistan. Finally, the results of the SDG co-benefits assessments of climate adaptation and mitigation measures in Hungary, St. Lucia, Senegal, Ethiopia, and Burkina Faso were published in the Green Growth Simulation Tool Phase 2 technical report.

Upcoming projects next year applying the Green Growth Index and Simulation Tool include the SDG co-benefits assessment of climate adaptation measures to support the review and update of the Lao PDR National Green Growth Strategy and the SDG alignment assessment for the United Arab Emirates (UAE) National Adaptation Plan. Various plans also exist to develop the National Green Growth Index further using participatory approaches in selected African, Central Asian, and Pacific countries.

1 Introduction

1.1 About the Green Growth Index

The Green Growth Index is a composite index combining green growth indicators from four dimensions - efficient and sustainable resource use, natural capital protection, green economic opportunities, and social inclusion. The green growth indicators are benchmarked against sustainability targets, including Sustainable Development Goals (SDGs), Paris Climate Agreement, and Aichi Biodiversity Targets. The scores for the Green Growth Index, ranging from 1 to 100, measure a country's performance in achieving these sustainability targets. A score of 100 indicates that the target for a given indicator has been achieved. The Green Growth Index is thus a practical tool for aligning a country's pathway to green growth with achieving the SDGs and national climate and biodiversity goals.[1] The Green Growth Index was first published in 2019 and consistently reviewed and improved to increase the number of SDG indicators. GGGI engaged many experts in updating the green growth indicators to ensure their policy relevance. The reviews were conducted through online surveys, allowing experts to participate worldwide. Experts from over 50 countries participated in the review in 2021.[2] The experts are multi-disciplinary, representing government, non-government, academic, private, and international organizations. Since 2020, experts contributing to the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) and Intergovernmental Panel on Climate Change (IPCC) assessment reports also participated in the reviews.

In this year's Green Growth Index, eight new green growth indicators were added to the green economic opportunities dimension. While the indicators in other dimensions remained the same, their data availability improved, increasing the country covered in the Green Growth Index from 147 in 2021 to 157 in 2022. In addition to the Global Green Growth Index, regional and national green growth indices have been published.[1] The Regional Green Growth Index includes the Green-Blue Growth Index for the Organisation of Eastern Caribbean States (OECS), published in 2021,[3] and the Green and Inclusive Growth Index for the Central Asian Countries, published in 2022[4]. The former was developed in collaboration with the OECS Commission and the latter with the Asian Development Bank (ADB). The National Green Growth Index was developed through participatory approach and in close collaboration with GGGI's government partners in Zambia (2022), Kenya (2023), Ghana (2023), and Lao PDR (2022-2023), including the Ministry of Economy and Environment (MoGEE) in Zambia, The National Treasury and Economic Planning (TNT&EP) in Kenya, the Ministry of Environment, Science, Technology, and Innovation (MESTI) in Ghana, and Ministry of Planning and Investment (MPI) in Lao PDR. The regional and national applications included additional green growth indicators relevant to the economic, social, and environmental contexts of a group of countries or a country. The conceptual framework of the Green Growth Index also guided the selection of indicators at these levels of applications.

1.1.1 Conceptual framework

The conceptual framework for the Green Growth Index builds on GGGI's definition of green growth: "*Green growth is a development approach that seeks to deliver economic growth that is both environmentally sustainable and socially inclusive. It seeks opportunities for economic growth that are low-carbon and climate resilient, prevent or remediate pollution, maintain healthy and productive ecosystems, and create green jobs, reduce poverty and enhance social inclusion.*"[5]

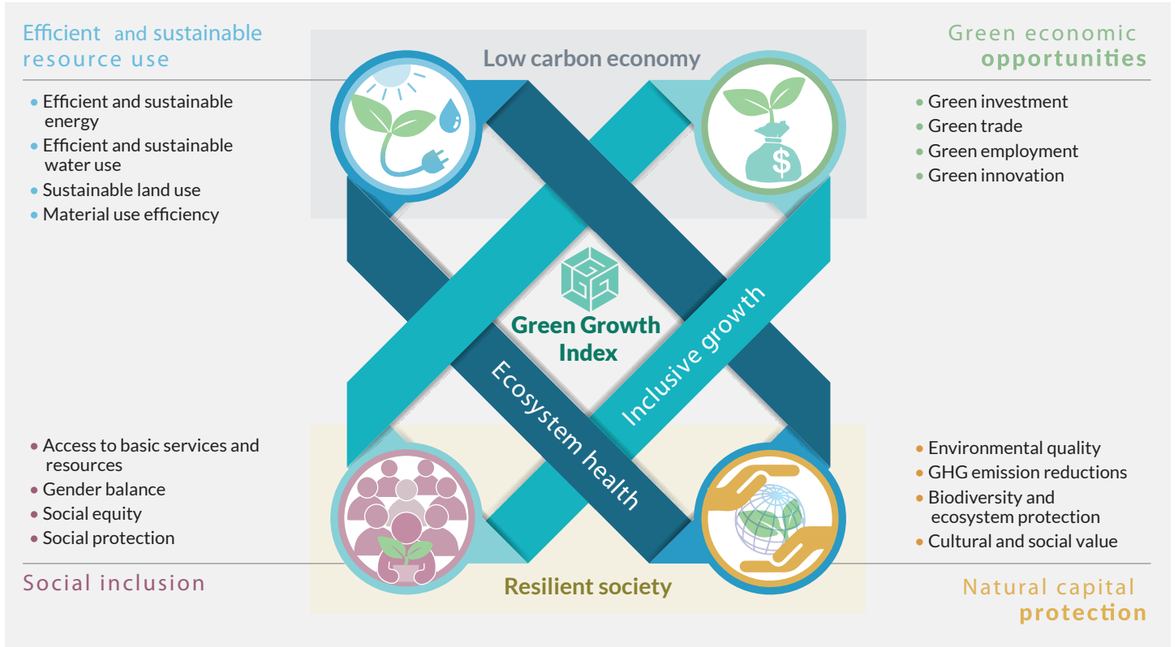
The multi-dimensional characteristic of the Green Growth Index captures the broad green growth definition. The framework represents the interlinkages among the four green growth dimensions, which are defined by four sustainability concepts - low carbon economy, ecosystem health, inclusive growth, and resilient society (Figure 1). Efficient and sustainable use of resources contributes to natural capital protection and supports a low-carbon economy. While using resources like water, energy, land, and materials is key to climate mitigation, protecting natural capital ensures a healthy ecosystem that increases economic productivity and creates new economic opportunities (i.e., green jobs, trade, investment, and innovation) for society. Social inclusion is an essential mechanism to allow people in all parts of society to contribute to creating these opportunities and, at the same time, benefit from them. Green growth thus ensures inclusive growth, enhancing society's resilience. Benefits from green growth should include access to basic services and resources, equal gender opportunities, and social equity and protection, all of which are key to climate adaptation.

Four sustainability pillars, also called indicator categories, represent each dimension. They underpin the transition to efficient and sustainable resource use, enhancement of natural capital protection, creation of green economic opportunities, and enablement of social inclusion. Box 1 presents the definitions of these pillars. The green growth indicators representing each pillar in the Global Green Growth Index are discussed in section 1.1.2. Because the indicators are benchmarked against sustainability targets (see section 6.3 and Annex 1), a score of 100 on the index, dimensions, and pillars means that a country has reached a given target. The scores are classified in each range and can be interpreted as follows:

- 81–100 are very high scores, having reached or almost reached the target.

- 61–80 are high scores, taking a strategic position to ultimately reach the target.
- 41–60 are moderate scores, finding the right balance to move forward to and avoid moving away from the target.
- 21–40 are low scores, identifying the right policies to align development toward achieving the target.
- 1–20 are very low scores, requiring significant actions to improve position relative to the target.

Figure 1. Conceptual Framework for the Green Growth Index



1.1.2 Indicator framework

In collaboration with international experts, GGGI continuously improved the indicator framework for the Green Growth Index. In this year's report, for the first time since the publication of the Green Growth Index in 2019, each pillar across the four dimensions has three green growth indicators (Figure 2). This was achieved by adding eight indicators (i.e., two indicators per pillar) to the Green Growth Index, mainly to the green economic opportunities dimension (Table 1). Having an equal number of indicators per pillar is important to give equal weights to each of them. Data is dearth for relevant green growth indicators for this dimension in the past years. Improvement in data availability allowed the inclusion of additional green economic opportunities indicators. The two green growth indicators added to green investment include the degree of integrated water resources management implementation, financing (GV2) and the total amount of funding to promote environmentally sound technologies per GDP (GV3). Both are SDG indicators and data are available from the UNSTATS database. CO_2 emissions embedded in trade (GT2) and water virtual trade flows (GT3) were the two additional indicators for green trade. Our World in Data calculated and published the GT2 using the database from the Global Carbon Budget (2023)[6]. GGGI calculated and published the GT3 using the water footprint database from the Waterfootprint[7] and agricultural trade database from the Food and Agriculture Organization of the United Nations (FAO)[8], based on the methods suggested by Mekonnen and Hoekstra.[9] The two new indicators in green employment were the ratio of renewable energy employment to renewable energy production (GJ2) and the employed population below the international poverty line (GJ3). IRENA and ILO[10] published the GJ2 data and ILO published the GJ3, an SDG indicator with data downloaded from the UNSTATS database. The two green growth indicators added to green innovation include the World Bank's indicator on university-industry collaboration in research and development (GN2)[11] and the International Renewable Energy Agency's (IRENA) indicator on installed renewable energy-generating capacity (GN3)[12]. The latter is an SDG indicator with data downloaded from the UNSTATS database.

The eight new green economic opportunities indicators were selected through a systematic and participatory process as follows:

1. GGGI, through its Green Growth Performance Measurement (GGPM) team, assessed policy-relevant

Box 1. Definitions of the green growth pillars in Figure 1

1. Efficient and sustainable energy refers to delivering more services or products per unit of energy used and meeting present needs by using renewable sources to ensure sustainability of energy for future use (IRENA & C2E2, 2015; Kutscher, Milford, & Keith, 2018).
2. Efficient and sustainable water use refers to delivering more services or products per unit of water used, reducing environmental impact resulting from water scarcity and pollution, and improving water allocation among competing uses (UNEP, 2014; Wang, Yang, Deng, & Lan, 2015).
3. Sustainable land use refers to delivering more services or products for a fixed amount of land used and without compromising many ecosystem services provided by land (Auzins, Geipele, & Geipele, 2014; Smith, 2018).
4. Material use efficiency refers to delivering more services or products per unit of raw material used and reducing material demand through increased recycling, longer-lasting products, and component re-use, among others (Allwood, Ashby, Gutowski, & Worrell, 2011; Lifset & Eckelman, 2013).
5. Environmental quality refers to properties and characteristics of the environment which may affect the health of human beings and other organisms, including air, water and noise pollution, access to open space, and visual impacts of buildings (EEA, 2015, 2017).
6. Greenhouse gas (GHG) emission reduction refers to the reduction and removal of CO_2 and non-CO_2 emissions from the atmosphere in order to address climate change (IPCC, 2013; Symon, 2013).
7. Biodiversity and ecosystem protection refers to the protection of species, habitats, and ecosystems as well as the services they provide, with protected areas as an important measure to achieve biodiversity conservation (UNEP-WCMC & IUCN, 2016; IPBES, 2018).
8. Cultural and social value refers to the societal value given to natural capital due to its importance to communities and their local culture, which encourages sustainable use and protection of natural resources (Small, Munday, & Durance, 2017; da Rocha, Almassy, & Pinter, 2017).
9. Green investment refers to public and private investment that promotes, in a direct or indirect manner, sustainable resource use, including material, water, energy, and land, and natural capital protection, such as environmental protection and climate action, advancing sustainable development and green growth (Eyraud, Wane, Zhang, & Clements, 2011; Lović Obradović, 2019).
10. Green trade refers to the competitiveness of a country to produce and export environmental goods that can contribute to environmental protection, climate action, green growth, and sustainable development (PAGE, 2017a; European Parliament, 2019).
11. Green jobs refer to employment created and sustained by economic activities that are more environmentally sustainable; contribute to protecting the environment and reduce people's environmental footprint; and offer decent working conditions (UNEP, ILO, IOE, & ITUC, 2008; ILO, 2015).
12. Green innovation refers to product, process, and service innovations such as energy-saving, pollution-prevention, waste recycling, green product designs, or corporate environmental management that yields environmental benefits (Schiederig, Tietze, & Herstatt, 2011; Gao et al., 2018).
13. Access to basic services refers to the general availability of services, such as telecommunications, financial, water and sanitation, and energy services, to people regardless of income and location, and which requires an effective governance at multiple scales due to the local nature of these services (OECD & WB, 2006; UCLG, 2014).
14. Gender balance refers to equality based on gender in terms of rights, resources, opportunities, and protection, and the ability to use them to make strategic choices and decision. Women's social and economic empowerment at work, home, and communities increases inclusive growth and reduces poverty (UNICEF, 2011; UN Women, 2018).
15. Social equity refers to a fair and equitable public and social policy, giving equal opportunities to all by a fair allocation of and access to resources that take into account social inequalities. Addressing and embedding equity issues in the design of a policy will lead to sustainable economic growth over the long term (Clench-Aas & Holte, 2018; OECD, 2018).
16. Social protection refers to programs designed to provide benefits to ensure income security and access to social services, contributing to social equity and inclusive society and reducing poverty and exposure to risks (UNRISD, 2010; ESCWA, 2015).

Figure 2. Indicator Framework for the 2022 Green Growth Index

Dimensions [Goals]	Indicator categories [Pillars]		Indicators [metrics]
Green Growth Index	Efficient and sustainable resource use	Efficient and sustainable energy	EE1 Ratio of total primary energy supply to GDP (MJ per $2011 PPP GDP)
			EE2 Share of renewable to total final energy consumption (Percent)
			EE3 Logistics performance, efficiency in sustainable transport (Score)
		Efficient and sustainable water use	EW1 Water use efficiency (USD per m^3)
			EW2 Share of freshwater withdrawal to available freshwater resources (Percent)
			EW3 Sustainable fisheries as a proportion of GDP (Ratio)
		Sustainable land use	SL1 Nutrient balance per unit area (Tons per hectare)
			SL2 Share agriculture organic to total agriculture land area (Percent)
			SL3 Livestock units per agricultural land area (LSU/ha)
		Material use efficiency	ME1 Domestic material consumption per unit of GDP (Kilograms per constant 2015 USD)
			ME2 Total material footprint (MF) per capita (Tons per capita)
			ME3 Average of food loss to production and food waste to consumption (Percent)
	Natural capital protection	Environmental quality	EQ1 $PM_{2.5}$ air pollution, mean annual population-weighted exposure (Micrograms per m^3)
			EQ2 DALY rate due to unsafe water sources (DALY lost per 100,000 persons)
			EQ3 Municipal solid waste (MSW) generation per capita (Tons per year per capita)
		Greenhouse gas emissions reductions	GE1 Ratio of CO_2 emissions to population, including AFOLU (Metric tons per capita)
			GE2 Ratio of non-CO_2 (CH_4, N_2O and F-gas) emissions to population, excluding AFOLU (CO_2eq tons per capita)
			GE3 Ratio of non-CO_2 (CH_4, N_2O and F-gas) emissions in agriculture to population (CO_2eq tons per capita)
		Biodiversity and ecosystem protection	BE1 Average proportion of Key Biodiversity Areas covered by protected areas (Percent)
			BE2 Share of forest area to total land area (Percent)
			BE3 Above-ground biomass in forest (Tons per hectare)
		Cultural and social value	CV1 Red List Index (Score)
			CV2 Tourism and recreation in coastal and marine areas (Score)
			CV3 Share of terrestrial and marine protected areas to total territorial areas (Percent)
	Green economic opportunities	Green investment	GV1 Ratio of adjusted net savings to GNI, including particulate emission damage (5 yrs moving ave.)
			GV2 Degree of integrated water resources management implementation, financing (Percent)
			GV3 Total amount of funding to promote environmentally sound technologies per GDP (Ratio)
		Green trade	GT1 Share of export of environmental goods (OECD and APEC classifications) to total export (Percent)
			GT2 CO_2 emissions embedded in trade (Percent)
			GT3 Water virtual trade flows (Tons per hectare)
		Green employment	GJ1 Share of green manufacturing employment in total manufacturing employment (Percent)
			GJ2 Ratio of renewable energy employment to renewable energy production (Ratio)
			GJ3 Employed population below international poverty line (Percent)
		Green innovation	GN1 Development of environment-related technologies, share of patents (Percent)
			GN2 University-industry collaboration in Research & Development (Score)
			GN3 Installed renewable energy-generating capacity (Watts per capita)
	Social inclusion	Access to basic services and resources	AB1 Population with access to basic services, i.e. Water, sanitation, electricity, and clean fuels (Percent)
			AB2 Prevalence of undernourishment (Percent)
			AB3 Universal access to sustainable transport (Score)
		Gender balance	GB1 Proportion of seats held by women in national parliaments (Percent)
			GB2 Gender ratio of an account at a financial institution or mobile-money-service provider (Ratio)
			GB3 Getting paid, covering laws and regulations for equal gender pay (Score)
		Social equity	SE1 Inequality in income based on Palma ratio (Ratio)
			SE2 Population with access to basic services by urban/rural, i.e. electricity (Ratio)
			SE3 Share of youth (aged 15-24 years) not in education, employment or training (Percent)
		Social protection	SP1 Proportion of population above statutory pensionable age receiving pension (Percent)
			SP2 Universal health coverage (UHC) service coverage (Score)
			SP3 Proportion of urban population living in slums (Percent)

Table 1. Summary of the changes in the indicators from 2019 to 2022

Dimension	2019-2020		2020-2021		2021-2022	
	New indicators	Replaced proxy variables	New indicators	Replaced proxy variables	New indicators	Replaced proxy variables
Efficient and sustainable resource use	0	1	4	0	0	0
Natural capital protection	0	1	0	0	0	0
Green economic opportunities	0	0	0	0	8	0
Social inclusion	0	2	0	2	0	0

green growth indicators for the green economic opportunities dimension and checked data availability from different online sources. At least four indicators were identified for each of the four pillars in this dimension, including green investment, green trade, green employment, and green innovation.

2. The GGPM team requested international experts to rate the indicators' policy relevance in each pillar through an online survey conducted in September 2023. About 20 experts participated in the survey, 36 percent participating in the review for the first time and all working in the green growth field (Figure 3). The survey results are discussed in section 6.1.

3. In collaboration with the Green Growth Knowledge Partnership (GGKP), GGGI conducted a virtual workshop on the 12th of September 2023. The workshop aimed to present the online survey results and validate the two top-rated green growth indicators in each of the four pillars of green economic opportunities.

The validation was conducted through two Mentimeter votes, one before the breakout session (i.e., initial votes) and the other after it (i.e., final votes). The final Mentimeter votes include new indicators suggested during the breakout session. The Mentimeter votes are presented in Annex 2.

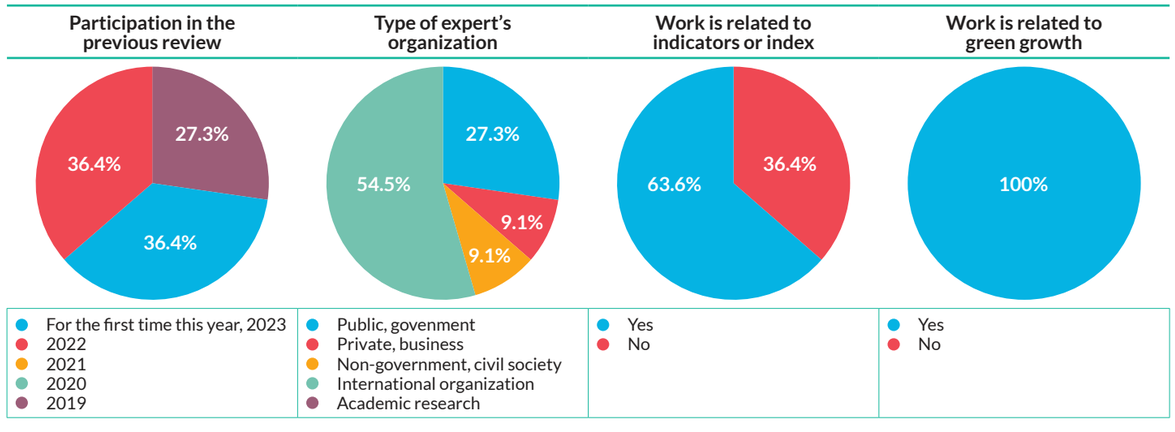
After the workshop, the GGPM team carefully assessed the votes, comments, and suggestions of the international experts. It narrowed down the suggested indicators to two per pillar based on (1) conceptual and policy relevance and (2) data coverage and availability across countries. Section 6.1 provides further details on these.

Further improvement on the green growth indicators is expected in the following years to replace proxy variables, which were temporarily used in the Green Growth Index to represent green growth indicators with a lack of data. Table 1 shows that four proxy variables have been replaced with green growth indicators in 2019-2020 and another two in 2020-2021. These indicators are mainly SDGs from the UNSTATS database. Information on the remaining proxy variables in the Green Growth Index is available in Section 6.1.

1.1.3 Link to the SDGs

Of the 48 indicators in the Green Growth Index, 34 (or 71 percent) are SDG indicators. But because ME3 (i.e., food loss and food waste), BE1 (i.e., marine, freshwater, terrestrial, mountain), and AB1 (i.e., water, sanitation,

Figure 3. Characteristics of the international experts participating in the online survey for the green economic opportunities dimension



electricity, and clean fuels) indicators combined different SDG indicators in one green growth indicator (i.e., composite indicators), the total number of SDG indicators included in the Index is 41 (Figure 3A). The natural capital protection dimension has the most significant number of SDG indicators, while the green economic opportunities dimension has the least number. Half of the eight new green economic opportunities' indicators are SDGs, including the degree of integrated water resources management implementation, financing (GV2), total amount of funding to promote environmentally sound technologies per GDP (GV3), employed population below international poverty line (GJ3), and installed renewable energy-generating capacity (GN3). SDG 9 on the industry, innovation, and infrastructure includes SDG 9.2.2 on manufacturing employment as a proportion of total employment. The indicator GJ1 share of green employment in total manufacturing (percent) is thus represented in SDG 9.2.2, albeit focusing on the green aspect of manufacturing employment.

The remaining 29 percent of green growth indicators are non-SDGs, which directly support the achievement of the SDGs (Figure 3B). However, some may become part of the SDG indicators because the UN Member Countries continue to review, and international organizations are committed to improving SDG databases. For example, ongoing debates exist on including the Palma Ratio as a measure of income inequality in SDG 10.[13] The Gini index is currently used as an indicator to measure income inequality in SDG 10, specifically SDG 10.4.2 redistributive impact of fiscal policy. However, experts recognize the limitations of the Gini index in measuring income inequality and that complementary indicators will be needed to achieve Goal 10 of reducing inequality within and among countries. For transport, SDG 11.2.1 on the proportion of the population that has convenient access to public transport (percent) was added to the UNSTATS database last year.[14] However, data for this SDG indicator remain very scarce. SDG 9.1.2 passenger and freight volumes, by mode of transport cover indicators (i.e., freight volume, passenger volume, maritime container port traffic) that are used to compute WB's LPI indicators in efficiency in sustainable transport (EE3). Nonetheless, this indicator is a proxy variable to be replaced when data availability for SDG 9.1.2 improves in the coming years.

In addition to policy relevance, 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. But there are no globally agreed climate targets for some SDG indicators, including GHG emissions reduction. Governments determine national targets in their National Determined Contributions (NDCs). To allow for cross-country comparisons, national targets are not used. To come up with sustainability targets for all green growth indicators, the following criteria were adopted:

SDG indicators

1. The SDG targets, both explicit and implicit, which were suggested by the Organisation for Economic Co-operation and Development (OECD)[15] and UN Sustainable Development Solutions Network (SDSN)[16] reports, were used. If the interpretation of implicit targets differs, the SDSN values applied globally were adopted.

2. The average value of the top five performers was used for SDG indicators not included in the OECD and SDSN reports.

Non-SDG indicators

1. The targets suggested in scientific literature, and reports from international organizations were used.

2. The average value of the top five performers was used for non-SDG indicators with no available information from the literature and reports.

Criteria 2 and 4 follow methods that were used in other global indices, such as SDSN's SDG Index[17] and UNEP's Green Economy Progress (GEP)[18]. The details on the sustainability targets used to benchmark the 2020 Green Growth Index indicators are discussed in section 6.3.

Figure 4. Links of the Green Growth Index to Sustainable Development Goals

A. Sustainable Development Goals (SDG) indicators used in the Green Growth Index

Green Growth Index	Dimensions		Indicators [metrics]	Sustainable Development Goals (SDG)* Goal	Target	Indicator
	Efficient and sustainable resource use	EE1	Ratio of total primary energy supply to GDP	Affordable and clean energy	7.3	7.3.1
		EE2	Share of renewable to total final energy consumption	Affordable and clean energy	7.2	7.2.1
		EW1	Water use efficiency	Clean water and sanitation	6.4	6.4.1
		EW2	Share of freshwater withdrawal to available freshwater resources	Clean water and sanitation	6.4	6.4.2
		EW3	Sustainable fisheries as a proportion of GDP	Life below water	14.7	14.7.1
		ME1	Domestic material consumption per unit of GDP	Decent work and economic growth	8.4	8.4.2
				Responsible consumption and production	12.2	12.2.2
		ME2	Total material footprint per capita population	Decent work and economic growth	8.4	8.4.2
		ME3	Share of food loss to production and food waste to consumption	Responsible consumption and production	12.3.1	12.3.1(a) 12.3.1(b)
	Natural capital protection	EQ1	$PM_{2.5}$ air pollution, mean annual population-weighted exposure	Good health and well-being	3.9	3.9.2
		EQ2	DALY rate due to unsafe water sources	Responsible consumption and production	12.4	12.4.2
		EQ3	Municipal solid waste generation per capita	Industry, innovation and infrastructure	9.4	9.4.1
		GE1	Ratio of CO_2 emissions to population, including AFOLU	Climate action	13.2	13.2.2
		GE2	Ratio of non-CO_2 emissions to population, excluding AFOLU to population	Climate action	13.2	13.2.2
		GE3	Ratio of non-CO_2 emissions in agriculture and LUCF to population	Life below water	14.5	14.5.1
		BE1	Proportion of KBAs covered by protected areas	Life on land	15.1 15.4	15.1.2 15.4.1
		BE2	Share of forest area to total land area	Life on land	15.1	15.1.1
		BE3	Above-ground biomass in forest	Life on land	15.2	15.2.1
		CV1	Red List Index	Life on land	15.5	15.5.1
		CV3	Share of terrestrial and marine protected areas to total territorial areas	Life below water	14.5	14.5.1
	Green economic opportunities	GV2	Degree of integrated water resources management implementation, financing	Clean water and sanitation	6.5	6.5.1
		GV3	Total amount of funding to promote environmentally sound technologies per GDP	Partnerships for the goals	17.7	17.7.1
		GJ1	Share of green employment in total manufacturing	Industry, innovation and infrastructure	9.2.2	6.4
		GJ3	Employed population below international poverty line	No poverty	1.1	1.1.1
		GN3	Installed renewable energy-generating capacity (Watts per capita)	Affordable and clean energy	7.b	7.b.1
				Responsible consumption and production	12.a	12.a.1

* Details on SDG targets and indicators are available on these links: https://unstats.un.org/sdgs/indicators/database/; https://unstats.un.org/sdgs/metadata/

Figure 4. Links of the Green Growth Index to Sustainable Development Goals *(continued)*

A. Sustainable Development Goals (SDG) indicators used in the Green Growth Index

	Dimensions		Indicators [metrics]	Sustainable Development Goals (SDG)* Goal	Target	Indicator
Green Growth Index	Social inclusion	AB1	Population with access to basic services	Clean water and sanitation	6.1 6.2	6.1.1 6.2.1
				Affordable and clean energy	7.1	7.1.1 7.1.2
		AB2	Prevalence of undernourishment	Zero Hunger	2.1	2.1.1
		GB1	Proportion of seats held by women in national parliaments	Gender equality	5.5	5.5.1
		GB2	Gender ratio of an account at a financial institution or mobile-money-service	Decent work and economic growth	8.10	8.10.2
		SE2	Population with access to basic services by urban/ rural, i.e. electricity	Affordable and clean energy	17.1	7.1.1
		SE3	Share of youth not in education, employment or training	Decent work and economic growth	8.6	8.6.1
		SP1	Proportion of population above statutory pensionable age receiving pension	No p overty	1.3	1.3.1
		SP2	Universal health coverage service coverage index	Good health and well-being	3.6	3.6.1
		SP3	Proportion of urban population living in slums	Sustainable cities and communities	11.1	11.11.1

* Details on SDG targets and indicators are available on these links: https://unstats.un.org/sdgs/indicators/database/; https://unstats.un.org/sdgs/metadata/

B. Link of green growth indicator s to SDGs and other sustainability targets

Dimensions		Indicators [metrics]	Link to SDGs and other targets Sustainable Development Goals (SDGs)*		other targets
Efficient and sustainable resource use	EE3	Efficiency in sustainable transport	Industry, innovation and infrastructure	9.1	
	SL1	Soil nutrient budget	Life on land	15.3.1	Aichi
	SL2	Share of organic agriculture to total agricultural land area	Zero Hunger	2	Aichi
	SL3	Share of ruminant livestock population to agricultural area	Climate action	13.2	Climate
Natural capital protection	CV2	Tourism and recreation in coastal and marine areas	Responsible consumption and production	12.B	
	CV3	Share of terrestrial protected areas to total territorial areas	Life on land	15.1	Aichi
Green economic opportunities	GV1	Ratio of adjusted net savings to GNI, including particulate emission damage	Responsible consumption and production	12	
	GT1	Share of export of environmental goods to total export	Responsible consumption and production	12	
			Partnerships for the goals	17.7.1	
	GT2	CO_2 emissions embedded in trade	Climate action	13.2	Climate
Social inclusion	AB3	Universal access to sustainable transport	Industry, innovation and infrastructure	9.1	
	GB3	Laws and regulations for equal gender pay	Gender equality	5.C	
			Reduced equality	10.2	
	SE1	Inequality in income based on Palma ratio	No poverty	1.1.1 1.2.1	
			Reduced equality	10.1.1	

* Details on SDG targets and indicators are available on these links: https://unstats.un.org/sdgs/indicators/database/; https://unstats.un.org/sdgs/metadata/

1.2 Updates in the 2022 Green Growth

The scores in the 2023 Green Growth Index scores, as presented in this report, are not comparable to those in the 2022 Green Growth Index report for several reasons:

1. Eight green growth indicators were added to the green economic opportunities dimension in 2023, as discussed in section 1.1.2. These indicators were selected through expert consultation through an online survey and webinar.

2. The data sources for one indicator changed in the 2023 Green Growth Index due to data availability in the UNSTATS database, particularly the DALY rate due to unsafe water sources (EQ2). The data for this indicator was downloaded from the Global Health Data Exchange (GHDx) last year.

3. The database updates for many indicators changed values for most recent years and previous years. This could be explained by the new knowledge generated for these indicators, which resulted in the correction of values. Annex 3 provides an overview of the data divergence for the four green growth dimensions from 2010 to 2022.

4. The number of data points for several indicators has increased in 2023, causing changes in scores for some countries. Figure 4 shows that the data availability improved for all dimensions except for natural capital protection. The most considerable data improvements are recorded for the green economic opportunities dimension. Better data availability resulted in ten more countries with Green Growth Index scores in the 2023 Green Growth Index.

Figure 5. Percentage change in data availability for the indicators, by dimension

Note: In the figure above, the indicators for the 2023 Index report only include those which were used in the 2022 Index report to allow comparisons. Thus, the former excludes the data for the eight new indicators in the green economic opportunities (GEO) dimension.

1.3 Purpose and structure of the report

As discussed in the previous section, the Index scores published in this report are not directly comparable with those in the 2022 Green Growth Index Report. To allow comparison of scores and ranks over time, the 2023 Green Growth Index presents the scores for 157 countries (i.e., 43 in Africa, 26 in the Americas, 45 in Asia, 39 in Europe, and 4 in Oceania) from 2010 to 2022, including key highlights on differences in green growth performance among countries and regions and across dimensions and indicators. The report's first edition discusses details on the concept and methods for developing the Green Growth Index.[19] Annex 1 summarizes the methods for computing the Green Growth Index. The structure of this report is as follows:

Chapter 1 Briefly describes the concept of the Green Growth Index and explains the improvements made to its indicator framework. This chapter also briefly discusses the link of the indicators to the SDGs.

Chapter 2 Provides a global overview of the Green Growth Index and its dimensions using maps to present a bird's eye view of the countries' green growth performance. This chapter also presents country and subregional dashboards on the Index, dimensions, and indicators to provide contexts to the geographical differences in performance.

Chapter 3 Presents the regional outlook of the Green Growth Index with a particular focus on the performance of regions (i.e., Africa, the Americas, Asia, Europe, and Oceania) on the four green growth dimensions and the trend in performance from 2010 to 2022. This chapter also compares the performance of selected economic groups.[a]

Chapter 4 Presents the distribution pattern of the Green Growth Index scores by region and discusses the performance of top-performing countries in each region.

Chapter 5 Features the national Green Growth Index for Kenya and Ghana, presenting the 80 green growth indicators selected by the national experts during various participatory activities. The chapter compares the Green Growth Index scores and the distance to targets of the green growth indicators in these two countries.

Chapter 6 Discusses the following steps to develop further the Global Green Growth Index: the proxy variables that will be replaced, data availability and confidence level, and sustainability targets.

Chapter 7 Presents the projects at GGGI, which applied the Green Growth Index and its Simulation Tool to support GGGI Member Countries and its Regional Partners in greening National Development Plans and Frameworks and assessing co-benefits of Low-Emission Development Strategies.

Chapter 8 Presents the statistical tables that provide detailed results of each country's Green Growth Index, including those that cannot be ranked due to a lack of data for some green growth indicators. The tables show the scores for the Index, dimensions, indicator categories, and normalized indicators for all countries and are classified by region.

a European Union (EU), North American Free Trade Agreement (NAFTA), Mercado Común del Sur (MERCOSUR), Common Market for Eastern and Southern Africa (COMESA), Association of Southeast Asian Nations (ASEAN), and South Asian Association for Regional Cooperation (SAARC)

2 Global Overview

2.1 Maps

Figure 6 presents the maps summarizing the scores for the four green growth dimensions in 2022. Box 2 provides the classification and interpretation of these scores. In 2022, only one country, the Democratic Republic of the Congo, recorded a very low score in the green economic opportunities dimension among the 157 countries assessed. However, the United States, which achieved the highest score, reached only 64.64, making green economic opportunities the only green growth dimension without very high scores. A total of 153 countries (or 97 percent) fell within the low to moderate score range. More specifically, 72 countries (or 46 percent) received low scores, while 81 countries (or 51 percent) received moderate scores. These countries collectively cover a land area of 80.82 million km² and have a combined population of 6.96 billion people.

In contrast, social inclusion is the dimension with the highest number of countries achieving very high scores, with 41 (or 25 percent) of the 157 countries receiving very high scores in this dimension. These countries, representing a land area of 48 million km² and a population of 3.69 billion people, are primarily located in Europe and North America. Most countries scored high with 66 (or 42 percent) of the 157 countries, covering about 60.16 million km² and with a population of 5.6 billion people. Most countries with low scores in social inclusion, numbering 13, along with one country scoring very low, are primarily located in the Sub-Saharan African region. Notably, in 2022, no countries received a very low score in the social inclusion dimension.

Following social inclusion, natural capital protection has the second-highest number of countries with very high scores, with 9 achieving this status. All nine of these countries are in Europe. Among the 157 countries assessed for natural capital protection, 102 (or 65 percent) received high scores, covering a land area of 79.63 million km² and a population of 7.76 billion people. Only eight countries received low scores. In 2022, no countries received a very low score in the natural capital protection dimension.

The dimension of efficient and sustainable resource use exhibited the widest range of scores. Of the 157 countries evaluated for efficient and sustainable resource use, only two countries, Austria and Switzerland, achieved very high scores. Most countries received high scores (72 countries or 46 percent) or moderate scores (57 countries or 36 percent), covering a land area of 83.81 million km² and a population of 7.8 billion. In many countries, 22 (or 14 percent) received low efficient and sustainable resource use scores. Notably, four countries, including Syria, Iran, Egypt, Turkmenistan, and Uzbekistan, received very low scores in this dimension.

The scores for the four green growth dimensions were aggregated using geometric means to derive the overall scores for the Green Growth Index (Annex 1). Only countries with scores for all four dimensions have scores for the Green Growth Index, corresponding to 157 countries in 2022 (Figure 7). They are distributed in different regions: 43 countries in Africa, 26 countries in the Americas, 45 countries in Asia, 39 countries in Europe, and four countries in Oceania. No country scores very low or very high on the Green Growth Index. About 62 percent (97 countries) of the 157 countries show a moderate performance between 40 and 60. These countries cover 36.89 million km2 of land area and 4.64 billion people. Forty-six countries have high performance with scores between 60 and 80. The high-scoring countries cover 38.61 million km2 of land and 1.91 billion people, mainly in Europe. Sixteen countries, mainly Asian countries, have a low score between 20 and 40 on the Green Growth Index. These countries cover 13.99 million km² of land and 384.7 million people. Switzerland, located in Western Europe, is the highest-scoring country with an overall Index score of 77.53; however, it is still far from reaching the sustainability target of 100. The lowest-scoring country is Syria, with a Green Growth Index score of only 28.68.

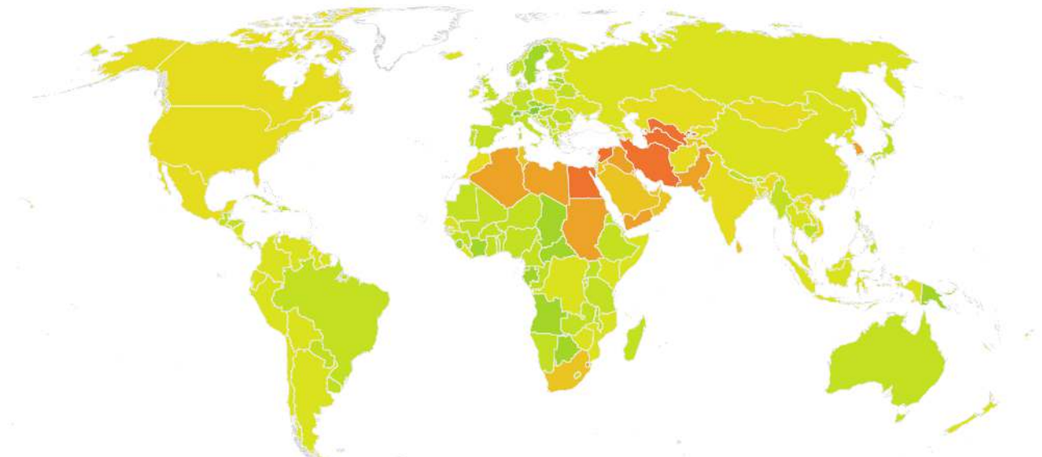
Compared to 2010, the Green Growth Index scores have generally improved for most countries by 2022. Figure 7 illustrates that 110 countries witnessed a moderate increase in their performance, ranging from 0 to 10 percent, from 2010 to 2022. Only 12 countries substantially increased scores, ranging from 10 to 20 percent. Notably, Iceland, located in Northern Europe, demonstrated a remarkable performance increase of over 20 percent. Conversely, many countries (33) experienced declining scores, with decreases of up to -10 percent on the Green Growth Index. The Central African Republic was the only country that recorded a drop of more than 10 percent.

Box 2. Classification and interpretation of the scores

80–100 are very high scores, having reached or almost reached the target
60–80 are high scores, taking a strategic position to reach the target completely
40–60 are moderate scores, finding the right balance to move closer to the target
20–40 are low scores, identifying the right policies to align development toward achieving the target
1–20 are very low scores, requiring significant actions to improve position relative to the target

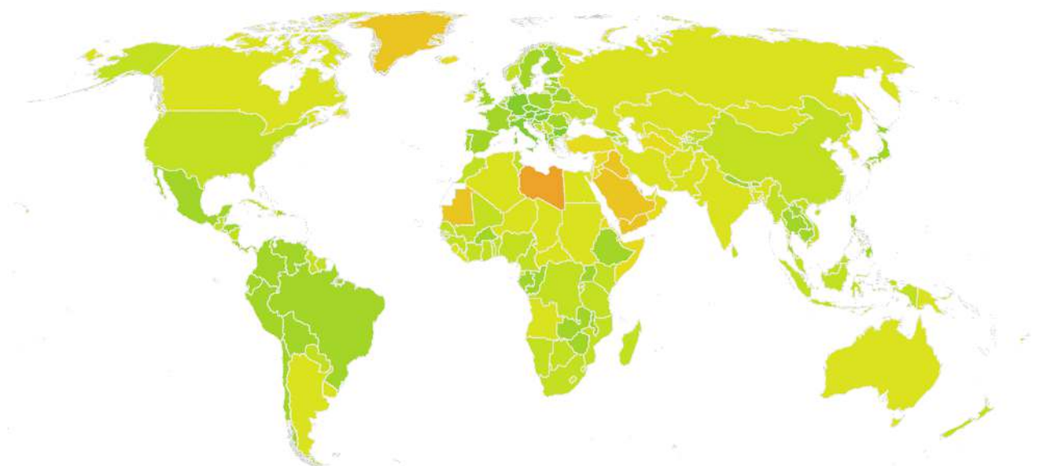
Figure 6. Sub-indices of the green growth dimensions for different countries, 2022

Efficient and Sustainable Resource Use



INDEX	LEVEL	NO. OF COUNTRIES	AREA*	POPULATION**
100	Very high	4	0.13	17.71
80	High	93	39.28	1846.16
60	Moderate	62	75.55	4749.90
40	Low	23	12.34	590.97
20	Very low	5	3.73	234.65
0				

Natural Capital Protection

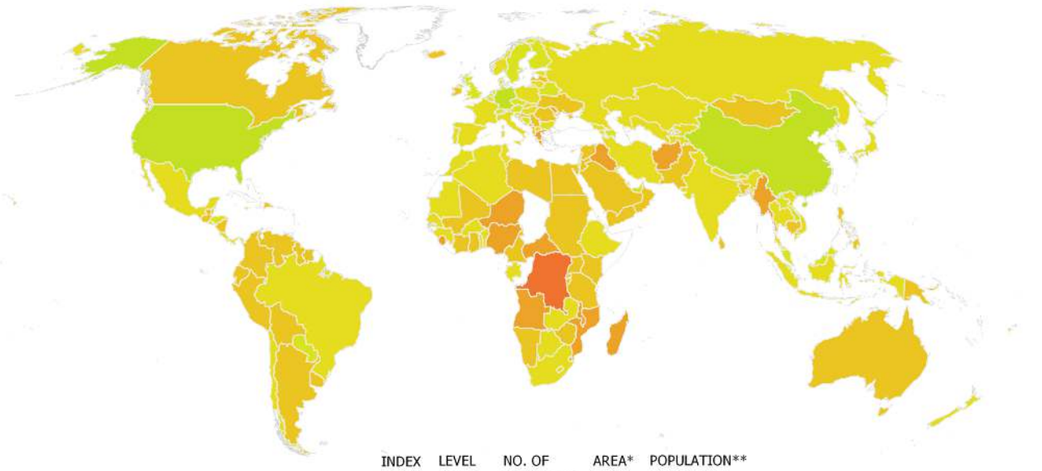


INDEX	LEVEL	NO. OF COUNTRIES	AREA*	POPULATION
100	Very high	10	1.16	192.50
80	High	122	62.41	4517.57
60	Moderate	52	62.69	2693.53
40	Low	11	7.68	120.24
20	Very low	2	0.01	0.20
0				

* Million sq. km
** Million persons

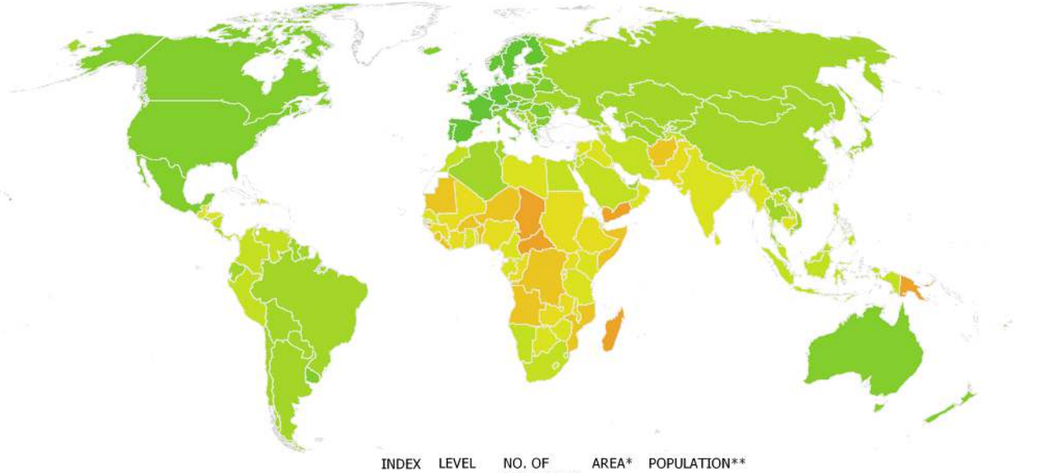
Figure 6. Sub-indices of the green growth dimensions for different countries, 2022 (continued)

Green Economic Opportunities



INDEX	LEVEL	NO. OF COUNTRIES	AREA*	POPULATION**
100	Very high	0	0	0
80	High	3	19.19	1814.84
60	Moderate	81	54.49	3529.09
40	Low	72	51.64	1908.04
20	Very low	1	2.33	82.73
0				

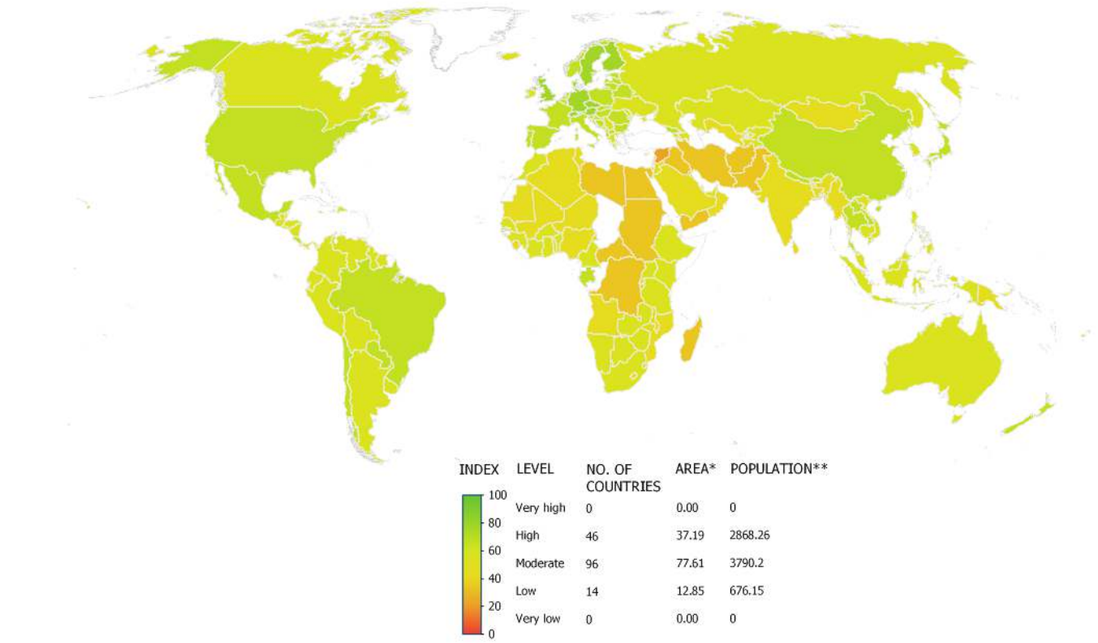
Social Inclusion



INDEX	LEVEL	NO. OF COUNTRIES	AREA*	POPULATION**
100	Very high	41	34.61	1075.23
80	High	71	64.56	3334.33
60	Moderate	46	19.56	2628.53
40	Low	20	11.86	359.47
20	Very low	0	0	0
0				

* Million sq. km
** Million persons

Figure 7. Performance Green Growth Index in 2022 (top) and change in Index scores from 2010 to 2022 (bottom)



2.2 Dashboards

Table 2 presents a regional dashboard for the Green Growth Index, detailing the changes in Index scores for 157 countries from 2010 to 2022. It includes only those countries with data across all four green growth dimensions, encompassing 43 countries in Africa, 26 in the Americas, 45 in Asia, 39 in Europe, and four in Oceania. In 2022, the top performers by region were Gabon in Africa, the United States in the Americas, Japan in Asia, Switzerland in Europe, and New Zealand in Oceania. Switzerland surpassed Austria in 2022, the 2010 leader in Europe. The least-performing countries by region were Libya in Africa, Barbados in the Americas, Syria in Asia, Montenegro in Europe, and Papua New Guinea in Oceania. Trinidad and Tobago, Syria, and Australia ranked at the bottom in their regions in 2010. In Table 2, multi-directional arrows are used to show the performance of countries over time:

↑	Pointing straight up represents increasing performance, above 5% increase in scores
↗	Slightly slanting upward represents modest performance, between <5% and ≥ 1% increase in scores.
→	Pointing horizontally represents stable or almost no change in performace, between <1 and ≥ 0% change in scores
↘	Slightly slanting downward represents slight decline in performance, between < 0% and ≥ 5% decrease in scores
↓	Pointing straight down represents worsening performance, below -5% decrease in scores

A ±5 percent interval was used as a benchmark to assess performance, as data points were predominantly gathered around this value. Africa and Asia had the most countries with score changes exceeding 5 percent, totaling 17 in Africa and 16 in Asia. Iceland in Europe showcased the most remarkable progress, with its scores rising by 25 percent between 2010 and 2022. Despite these significant percentage increases in scores, these countries did not experience significant shifts in their regional rankings during the same period. Côte d'Ivoire in Africa saw the most dramatic rise in ranks, moving from 28th in 2010 to 11th in 2022, an ascent of 17 places. Guinea in Africa also showed the most considerable improvement in ranks, from 31st in 2010 to 14th in 2022, with a 19 percent increase in the Green Growth Index scores from 2010 to 2022, the highest in the region. The countries that maintained their ranks in the last 12 years are two in Africa, four in the Americas, four in Asia, 11 in Europe, and one in Oceania.

In 2022, Europe maintained its position as the top-performing region, primarily due to the relatively high scores of many European countries in social inclusion and green economic opportunities. Notably, in the social inclusion dimension, there were no scores below 70 for European countries in 2022 (Table 2). A noteworthy observation in the green economic opportunities dimension is that in 2022, apart from the Democratic Republic of Congo, no country scored below 20 points. In contrast, in 2022, 26 out of 39 African countries, 9 out of 22 in the Americas, and 21 out of 43 in Asia had scores below 20 for green economic opportunities. It is worth highlighting that African countries, except the Democratic Republic of Congo, made significant improvements in the dimension of green economic opportunities. The notable increase in green trade has substantially enhanced green economic opportunities during the year. In Asia, scores in this dimension remained relatively low overall, but China, South Korea, and Qatar have been at the forefront of promoting green economic opportunities. In 2022, in the Americas, the United States and Canada lagged behind European countries in creating green economic opportunities. However, the United States made significant strides, achieving an impressive increase from 34.16 to 64.64, a gain of 30.48 points in the green economic opportunities dimension from 2010 to 2022.

Figure 8 outlines the subregional performances for the different pillars of the Green Growth Index. A key observation is the shift in green trade (GT) scores. In 2021, GT scores were very low across all regions, but in 2022, there was a significant shift from low to moderate in most areas. On the other hand, the green investment (GV) scores have declined to low in most regions. Similarly to 2021, the scores for efficient and sustainable resource use indicators in 2022 remain the least impressive in most subregions, except material use efficiency (ME). Material use efficiency continues to maintain very high scores across all regions in 2022.

For the indicators of natural capital protection, the scores for environmental quality (EQ) and GHG emissions reduction (GE) generally ranged from high to very high across all regions, with a few exceptions. Notably, in the case of GHG emissions reduction (GE), Northern America scored 44.01, while Australia and New Zealand received a score of 34.11, marking them as exceptions to the high scores. Australia and New Zealand's subregional average was brought down by Australia, receiving a very low score of 19.62. Conversely, the scores for biodiversity and ecosystem protection (BE) and cultural and social value (CV) tended to be lower than the previous two pillars in most subregions. Regarding the former pillar, subregions such as Northern Africa, Central Asia, and Western Asia exhibited very low scores for biodiversity and ecosystem protection (BE). Cultural and social value (CV) scores were mostly distributed as low and moderate, except for Southern and Western Europe, with high and very high scores, respectively.

In terms of social inclusion, there was a noticeable variation in scores across different indicators and subregions. The social

equity (SE) indicator generally received high or very high scores in most regions, except Eastern, Middle, Southern, and Western Africa. Northern Africa's social equity (SE) scores align with the rest of the subregions worldwide. These subregions also showed low scores for access to basic services and resources (AB). Social protection (SP) also recorded low scores in Eastern, Middle, and Western Africa. In the Melanesia subregions of Oceania, low scores in access to basic services and resources (AB) and social protection (SP) were also observed.

Table 2. Country dashboard for dimensions and Green Growth Index performance, by region

Country	Sub-region*	Dimension scores (2022) ESRU	NCP	GEO	SI	2010 Index	2010 Rank	2022 Index	2022 Rank	Performance
AFRICA										
Gabon	Sub-Saharan Africa	77.78	72.85	42.62	59.14	57.10	2	61.48	1	↑
Cabo Verde	Sub-Saharan Africa	64.00	61.34	51.85	69.68	59.63	1	61.37	2	↗
Seychelles	Sub-Saharan Africa	51.44	78.04	41.13	76.95	52.75	9	59.70	3	↑
Botswana	Sub-Saharan Africa	73.63	64.99	41.39	57.56	54.83	7	58.11	4	↑
Namibia	Sub-Saharan Africa	60.60	66.17	38.61	64.11	55.65	4	56.13	5	→
Mauritius	Sub-Saharan Africa	60.90	52.20	38.55	80.21	56.92	3	55.99	6	↘
Togo	Sub-Saharan Africa	61.40	69.92	42.28	53.71	51.61	11	55.88	7	↑
Senegal	Sub-Saharan Africa	59.70	65.00	41.59	56.42	51.31	13	54.93	8	↑
Morocco	Northern Africa	47.69	66.05	40.99	68.46	54.97	6	54.53	9	↘
Burkina Faso	Sub-Saharan Africa	67.53	73.04	48.67	36.32	49.17	20	54.34	10	↑
Cote d'Ivoire	Sub-Saharan Africa	72.04	66.31	37.89	47.28	47.30	28	54.08	11	↑
Tanzania	Sub-Saharan Africa	68.17	67.63	36.08	51.02	49.50	18	53.97	12	↑
Zambia	Sub-Saharan Africa	63.21	71.55	42.83	43.70	50.55	16	53.94	13	↑
Guinea	Sub-Saharan Africa	60.15	67.33	45.19	46.06	45.18	31	53.88	14	↑
Uganda	Sub-Saharan Africa	64.87	72.82	36.63	47.79	51.58	12	53.63	15	↗
Ghana	Sub-Saharan Africa	61.21	64.79	37.19	55.29	51.71	10	53.44	16	↗
Rwanda	Sub-Saharan Africa	69.23	69.67	30.44	54.31	47.83	27	53.14	17	↑
Kenya	Sub-Saharan Africa	59.61	63.73	37.69	54.69	50.80	15	52.90	18	↗
South Africa	Sub-Saharan Africa	39.53	64.49	43.64	69.57	55.17	5	52.74	19	↘
Cameroon	Sub-Saharan Africa	61.84	61.55	36.51	55.08	49.73	17	52.60	20	↑
Ethiopia	Sub-Saharan Africa	62.20	70.84	41.12	42.22	48.90	22	52.59	21	↑
Zimbabwe	Sub-Saharan Africa	56.70	77.08	32.34	51.64	53.10	8	51.98	22	↘
Benin	Sub-Saharan Africa	63.27	63.71	41.01	39.97	51.11	14	50.70	23	↘
Gambia	Sub-Saharan Africa	62.39	63.66	29.78	52.16	49.05	21	49.84	24	↗
Lesotho	Sub-Saharan Africa	62.34	41.46	40.13	53.01	48.41	23	48.42	25	→
Tunisia	Northern Africa	30.01	60.91	41.65	72.16	48.23	25	48.41	26	→
Malawi	Sub-Saharan Africa	64.69	77.06	24.45	44.75	49.49	19	48.33	27	↘
Mali	Sub-Saharan Africa	65.43	60.68	30.04	44.55	47.23	29	48.01	28	↗
Burundi	Sub-Saharan Africa	63.74	68.46	30.31	40.00	45.77	30	47.96	29	↗
Nigeria	Sub-Saharan Africa	62.19	61.26	27.03	43.65	48.37	24	46.05	30	↓
Mauritania	Sub-Saharan Africa	66.73	36.60	46.44	39.09	43.32	35	45.89	31	↑
Algeria	Northern Africa	28.52	51.19	40.66	73.30	43.27	36	45.67	32	↑
Sierra Leone	Sub-Saharan Africa	70.74	59.45	28.83	35.83	43.79	32	45.65	33	↗
Mozambique	Sub-Saharan Africa	57.58	68.15	27.02	39.84	43.54	34	45.33	34	↗
Angola	Sub-Saharan Africa	70.13	58.64	24.23	38.52	48.15	26	44.26	35	↓

*Based on the sub-region and intermediate region on UNSTATS (https://unstats.un.org/unsd/methodology/m49/overview/)

Legend

0 10 20 30 40 50 60 70 80 90 100
Very low Low Moderate High Very high

↑ > 5% ↗ ≤ 5% & > 1 → ≤ 1% & > 0 ↘ ≤ -1% & -5% ↓ > -5%

Table 2. Country dashboard for dimensions and Green Growth Index performance, by region *(continued)*

Country	Sub-region*	Dimension scores (2022) ESRU	NCP	GEO	SI	2010 Index	2010 Rank	2022 Index	2022 Rank	Performance
Niger	Sub-Saharan Africa	64.26	54.46	26.81	32.51	42.04	37	41.79	36	↘
Eswatini	Sub-Saharan Africa	21.03	61.07	35.87	64.04	38.59	39	41.45	37	↑
Madagascar	Sub-Saharan Africa	61.38	61.88	21.42	27.07	41.50	38	38.52	38	↓
Sudan	Northern Africa	27.49	50.81	35.66	42.77	36.48	41	38.20	39	↗
Egypt	Northern Africa	16.26	56.00	35.39	62.93	37.07	40	37.74	40	↗
DR Congo	Sub-Saharan Africa	55.62	68.28	17.20	30.00	31.71	43	37.42	41	↑
Central African Republic	Sub-Saharan Africa	70.21	55.40	20.04	22.55	43.55	33	36.41	42	↓
Libya	Northern Africa	23.77	28.86	36.31	52.52	36.26	42	33.82	43	↓
AMERICAS										
United States	Northern America	47.08	62.79	64.64	86.27	62.34	2	63.72	1	↗
Paraguay	Latin America and the Caribbean	65.93	66.12	51.04	73.56	60.22	3	63.61	2	↑
Brazil	Latin America and the Caribbean	67.83	71.14	46.14	72.79	62.55	1	63.45	3	↗
Costa Rica	Latin America and the Caribbean	57.59	71.66	44.83	73.44	59.34	4	60.71	4	↗
Mexico	Latin America and the Caribbean	49.56	73.17	45.61	80.42	58.55	6	60.39	5	↗
Chile	Latin America and the Caribbean	51.12	74.03	44.59	78.51	58.40	8	60.33	6	↗
Honduras	Latin America and the Caribbean	61.48	72.70	50.80	57.01	57.30	9	59.98	7	↗
Uruguay	Latin America and the Caribbean	66.00	58.70	39.96	82.09	56.29	14	59.71	8	↑
Panama	Latin America and the Caribbean	61.01	73.46	40.66	68.46	58.43	7	59.43	9	↗
Jamaica	Latin America and the Caribbean	54.15	66.47	52.23	64.43	55.48	19	58.99	10	↑
Bolivia	Latin America and the Caribbean	57.31	71.62	37.01	78.24	58.65	5	58.71	11	→
Dominican Republic	Latin America and the Caribbean	61.06	75.22	36.40	67.40	56.16	16	57.94	12	↗
El Salvador	Latin America and the Caribbean	57.51	64.03	42.17	71.63	54.26	21	57.75	13	↑
Ecuador	Latin America and the Caribbean	56.42	70.62	37.57	71.67	56.19	15	57.23	14	↗
Colombia	Latin America and the Caribbean	57.29	71.04	39.48	64.81	54.22	22	56.80	15	↗
Peru	Latin America and the Caribbean	59.09	70.87	35.27	69.47	56.85	11	56.60	16	↘
Nicaragua	Latin America and the Caribbean	59.94	69.73	39.19	60.01	55.84	18	56.00	17	→
Guatemala	Latin America and the Caribbean	61.70	66.14	39.90	58.33	55.98	17	55.51	18	↘
Canada	Northern America	48.51	58.96	37.06	87.28	53.13	24	55.15	19	↗
Suriname	Latin America and the Caribbean	52.48	64.12	37.74	71.64	57.08	10	54.92	20	↘
Venezuela	Latin America and the Caribbean	53.64	70.70	37.04	64.51	56.32	13	54.86	21	↘
Belize	Latin America and the Caribbean	57.78	71.81	32.46	64.79	53.48	23	54.35	22	↗
Argentina	Latin America and the Caribbean	57.14	59.44	33.24	76.81	56.47	12	54.26	23	↘
Guyana	Latin America and the Caribbean	53.06	62.12	32.08	74.21	55.32	20	52.93	24	↘
Trinidad and Tobago	Latin America and the Caribbean	33.32	52.79	44.24	78.42	50.66	25	49.70	25	↘
Barbados	Latin America and the Caribbean	36.37	58.76	30.94	67.06	47.72	26	45.89	26	↘
ASIA										
Japan	Eastern Asia	61.95	70.20	49.29	77.52	62.60	1	63.85	1	↗
China	Eastern Asia	53.81	63.33	62.68	76.65	59.54	5	63.61	2	↑
Laos	South-eastern Asia	59.35	76.22	52.54	65.42	58.70	6	62.79	3	↑
Thailand	South-eastern Asia	57.91	73.17	47.31	76.97	61.24	2	62.68	4	↗
Bhutan	Southern Asia	62.10	78.79	49.82	57.25	57.89	9	61.12	5	↑
Georgia	Western Asia	54.59	72.73	45.33	76.17	60.23	4	60.85	6	↗

*Based on the sub-region and intermediate region on UNSTATS (https://unstats.un.org/unsd/methodology/m49/overview/)

Legend

0 10 20 30 40 50 60 70 80 90 100
Very low Low Moderate High Very high

↑ > 5% ↗ ≤ 5% & > 1 → ≤ 1% & > 0 ↘ ≤ -1% & -5% ↓ > -5%

Table 2. Country dashboard for dimensions and Green Growth Index performance, by region *(continued)*

Country	Sub-region*	Dimension scores (2022) ESRU	NCP	GEO	SI	2010 Index	2010 Rank	2022 Index	2022 Rank	Performance
Nepal	Southern Asia	63.73	72.97	41.49	68.78	57.96	8	60.36	7	↗
Malaysia	South-eastern Asia	56.83	66.56	51.97	65.21	58.54	7	59.84	8	↗
Philippines	South-eastern Asia	61.51	73.88	39.64	66.36	57.27	11	58.80	9	↗
Cyprus	Western Asia	55.04	74.79	35.60	80.93	60.41	3	58.68	10	↘
Indonesia	South-eastern Asia	57.56	64.62	47.74	65.32	57.07	13	58.36	11	↗
Azerbaijan	Western Asia	44.78	64.37	54.57	67.98	57.18	12	57.18	12	↘
Armenia	Western Asia	43.44	69.11	46.62	75.81	55.56	14	57.07	13	↗
Maldives	Southern Asia	60.24	52.31	47.38	69.89	57.36	10	56.83	14	↘
Cambodia	South-eastern Asia	60.62	77.26	36.86	58.88	51.09	19	56.47	15	↑
Vietnam	South-eastern Asia	48.45	62.10	47.74	70.66	54.23	16	56.44	16	↗
Kyrgyz Republic	Central Asia	42.49	63.54	45.68	72.88	54.98	15	54.75	17	↘
Kazakhstan	Central Asia	49.99	53.20	41.36	79.00	49.61	24	54.29	18	↑
Israel	Western Asia	49.96	48.27	42.60	82.29	54.00	17	53.92	19	↘
Tajikistan	Central Asia	37.35	61.73	48.86	68.86	49.93	22	52.78	20	↑
Brunei Darussalam	South-eastern Asia	42.88	56.08	43.93	72.44	52.60	18	52.60	21	↘
South Korea	Eastern Asia	28.66	57.46	58.60	79.27	49.20	25	52.59	22	↑
Timor-Leste	South-eastern Asia	69.10	63.88	22.95	73.27	50.75	20	52.20	23	↗
United Arab Emirates	Western Asia	36.53	48.22	52.38	71.95	44.48	32	50.76	24	↑
Singapore	South-eastern Asia	29.47	58.21	46.40	78.92	45.85	30	50.06	25	↑
Palestine	Western Asia	45.84	41.45	49.50	64.66	47.97	27	49.66	26	↗
India	Southern Asia	40.62	53.30	45.41	57.72	45.62	31	48.81	27	↑
Myanmar	South-eastern Asia	62.05	60.63	27.47	54.28	49.79	23	48.67	28	↘
Mongolia	Eastern Asia	43.70	54.81	31.58	73.79	50.37	21	48.60	29	↘
Bangladesh	Southern Asia	55.94	54.46	32.17	55.94	48.75	26	48.39	30	↘
Sri Lanka	Southern Asia	37.92	63.67	36.84	58.50	45.92	29	47.76	31	↗
Qatar	Western Asia	48.26	33.97	51.59	55.36	44.23	33	46.52	32	↗
Jordan	Western Asia	36.33	48.39	39.42	66.07	44.22	34	46.26	33	↗
Lebanon	Western Asia	45.99	58.45	24.87	57.49	46.81	28	44.28	34	↓
Uzbekistan	Central Asia	19.26	56.67	45.38	71.56	39.92	37	43.39	35	↑
Oman	Western Asia	32.48	40.31	39.85	53.62	37.63	41	40.90	36	↑
Saudi Arabia	Western Asia	31.50	35.99	39.43	61.80	37.93	39	40.77	37	↑
Pakistan	Southern Asia	26.67	52.22	37.72	47.61	37.93	40	39.77	38	↗
Afghanistan	Southern Asia	48.93	54.71	23.57	38.91	33.46	45	39.58	39	↑
Bahrain	Western Asia	37.45	23.11	46.42	60.54	34.09	44	39.49	40	↑
Kuwait	Western Asia	29.13	34.60	46.98	50.61	41.05	35	39.35	41	↘
Iran	Southern Asia	13.62	57.26	41.43	60.28	38.05	38	37.35	42	↘
Iraq	Western Asia	22.59	37.24	27.02	56.25	36.69	42	33.63	43	↓
Yemen	Western Asia	27.24	39.26	38.00	27.19	35.74	43	32.42	44	↓
Syria	Western Asia	10.52	40.61	31.13	50.84	29.90	46	28.68	45	↘
EUROPE										
Switzerland	Western Europe	84.90	79.97	56.62	94.01	75.57	1	77.53	1	↗
Austria	Western Europe	80.24	80.43	53.46	93.83	73.70	2	75.43	2	↗
Germany	Western Europe	66.99	82.65	62.63	92.67	70.65	5	75.29	3	↑
Denmark	Northern Europe	78.23	71.30	58.76	91.22	72.51	3	73.94	4	↗
Sweden	Northern Europe	76.31	78.17	50.59	94.69	**72.40**	**4**	**73.11**	**5**	→
Czech Republic	Eastern Europe	70.80	81.53	53.89	86.93	70.32	6	72.11	6	↗
United Kingdom	Northern Europe	67.89	78.52	51.45	91.47	69.04	7	70.77	7	↗
Finland	Northern Europe	68.39	72.23	54.70	92.16	68.61	8	70.64	8	↗
Belarus	Eastern Europe	62.63	72.91	57.48	88.25	66.49	10	69.37	9	↗
France	Western Europe	67.23	78.69	44.52	92.75	65.49	13	68.36	10	↗
Italy	Southern Europe	65.90	80.29	47.04	87.32	65.25	16	68.28	11	↗
Slovakia	Eastern Europe	72.09	84.03	43.11	82.72	65.97	12	68.17	12	↗
Hungary	Eastern Europe	65.45	80.80	46.95	83.06	68.27	9	67.39	13	↘
Slovenia	Southern Europe	61.63	78.77	49.10	86.30	65.41	14	67.35	14	↗
Netherlands	Western Europe	57.72	71.04	53.55	93.39	65.34	15	67.29	15	↗
Portugal	Southern Europe	64.63	78.44	41.85	91.20	63.25	19	66.32	16	↗
Norway	Northern Europe	61.51	69.76	46.77	93.06	66.22	11	65.74	17	↘
Estonia	Northern Europe	63.51	75.18	44.86	87.02	64.53	17	65.71	18	↗
Lithuania	Northern Europe	68.60	72.48	42.14	84.62	61.95	21	64.89	19	↗
Spain	Southern Europe	60.10	76.18	41.40	92.18	62.75	20	64.65	20	↗
Poland	Eastern Europe	59.60	75.58	43.57	88.15	61.24	24	64.49	21	↑
Luxembourg	Western Europe	71.39	75.32	35.78	88.40	64.48	18	64.22	22	↘
Bosnia and Herzegovina	Southern Europe	68.86	65.33	51.44	72.56	57.61	33	64.01	23	↑
Belgium	Western Europe	51.98	76.65	45.78	91.52	57.81	32	63.92	24	↑
Albania	Southern Europe	66.01	82.32	38.31	79.35	60.23	26	63.75	25	↑
Latvia	Northern Europe	72.92	76.22	35.05	84.69	61.93	22	63.73	26	↗
Romania	Eastern Europe	62.05	77.24	39.31	84.65	61.41	23	63.20	27	↗
Croatia	Southern Europe	63.93	83.79	35.39	83.32	61.02	25	63.04	28	↗
Macedonia	Southern Europe	59.01	74.97	45.08	73.25	56.38	35	61.82	29	↑
Bulgaria	Eastern Europe	53.32	80.31	40.34	82.79	58.48	28	61.50	30	↗
Serbia	Southern Europe	61.33	69.44	38.75	77.07	58.21	31	59.72	31	↗
Greece	Southern Europe	64.35	76.80	29.10	85.76	59.23	27	59.26	32	→
Russia	Eastern Europe	53.06	57.54	47.55	78.14	58.31	30	58.03	33	↘
Ukraine	Eastern Europe	56.05	65.95	39.47	74.45	58.40	29	57.41	34	↘
Ireland	Northern Europe	59.47	58.31	32.73	88.63	57.50	34	56.31	35	↘
Moldova	Eastern Europe	61.10	66.99	29.20	82.78	56.17	36	56.08	36	↘
Iceland	Northern Europe	55.66	44.37	36.22	88.16	42.37	39	52.99	37	↑
Malta	Southern Europe	45.11	63.04	24.33	82.36	45.17	38	48.86	38	↑
Montenegro	Southern Europe	31.07	66.46	32.01	71.03	45.37	37	46.55	39	↗
Oceania										
New Zealand	Australia and New Zealand	59.38	68.36	41.10	87.98	61.18	1	61.89	1	↗
Fiji	Melanesia	59.54	68.28	47.45	64.74	55.75	3	59.45	2	↑
Australia	Australia and New Zealand	68.05	52.56	37.18	89.16	56.42	2	58.68	3	↗
Papua New Guinea	Melanesia	78.68	55.00	36.91	23.08	42.92	4	43.82	4	↗

*Based on the sub-region and intermediate region on UNSTATS (https://unstats.un.org/unsd/methodology/m49/overview/)

Legend

0 10 20 30 40 50 60 70 80 90 100
Very low Low Moderate High Very high

↑ > 5% ↗ ≤ 5% & > 1 → ≤ 1% & > 0 ↘ ≤ -1% & -5% ↓ > -5%

Table 2. Country dashboard for dimensions and Green Growth Index performance, by region *(continued)*

Legend

0 10 20 30 40 50 60 70 80 90 100
Very low Low Moderate High Very high

↑ > 5% ↗ ≤ 5% & > 1 → ≤ 1% & > 0 ↘ ≤ -1% & -5% ↓ > -5%

Figure 8. Dashboard of pillars in each green growth dimension, by sub-regions in 2022

Sub-regions	Efficient and sustainable resource use				Natural capital protection				Green economic opportunities				Social inclusion				Sub-regions
	EE	EW	SL	ME	EQ	GE	BE	CV	GV	GT	GJ	GN	AB	GB	SE	SP	
Eastern Africa	55.26	47.94	70.13	88.27	73.36	84.18	48.46	63.13	34.16	61.29	23.04	30.23	36.93	74.81	70.00	33.68	Eastern Africa
Middle Africa	56.18	53.06	88.16	90.52	64.42	71.11	64.75	61.84	28.81	55.89	32.03	20.97	38.00	57.07	58.69	27.50	Middle Africa
Northern Africa	41.21	5.23	70.37	90.63	77.44	79.95	26.31	52.59	47.19	62.37	49.28	18.01	61.90	56.04	85.19	57.06	Northern Africa
Southern Africa	59.26	35.01	71.22	84.25	73.30	68.78	42.62	67.96	37.99	63.54	40.46	31.03	48.03	77.47	59.68	70.18	Southern Africa
Western Africa	59.34	46.64	69.77	89.57	58.26	87.57	49.98	61.84	37.01	57.93	36.75	27.86	39.17	57.07	65.25	29.74	Western Africa
Caribbean	41.43	41.21	69.25	92.52	79.85	76.82	50.40	58.15	38.54	66.33	53.96	25.31	64.30	63.12	77.23	59.93	Caribbean
Central America	60.87	34.98	61.27	89.91	86.24	79.73	61.06	60.88	35.07	67.35	47.00	29.98	63.90	71.64	77.25	58.00	Central America
Northern America	53.53	42.40	60.84	74.45	71.41	44.01	35.69	61.11	40.91	62.04	57.74	47.48	84.16	81.14	92.01	92.14	Northern America
South America	56.78	41.74	63.15	81.77	86.26	61.65	61.17	63.58	32.05	61.10	44.76	33.27	63.17	77.38	80.90	74.30	South America
Central Asia	35.25	15.45	61.07	82.85	85.62	66.07	24.08	77.02	40.71	68.00	41.57	42.33	67.54	62.72	88.22	83.05	Central Asia
Eastern Asia	48.71	40.53	58.07	71.91	76.39	70.60	47.61	63.15	51.79	68.53	53.34	31.90	76.04	63.65	92.96	86.63	Eastern Asia
South-Eastern Asia	55.41	41.48	58.31	82.92	85.58	70.67	58.11	59.09	52.09	63.16	42.13	27.46	67.70	69.98	88.55	54.15	South-Eastern Asia
Southern Asia	52.54	26.51	61.17	92.09	71.45	86.26	42.58	54.86	38.76	61.27	50.75	25.90	56.01	57.48	81.91	42.73	Southern Asia
Western Asia	38.81	17.08	63.48	77.78	75.13	66.53	24.02	53.38	41.86	65.77	46.44	31.08	65.54	53.55	86.43	58.50	Western Asia
Eastern Europe	46.47	52.51	76.72	84.77	84.70	72.54	69.61	73.33	51.36	73.47	42.51	24.84	85.24	73.49	93.04	83.21	Eastern Europe
Northern Europe	70.72	54.00	73.83	72.05	85.41	69.57	50.71	71.25	56.79	71.57	26.95	41.89	88.21	89.60	94.51	86.35	Northern Europe
Southern Europe	59.76	35.26	70.40	86.44	83.52	78.68	57.03	78.24	44.87	68.11	34.20	27.33	78.49	78.73	90.41	80.86	Southern Europe
Western Europe	64.73	61.14	75.93	84.25	80.50	77.26	58.96	88.30	63.13	72.65	32.76	47.45	93.56	91.29	94.31	90.52	Western Europe
Australia and New Zealand	57.55	54.00	79.35	69.79	83.99	34.11	64.26	69.75	46.69	52.62	25.11	40.26	85.43	86.44	92.14	90.45	Australia and New Zealand
Melanesia	51.60	40.13	77.85	84.11	84.84	75.96	50.24	48.16	38.15	52.02	49.90	34.56	56.64	25.43	79.85	33.23	Melanesia
Micronesia	37.79		92.60	95.16	82.41	88.27	44.36	45.92	10.73			16.60	51.94	47.43	79.85	65.61	Micronesia
Polynesia	55.10		79.37	90.47	90.40	85.48	37.32	62.23	35.26			12.72	64.38	46.74	82.67	57.10	Polynesia

Legend

0 10 20 30 40 50 60 70 80 90 100
Very low Low Moderate High Very high

Definitions:
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

3 Regional Outlook

3.1 Subregional Performance

Green Growth Index and dimension scores are provided for countries within five geographic regions – Africa, the Americas, Asia, Europe, and Oceania. To further understand the Green Growth Index results, an in-depth analysis of each region is provided, discussing the scores of efficient and sustainable resource use, natural capital protection, green economic opportunities, and social inclusion at a subregional level. The Green Growth Index is calculated as a geometric mean of the dimensions. The changes in the Green Growth Index scores by subregion and dimension were analyzed between 2010 and 2022 to gain a deeper understanding of the region's economic development over time.

3.1.1 Africa

The Green Growth Index encompasses the results for five distinct African subregions: Eastern, Middle, Northern, Southern, and Western. Figures 9 and 10 compare the overall green growth performance in these African subregions between 2010 and 2022. Over this period, the Green Growth Index scores remained relatively stable in Eastern, Southern, and Western Africa but not in Middle and Northern Africa, where the scores exhibited noticeable declines due to negative changes in efficient and sustainable resource use. In 2010, the scores for African subregions on the Green Growth Index ranged from 40.89 to 50.75. By 2022, a modest improvement was observed, with scores ranging from 43.06 to 51.38, as depicted in Figure 9. Among the four dimensions of green growth, the most robust performance was observed in natural capital protection across each subregion. Although there was a slight improvement in green economic opportunities in the region compared to 2021, it remains the weakest-performing dimension. Notably, almost all countries in each subregion, both in 2010 and 2022, demonstrated low performance in green economic opportunities. Libya and the Central African Republic exhibited a downward trend in this dimension, as well as in their overall Green Growth Index performance (Table 2).

In 2022, Middle Africa maintained its leading position in efficient and sustainable resource use. Despite this, the subregion's performance in social inclusion lagged, primarily due to poor access to basic services and social protection. Moreover, Middle Africa's performance in green economic opportunities was the lowest. Thus, social inclusion and green economic opportunities offer Middle Africa significant opportunities to improve its green growth performance. Eastern Africa achieved the second-highest Green Growth Index score in the African region. However, it scored lower in other dimensions, including efficient and sustainable resource use and green economic opportunities. Across all five subregions, scores for green economic opportunities were notably low. While Northern Africa continued to lead in social inclusion, its poor performance in efficient and sustainable resource use, particularly due to green innovation, negatively impacted its Green Growth Index score. Moreover, Northern Africa was the weakest performer in efficient and sustainable water use, one of the pillars in the efficient and sustainable resource dimension. Several countries in this subregion still scored very low in efficient and sustainable water use due to water scarcity. Higher performance in efficient and sustainable resource use in Middle Africa can be attributed to very high scores in sustainable land use and material use efficiency. Across Africa, scores for material use efficiency were consistently very high in all regions.

Figures 9 and 10 provide valuable insights into how to boost green growth across Africa. These opportunities depend on successfully improving scores in green trade, green jobs, green investment, and green innovation, along with efficient and sustainable energy and water use, biodiversity and environmental protection, access to basic services, and social protection.

3.1.2 The Americas

The Americas consists of four subregions – the Caribbean, Central America, Northern America, and South America. The subregions' performance in the Green Growth Index and dimensions in 2010 and 2022 are presented in Figures 11 and 12. In the Americas, the Green Growth Index scores ranged from 51.98 to 59.56 in 2010. However, by 2022, these scores showed a noticeable increase, expanding the range from 53.13 to 58.02, as depicted in Figure 11. Nonetheless, several countries in the Americas, including Suriname, Guyana, Argentina, and Barbados, experienced a 4 percent decrease in their respective Green Growth Index scores. Among the four green growth dimensions, social inclusion demonstrated the most significant improvement in the Americas, with scores increasing from 69.14 to 71.66. The natural capital protection dimension followed closely, showing an increase in scores from 64.55 to 67.24. In 2022, efficient and sustainable resource use emerged as the weakest among all dimensions, with Trinidad and Tobago playing a notable role in contributing to this lower performance. While there was a slight improvement in green economic opportunities across the Americas' subregions, the scores for this dimension remained relatively low.

In 2022, Northern America achieved the highest performance, as shown in Figure 11. predominantly due to an exceptionally high score in the social inclusion dimension, particularly in the social equity pillar. The high scores observed in this subregion largely result from emphasizing policies for social inclusion, with the United States leading the way and playing a pivotal role in this regard, along with significant public investment in social programs. However, three other dimensions, such as efficient and sustainable resource use, green economic opportunities, and natural capital protection, ranged from low to moderate scores in this subregion. Central America performed best in natural capital

Figure 9. Green Growth Index and dimension subindices in the African subregions, 2022

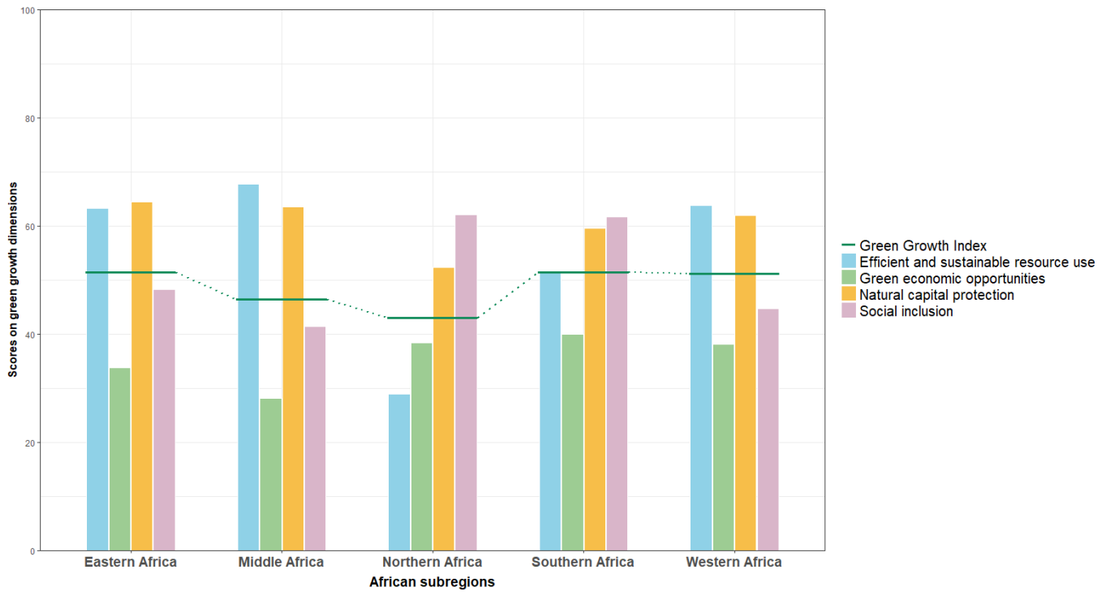
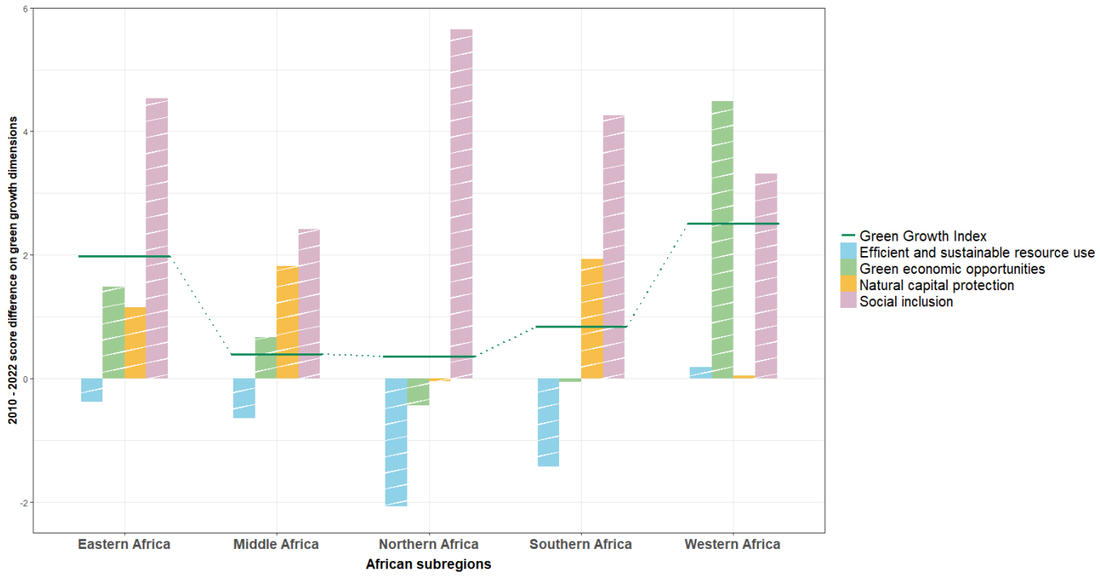


Figure 10. Score difference for the Green Growth Index and dimension subindices in the African subregions, 2010-2022



protection, with high scores for environmental quality and GHG emissions reduction. Notably, all countries in Central America scored very high in environmental quality, and half of them, including Costa Rica, El Salvador, Guatemala, and Honduras, scored very high in GHG emissions reduction. South America performed slightly better in the Green Growth Index scores in 2022 but showed weaker performance in green economic opportunities, primarily due to low green job creation and green innovation.

All subregions can improve performance in green economic opportunities (Figure 11) However, Figure 12 shows that further opportunities to enhance green growth performance vary across the subregions. The Caribbean and Central America experienced a decline in efficient and sustainable resource scores, while Northern America and South America showed a decrease in green economic opportunities from 2010 to 2022. Reversing these declining trends will

Figure 11. Green Growth Index and dimension subindices in the Americas subregions, 2022

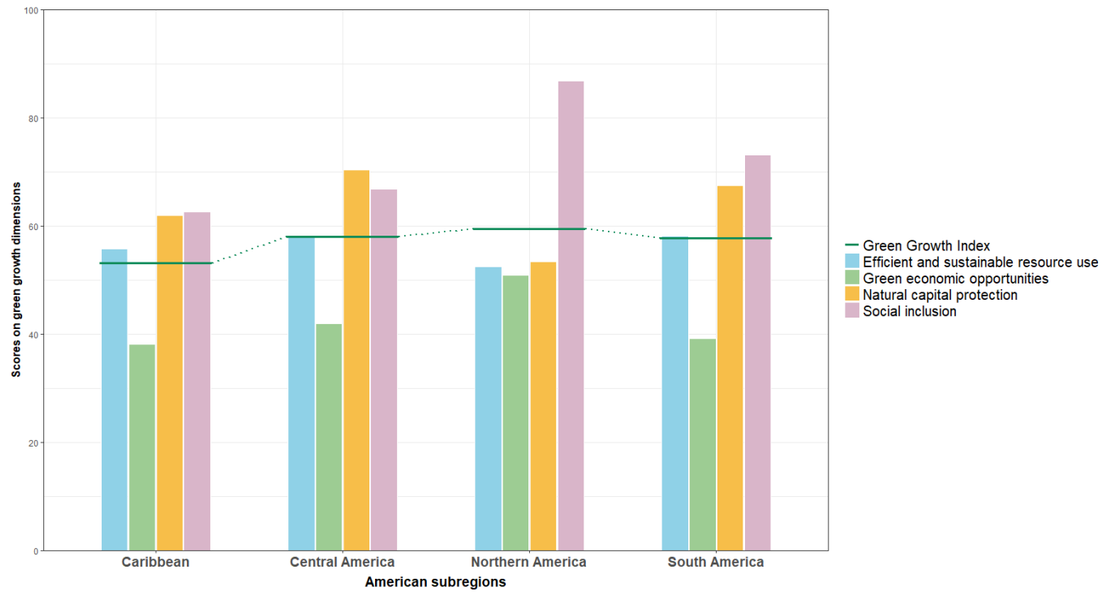
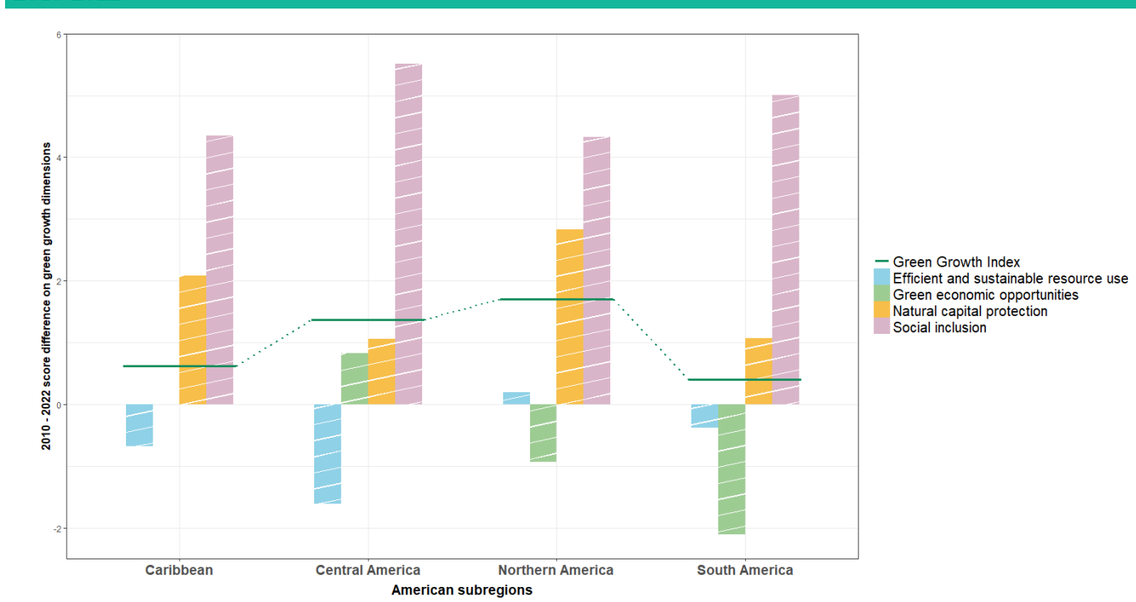


Figure 12. Score difference for the Green Growth Index and dimension subindices in the Americas subregions, 2010-2022



contribute to improving Green Growth Index scores in these subregions.

3.1.3 Asia

The subregions of Asia include Central, Eastern, South-eastern, Southern, and Western. Figure 13 and Figure 14 show that the Green Growth Index scores are similar across these subregions in 2010 and 2021. The scores ranged from 41.89 to 54.11 in 2010 and 45.91 to 57.16 in 2022. In most Asian countries, except for Yemen and Afghanistan, social inclusion continues to show the highest scores in 2022. The dimension of green economic opportunities decreased compared to 2010, particularly due to low green innovation, green investment, and green employment. Efficient and sustainable resource

use still shows negligible improvement from 2010 to 2022. Low scores were recorded in Uzbekistan in Central Asia and Iran, Syria, Iraq, and Yemen in Western Asia. However, most Central Asian countries showed growth in the Global Green Growth scores, with high scores in social inclusion. Across all regions in Asia, the scores for material use efficiency were high or very high, contributing to high scores in efficient and sustainable resource use. In the case of social inclusion, all regions benefited from high to very high scores in sustainable equality.

In 2022, Eastern Asia achieved the top score, primarily due to its very high performance in social inclusion and high natural capital protection. Japan and China were particularly noteworthy, securing the first and second places in the Green Growth Index, with high scores in natural capital protection and social inclusion. However, Eastern Asia struggled with low scores in green innovation, leading to poor performance in green economic opportunities. South-eastern Asia also made significant strides in the same year, with Laos and Thailand ranking third and fourth, mainly

Figure 13. Green Growth Index and dimension subindices in the Asian subregions, 2022

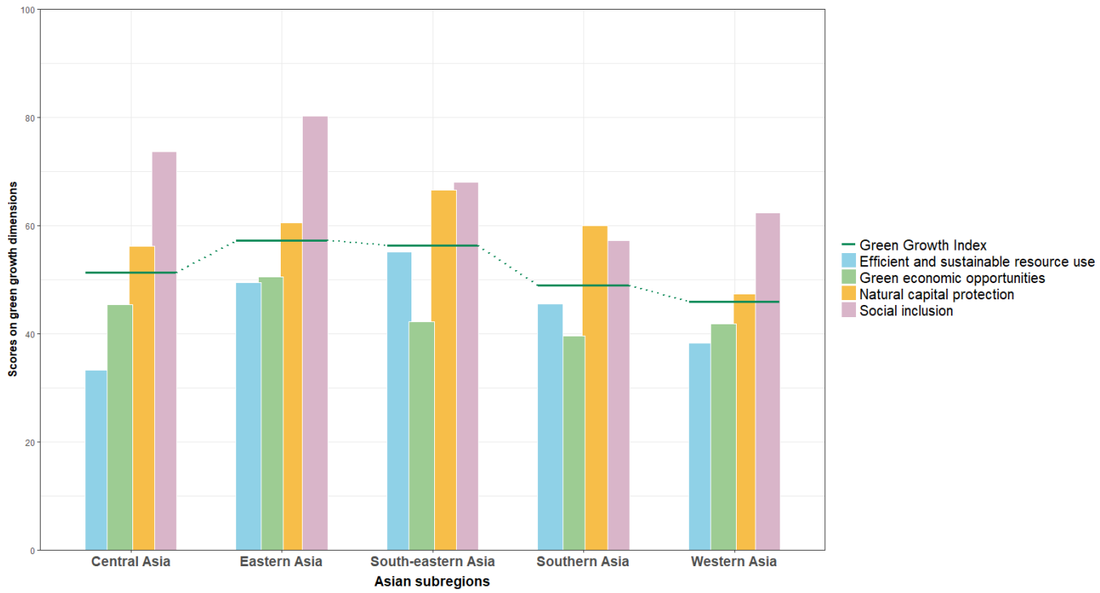
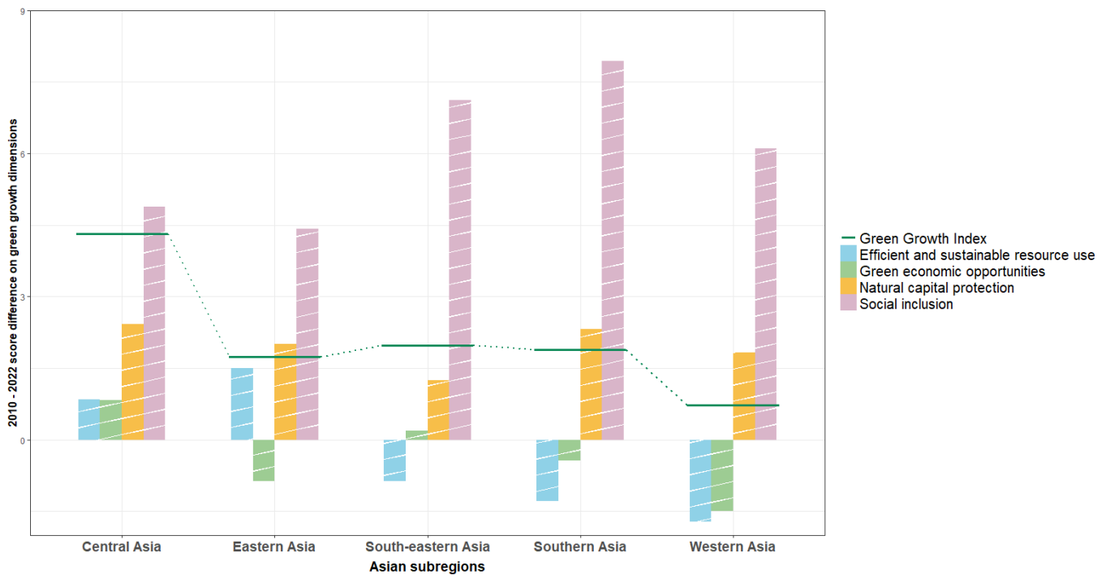


Figure 14. Score difference for the Green Growth Index and dimension subindices in the Asian subregions, 2010-2022



due to their high natural capital protection scores. A notable highlight was Cambodia, which showed considerable growth with an 11 percent increase, largely influenced by the rise in natural capital protection (Table 2). Very high scores in environmental quality and cultural and social value contributed to Cambodia's remarkable performance. On the other hand, Timor-Leste exhibited very low performance in green economic opportunities, mainly in green innovation and green investment pillars. In Western Asia, the United Arab Emirates saw a 14 percent growth, primarily attributed to high social inclusion scores. However, the efficient and sustainable resource use score remained low mainly due to the country's challenges in efficient and sustainable energy and water use. Overall, Southern and Western Asia demonstrated low efficient and sustainable resource use scores. In contrast, Southern Asia experienced growth in natural capital protection, driven by high scores in GHG emissions reduction. Notably, Bhutan in Southern Asia marked a very high score of 87.14.

Figure 14 shows that, except for Central Asia, all Asian subregions experienced a decline in scores in efficient and sustainable resource use, green economic opportunities, or both from 2010 to 2022. At the same time, green growth performance in these two dimensions was lower than natural capital protection and social inclusion across all subregions in 2022 (Figure 13) This indicates that efficient and sustainable resource use and green economic opportunities offer good potential for improving Asia's Green Growth Index scores.

3.1.3 Europe

Europe's Eastern, Northern, Southern, and Western subregions achieved the highest scores on the Green Growth Index, with scores above 60 ranging from 61.14 to 70.29 in 2022 (Figure 15). Western Europe, in particular, recorded very high scores, with Switzerland, Austria, and Germany taking the top three positions in the region. The most significant improvements were observed in the social inclusion and natural capital protection dimensions. Notably, scores in the latter dimension were exceptionally high across most European countries, especially in social equality, where all countries recorded very high scores.

However, in contrast to the high social inclusion scores, green economic opportunities scored significantly lower. This was particularly evident in Southern Europe, with Greece and Malta showing the lowest scores due to very low green employment and green innovation. It is also noteworthy that Northern Europe, despite high scores across all dimensions, had lower green employment and green innovation, indicating that improving these pillars could enhance their scores of green economic opportunities. All European countries, except Montenegro, showed moderate or high scores with respect to efficient and sustainable resource use (Tanle 2). Southern Europe faced challenges with efficient and sustainable water use; however, high scores in sustainable land use and material use efficiency contributed to moderate efficient and sustainable resource use scores. Natural capital protection scores were uniformly high across most European countries, mainly due to high environmental quality.

Figure 15 and Figure 16 indicate that in European subregions, areas such as green innovation, green trade, green jobs, and green investment stand out as key pillars of green growth. Moreover, these figures suggest that there is room for enhancing green growth performance through

Figure 15. Green Growth Index and dimension subindices in the European subregions, 2022

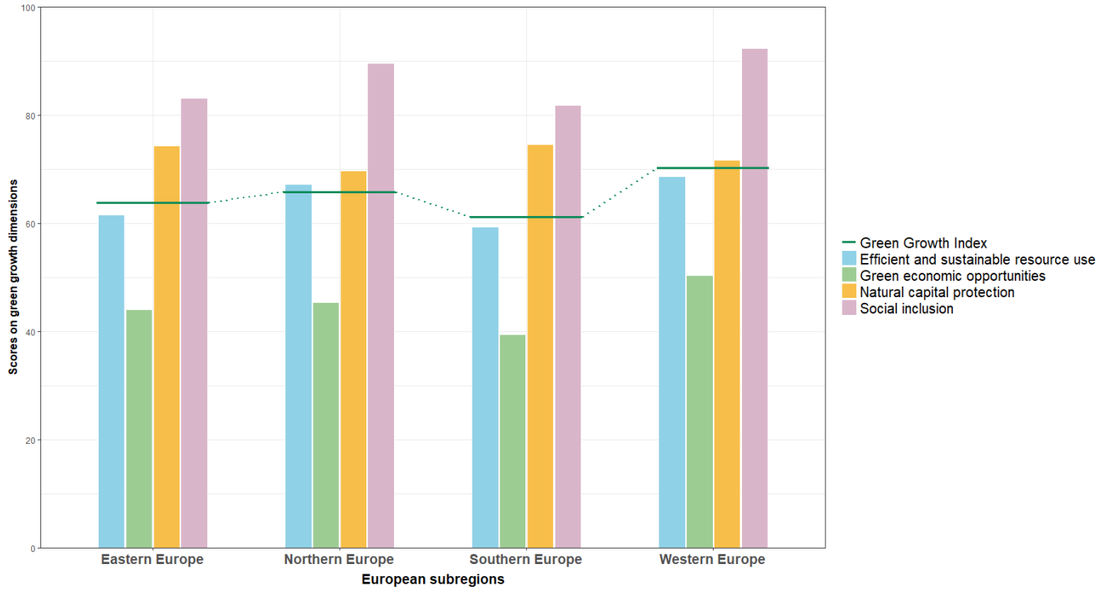
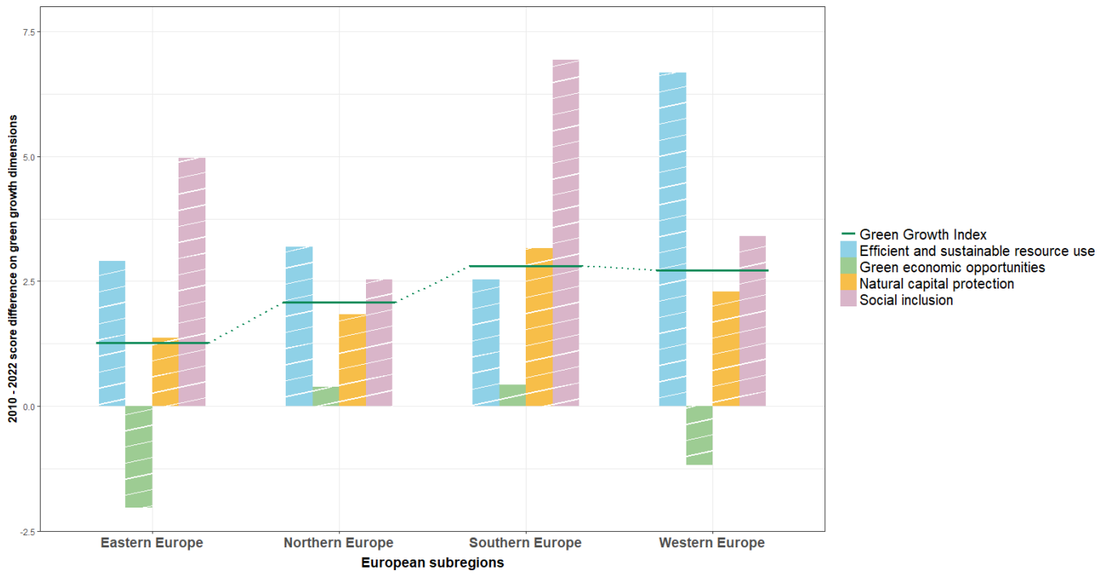


Figure 16. Score difference for the Green Growth Index and dimension subindices in the European subregions, 2010-2022



improvements in efficient and sustainable energy and water use, along with bolstering biodiversity and ecosystem protection in these subregions.

3.1.4 Oceania

Oceania has four subregions – Australia and New Zealand, Melanesia, Micronesia, and Polynesia. It is important to note that due to the data availability of Oceanian subregions, their comparison is limited in green economic opportunities, especially on green investment, green jobs, and green innovation (Figure 8). Moreover, Micronesia and Polynesia have limited data on efficient and sustainable resource use, particularly efficient water use. Micronesia has further data limitations on sustainable land use and material use efficiency. Therefore, due to challenges in data availability in many subregions in Oceania, analysis can be conducted only on a country level for Australia, New Zealand, Fiji, and Papua New Guinea (Figures 17 and 18). Except for Papua New Guinea, with a Green Growth score of about 43, these countries in Oceania had a score of around 60 in 2022. The changes in the score were very minimal for New Zealand and Papua New Guinea, at around 1 point.

The four Oceania countries scored high in efficient and sustainable resource use. However, while sustainable land use and material use efficiency showed high scores, efficient and sustainable energy and water use displayed only low scores. Natural capital protection was kept at moderate to high levels in all four countries, but Australia and New Zealand showed an extreme need for improvement in GHG reduction. Excluding Papua New Guinea, which had very low social inclusion scores, the other three countries ranked highest in this area. Fiji, in particular, has demonstrated remarkable growth in social inclusion since 2010. Papua New Guinea showed poor performance in gender balance and social protection, while New Zealand and Australia scored highly across access to basic services and resources, gender balance, social equality, and social protection.

Figure 8, Figure 17 and Table 2 highlighted that in Oceanian subregions, data availability across countries and over time is a significant challenge to tracking green growth performance. The regional assessment of data availability in section 6.2 also highlights the impact on the confidence level of the green growth dimension scores, where Oceania has a low confidence level in green economic opportunities and social inclusion.

Figure 17. Green Growth Index and dimension subindices in the Oceania subregions, 2022

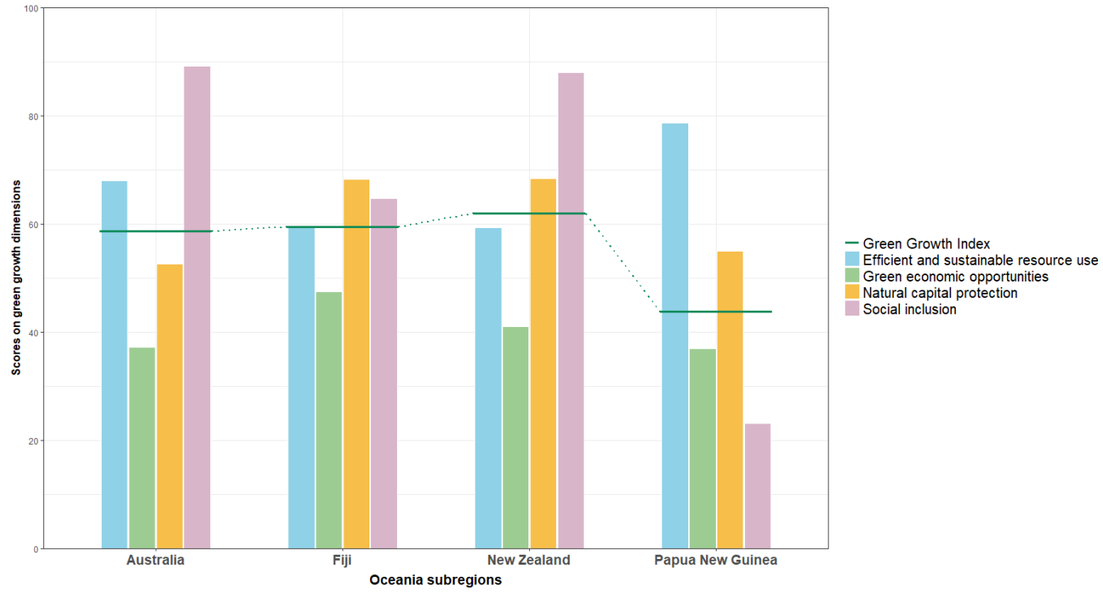
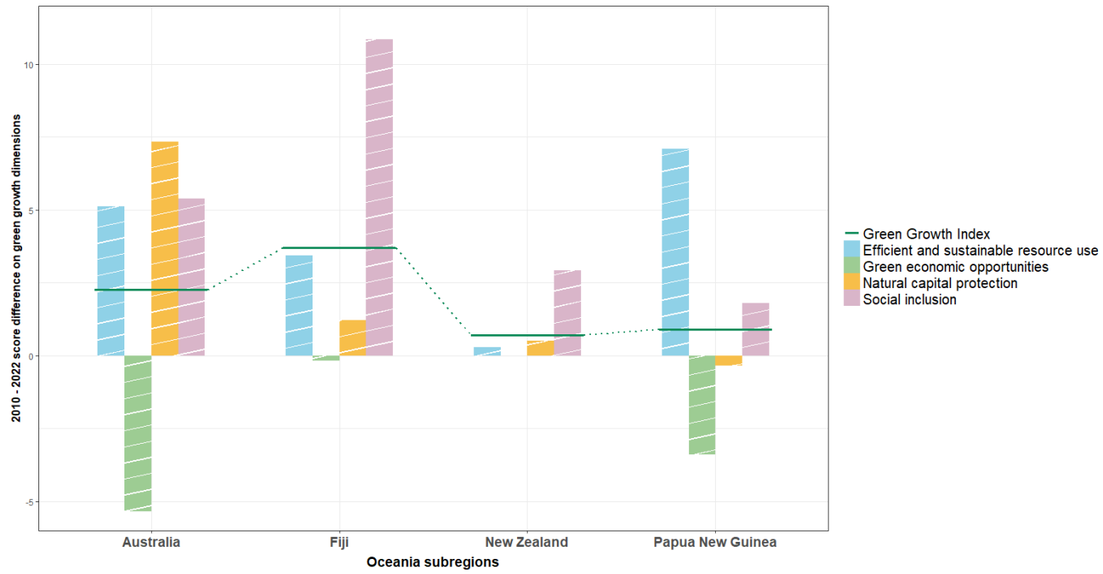


Figure 18. Score difference for the Green Growth Index and dimension subindices in the Oceania subregions, 2010-2022



3.2 Regional trend

3.2.1 Overall trend

Trend analysis is crucial for monitoring the countries' performances in the Green Growth Index. This analysis looks for patterns and highlights valuable information on green growth performance. Policymakers need to identify the factors influencing both upward and downward trends in the Green Growth Index and its dimensions. It enables them to pinpoint the specific green growth indicators that require immediate attention, make informed decisions, and plan strategically. Figure 19 illustrates the Green Growth Index scores by region from 2010 to 2022. Europe consistently held the highest global score in the Green Growth Index throughout this period, starting at 66.76 in 2010 and showing modest progress by reaching 68 in 2022. The European Union has been actively striving to foster green growth, and Europe's 6 percent increase in the Green Growth Index scores between 2010 and 2022 was slightly higher than in the Americas. The Americas recorded Green Growth Index scores from 56.43 to 57.27, reflecting upper moderate performance attributed to sustained efforts in environmental quality and social equality. Oceania marked the most notable score shift, ranging from 54.07 to 56, also within upper moderate levels. On the other hand, Africa and Asia consistently scored the lowest, with Africa slightly changing from 47.96 to 49.56 and Asia from 48.99 to 50.51, both in the lower moderate range. Despite this, both continents saw some growth in national capital protection and social inclusion.

3.2.2 Trend in dimensions

Figure 20 depicts regional trends from 2010 to 2022 across four green growth dimensions: efficient and sustainable resource use, natural capital protection, green economic opportunities, and social inclusion. While trends vary, the green economic opportunities dimension remains consistently below targets, showing stability or a decline, particularly in the Americas and Oceania. This dimension is a significant challenge to the green growth transition, with the lowest scores and minimal progress except in Asia.

On the other hand, all five regions demonstrate an upward trend in the social inclusion dimension. Social inclusion scores have risen systematically during the period from 2010 to 2022. This is especially true in regions with many developing countries like Asia, the Americas, and Africa. The increase in social inclusion scores can largely be attributed to the wide-ranging efforts at poverty reduction primarily centered around financial inclusion efforts. Financial inclusion has been crucial in combating poverty and income inequality by providing disadvantaged populations access to formal financial services. These efforts significantly reduced poverty and income inequality by promoting more equitable participation, access to resources, and overall societal welfare.[20]

Meanwhile, the trends for natural capital protection and efficient and sustainable resource use stood out for Africa.

Figure 19. Trend in Green Growth Index by region, 2010-2022

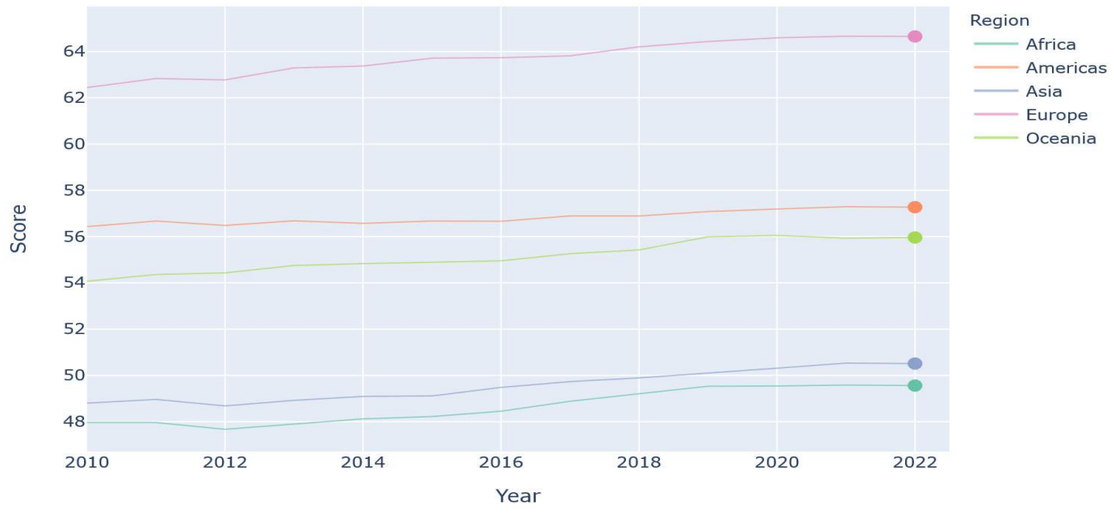
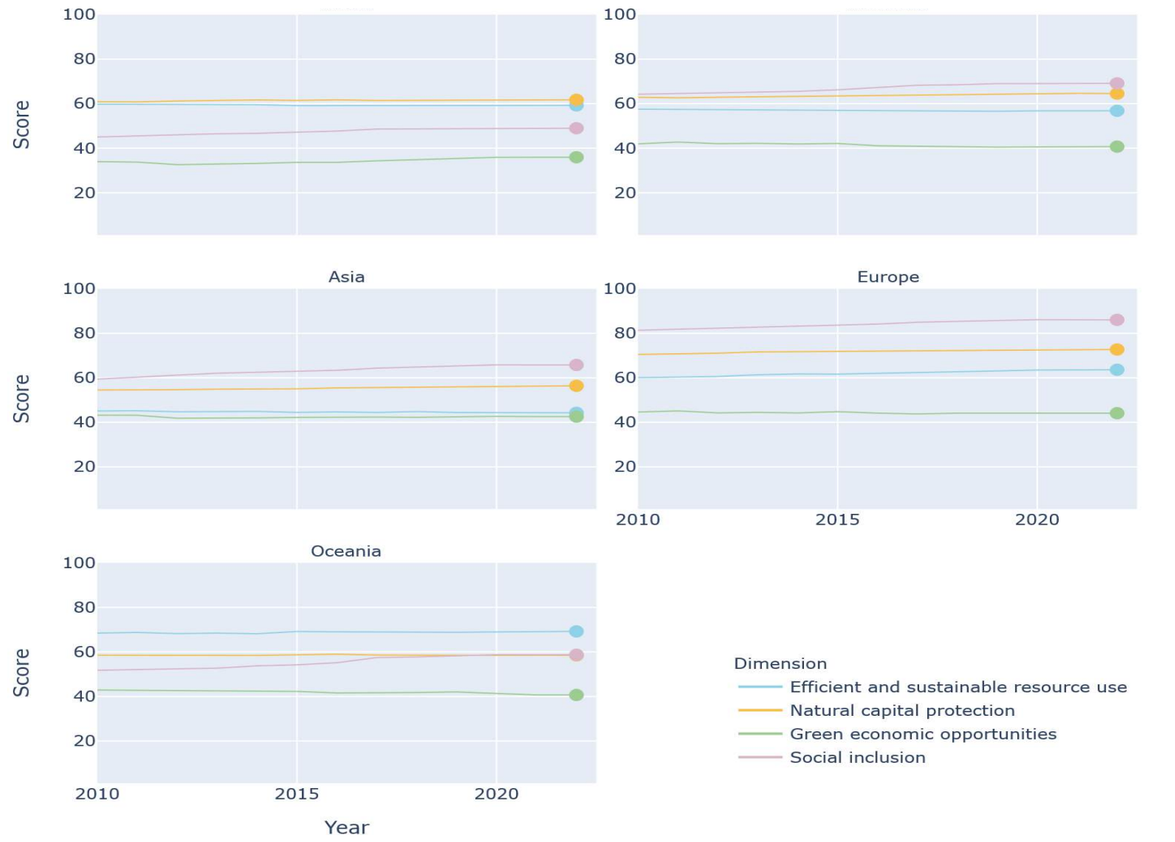


Figure 20. Trend in green growth dimensions by region, 2010-2022



Natural capital protection is the second green growth dimension, with the highest scores in all regions but Africa in the last decade. The depletion of natural capital can lead to substantial economic losses and hinder poverty reduction and SDGs.[21] The trends for natural capital protection and efficient and sustainable resource use indicate that the protection of natural capital has been one of the main contributors to enhancing green growth performances across regions. A comparison between Africa and Asia can serve as a good example. Africa has scored higher than Asia in natural capital protection due to its significant concentration of natural assets. The Sub-Saharan Africa region holds one of the highest proportions of natural assets in its wealth globally, necessitating special attention to resource management. Effective management can transform these assets into engines of economic transformation.[22] However, Asia usually prioritized industrialization over conservation, which accounts for over 50 percent of the world's total GHG gas emissions.[23]

Africa

Africa has made high progress in the social inclusion dimension, with a consistent increase of 15 percent in its score from 44.28 in 2010 to 50.99 in 2022 (Figure 20). This is higher than the trend in other dimensions. Nonetheless, there are still social inclusion issues that require improvement, as the score remains in the moderate range. The proportion of African youth completing upper-secondary or tertiary education is projected to reach 34 percent by 2040, up from 23 percent in 2020 and 18 percent in 2010. Africa has the world's youngest population, with a median age of 19 years, compared to 30 for Latin America and the Caribbean, 31 for developing Asia, and 42 for Europe. Africa acknowledges the importance of education as a fundamental development priority and places emphasis on providing equitable and inclusive access to education for people of all ages, promoting literacy among youth and adults, and fostering education that promotes global citizenship and sustainable development as integral components of its Education 2030 objectives. Gender balance is also a challenge, especially in Sub-Saharan Africa, where the gender gap in educational attainment is notable, with an overall parity score of 86 percent. While some countries have achieved gender parity in education, others lag behind.[24]

Africa's natural resources are significant assets for its natural capital protection. Natural capital accounts for 19 percent of Africa's total wealth, surpassing Latin America and the Caribbean (7 percent) and developing Asia (3 percent).

African forests have contributed positively to global carbon stock, increasing by 11.6 million kilotons of CO_2-equivalent net emissions from 2011 to 2020, while forests outside Africa experienced a decline of 13 million kilotons.[25]

Challenges in green economic opportunities in Africa are linked to the high cost of capital and a lack of reliable information, hindering investment in sectors such as renewable energy. The financial barriers to efficient and sustainable resource use are reflected in the spread of African Eurobonds and the high average cost of capital for energy projects. However, intra-Africa foreign direct investment has been resilient, particularly in renewable energies and Information and Communication Technologies (ICT), even during the COVID-19 pandemic. One of the critical areas requiring immediate attention in Africa is the provision of safe and affordable drinking water. In 2020, only 39 percent of Africa's population had access to safely managed drinking water, though this had increased from 36 percent in 2015. However, 411 million people, or three of every five individuals on the continent, still lacked access. North and Southern Africa showed the most progress, with 77 percent and 74 percent access rates, respectively, while Central Africa had the lowest access level at 22 percent in 2020.[26]

America

There has been progress in social inclusion and natural capital protection in the Americas. Specifically, the score in the former dimension increased from 69.14 to 71.66, and that in the latter dimension increased from 64.55 to 67.24 from 2010 to 2022. This represents an increase of 3.63 percent for social inclusion and 4 percent for natural capital protection (Figure 20). Most American countries showed relatively stable Green Growth Index scores during this period, except for generally lower scores in the green economic opportunities dimension. However, efficient and sustainable resource use, natural capital protection, and social inclusion scores ranged from moderate to high for most countries in the region.

Efficient and sustainable resource use scores have been slightly lower in the United States and Canada, and this can be attributed to several factors, primarily related to economic growth, energy consumption, and the utilization of natural resources.[27] Economic growth often leads to increased CO_2 emissions, contributing to environmental degradation. This correlation is particularly evident in industrialized countries like Canada and the United States, where industrialization results in substantial energy consumption and CO_2 emissions.[28] The more an economy grows, the more energy it consumes, especially if that growth is not coupled with efficient and sustainable resource-use practices. This trend is commonly observed in developed countries, including North America. The extraction and consumption of natural resources also play a significant role. In North America, there is intensive exploitation of natural resources due to economic development, which can negatively affect environmental sustainability.[29] While natural resources like forests reduce CO_2 emissions, they increase them more often, particularly when their extraction and use are not managed sustainably. Sustainable water use also received low scores, and without improvement, some areas in the United States are projected to face significant decreases in water supply by 2050.[30]

The trend in natural capital protection scores across the Americas region was generally moderate, but there is room for improvement in the biodiversity and ecosystems, especially in North America. One of the primary causes of biodiversity loss in North America has been habitat loss and degradation, including urban development, agricultural expansion, and industrial activities encroaching on natural lands, leading to significant declines in wildlife populations.[31]

The performance in the green economic opportunities dimension in the Americas remained consistently below the set targets and showed a generally stable trend, with a slight increase over time. However, low scores in green economic opportunities, including green investment and innovation, still indicate the need to improve performance in this dimension. Many economies in Central and South America often face limited access to green finance, high capital costs, and constraints due to balance-of-payments and fiscal imbalances, which limits their ability to finance green investments effectively. Additionally, numerous countries in Central and South America lack the necessary productive and technological capabilities to transition to green industries.[32] This includes a need for more diversification and competitiveness in high-tech goods, reducing import dependency for machinery and equipment needed to reduce emissions.[33] To overcome this, countries in Central and South America are making various efforts. Brazil, in particular, has experienced a surge in the issuance of green bonds in the past decade, totaling 5 billion USD by 2019. Brazil also is the largest green bond market in the region in terms of the number of bonds, issuers, and the total amount issued.[34] The Mexican government adopted a market-driven approach by conducting a national auction for solar PV, where contracts were awarded based on competitive pricing from all clean energy sources. However, this approach primarily attracted large foreign developers, which has limited the development of domestic renewable energy capabilities across the entire value chain.[35]

Asia

Asia has shown an upward trend in social inclusion, achieving a high-performance level with a 9.6 percent increase in its score, from 59.46 in 2010 to 65.17 in 2022 (Figure #). Eastern Asia's very high performance notably drives this improvement. Southern Asia has relatively lower scores in social protection, and many countries still need to adopt fully integrated, comprehensive, and inclusive social protection systems. Often, households and individuals rely on informal networks such as family, community, women's groups, savings cooperatives, and informal credit markets for social protection.[36] This reliance on informal networks highlights a gap in formal social protection systems. The substantial reduction in extreme poverty across many Asian countries is largely attributed to rapid economic growth and focused poverty alleviation programs.[37] These include investments in infrastructure, education, healthcare, and initiatives targeting the poorest communities and supporting small and medium-sized businesses.[38]

The region's progress in the natural capital protection dimension has been slow, maintaining a moderate level. While most Asian countries show moderate to high performance, the slight overall improvement is limited by reduced GHG emissions across almost all subregions. Progress has been consistently below targets in the green economic opportunities dimension in the region. In 2010 and 2022, the scores remained in the same range, at about 42.56. However, some Asian countries are putting efforts in place to improve performance in green economic opportunities. For example, Japan's green innovation efforts are centered around its ambitious Green Growth Strategy on decarbonizing the electric power sector and electrifying other sectors, leveraging renewable energy, hydrogen power, and digital technology to enhance energy efficiency. Additionally, Japan has established a substantial Green Innovation Fund, amounting to 2 trillion Yen, to support ambitious R&D and the implementation of green technologies over the next decade.[39]

The trend in efficient and sustainable resource use is slightly declining, primarily due to energy efficiency and water management issues, particularly in Central Asia, Southern Asia, and Western Asia. Central Asian countries struggle with a water crisis caused by limited rainfall, droughts, and inefficient water use, impacting their development.[40] In Southern Asia, about 1.5 billion people face water stress and scarcity, exacerbated by climate change and high demand, especially in the Ganges-Brahmaputra basin.[41] Western Asia likely encounters similar challenges due to resource limitations and the impact of climate change on water sustainability. These issues underscore the need for better water management practices and policies to enhance water efficiency and sustainability in these regions.[42]

Europe

Europe's trends in all dimensions are rising slightly and more significantly than other regions. The region consistently achieved very high performance in the social inclusion dimension, increasing by 6.27 percent from 80.97 in 2010 to 86.05 in 2022 (Figure 20). The increasing trend can be attributed to the improvements across all green growth pillars in many Eastern European countries. The rise in gender equality scores in Europe is mainly due to the European Commission's Gender Equality Strategy 2020-2025[43], which focuses on ending gender-based violence, closing labor and pay gaps, and achieving gender balance in decision-making. This comprehensive approach includes gender mainstreaming and targeted actions across all EU policy areas, emphasizing intersectionality and societal participation. Additionally, EU Member States have implemented measures to support victims of violence and combat domestic violence, especially during the COVID-19 pandemic, further advancing gender equality goals.[44]

Europe's moderate increase in the trend in the natural capital protection dimension is closely linked to the varied success and complex nature of its GHG reduction efforts. Despite ambitious targets, such as reducing emissions by 55 percent by 2030 and achieving net zero by 2050, the actual pace of reduction has been inconsistent, with sectors like transport and buildings witnessing post-pandemic emission increases. The reliance on technologies such as electrification and energy efficiency has been effective but not universally applied across all sectors.[45] Additionally, the effectiveness of carbon sinks in the land, land use change, and forestry (LULUCF) sector has declined due to increased wood demand and natural disturbances. To reverse the declining trend, the EU has introduced a range of policies, including the 'Fit for 55' package and revised targets for renewable energy and energy efficiency.

Europe also recorded progress in the efficient and sustainable resource use dimension, increasing by six percent from 60.48 in 2010 to 63.62 in 2022. The European Commission's Circular Economy Action Plan is a key framework aiming to reduce pressure on natural resources and create sustainable growth and jobs, which are essential for achieving the EU's 2050 climate neutrality target and halting biodiversity loss. It focuses on moving away from the linear "take-make-use-dispose" model to a regenerative growth model, keeping resource consumption within planetary boundaries. Germany is leading this progress with policy initiatives that include ending natural gas production from the Groningen field by mid-2022 to reduce gas demand and transitioning to alternative energy sources, alongside a broad framework of supporting policies under the 2019 Climate Agreement to meet its 2030 and 2050 emissions targets. Moreover, the EU has embarked upon a Roadmap to a Resource Efficient Europe under its EU 2020 Strategy for Smart, Sustainable, and Inclusive Growth, aiming to transform Europe's economy into a sustainable one by 2050. This transformation is expected to benefit many sectors, from waste and industrial production to food and agriculture, by maximizing resource productivity and minimizing resource extraction and waste generation.[46]

In Europe, the trend of green economic opportunities has generally remained stable. From 2010 to 2022, the scores remained in the same range, both in 2010 and 2022, when the scores were consistently 44.11, yet consistently fell short of the set goals. Despite this, the region maintained the highest score in this dimension, a trend that persisted over the past ten years. The European Union's Carbon Border Adjustment Mechanism (CBAM) is a key initiative in its green trade efforts, aiming to level the playing field for EU producers by imposing a carbon price on imports of certain goods from less regulated outside markets. This system is designed to encourage cleaner production outside the EU and align with the phase-out of free allowances under the EU Emissions Trading System (ETS), thereby supporting the decarbonization of the EU industry.

Oceania

Oceania was the only region with consistently high performance in the efficient and sustainable resource use dimension between 2010 and 2022 but generally remained stable. From 2010 to 2022, the scores remained in the same range, from 69.37 in 2010 to 69.22 in 2022 (Figure 20). This promising trend was attributed to increased efficient and sustainable land use scores in Australia and Melanesian countries.

Australia achieved the highest ranking due to its exceptionally high ratings in sustainable land use. Oceania hosts half of the world's 72.3 million hectares of organic agricultural land, with 35.7 million hectares in Australia. Meanwhile, Papua New Guinea is actively implementing progressive land use policies. In Papua New Guinea (PNG), sustainable land use has been a focus, with the United Nations Development Programme (UNDP) supporting the government to harmonize land use sector-based legislation as part of the National REDD+ Strategy 2017-2027.[47] This strategy, endorsed by the government in 2017, aims to reduce emissions from deforestation and forest degradation. Additionally, the PNG government recognizes land use planning as a national priority and an essential component of the country's customary land tenure system.

Oceania experienced a marginal decline in natural capital protection, decreasing by 0.3 percent from 58.68 in 2010 to 58.45 in 2022. The region's performance largely remained moderate over the past decade. This decline is mainly due to significant drops in environmental quality indicators in New Zealand and Australia, with particularly low scores in GHG emissions reduction contributing to this trend. Australia and New Zealand have faced challenges in reducing GHG emissions. Australia's high per capita emissions are attributed to its significant reliance on coal and a slow transition to renewables, with only 21 percent of its electricity from renewable sources in 2019. In contrast, despite having a higher percentage of renewable energy, New Zealand struggles with agricultural emissions, mainly from livestock. However, Fiji performed well in this dimension due to very high scores in environmental quality and GHG emission reductions.[48]

The region experienced the most significant improvement in the social inclusion dimension, increasing by 15 percent from 51.21 in 2010 to 58.71 in 2022. The rise in social inclusion can be attributed to increased access to basic services and resources across all countries and a moderate increase in scores for the gender balance category. The most significant increases were observed for gender balance in Micronesia and Polynesia. For example, Fiji's rise in social equality scores is mainly due to 83.3 percent of its legal frameworks under the SDGs that promote gender equality and focus on preventing violence against women.[49,50] Efforts like the Fiji Country Gender Assessment Report and the Gender Equity and Social Inclusion Policy 2021-2024 further demonstrate the country's commitment to gender equality and integrating these principles across government plans and processes.[51]

Similar to other dimensions, the trend in green economic opportunities has remained consistently under its goals, showing a minor decline of 1 percent from 40.4 in 2010 to 40.66 in 2022. This is mainly due to the lowest score in green jobs and green investment. Australia and New Zealand have not fully realized their potential in green jobs and investments, primarily due to a lack of solid and consistent incentives for green energy financing. Despite having considerable renewable resources, they have historically lagged in renewable energy usage and green energy investment, attributed to political interests, regulatory challenges, and issues in designing electricity markets that support energy transition.[52]

3.2.3 Selected regional economic groups

This section analyses the green growth performance in selected economic groups, including the EU, North American Free Trade Agreement (NAFTA), Mercado Común del Sur (MERCOSUR), Common Market for Eastern and Southern Africa (COMESA), Association of Southeast Asian Nations (ASEAN), and South Asian Association for Regional Cooperation (SAARC). One important criterion for their selection is the lack of overlapping country memberships (Box 3), avoiding overestimating performance measurement. In addition, these economic groups are among the most important in terms of regional economic integration. The EU has the most significant number of member countries but with the least land area. After the EU, SAARC has the smallest land area but the largest population, with 1.9 billion people. NAFTA has the largest land area with 20 million km2 and a GDP of 27 trillion USD in 2022. Moreover, it also has the largest per capita GDP of about 54 thousand USD. COMESA, although having the third largest land area and population, has the lowest GDP of about 910 million USD and per capita GDP of 1.53 thousand USD. ASEAN has the third largest member countries with the third lowest GDP.

Figure 21 illustrates that the EU outperformed NAFTA in terms of green growth performance between 2010 and 2022. Furthermore, the EU exhibited a higher rate of improvement in Green Growth Index scores compared to NAFTA during this period. Despite NAFTA having a slightly higher score than the EU in green economic opportunities, the EU, in the same year, achieved significantly higher scores in social inclusion, natural capital protection, and efficient and sustainable resource use. This contrast can be clarified by examining the country-specific pillar scores. NAFTA's more

robust performance in green economic opportunities can be attributed to the higher score for green employment in the United States, which, at 76.29, surpasses the EU average.

In contrast, the EU's better performance in the remaining three dimensions can be attributed to the contributions of various countries within the EU. For instance, Switzerland, Austria, and Germany, with scores above 75, played a significant role in the EU's overall strong performance in efficient and sustainable resource use. The pillars primarily responsible for this achievement were efficient and sustainable water use and sustainable land use. Austria, Slovakia, Croatia, Czech Republic, Albania, and Germany, with scores exceeding 80, made substantial contributions to the EU's high performance in natural capital protection, particularly in reducing GHG emissions and preserving biodiversity and ecosystems. Switzerland, Austria, Germany, Denmark, Sweden, the United Kingdom, Finland, Norway, the Netherlands, France, Belgium, and Spain were the leading performers in the EU for social inclusion, with scores exceeding 90. The pillars contributing to this high performance in social inclusion encompassed access to essential resources and services and social equity.

Over the decades, the Green Growth Index scores for NAFTA and MERCOSUR have grown within a similar range.

Figure 21. Trend in Green Growth Index scores in selected economic groups, 2010-2022

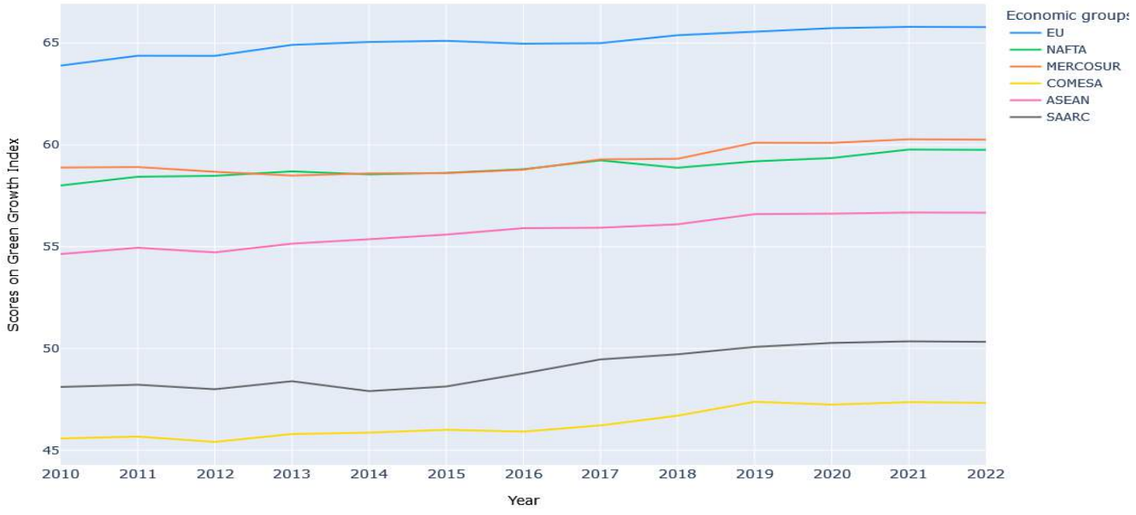
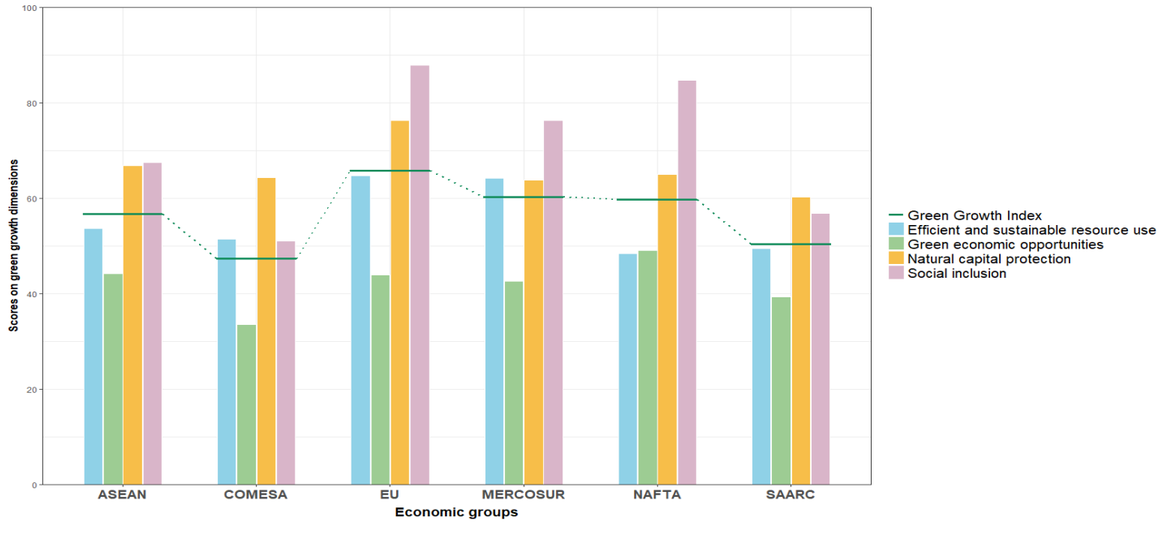


Figure 22. Green Growth Index and dimension subindices in the economic groups, 2022



Interestingly, between 2012 and 2017, the scores for both groups were nearly identical. However, since 2017, NAFTA has held a slight advantage. Specifically, NAFTA clearly held a distinct advantage in social inclusion, green economic opportunities, and natural capital protection, with notably higher scores, especially in the green economic opportunities dimension. This was attributed to NAFTA's better performance in green trade and green employment. In contrast, MERCOSUR continued to outperform NAFTA in 2022 in terms of efficient and sustainable resource use, demonstrating higher average scores in efficient and sustainable energy, water, and land use compared to NAFTA member countries.

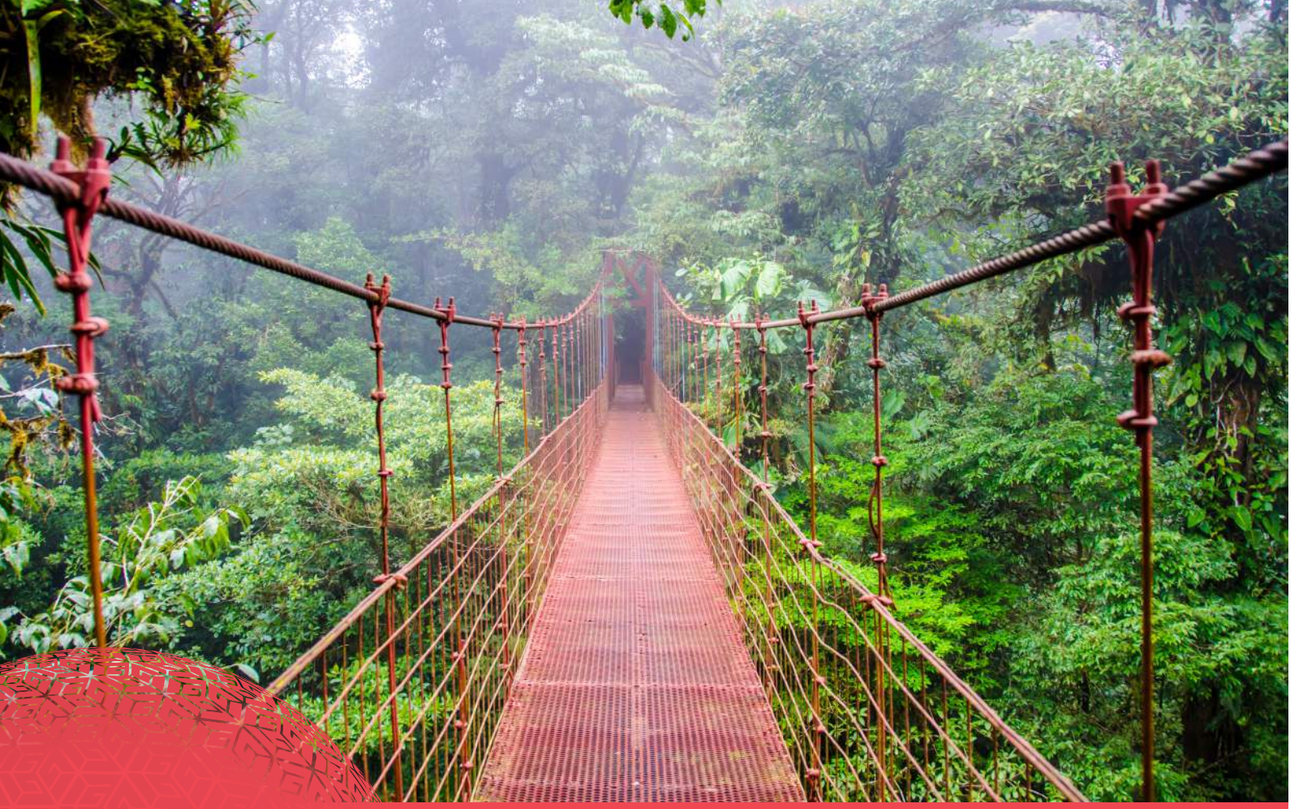
From 2010 to 2022, ASEAN maintained a trend of moderate to high scores, showing gradual growth over the years. In 2022, ASEAN exhibited exceptional natural capital protection and social inclusion performance. On the other hand, SAARC experienced a trend of low to moderate scores from 2010 to 2022, with gradual improvement. In 2022, when compared to SAARC, ASEAN outperformed it in all four dimensions, with a significant difference noted in social inclusion. This difference can be attributed to disparities in access to basic services and resources, gender balance, and social protection. Afghanistan and Pakistan recorded low social protection scores of less than 25.

From 2010 to 2022, COMESA and SAARC were the least-performing economic groups, both receiving low scores. Regarding the Green Growth Index, COMESA scored lower than SAARC overall. However, at the dimension level, COMESA outperformed SAARC in natural capital protection and efficient and sustainable resource use. At the indicator level, COMESA achieved higher average scores in efficient and sustainable water and land use, with 38.95 and 68.68, respectively. In contrast, SAARC scored lower on these indicators, with 29.55 and 54.21, respectively. Worth noting is that while COMESA showed relatively high performance in access to basic resources and services, SAARC performed lowest in the same indicator, with a score of 41.08. Nonetheless, several countries in COMESA had scores below 20, including Madagascar, Zambia, Eritrea, the Democratic Republic of Congo, and Burundi.

Box 3. Characteristics of selected economic groups, 2022

Economic blocks*	Number of countries	Year of founding	Total land area (million km²)	Total population (million people)	Total GDP (trillion current USD)	GDP per capita (thousand current USD)
EU	27	1993	4.00	447.20	17.18	38.41
NAFTA	3	1994	20.06	496.84	26.58	53.49
MERCOSUR	4	1991	11.67	270.27	2.20	8.12
COMESA	19	1994	10.81	595.08	0.91	1.53
ASEAN	10	1967	4.39	673.99	3.35	4.97
SAARC	8	1985	4.77	1,901.91	4.09	2.15

*Members:
European Union (EU): Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, and Sweden
North American Free Trade Agreement (NAFTA): Mexico, Canada, and United States
Mercado Común del Sur (MERCOSUR): Argentina, Brazil, Paraguay, and Uruguay
Common Market for Eastern and Southern Africa (COMESA): Burundi, Comoros, Dem. Rep. of Congo, Djibouti, Arab Rep. of Egypt, Eritrea, Ethiopia, Kenya, Libya, Madagascar, Malawi, Mauritius, Rwanda, Seychelles, Sudan, Eswatini, Uganda, Zambia, and Zimbabwe
Association of Southeast Asian Nations (ASEAN): Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam
South Asian Association for Regional Cooperation (SAARC): Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka



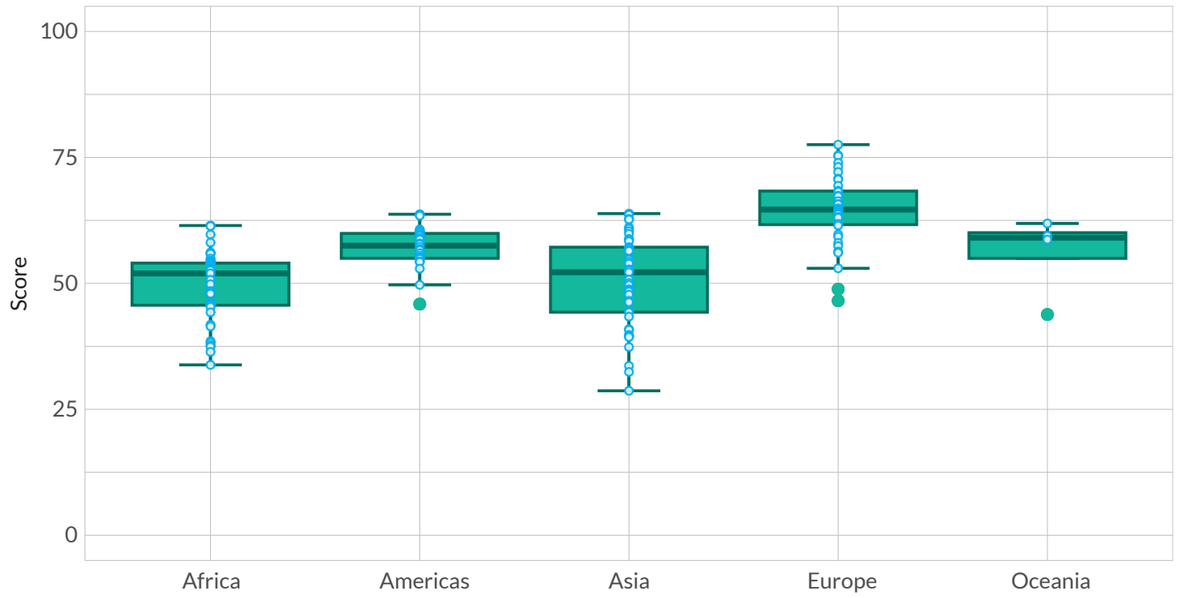
4 Country Performance

4.1 Country Distribution

The Green Growth Index scores of the countries by region are presented in the boxplot diagram in Figure 23. The scores for most European countries gather around the high range of scores, between 60 and 80, in 2022. This contrasts with the African and Asian countries, whose scores gather around the moderate range, between 40 and 60. There were six African countries with scores below 40, including Madagascar, Sudan, Egypt, DR Congo, Central African Republic, and Libya. Compared with Africa, more countries in Asia had scores below 40. These Asian countries include Pakistan, Afghanistan, Bahrain, Kuwait, Iran, Iraq, Yemen, and Syria. Gabon and Cabo Verde were the only African countries with scores above 60, showing a high green growth performance. In Asia, Japan and China were the countries reaching high scores but also the countries Laos, Thailand, Bhutan, Georgia, and Nepal showed scores above 60. The scores for the Americas and Oceania countries tended to split above and below 60, corresponding to high and moderate performance, respectively. In Oceania, Papua New Guinea's score was located farther away from the other scores in the scatter diagram. Trinidad and Tobago and Barbados were farthest from the other countries in the Americas. Nonetheless, these countries in Oceania and the Americas performed moderately, unlike many countries in Africa and Asia, which showed low performance. The outliers in Europe are Malta and Montenegro Malta, but both have scores above 40, i.e., 48.86 and 46.55, respectively.

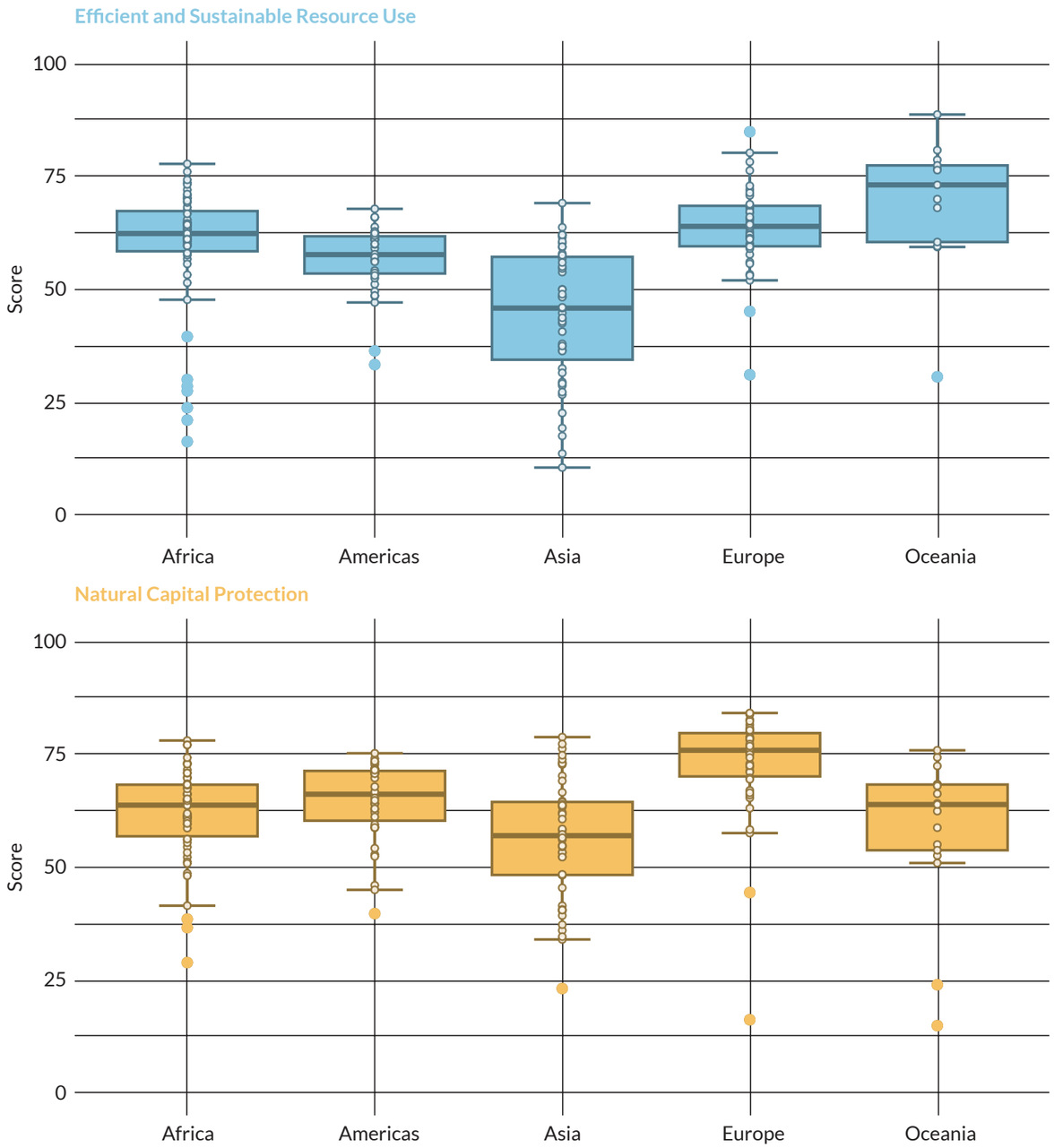
Figure 24 presents the distribution of country scores for the four green growth dimensions and reveals more information on the green growth performance of other countries in Oceania. While country performance in Oceania for social inclusion and natural capital protection dimensions approaches those in other regions, it tends to follow the distribution of European countries as far as efficient and sustainable resource use is concerned. Unfortunately, Oceania countries continue to lack data on green economic opportunities. Generally, the countries in Europe performed better in natural capital protection than other countries, albeit there is one outlier, Monaco, with a very low score of only 16.19. This is almost as low as the lowest value of 14.88 for Guam in Oceania. Notably, while many European countries have better scores on green economic opportunities, they also have low scores, like most countries in other regions. The European countries excelled in social inclusion, with high and very high scores, without any country outliers. This region is approaching the sustainability goal of leaving no one behind. On the other hand, this remained a significant challenge in many countries in Africa as many of them remain to have low and a few others even very low

Figure 23. Distribution pattern of country scores for the Green Growth Index by region, 2022



performance in social inclusion. The three African countries with very low scores for social inclusion include the Central African Republic, Guinea-Bissau, and Chad. Haiti is an outlier in the Americas region in terms of social inclusion, with a score of 39.4. The distribution of scores was promising for natural capital protection, where countries across regions, including Africa, tended to gather at the upper end of the scatter diagram, closer to the sustainability targets.

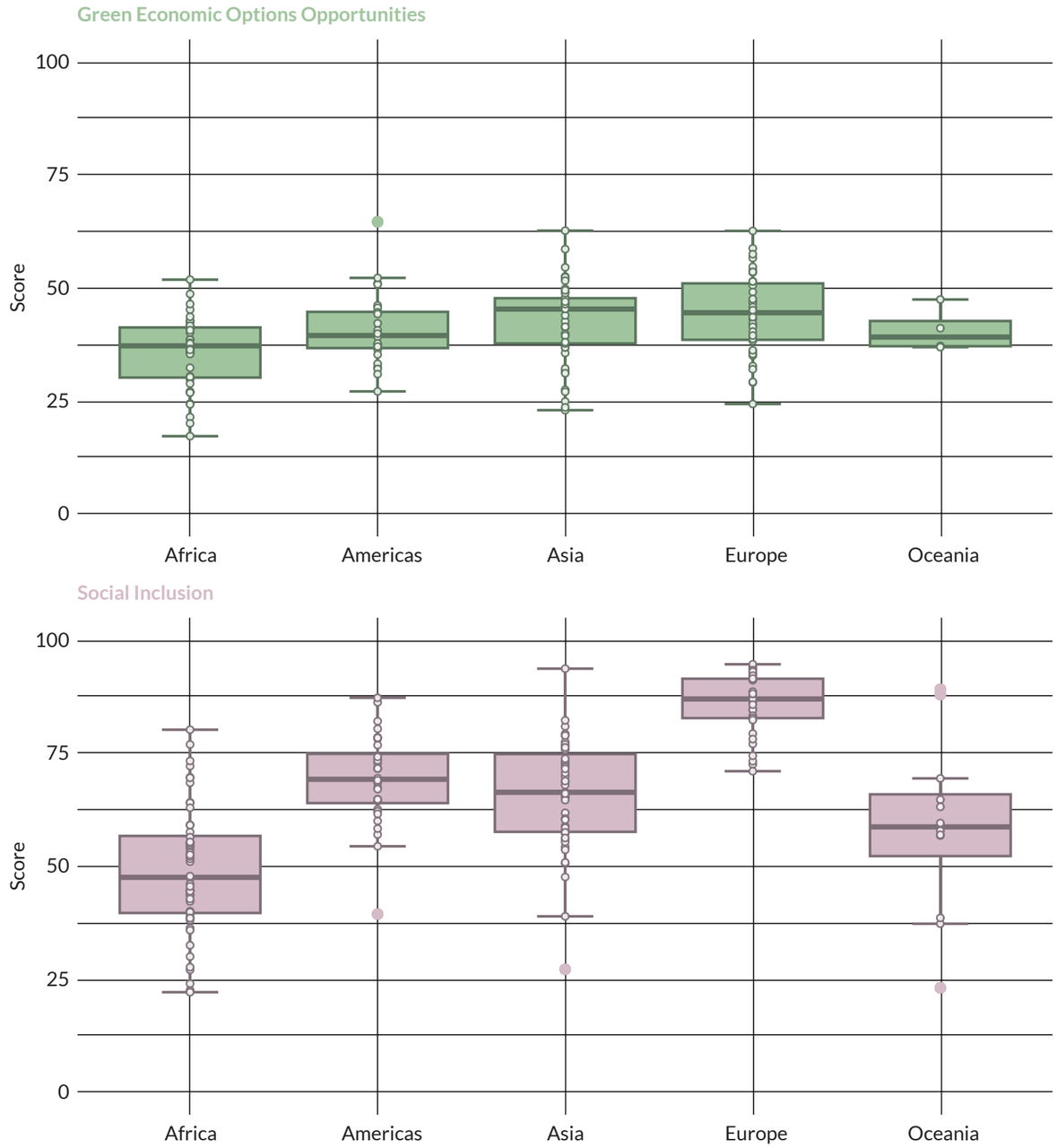
Figure 24. Distribution pattern of country scores for the green growth dimensions by region, 2022



Dimensions:

Efficient and sustainable resource use | Natural capital protection

Figure 26. Distribution pattern of country scores for the green growth dimensions by region, 2022 *(continued)*



Green economic opportunities | Social inclusion

4.2 Best performers by region

In the 2022 Green Growth Index, the top-ranking countries by region were Switzerland in Europe with a score of 77.53, Japan in Asia with a score of 65.85, The United States of America in the Americas with a score of 63.72, New Zealand in Oceania with a score of 61.89, and Gabon in Africa with a score of 61.49. Figure 19 shows the scores of these countries for the different green growth pillars, which contributed to their overall top performance in their respective regions. The indicators were benchmarked against the sustainability targets. The circular diagrams in Figure 25 thus show the distance to targets in each pillar, where a score of 100 indicates that a target was reached.

Switzerland had a very high green growth performance, topping not only the regional ranking but also the global one. It progressed closer to achieving all its targets in social inclusion (Figure 25), reflected by a dimension score of 94.01 (Table 2). However, Switzerland occupied only the second rank in social inclusion, with Sweden occupying the first rank with a score of 94.69. Nonetheless, Switzerland overtook Sweden's very high performance in the other three green growth dimensions. Switzerland's performances in efficient and sustainable resource use and natural capital protection dimensions were at 84.90 and 79.97, respectively, in 2022. Although Switzerland has the highest European score for efficient and sustainable resource use, it only ranked 11th in natural capital protection. Switzerland's opportunities to further improve its performance in natural capital protection would be in biodiversity and ecosystem protection (BE), where the score is currently only at 63.4. The specific indicators to create these opportunities in this dimension would be the proportion of terrestrial, freshwater, marine, and mountain KBAs in protected areas (BE1) and above-ground biomass stock in the forest (BE3). Switzerland had a moderately high score of 56.62 in green economic opportunities in 2022 and ranked 4th in the region and 7th globally. Its lowest-performing indicator is in green employment (GJ), with a score of 50.69, but it ranks 6th in Europe on this indicator. Improvement is necessary in green trade, where Switzerland, with a score of 61.62, ranked only 32nd in Europe.

Japan leads in Asia's green growth performance in 2022. Like Switzerland, it performed best in social inclusion, almost reaching the social equity (SE) target with a score of 96.05 in 2022 (Figure 25). Although the scores in access to basic services and resources (AB) and social protection (SP) were also very high (87.48 and 88.42, respectively), Japan had only a moderate score of 48.6 in gender balance (GB). Japan's overall performance in social inclusion resulted in a score of 77.52, corresponding to the 7th rank in Asia (Table 2). The environmental quality (EQ) score of 87.45 is the highest in the natural capital protection dimension, but opportunities are available to improve the performance in this dimension by increasing the scores for cultural and social value (CV) and biodiversity and ecosystem protection (BE), which are currently at 52.92 and 64.13, respectively. Japan occupies the 9th rank in natural capital protection in Asia. For green economic opportunities, it ranked 10th with a score of 49.29. At the indicator level, Japan scored the lowest in green employment (GJ), scoring only very low at 32.23. The country's efficient and sustainable resource use performance is 61.95, corresponding to the fifth highest in Asia. In this dimension, Japan can improve performance in efficient and sustainable energy and water use, with moderate scores of 55.32 and 49.85, respectively.

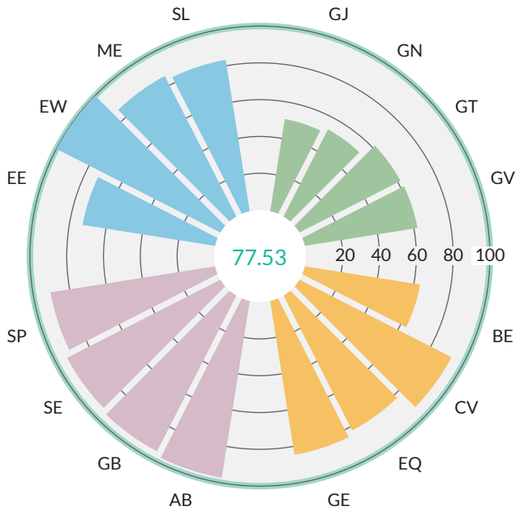
The **United States of America** (**USA**), the leader of the Americas region, shows high green growth performance with a score of 63.72 and ranks 28th globally, after 26 European countries and Japan. The USA's performance in green economic opportunities measures 64.64 and is highest in the region and globally (Table 2). The green employment (GJ) score of 76.29 is the highest in the region and second highest globally after China, but opportunities are available to improve the performance in this dimension by increasing the scores for green innovation (GN) and green trade (GT), which are currently at 53.61 and 71.58, respectively. Particularly, data is missing on installed renewable energy-generating capacity (GN3) and Water virtual trade flows (GT3). It scored 86.27 for social inclusion in 2022 (Figure 25), with very high scores for all pillars in this dimension. However, it only occupied the second rank after Canada in social inclusion. The country's efficient and sustainable resource use performance is only 47.08, corresponding to one of the lowest in the Americas. It can improve its efficient and sustainable water use (EW) score of 37.27. This is particularly the case for the indicators on water use efficiency (EW1) and sustainable fisheries (EW3), scoring very low. In natural capital protection, the USA ranks 27th in the region. The performance in this dimension can be improved by scoring better on greenhouse gas emissions reduction (GE) and biodiversity and ecosystem protection (BE), which currently show 50.78 and 52.96, respectively.

New Zealand leads in 2022 in the ranking on green growth performance in Oceania. It scored 87.98 for social inclusion in 2022 (Figure 25), with very high scores for all pillars in this dimension. However, it only ranked second after Australia in social inclusion (Table 2). The country also had a high performance in natural capital protection, occupying the 1st and 2nd ranks in cultural and social value (CV) and biodiversity and ecosystems protection (BE), respectively, in Oceania. Green growth performance can be improved in GHG emissions reduction (GE), scoring low at 48.60 and corresponding to 13th rank in the region. However, opportunities lie in improving scores for efficient and sustainable resource use and green economic opportunities. New Zealand can still improve its score for efficient and sustainable water use (EW) of 40.71. This is particularly the case for the indicators on water use efficiency (EW1) and sustainable fisheries (EW3), scoring very low. Similarly, increasing scores for sustainable use of land (SL) will give New Zealand the opportunity to catch up with Australia and Fiji. Regarding green economic opportunities, New Zealand ranked second in the region. However, it performs very poorly in green employment (GJ), with a score of 22.4.

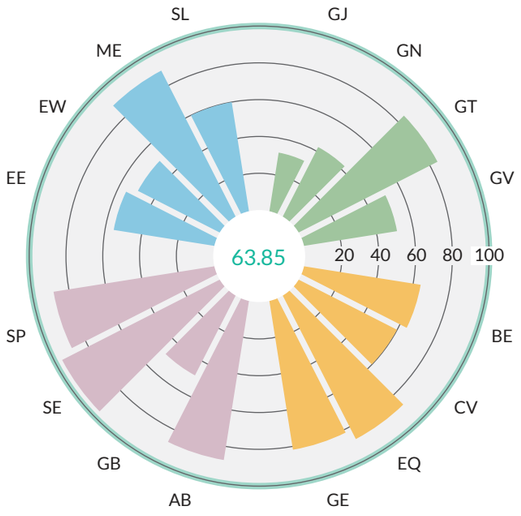
Gabon had an overall Index score of 61.48, only a few points away from New Zealand's due to its relatively high scores in several dimensions, except for green economic opportunities. Specifically, it ranked first in efficient and sustainable resource use and 6th in natural capital protection in Africa (Figure 25). With a score of 77.78 in efficient and sustainable resource use, it outperforms all the top-performing countries in other regions, except for Switzerland in Europe. Regarding social inclusion, it had moderate performance in social protection (SP) and gender balance (GB), with scores of 41.20 and 51.46, respectively. Specific indicators relating to universal health coverage (SP2) and equal gender pay (GB3) pushed the scores down for the country. Creating green economic opportunities will help further improve the country's green growth performance. Green innovation had a very low score of 24.3, and Gabon lacks green employment (GJ) data on the indicator share of green manufacturing employment in total manufacturing employment (GJ1), which hinders a more accurate comparison of its performance vis-à-vis top-performing countries in the other regions.

Figure 25. Distance to targets of green growth indicators in top-performing countries by region, 2022

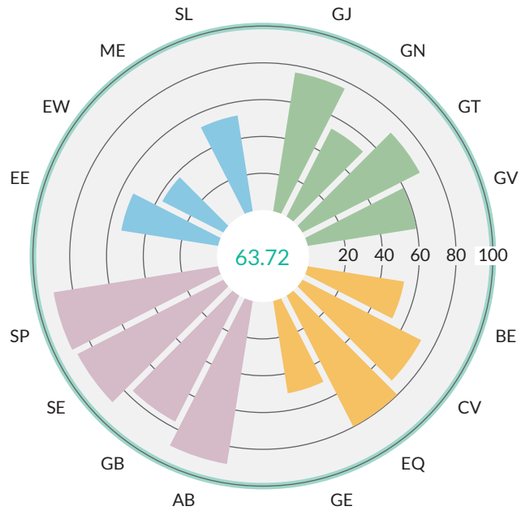
Switzerland (Europe)



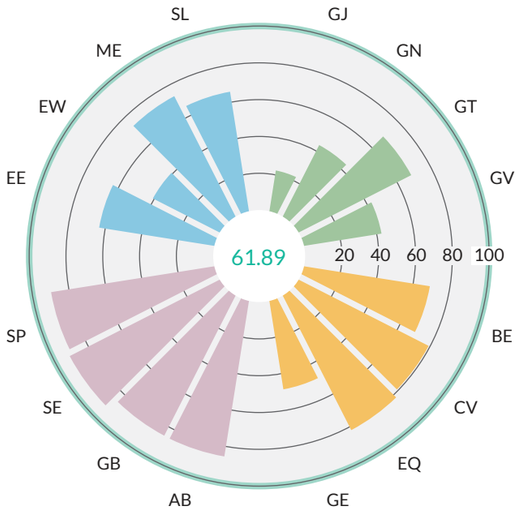
Japan (Asia)



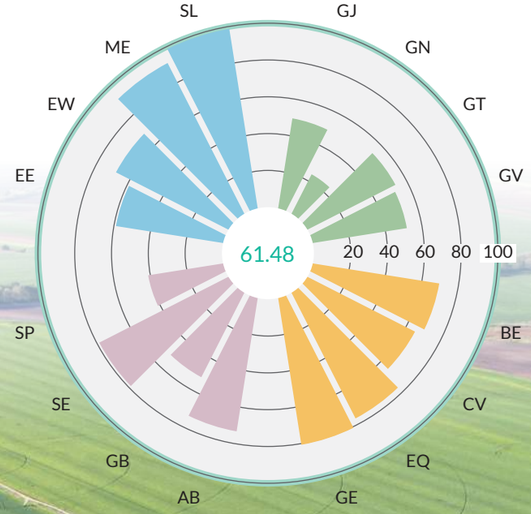
United States (The Americas)



New Zealand (Oceania)



Gabon (Africa)



Dimensions:

Efficient and sustainable resource use	Natural capital protection	Green economic opportunities	Social inclusion

Pillars:

EE – efficient and sustainable energy EW – efficient and sustainable water use SL – sustainable land use ME – waste and material use efficiency	EQ – environmental quality GE – greenhouse gas 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 equity SP – social protection

Dimensions:

Efficient and sustainable resource use	Natural capital protection
EE – efficient and sustainable energy EW – efficient and sustainable water use SL – sustainable land use ME – waste and material use efficiency	EQ – environmental quality GE – greenhouse gas emissions reduction BE – biodiversity and ecosystem protection CV – cultural and social value
Green economic opportunities	Social inclusion
GV – green investment GT – green trade GJ – green employment GN – green innovation	AB – access to basic services and resources GB – gender balance SE – social equity SP – social protection

5 Featured Countries: Kenya and Ghana

5.1 Green growth contexts

5.1.1 Kenya

Kenya is East Africa's largest economy, as such, the country's orientation towards sustainable development and the transition towards a low-carbon economy has profound, positive and far-reaching implications both at the national and international levels. In this light, that the country has acknowledged that national and regional environmental, economic, and social challenges impeding the country's progress towards economic prosperity are best answered with sustainable solutions, by developing its national green economy strategy. With the implementation period of 2016-2030, the objective of the Kenya Green Economy Strategy and Implementation Plan (GESIP) is to transition the country's socioeconomic landscape into one characterized by low carbon emissions, resource efficiency, equity, and inclusivity in fine thematic areas: sustainable infrastructure, building resilience, sustainable natural resources management, social inclusion, and sustainable livelihood.

Prior to the development and implementation of the GESIP, the country had in the past initiated interventions to orient itself towards a greener development pathway. These included targeted projects aimed at increasing the adoption of green technologies and other forms of green investments, employment in the environmental rehabilitation and conservation ventures, green energy generation, cleaner industrial production strategies and sustainable agricultural practices sectors.[55] Kenya's green agenda also exists in various policies and legislations such as 2018-2022 Medium Term Plan of Kenya Vision 2030, Climate Change Act of 2016, National Climate Change Action Plan 2018 – 2022, National Energy Policy of 2018, the Non-motorized Transport Policy of 2015 and aligned with the Country's Big Four Plan which sets out policies and measures to be focused on by the government in the following areas: (i) Expansion of manufacturing, (ii) Affordable housing, (iii) Universal healthcare, and (iv) Food security and nutrition.

Kenya has made significant strides towards a green economic model and is a leading country in Africa in the space of climate policy implementation and spurring climate action.[54] It is in this regard that the country in 2022 requested to join GGGI and is one of the few countries in Africa with a rating of 2°C compatibility projecting that the country is on track to meet or exceed its Paris Agreement Commitments. But the Medium-Term Review of the GESIP notes that more efforts are yet needed to actualize the various strategic objectives of GESIP. Strengthening collaboration and institutional coordination in the delivery of GESIP objectives and strategies, as well as building capacity of the Green Growth Unit at the Ministry of Environment, Climate Change and Forestry to enable it to monitor and coordinate the implementation of GESIP, is highly recommended to support the country's transition to a low carbon economy. Through membership to GGGI, Kenya aims to benefit from technical expertise and know-how that will scale up its green growth interventions and maximize good practices and approaches to leapfrog to a green economic model as per its Visions 2030 and the Green Growth Index is a useful tool to support the country's trajectory.

5.1.2 Ghana

Ghana was amongst the world's ten fastest-growing economies in 2019, driven by growth in the mining and petroleum sectors and strong agricultural output. The COVID-19 outbreak, the March 2020 shutdown, and a dramatic decrease in commodities exports ended Ghana's fast development (seven percent per year in 2017–19). The economic downturn significantly impacted households. According to estimates, the poverty rate climbed slightly in 2020, rising from 25 percent to 25.5 percent. Despite falling to 0.5 percent in 2020, the brisk agriculture and services sectors helped growth bounce back to 5.4 percent in 2021. The outlook remains positive, with projected GDP growth of 5.3 percent and 5.1 percent in 2022 and 2023 supported by the Ghana COVID-19 Alleviation and Revitalization. Climate change puts Ghana's economic and human growth at risk. Approximately 45,000 Ghanaians are affected by flooding annually on average, and the country's coastline is at risk of erosion and flooding due to rising sea levels. Inaction will increase heat stress, reduce crop and worker production, and damage infrastructure from irregular rainfall patterns. Environmental degradation, water scarcity, and regional air pollution will also hamper human capital and productivity.

Ghana has developed several key policies and strategic documents to ensure climate resilience and integration of adaptation measures into all facets of national development planning, including the National Climate Change Adaptation Strategy (NCCAS), National Climate Change Policy (NCCP), National Climate Change Master Plan, and Medium-Term Development Plan (MTDP). In Ghana's NCCP, four subject areas have been determined to address the country's adaptation challenges, including disaster preparedness and response, agriculture and food security, natural resource management, and energy and infrastructure. Medium-Term Development Plan (MTDP) The MTDP for 2018-2021 focuses on a range of issues, including adaptation and mitigation priorities, and refers to Ghana's NDC targets.[55] The National Development Planning Commission (NDPC) is currently preparing the MTDP for the 2022-2025 period. Ghana has revised its Nationally Determined Contribution (NDC) under the Paris Agreement (2020-2030) to reduce emissions by 15-45 percent below business-as-usual (BAU) and strengthen climate resilience in close alignment with its development priorities. In all, 20 mitigation and 11 adaptation actions in seven priority economic sectors have been committed for implementation in the next 10-year period (2020-2030). To update the NDCs in 2021–30, the government will need to spend US $9.3 billion.

Given its limited financial resources, the government is looking into more results-based climate funding options, including carbon markets, climate impact bonds, and leveraged private participation.

Ghana still needs to develop long-term contingency plans for dealing with climate change, as local managers seem to have an inadequate perception of the costs of dealing with such crises. Its low-carbon development strategy focuses on the period until 2030. Ghana wants to review progress towards meeting its NDC in 2025; however, a few details about the modalities of this process are currently available. For this review to be effective, the country requires more technical support on how to track the progress of the NDCs and other climate goals, especially in aggregating the cumulative effects of individual mitigation actions.[56] In this light, Ghana requested support from GGGI towards developing its National Green Growth Strategy, which starts with a Green Growth Performance Measurement (GGPM). The GGPM, through the Green Growth Index development, aimed at identifying the country's green growth priorities and guiding GGGI and the Government of Ghana by measuring the country's performance in achieving sustainability targets, including the SDGs, Paris Climate Agreement, and Aichi Biodiversity Targets. Moreover, guided by the Ghana Green Growth Index, the results and processes of the National Green Growth Strategy aim to set the pace and tools needed to support the Government of Ghana in unlocking access to climate finance through developing pipelines of projects.

5.2 National experts

The design process to develop the National Green Growth Index for Kenya and Ghana is aligned with the systematic and participatory approach applied in the Global Green Growth Index. National experts in these countries played a key role in the process, participating actively in several activities described in section 1.3 to develop the Green Growth Index. They were selected and invited by the respective GGGI's government partners in Kenya and Ghana, The National Treasury and Economic Planning (TNT&EP) and the Ministry of Environment, Science, Technology & Innovation (MESTI). The selection was based not only on the fields of expertise aligning with the four dimensions of the Green Growth Index but also on their capacity to support updating the Index in the following years. Fifty-four (54) experts from 24 institutions and 39 experts from 30 institutions, mainly from the government, participated in the design process in Kenya (Table 1) and Ghana (Table 2). Government agencies responsible for the environment, water and sanitation, housing, roads, etc., were represented in both countries. In addition to national experts from non-government organizations (NGOs) and academic institutions, six experts from the private sector in Ghana collaborated with the government institutions in the process.

Table 3. List of national experts participating in the design process of the Green Growth Index in Kenya

Ministries/Institutions	Sector	Number of participants	Number of activities participated
The National Treasury - Financing locally-led climate action program (TNT&EP - FLLoCA)	GOV	7	5
The National Treasury and Economic Planning (TNT&EP)	GOV	6	5
Ministry of Agriculture and Livestock Development (MoALD)	GOV	3	5
Ministry of Agriculture and Livestock Development, Climate Change Unit (MOALDCCU)	GOV	1	1
Ministry of Energy and Petroleum (MoEP)	GOV	4	3
Ministry of Foreign & Diaspora Affairs (MoFA)	GOV	1	1
Ministry of Mining, Blue Economy and Maritime Affairs (MoMBEMA)	GOV	2	4
Ministry of Water, Sanitation and Irrigation (MoWSI)	GOV	4	5
State Department for Economic Planning (SDEP)	GOV	1	2
State Department for ICT & Digital Economy (SDIDE)	GOV	2	2
State Department for Transport (SDT)	GOV	1	1
State Department of Housing and Urban Development (SDHUD)	GOV	4	3
The Kenya Institute for Public Policy Research and Analysis (KIPPRA)	GOV	1	4
National Environment Management Authority (NEMA)	GOV	1	1
Centre for Training and Integrated Research in ASAL Development (CETRAD)	GOV	1	2

Table 3. List of national experts participating in the design process of the Green Growth Index in Kenya *(continued)*

Ministries/Institutions	Sector	Number of participants	Number of activities participated
Kenya Agricultural and Livestock Research Organization (KALRO)	GOV	1	2
Kenya Electricity Generating Company PLC (KenGen)	GOV	3	2
Kenya Forest Service (KFS)	GOV	1	1
Kenya Industrial Research and Development Institute (KIRDI)	GOV	1	2
Kenya Association of Manufacturers (KAM)	NGO	3	4
Kenya Private Sector Alliance (KEPSA)	NGO	1	4
Sustainable Energy for All (SE4ALL)	NGO	2	2
University of Nairobi (UoN)	ACA	3	3
Total	24	54	

Note: GOV – government, NGO – non-government, and ACA – academic institutions.

Table 4. List of national experts participating in the design process of the Green Growth Index in Ghana

Ministries/Institutions	Sector	Number of participants	Number of activities participated
Ministry of Environment, Science, Technology & Innovation (MESTI)	GOV	4	5
SDG Advisory Office, Office of the President	GOV	1	2
National Development Planning Commission (NDPC)	GOV	2	5
Ministry of Sanitation and Water Resources-GASSLIP	GOV	1	1
Ministry of Sanitation and Water Resources	GOV	1	3
Ghana National Cleaner Production Centre EPA	GOV	2	4
Ministry Of Works and Housing	GOV	1	3
Ghana Standards Authority	GOV	1	3
Ministry Of Tourism, Arts and Culture	GOV	1	3
Council For Scientific and Industrial Research- Science and Technology Policy Research Institute (CSIR-STEPRI)	GOV	2	2
Community Water & Sanitation Agency	GOV	1	2
Ministry of Roads and Highways, Accra	GOV	1	4
Ministry of Local Government, Decentralization and Rural Development	GOV	1	4
Ghana Statistical Service	GOV	1	2
Centre For Environmental Impact Analysis	NGO	1	5
Ghana Climate Innovation Centre (Gcic)	NGO	3	4
Lion Clubs International	NGO	1	2
Friedrich-Ebert-Stiftung, Ghana office	NGO	1	4
Environmental Services Providers Association	NGO	1	2
World Energy Council's Future Energy Leaders	NGO	1	5
A Rocha Ghana	NGO	1	4
Federation of Plastics Manufacturers Recyclers Association, Ghana	NGO	1	2
Kwame Nkrumah University of Science and Technology (KNUST)	ACA	1	1
University of Energy and Natural Resources (UENR)	ACA	1	3
University of Environment and Sustainable Development	ACA	1	1
Africa Environmental Sanitation Consult	PRI	1	5
Stark Energy Ltd	PRI	1	5
Medical Waste Services Limited (Jospong Group)	PRI	1	5
Ghana Real Estate Developers Association (GREDA)	PRI	2	4
Zoomlion Ghana Limited	PRI	1	2
Total	30	39	

Note: GOV – government, NGO – non-government, ACA – academic institutions and PRI – private sector.

5.3 Design process

The National Green Growth Index design process is systematic because the output from each activity feeds in as input into the following activity, and it is participatory because the national experts, who were identified before the process, were not only recipients but also sources of knowledge for developing the Index. Throughout the consultation process, the experts discussed, suggested, and selected the policy-relevant indicators and assessed the challenges and opportunities for green growth transition – with GGGI providing the needed technical support and expertise. The process combined different forms and mediums to allow interactive participation with and among the experts, including seminars/webinars, online surveys, participatory workshops, targeted consultations, and dissemination (e.g., global conferences). The chronology of activities for the national experts in Kenya and Ghana is presented in Figure 26. Details on each activity are discussed in separate reports for the Kenya and Zambia Green Growth Index,[57] and a summary is provided in the following sections. The National Treasury and Economic Planning (TNT&EP) in Kenya and the Ministry of Environment, Science, Technology & Innovation (MESTI) in Ghana led the activities of the national experts, with the GGGI's Green Growth Performance Measurement (GGPM) team providing support on the analytical methods (Annex 1).

5.3.1 Online surveys

Online surveys were instrumental in informing experts and collecting their feedback during the design process. They were used in the following activities:

- 1st online survey, which aimed to (i) familiarize the national experts on the potential indicators for the different green growth dimensions, (ii) build the capacity of experts to assess the policy relevance of the green growth indicators to Zambia's economic, social, and environmental contexts; and (iii) train experts on how to use the online survey forms which were used during 1st participatory workshop. Figure 27 shows examples of questions for the 1st online survey.
- 2nd online survey, which aimed to (i) inform the international experts on the application of the Green Growth Index in Kenya and Ghana and (ii) collect feedback on the policy relevance of the indicators selected by the national experts for the National Green Growth Index. The questions are like those in the 1st online survey, asking to rate the indicators' policy relevance and for reasons for giving "very low" or "not relevant" ratings. Unlike in the 1st online survey, they were not asked to provide alternative indicators if the ratings were very low or not relevant.

Online surveys were also used for the breakout sessions during the participatory workshops. The national experts used the online survey to provide group ratings on the policy relevance of the green growth indicators during the 1st participatory workshop. They used it again during the 2nd participatory workshop to assess the challenges and opportunities in the country's green growth transition based on the Green Growth scores. Figure 28 shows examples of survey questions for this activity.

The output from the 1st online survey was the prior knowledge created among experts on the policy relevance of the green growth indicators. The knowledge was necessary to prepare the national experts for the discussion during the 1st participatory workshop and selection of indicators for the Zambia Green Growth Index. The output from the 2nd online survey was the international experts' ratings on the relevance of the indicators to policy decision-making and development

Figure 26. Participatory activities for national experts in Kenya and Ghana

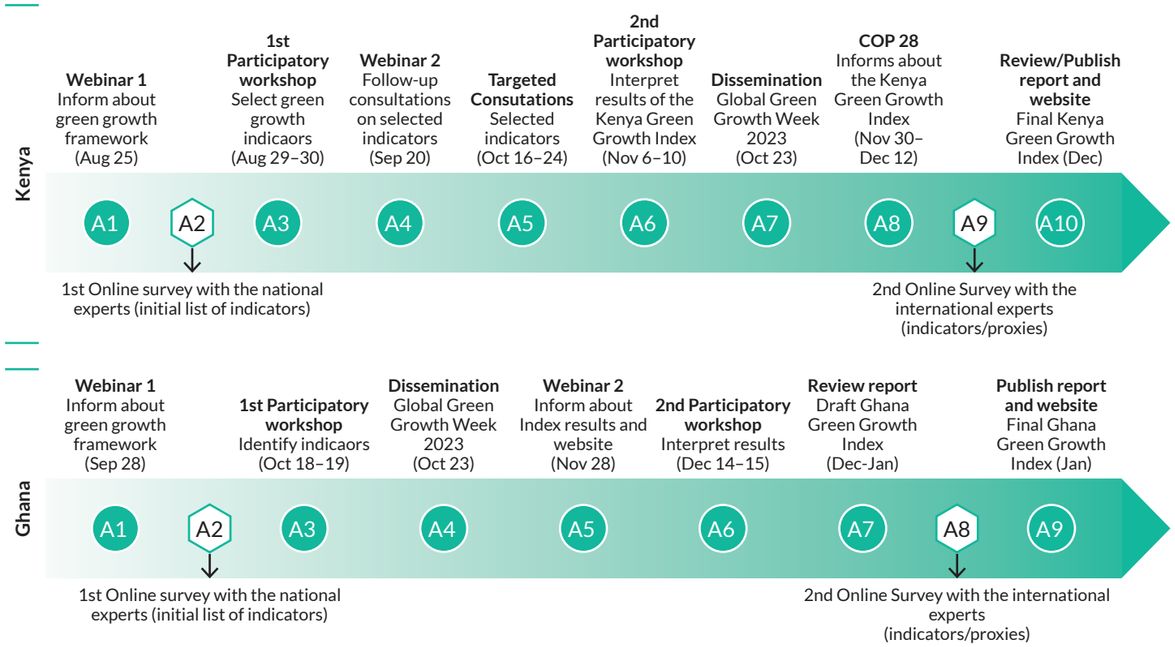


Figure 27. Examples of online survey questions to rate policy relevance of the indicators

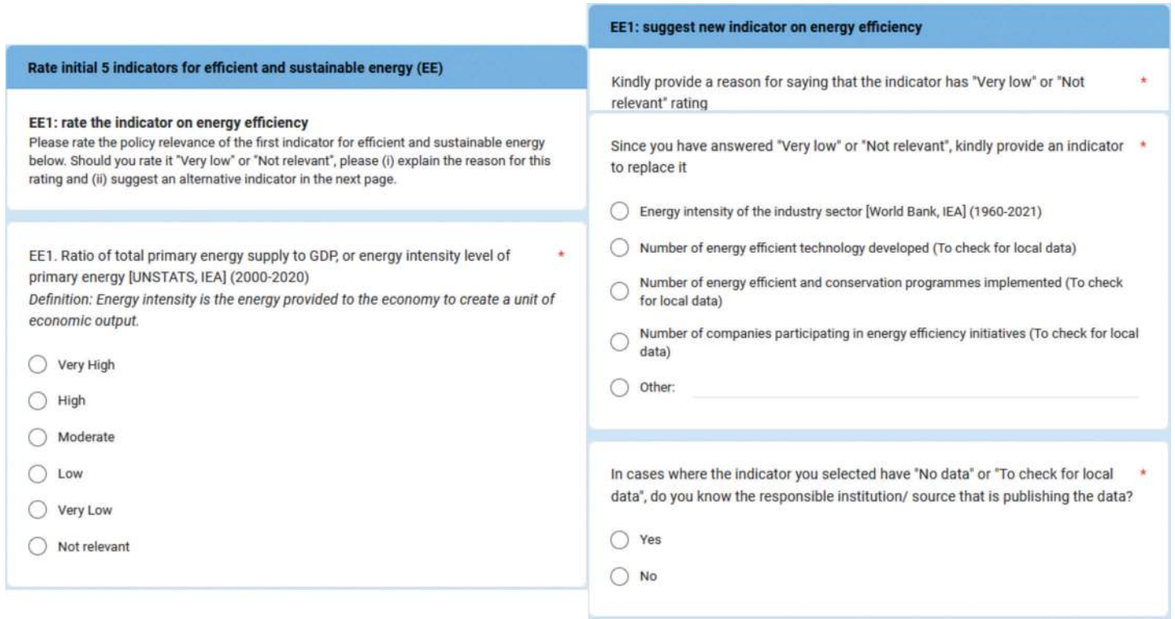


Figure 28. Examples of online survey questions to interpret the results of the Green Growth Index scores

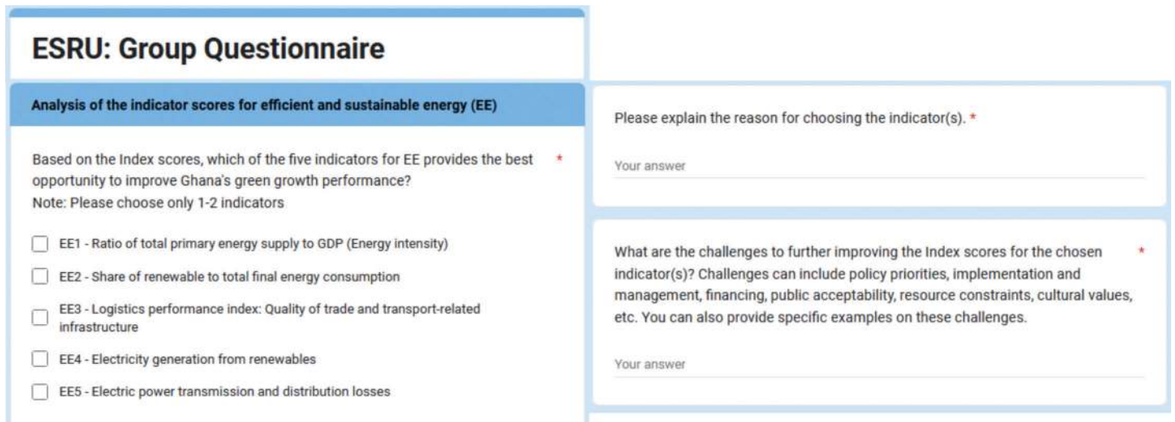
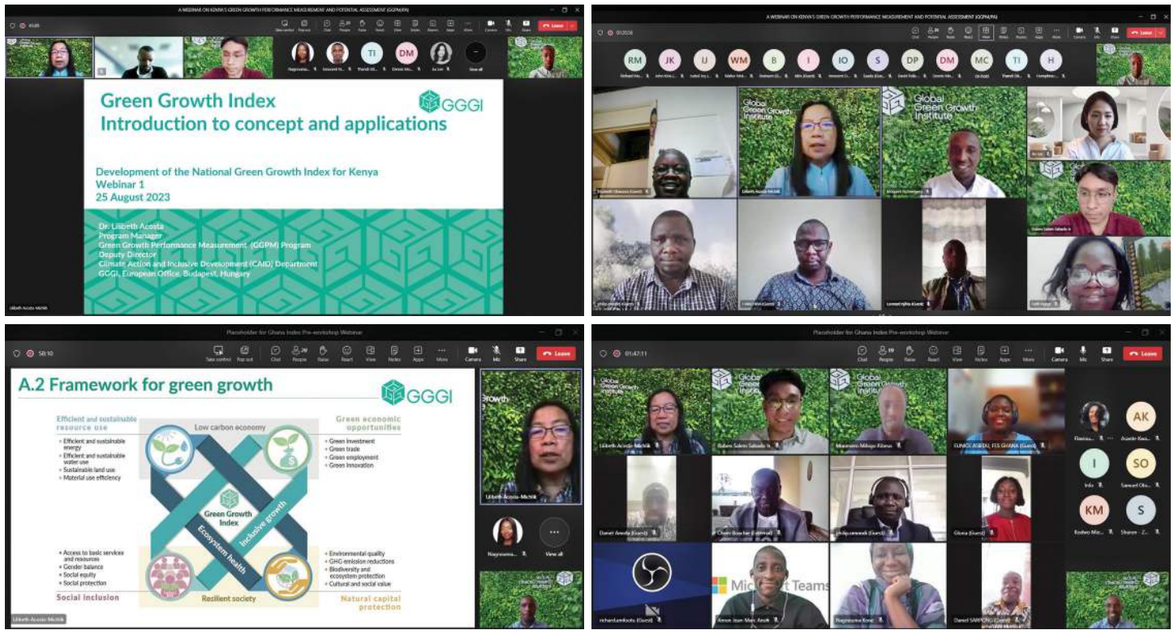


Figure 29. Selected photos from the 1st webinars in Kenya (top) and Ghana (bottom)



contexts in Kenya and Ghana or, in general, African countries. The results of these ratings are presented in Annex 4.

5.3.2 Webinars

These activities provided an opportunity to build awareness of the national experts and/or clarify their questions. Hybrid activities were also possible, with some experts attending in person and others online. Webinars allowed the GGGI team to interact with the national experts directly, providing them with the necessary technical knowledge before conducting the participatory workshops. They aimed to bring the national experts to the same level of understanding of their tasks, allowing them to participate actively in the discussion during these workshops. Two webinars were conducted with the following objectives:

- Webinar 1, informing the national experts about the concepts and applications of the Green Growth Index, creating knowledge among experts on the different green growth dimensions and the indicators that represent each dimension. Figure 29 presents selected photos from the 1st webinars in Kenya and Ghana.

- Webinar 2, aiming to (i) share with the national experts the link to the website of the preliminary Green Growth Index; (ii) explain to them how to navigate the website and how the Green Growth Index scores were computed; and (iii) collect feedback on the sustainability targets to be used for benchmarking indicators without SDG targets.

5.3.3 Participatory workshops

The participatory workshops allow national experts to actively contribute to the design process, creating ownership of the National Green Growth Index. The two participatory workshops had the following objectives:

- 1st participatory workshop, aimed at allowing the national experts to (i) discuss with each other the policy relevance of the green growth indicators and (ii) rate and vote on the green growth indicators with the highest policy relevance to the country's economic, social, and environmental contexts.

- 2nd participatory workshop, aimed to (i) share with the experts the link to the website of the final National Green Growth Index; (ii) allow them to discuss with each other the challenges and opportunities for green growth transition based on the Index scores; (iii) build their capacity to interpret the Index scores and use the green growth indicators in policy and planning, and (iv) share experiences from another country in developing the National Green Growth Index.

The national experts assessed more than 200 potential green growth indicators, selecting 80 most policy-relevant to the country's social, economic, and environmental contexts during the 1st participatory workshops (Figure 30 and Figure 31). The workshop followed a well-structured agenda:

Figure 30. Selected photos of the national experts in the breakout sessions during the first (top) and second (bottom) participatory workshops, Kenya

Figure 31. Selected photos of the national experts in the breakout sessions during the first (top) and second (bottom) participatory workshops, Ghana

5. During the plenary, the GGGI team presented the green growth indicators for each pillar, including the definition, data sources and availability, and relevance to SDGs and national policies.

6. After the presentation, the national experts provided initial individual votes on each pillar's top five most policy-relevant indicators, with the votes shown on-screen using Mentimeter. Four Mentimeter votes were conducted for each dimension.

7. During the breakout sessions, the national experts were divided into three groups to discuss and select the most relevant green growth indicators, with each group using an online survey to record their selected indicators and reasons for selecting them. Breakout sessions were conducted, one for each dimension. The national experts were also able to suggest new indicators during the sessions.

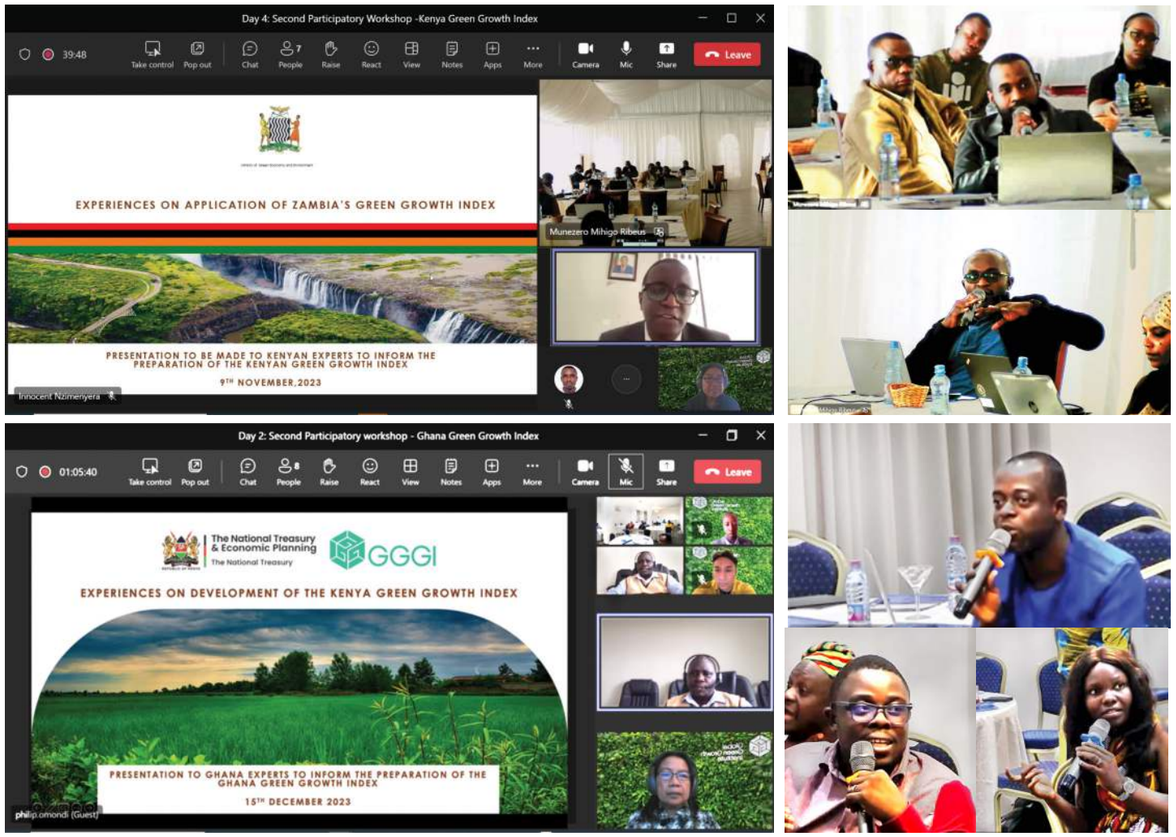
8. After each breakout session, the national experts returned to the plenary to report on the selected and suggested indicators, providing group discussion highlights.

9. During the plenary, the national experts provided final individual votes on each pillar's selected and suggested indicators using Mentimeter. The top five rated indicators for the pillar were used for the Green Growth Index. Four Mentimeter votes were conducted for each dimension.

The national experts assessed the challenges and opportunities for green growth transition based on the Green Growth Index scores, presented on an interactive website during the 2nd participatory workshop (Figure 30 and Figure 31). The workshop followed a well-structure agenda:

1. During the plenary, the GGGI team presented the methods for computing the Green Growth Index,

Figure 32. Zambia (top) and Kenya (bottom) sharing experiences in developing the Green Growth Index



Mr. Hedges Tembo from the Zambia Ministry of Economy and Environment (MoGEE sharing experience with the national experts in Kenya (top) and Mr. Philip Omondi sharing on behalf of Mr. Peter Odhengo Unit from the Kenya National Treasury and Economic Planning with the national experts in Ghana (bottom)

the targets to benchmark the indicators, and the calculated scores for the indicators and pillars.

2. After the presentation, the national experts provided initial individual votes on the pillars that show the most considerable potential to improve the country's green growth performance. One Mentimeter vote was conducted for each dimension.

3. During the breakout sessions, the national experts were divided into three groups to identify the green growth indicators showing the best opportunities to improve the country's performance and discuss the challenges to be overcome in its transition to green growth.

4. After each breakout session, the national experts returned to the plenary to report on the highlights of the group discussions.

5. During the plenary, the national experts provided final individual votes through Mentimeter on the pillars, showing the most significant potential to improve the country's green growth performance. The results of the individual Mentimeter votes and the group reports were used as inputs to the technical report.

During the 2nd participatory workshop, experiences from other countries in developing and using the National Green Growth Index were shared with the national experts (Figure 32). In Kenya, Mr. Hedges Tembo, Chief of Green Economy from the Zambia Ministry of Economy and Environment (MoGEE), gave an online presentation on the Zambia Green Growth Index. In Ghana, Mr. Philip Omondi presented on behalf of Mr. Peter Odhengo, Head of Climate, Finance & Green Economy Unit from the Kenya National Treasury and Economic Planning.

5.3.4 Dissemination

The dissemination activities aimed to (i) inform about the collaborative projects between the GGGI and its Member Countries and Partners on the National Green Growth Index, (ii) create awareness among global audiences about the value of the Green Growth Index in tracking performance in the green growth transition, and (ii) provide an opportunity

to government officers who are participating in the development of the Index to disseminate it globally.

The Kenya and Ghana Green Growth Index were presented in the session on Green Growth Index - A Policy Tool to Mainstream Green Growth Indicators in Planning Process and Capacity-Building during the Global Green Growth Week, held virtually on October 23-27, 2023 (Figure 33). Dr. Malle Fofana, GGGI's Director and Head of Programs in Africa, gave the welcome remarks, and Dr. Lei Lei Song, Director of Economic Analysis and Operational Support Division at the Asian Development Bank (ADB), gave the opening remarks for this session on October 23, 2023. Dr. Lilibeth Acosta, Deputy Director and GGPM Program Manager at GGGI presented an overview of concepts and applications in Asia and Africa and a comparison of the green growth performance in Azerbaijan and Central Asian countries. Mr. Philip Omondi presented the Kenya Green Growth Index on behalf of Mr. Peter Odhengo, Head of Climate, Finance and Green Economy Unit at the National Treasury and Economic Planning. Other National Green Growth Index presentations were given for Ghana and Lao PDR. Mr. Oliver Boachie, Senior Advisor to the Minister at the Ministry of Environment, Science, Technology, and Innovation (METSI), presented the Ghana Green Growth Index. Mr. Bounma Thor, Program Officer in GGGI Lao PDR Country Office, presented the Lao PDR Green Growth Index on behalf of Ms. Sisavanh Didaravong, Deputy Director General, DRI, Ministry of Planning and Investment. Dr. Aimee Hampel-Milagrosa, Urban Development Specialist in the ADB's Water Supply and Urban Development Sector Group, moderated the presentations during the session.

Other speakers and panelists in the session included the following:

Dr. Lei Lei Song, Director, Economic Analysis and Operational Support Division, ADB Philippines

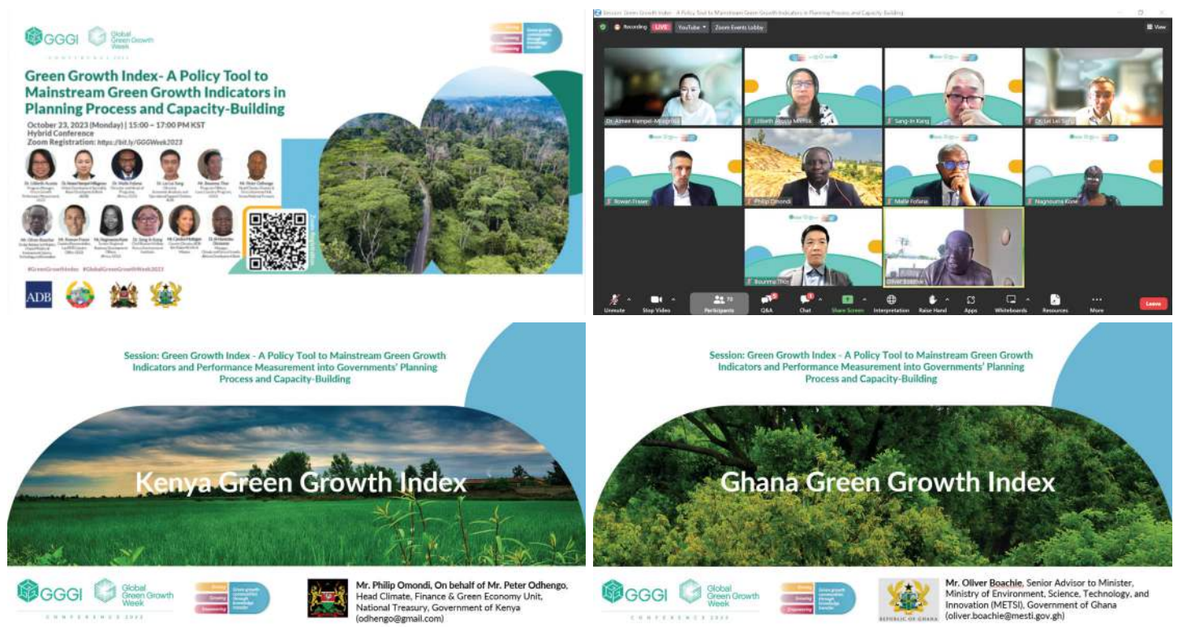
Mr. Rowan Fraser, Program Officer, Laos Country Program, Lao PDR

Ms. Nagnouma Kone, Senior Regional Business Development Officer, Africa, Côte D'Ivoire

Dr. Sang In Kang, Chief Research Fellow, Korea Environment Institute, Republic of Korea

Dr. Al-Hamndou Dorsouma, Manager, Climate and Green Growth, African Development Bank (AfDB), Côte d'Ivoire

Figure 33. Presentations during the Global Green Growth Week 2023



5.4 Green growth indicators

Eighty (80) green growth indicators were selected by the national experts in Kenya and Ghana; about 60 percent were directly derived from the SDGs. While the number of indicators for the global Green Growth Index is limited to 48, more indicators were used for the National Green Growth Index to include all relevant indicators to measure the country's performance in transitioning to green growth. Each pillar has five green growth indicators, giving equal weight to each of the 80 indicators. Only a few indicators differ in Kenya and Ghana: EE5 and ME5 in efficient and sustainable resource use; EQ3, BE3, CV1, and CV3 in natural capital protection; and SP5 in social inclusion. All green economic opportunities indicators are the same in Kenya and Ghana (Table 5). The similarities in the green growth indicators were brought about by the high ratings given by the experts to the five initial indicators proposed by the GGGI team in the online surveys. Before the participatory activities with the national experts, the GGGI team checked the relevance of the indicators to the countries' key national policies. The national policies assessed in Kenya include Kenya Vision 2030, Green Economy Strategy and Implementation Plan (GESIP) 2016-2030, Big Four Agenda, Nationally Determined Contributions (NDC), National Climate Change Action Plan (NCCAP), and Fifth National Report to the Conference of Parties to the Convention on Biological Diversity (NBSAP), and those assessed in Ghana include the long-term National Development Plan of Ghana 2018-2057, National Medium-term Development Policy Framework 2022-2025, Updated Nationally Determined Contribution under the Paris Agreement (2020-2030), National Biodiversity Strategy and Adaptation Plan (2016), and Ghana National Climate Change Master Plan Action Programmes for Implementation 2015-2020.

The development priorities identified as relevant to the green growth indicators include sustainable infrastructure, building resilience, resource efficiency and social inclusion and sustainable livelihood in Kenya and economic transformation, human skills and development, environmental sustainability, and the water-land-food nexus in Ghana. Detailed discussion on the relevance of the 80 green growth indicators to the national policies and development priorities are available in the Kenya and Ghana Green Growth Index Report.[58]

The policy relevance ratings given by the international experts on the 80 green growth indicators through online surveys were mainly high and very high (Annex 4).

Table 5. Green growth indicators selected by national experts for the Green Growth Index in Kenya and Ghana

Indicator code	Indicator Name	Units	Data Pulisher	Selected indicators		SDG
				Kenya	Ghana	
EE1	Energy intensity	MJ per GDP	IEA	●	●	●
EE2	Renewable energy share	Percent	IEA	●	●	●
EE3	Efficient transport	Score	WB	●	●	
EE4	Low-carbon electricity	Percent	BP, Ember	●	●	
EE5	Per capita electricity consumption	Kwh per capita	EIA	●		
	Electricity transmission losses	Percent	IEA		●	
EW1	Water use efficiency	USD per cubic meter	FAO	●	●	●
EW2	Level of water stress	Percent	FAO	●	●	●
EW3	Sustainable fisheries	Percent	UNSD, OECD	●	●	●
EW4	Share of surface irrigation	Percent	FAO	●	●	
EW5	Renewable water resources per capita	Cubic meter per capita	FAO	●	●	
SL1	Soil nutrient balance	N Kg per ha	FAO	●	●	
SL2	Organic agriculture area	Percent	FAO	●	●	
SL3	Share ruminant livestock	Number per ha	FAO	●	●	
SL4	Agricultural productivity	USD per ha	FAO	●	●	
SL5	Farm machinery per unit land	HP per ha	USDA	●	●	
ME1	Material consumption per GDP	Kg per GDP	OECD, WB	●	●	●
ME2	Material footprint	Tons per capita	UNEP	●	●	●
ME3	Food loss and food waste	Ratio	FAO	●	●	●
ME4	Municipal solid waste recycled	Percent	FAO	●	●	●
ME5	Waste water treatment facilities	Number	FAO	●		
	Ratio treated municipal wastewater	Ratio	FAO		●	

Table 5. Green growth indicators selected by national experts for the Green Growth Index in Kenya and Ghana *(continued)*

Indicator code	Indicator Name	Units	Data Pulisher	Selected indicators		SDG
				Kenya	Ghana	
EQ1	$PM_{2.5}$ air pollution	Mg per cubic meter	WHO	●	●	●
EQ2	DALY rate from unsafe water	DALY per persons	GHD	●	●	
EQ3	Solid waste generation	Tons per capita	WB	●		●
	Degraded land over total land area	Percent	FAO		●	●
EQ4	Chlorophyll-a deviations	Percent	UNEP	●	●	●
EQ5	Water with good ambient quality	Percent	UNEP	●	●	●
GE1	CO_2 emissions per capita	Tons per capita	CAIT, WB	●	●	
GE2	Non-CO_2 per capita excl. AFOLU	CO_2eq tons per capita	CAIT, WB	●	●	●
GE3	Non-CO_2 emissions in AFOLU	CO_2eq tons per capita	CAIT, WB	●	●	●
GE4	Carbon intensity of energy production	CO_2/kg per Kwh	GCB, EIA	●	●	
GE5	CO_2 emissions per mfg value-added	CO_2/kg per USD	IEA, UNIDO	●	●	●
BE1	Protected key biodiversity areas	Percent	IUCN, UNEP-WCMC	●	●	●
BE2	Share of forest areas	Percent	FAO	●	●	●
BE3	Forest above-ground biomass	Tons per ha	FAO	●		●
	Forest area within legally established PAS	Percent	FAO		●	●
BE4	Forest under certification scheme	Ha	FAO	●	●	●
BE5	Change in extent of water ecosystems	Percent	UNEP	●	●	●
CV1	Local breeds risk of extinction	Percent	FAO	●		●
	Red list index	Score	IUCN		●	●
CV2	Terrestrial protected areas	Percent	UNEP-WCMC	●	●	●
CV3	Tourism contribution to GDP	USD per GDP	WTTC	●		
	International tourism receipts	USD	WTO		●	
CV4	Plant genetic resources accessions	Number per ha	FAO	●	●	●
CV5	Share of exports of cultural goods	Percent	UNESCO	●	●	
GV1	Adjusted net savings	Percent GNI	WB	●	●	
GV2	Renewable electricity capacity	Watts per capita	IRENA	●	●	●
GV3	Financial flows for clean energy R&D	USD per GDP	OECD, IRENA	●	●	●
GV4	Agriculture orientation index	Score	IMF, UNSD	●	●	●
GV5	Road quality	Score	UNCTAD	●	●	
GT1	Exports of environmental goods	Percent	UNIDO	●	●	
GT2	Environmental technologies exported	Percent	ILO	●	●	●
GT3	ISO 14001 certificates issued	Number	ILOSTAT	●	●	
GT4	New business density	Number per capita	WB	●	●	
GT5	High-technology exports	Percent	OECD	●	●	
GJ1	Green employment in manufacturing	Percent	UNCOMTRADE	●	●	
GJ2	Employed people below poverty line	Percent	UNEP, OECD	●	●	●
GJ3	Vulnerable employment	Percent	ISO	●	●	
GJ4	Firms offering formal training	Percent	WB	●	●	
GJ5	ODA flows for scholarships	USD	UN-COMTRADE	●	●	●
GN1	Environmental technologies	Percent	OECD	●	●	
GN2	Scientific and technical journals	Number per persons	WB, UN	●	●	
GN3	Researchers per million inhabitants	Number per persons	UNESCO	●	●	●
GN4	Medium/high-tech mfg value-added	Percent	UNIDO	●	●	●
GN5	Trademark applications	Number	WIPO	●	●	
AB1	Access to safe water and sanitation	Percent	WHO/UNICEF	●	●	●
AB2	Access to electricity and clean fuels	Percent	WB, WHO	●	●	●

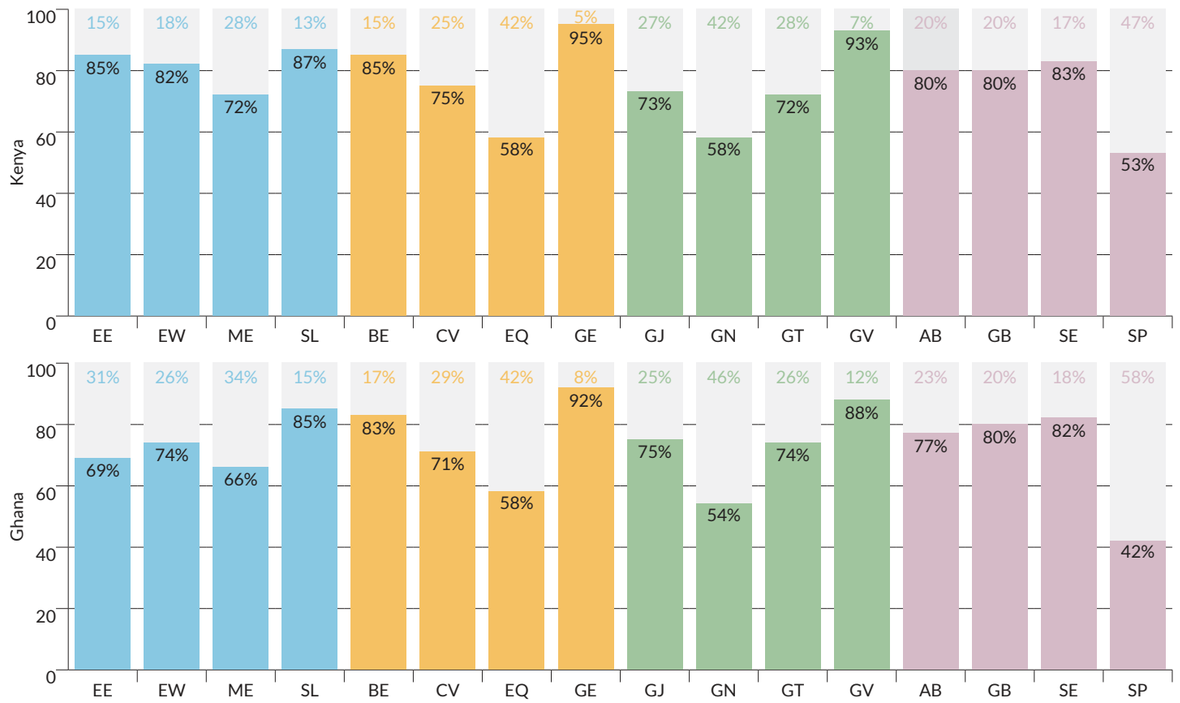
Table 5. Green growth indicators selected by national experts for the Green Growth Index in Kenya and Ghana *(continued)*

Indicator code	Indicator Name	Units	Data Pulisher	Selected indicators		SDG
				Kenya	Ghana	
AB3	Prevalence of undernourishment	Percent	FAO	●	●	●
AB4	Convenient access to public transport	Percent	UN-Habitat	●	●	●
AB5	Property rights	Score	Heritage Foundation	●	●	
GB1	Women in national parliaments	Percent	IPU	●	●	●
GB2	Gender account in financial institution	Ratio	WB, WHO	●	●	●
GB3	Equal gender pay	Score	WB, WHO	●	●	
GB4	Mothers with maternity cash benefits	Percent	KNBS	●	●	●
GB5	School enrollment gender parity	Ratio	UNESCO	●	●	
SE1	Inequality in income	Ratio	WB, WHO	●	●	
SE2	Rural-urban access to electricity	Ratio	WB, IEA, IRENA, UNSD, WHO	●	●	●
SE3	Youth unemployment disparity	Ratio	ILO	●	●	●
SE4	Age dependency ratio	Ratio	WB	●	●	
SE5	Cash benefit for people with disabilities	Percent	ILO	●	●	●
SP1	Share of old people receiving pension	Percent	ILO	●	●	●
SP2	Universal health coverage	Score	WHO	●	●	●
SP3	Population living in slums	Percent	UN-Habitat	●	●	●
SP4	Victims of intentional homicides	Number per capita	UNODC	●	●	●
SP5	Score of Hyogo Framework	Score	UNISDR	●		
	Implementing local disaster risk reduction strategies	Percent	UNDRR		●	●

Definitions: International Energy Agency (IEA), World Bank (WB), British Petroleum Company plc (BP), U.S. Energy Information Administration (EIA), Food and Agriculture Organization (FAO), Global Carbon Budget (GCB), United Nations Statistics Division (UNSD), Organization for Economic Cooperation and Development (OECD), United States Department for Agriculture (USDA), United Nations Environment Programme (UNEP), International Union for Conservation of Nature (IUCN), UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC), Forest Certification Organizations (FSC), Programme for the Endorsement of Forest Certification (PEFC), World Database on Protected Areas (WDPA), World Travel & Tourism Council (WTTC), United Nations Educational, Scientific and Cultural Organization (UNESCO), World Health Organization (WHO), Institute for Health Metrics and Evaluation (IHME), The United Nations Environment Programme (UNEP), Climate Watch (CW), Climate Analysis Indicators Tool (CAIT), Global Carbon Project (GCP), BP and Shift Energy Data Portal (BP), United Nations Industrial Development Organization (UNIDO), International Labour Organization (ILO), United Nations (UN), World Intellectual Property Organization (WIPO), United Nations Commodity Trade Statistics Database (UN COMTRADE), International Organization for Standardization (ISO), International Renewable Energy Agency (IRENA), International Monetary Fund (IMF), United Nations Conference on Trade and Development (UNCTAD), United Nations International Children's Emergency Fund (UNICEF), Inter-Parliamentary Union (IPU), Kenya National Bureau of Statistics (KNBS), United Nations Human Settlements Programme (UN-Habitat), United Nations Office on Drugs and Crime (UNODC), United Nations International Strategy for Disaster Reduction Secretariat (UNISDR), United Nations Office for Disaster Risk Reduction (UNDRR).

Figure 34 summarizes the data availability and gaps for each pillar's different green growth indicators from 2010 to 2022. In both Kenya and Ghana, the indicators in GHG emissions reduction (GE) and green investment (GV) pillars had the highest data availability, followed by sustainable land use (SL) and biodiversity and ecosystem protection (BE). Data availability was almost at the same level for these pillars in both countries, ranging between 83 and 95 percent. The pillars with the most considerable data gaps include environmental quality (EQ), green innovation (GN), and social protection (SP). While data gaps in EQ were 42 percent in both countries, GN and SP have higher data gaps in Ghana (i.e., 46 percent, 58 percent) than in Kenya (i.e., 42 percent, 47 percent). Other pillars where data gaps were more significant in Ghana include efficient and sustainable energy (EE), efficient and sustainable water use (EW), and material use efficiency (ME). The share of old people receiving pension (SP1) and universal health coverage (SP2) were the two indicators contributing to significant data gaps in the SP pillar in both countries. The solid waste generation (EQ3 in Kenya), Degraded land over total land area (EQ3 in Ghana), and water with good ambient quality (EQ5) contributed to the significant data gaps in the EQ pillar. The indicators with the most significant data gaps in the GN pillar were the researchers per million inhabitants (GN3) and trademark applications (GN5). Except for GN5, all these green growth indicators are from the SDGs and are expected to improve data availability in the following years. Simple imputations were done to allow the computation of the Green Growth Index to fill in the data gaps (Annex 1).

Figure 34. Data gaps for the indicators per pillar in the Kenya and Ghana Green Growth Index, 2010-2022



Efficient and sustainable resource use	Natural capital protection	Green economic opportunities	Social inclusion	Missing
EE – efficient and sustainable energy EW – efficient and sustainable water use SL – sustainable land use ME – waste and material use efficiency	EQ – environmental quality GE – greenhouse gas 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 equity SP – social protection	

5.5 Green growth performance

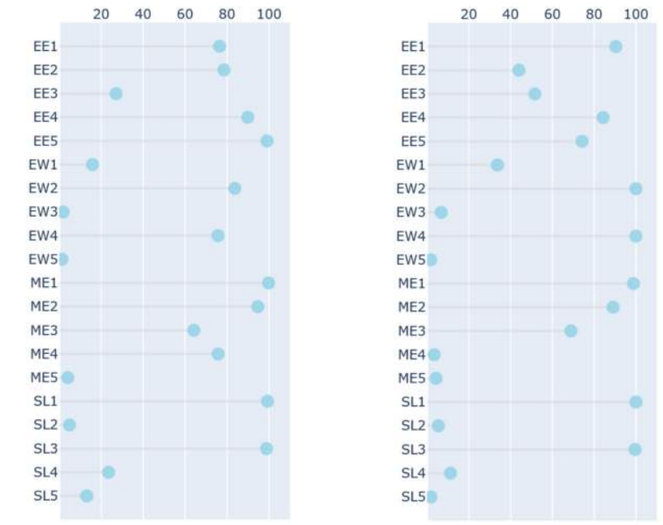
The different units of the green growth indicators (Table 5) have been rescaled to a uniform unit with a scale of 1 to 100 (i.e., normalization) to allow the aggregation of scores at the pillar, dimension, and Index levels (Annex1). In addition, like for the global Green Growth Index (i.e., this report), the green growth indicators were benchmarked against sustainability targets so that the normalized scores measure how far the indicators are from the sustainability targets (i.e., distance to targets). For example, a score of 100 would mean that the sustainability target for an indicator was achieved. However, unlike the global Green Growth Index, the average values for the top 5 performing developing countries for indicators without sustainability targets were used for the Kenya and Ghana Green Growth Index. The national experts voted to use them instead of the top five performing countries globally during Webinar 2. This chapter compares the scores for the Green Growth Index in Kenya and Ghana.

5.5.1 Green growth indicator scores

Figure 35 compares Kenya and Ghana's scores for the 20 green growth indicators in the efficient and sustainable resource use dimension in 2022. Kenya had four indicators, and Ghana had five indicators, reaching a 100 score. Both countries reached sustainability targets in soil nutrient balance (SL1), share of ruminant livestock (SL3), and material consumption per GDP (ME1). The other green growth indicator showing a 100 score in Kenya is per capita electricity consumption (EE5). Ghana has a different indicator for EE5, i.e., electricity transmission losses, with a score of less than 80. Ghana performed better than Kenya in these two EE5 indicators, but the national experts in the former country considered it more relevant to track performance in electric power transmission and distribution losses, which is still about 20 points away from achieving the target.[59] The other indicators for which Ghana garnered a 100 score were the level of water stress (EW2) and the share of surface irrigation (EW4). Kenya lagged behind Ghana in these efficient and sustainable water use indicators. Ghana successfully kept its freshwater withdrawal low in the last decade and decreased surface irrigation use since 2000.[60] However, Ghana's very high performance in five efficient and sustainable resource use indicators was dragged down by lower scores in many other indicators in this dimension. For example, the municipal solid waste recycled (ME4) score was only 3.43 in Ghana compared to 75.74 in Kenya. Because of this, Ghana had a slightly lower aggregated score of 52.69 in the efficient and sustainable resource use dimension, i.e., 1.44 points lower than Kenya (see section 1.5.3).

Figure 36 compares Kenya and Ghana's scores for the 20 green growth indicators in the natural capital protection dimension in 2022. Green growth performance in this dimension varied a lot in the two countries. While Kenya had four indicators with scores of 100, Ghana had only one: the share of forest areas (BE2). Kenya scored only 37.95 in BE2. However, Kenya reached sustainability targets in the local breeds risk of extinction (CV1), municipal solid waste generation (EQ3), chlorophyll-a deviations (EQ4), and ratio of CO_2 emissions per capita (GE1). Ghanaian experts selected

Figure 35. Scores in the efficient and sustainable resource use dimension in Kenya and Ghana, 2022



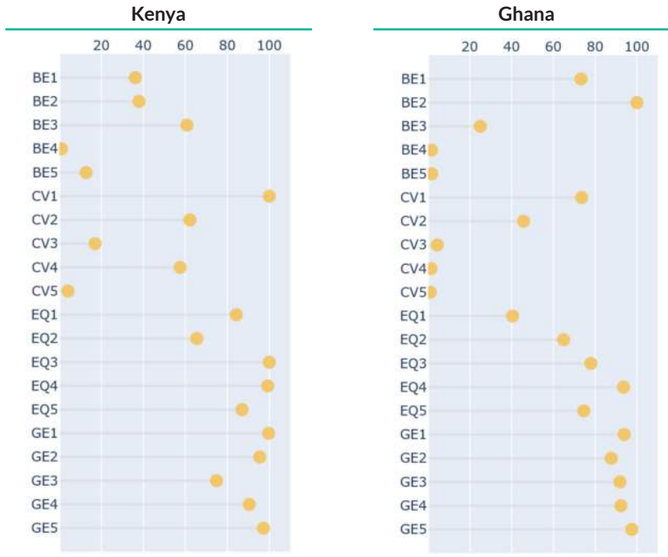
Efficient and sustainable energy (EE): EE1 - Energy intensity, EE2 - Renewable energy share, EE3 - Efficient transport, EE4 - Low-carbon electricity, EE5 - Per capita electricity consumption (Kenya), Electricity transmission losses (Ghana)

Efficient and sustainable energy (EW): EW1 - Water use efficiency, EW2 - Level of water stress, EW3 - Sustainable fisheries, EW4 - Share of surface irrigation, EW5 - Renewable water resources per capita

Sustainable land use (SL): SL1 - Soil nutrient balance, SL2 - Organic agriculture area, SL3 - Share ruminant livestock, SL4 - Agricultural productivity, SL5 - Farm machinery per unit land

Waste and material use efficiency (ME): ME1 - Material consumption per GDP, ME2 - Material footprint, ME3 - Food loss and food waste, ME4 - Municipal solid waste recycled, ME5 - Wastewater treatment facilities (Kenya), Ratio treated municipal wastewater (Ghana)

Figure 36. Scores in the natural capital protection dimension in Kenya and Ghana, 2022



Environmental quality (EQ): EQ1 - $PM_{2.5}$ air pollution, EQ2 - DALY rate from unsafe water, EQ3 - Solid waste generation (Kenya), Degraded land over total land area (Ghana), EQ4 - Chlorophyll-a deviations, EQ5 - Water with good ambient quality

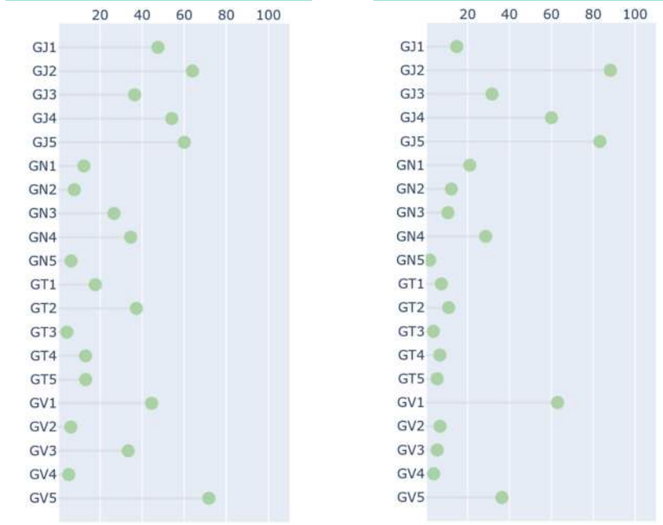
GHG emissions reduction (GE): GE1 - CO_2 emissions per capita, GE2 - Non-CO_2 per capita excl. AFOLU, GE3 - Non-CO_2 emissions in AFOLU, GE4 - Carbon intensity of energy production, GE5 - CO_2 emissions per manufacturing value-added

Biodiversity and ecosystem protection (BE): BE1 - Protected key biodiversity areas, BE2 - Share of forest areas, BE3 - Forest above-ground biomass (Kenya), Forest area within legally established PAs (Ghana), BE4 - Forest under certification scheme, BE5 - Change in extent of water ecosystems

Cultural and social value (CV): CV1 - Local breeds risk of extinction (Kenya), Red list index (Ghana), CV2 - Terrestrial protected areas, CV3 - Tourism contribution to GDP (Kenya), International tourism receipts (Ghana), CV4 - Plant genetic resources accessions, CV5 - Share of exports of cultural goods

a different indicator for EQ3, the degraded land over total land area (EQ3), which scored 77.97. EQ3 was one of the four with different green growth indicators in Kenya and Ghana in the natural capital protection dimension. Kenya performed better in these four indicators selected by the national experts, including municipal solid waste generation (EQ3), forest above-ground biomass (BE3), local breeds risk of extinction (CV1), and tourism contribution to GDP (CV3). Except for CV1, Kenya had higher values in these indicators from 2000 to 2022.[61] Among the four green growth indicators selected by the national experts in Ghana, i.e., degraded land over total land area (EQ3), forest area within legally established protected areas (BE3), red list index (CV1), international tourism receipts (CV3), Kenya performed better in BE3 and CV3.[62] Kenya recorded the lowest scores in the forest under the certification scheme (BE4) and share of exports of cultural goods (CV5). However, Ghana's scores in these green growth indicators were also as low as in Kenya. The results reveal that Kenya's performance in the natural capital protection dimension was better than Ghana's in many green growth indicators, including those not selected by Kenyan national experts. These can be reflected

Figure 37. Scores in the green economic opportunities dimension in Kenya and Ghana, 2022



Green investment (GV): GV1 - Adjusted net savings, GV2 - Renewable electricity capacity, GV3 - Financial flows for clean energy R&D, GV4 - Agriculture orientation index, GV5 - Road quality

Green trade (GT): GT1 - Exports of environmental goods, GT2 - Environmental technologies exported, GT3 - ISO 14001 certificates issued, GT4 - New business density, GT5- High-technology exports

Green employment (GJ): GJ1 - Green employment in manufacturing, GJ2 - Employed people below poverty line, GJ3 - Vulnerable employment, GJ4 - Firms offering formal training, GJ5 - ODA flows for scholarships

Green innovation (GN): GN1 - Environmental technologies, GN2 - Scientific and technical journals, GN3 - Researchers per million inhabitants, GN4 - Medium/ high-tech mfg value-added, GN5 - Trademark applications

in significant differences in the aggregated dimension scores, with 58.16 in Kenya and 50.76 in Ghana in 2022 (see section 1.5.3).

Figure 37 compares Kenya and Ghana's scores for the 20 green growth indicators in the green economic opportunities dimension in 2022. No score was above 100 in either country. Ghana reached the highest score in employed people below the poverty line (GJ2) and official development assistance (ODA) flows for scholarships (GJ5). Ghana's scores were 88.23 in GJ2 and 83.17 in GJ5, higher than Kenya's scores for these indicators. Among the four pillars, both countries had the highest scores in green employment indicators. However, Kenya achieved its highest score of 71.71 in road quality (GV5). Although Ghana scored better than Kenya in green employment indicators, except for green employment in manufacturing (GJ1), the former country had lower scores in green growth indicators in other pillars than the latter. Ghana's green trade indicators were all very low at less than 20. In contrast, Kenya scored 37.26 in the environmental technologies exported (GT2) 37.26 in 2022. The green growth indicators selected by the Kenyan and Ghanaian experts were the same across green economic opportunities pillars. The aggregated scores from these indicators showed that Kenya's green growth performance was low, with a score of 26.62, and Ghana's performance was very low, with a score of 18.98 (see section 1.5.3). Among the four dimensions, there is thus ample space for both countries to increase green growth performance in green economic opportunities, particularly in green trade, innovation, and investment.

Figure 38 compares Kenya and Ghana's scores for the 20 green growth indicators in the social inclusion dimension in 2022. The former country had two indicators with scores of 100, and the latter, while not having any 100 scores, had five indicators with scores above 95. Equal gender pay (GB3) and school enrollment gender parity (GB5) were the indicators with scores of 100 in Kenya. Ghana also scored very high in GB5 at 97.12 but only moderate in GB3 at 50.5. The scores in social equity and social protection were relatively at par in Kenya and Ghana, except for SP5, which had different indicators in the two countries. The SP5 indicator selected by the Kenyan experts was the score of the Hyogo Framework, with a moderate score of 58.88, and by the Ghanaian experts was the implementation of local disaster risk reduction strategies, with a very low score of 2.08. The scores in gender balance indicators were higher in Kenya than in Ghana, with the former country overweighing the latter's performance in equal gender pay (GB3) and Mothers with maternity cash benefits (GB4). In contrast, Ghana outweighed Kenya's performance in a few access to basic and services indicators, particularly in the prevalence of undernourishment (AB3), with the former scoring very high at 92.36 and the latter scoring moderate at 49.85. The results suggest that, although the aggregated scores for the social inclusion dimension were the same at about 57 (see section 1.5.3), opportunities to improve green growth performance slightly varied in Kenya and Ghana.

5.5.2 Distance to targets

Figure 39 compares Kenya and Ghana's Green Growth Index scores and distances to sustainability targets for the different green growth pillars at the national and global levels in 2022. The National and Global Green Growth Index scores for the two countries were moderate (i.e., between 41 and 60). The National Green Growth score was 47.95 in Kenya, 6.62 points higher than in Ghana. Among the pillars contributing to the higher score were material use efficiency (ME) in the efficient and sustainable resource dimension, environmental quality (EQ) in the natural capital protection dimension, and gender balance (GB) in the social inclusion dimension. Kenya performed better in these pillars, particularly for EQ and GB, with distance to targets of more than 80.

The Global Green Growth Index scores were higher than the National Green Growth Index scores in both countries. In contrast to the National Green Growth Index scores, however, the Global Green Growth Index score was higher in Ghana than in Kenya, albeit minimal, with a difference of

Figure 38. Scores in the social inclusion dimension in Kenya and Ghana, 2022

Access to basic services and resources (AB): AB1 - Access to safe water and sanitation, AB2 - Access to electricity and clean fuels, AB3 - Prevalence of undernourishment, AB4 - Convenient access to public transport, AB5 - Property rights

Gender balance (GB): 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

Social equity (SE): 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

Social protection (SP): 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 (Kenya), Implementing local disaster risk reduction strategies (Ghana)

Figure 39. Comparison of Kenya and Ghana's distance to sustainability targets by green growth pillars, 2022

0.54 points. Ghana's better green growth performance at the global level was attributed to the higher pillar scores for material use efficiency (ME) and sustainable land use (SL) in the efficient and sustainable resource use dimension, biodiversity and ecosystem protection (BE) in the natural capital protection dimension, and social equity (SE) in social inclusion dimension. These results suggest that the policy-relevant indicators selected by national experts for these pillars reveal the challenges confronting Ghana's green growth transition.

There were variations in the performance between Kenya and Ghana at the pillar level. The pillar scores show that Kenya and Ghana performed least in the green economic opportunities dimension, with scores below 40 except for green employment. In the natural capital protection dimension, Kenya performed lowest in biodiversity and ecosystem protection and Ghana in cultural and social value, with scores below 40. In the social inclusion dimension, access to basic services and resources had the lowest score in Kenya and social protection in Ghana. Opportunities to improve green growth performance thus differ in these countries.

5.5.3 Green growth trends

Figure 40 shows the scores for the Green Growth Index in Kenya and Ghana from 2010 to 2022, with scores in the former higher than the latter country throughout this period. Moreover, while the Green Growth Index scores showed an increasing trend, the rate of increase was faster in Kenya than in Ghana. The Green Growth Index scores gap between Kenya and Ghana was thus more significant in 2022 than in 2010. Figure 41 shows that efficient and sustainable resource use and natural capital protection contributed most to the growing score gap between them, with the trends significantly increasing in Kenya from mid-2015 and relatively unchanged in Ghana from 2010. Low-carbon electricity (EE4), the share of surface irrigation (EW4), and municipal solid waste recycled (ME4) were the green growth indicators contributing to the increasing efficient and sustainable resource use trend in Kenya. Water with good ambient water quality (EQ5) was mainly responsible for this country's increasing trend in the natural capital protection dimension. Both countries showed an increasing trend in social inclusion and a declining trend in green economic opportunities. Financial flows for clean energy R&D (GV3) and high-technology exports (GT5) were the indicators responsible for the decline in green economic opportunities trend in Kenya and Ghana, respectively.

Figure 40. Trends in the Green Growth Index in Kenya and Ghana, 2010-2022

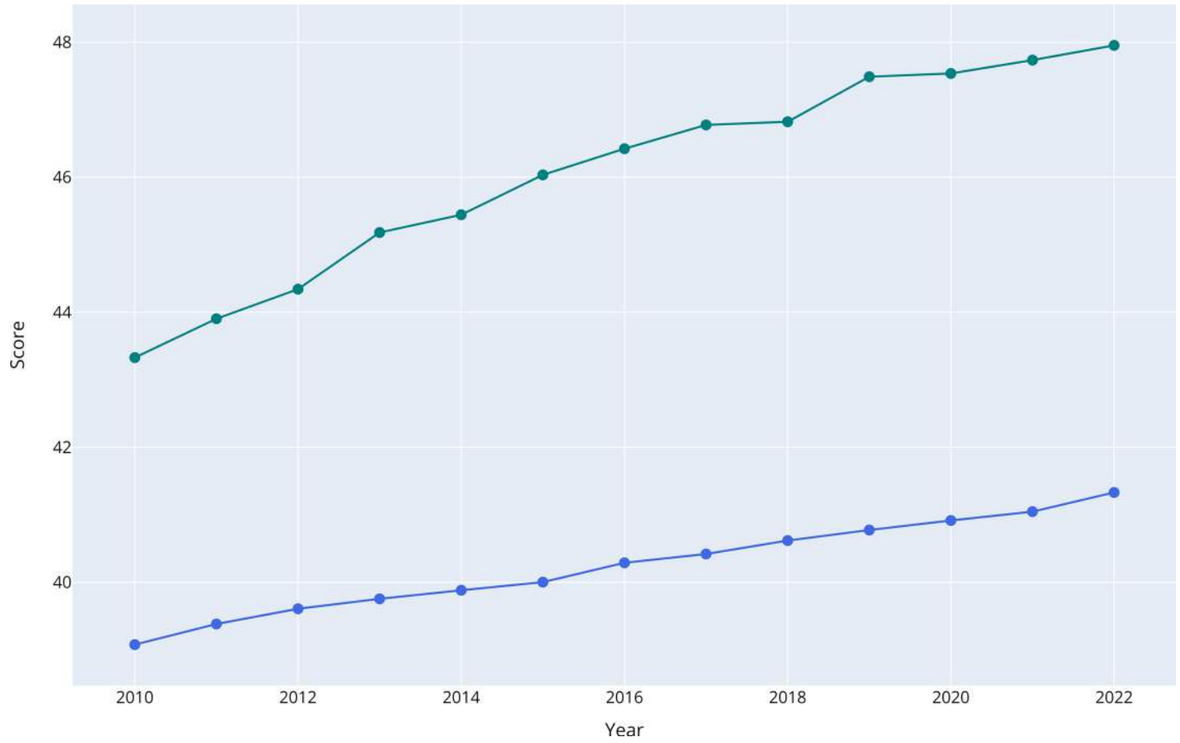
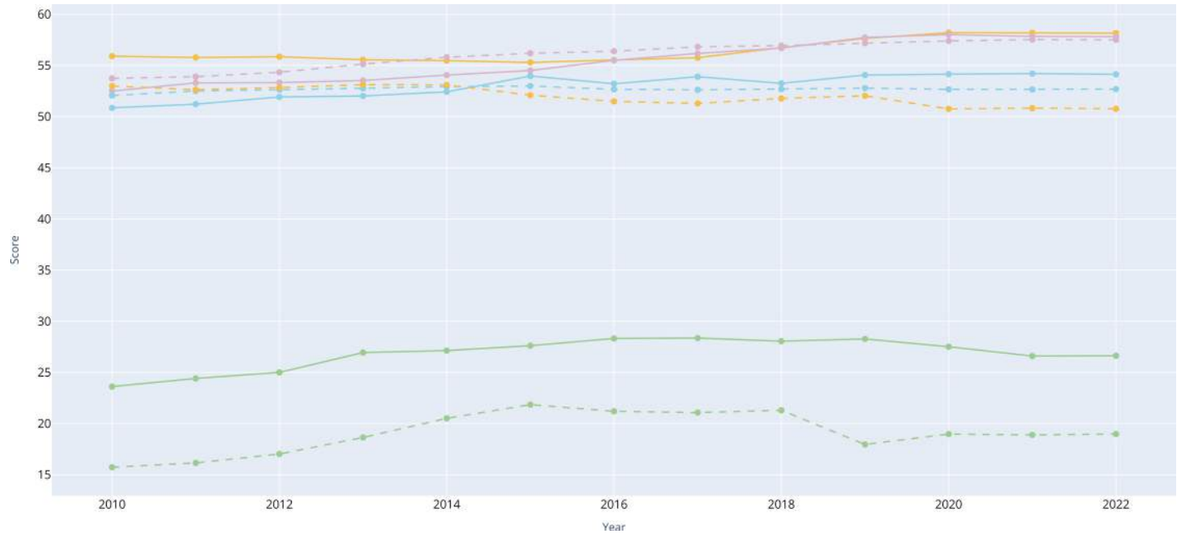


Figure 41. Trends in the green growth dimension scores in Kenya and Ghana, 2010-2022



6 Next steps for the Global Green Growth Index

6.1 Indicators and proxy variables

Of the 48 green growth indicators in the Global Green Growth Index, 22 (46 percent) are highly relevant to green growth, and many are efficient and sustainable resource use indicators (Figure 42). Thirteen (27 percent) indicators have moderate relevance, needing conceptual or data coverage improvement. Many indicators with moderate relevance are in the dimensions of green economic opportunities and social inclusion. The former dimension has equal numbers of indicators highly and moderately relevant to green growth. Three of the new green economic opportunities indicators have high relevance to green growth, including the degree of integrated water resources management implementation, financing (GV2) in green investment pillar, and CO_2 emissions embedded in trade (GT2) and water virtual trade flows (GT3) in green trade pillar (Table 6). All three were well-rated by the international experts during the consultations, particularly the final Mentimeter votes (Annex 5). The two new green economic opportunities indicators with moderate relevance to green growth include the renewable energy employment total renewable energy (GJ2) in the green employment pillar and university-industry collaboration in research and development (GN2) in the green innovation pillar. GJ2 will need to improve the time series data, and GN2 will need to focus on green research and development. International experts' ratings on these two indicators were not as high as those given to GV2, GT2, and GT3.

Indicators that need replacement due to low relevance to green growth are proxy variables. There are 13 proxy variables in the Green Growth Index, which are mostly in natural capital protection and green economic opportunities. Three proxy variables are among the 12 new green growth indicators added to the Green Growth Index this year.

The first proxy variable is for green investment and refers to the total amount of funding to promote environmentally sound technologies per GDP (GV3), an SDG indicator (Table 6). The SDG indicator for the amount of tracked exported environmentally sound technologies instead of the total investment in environmentally sound technologies was used due to a lack of data for the former indicator. The other indicators suggested and rated by the international experts for green investment have insufficient data. The second proxy variable among the new green economic opportunities indicator is the employed population below the international poverty line (GJ3), which was not consistently rated well during the international expert consultation. While it received several high ratings from the individual survey, it was rated not relevant during the group survey and ranked only 4th in the final Mentimeter votes (Annex 5). The third proxy variable, installed renewable electricity-generating capacity (GN3), is for green innovation, an SDG indicator not considered during the international expert consultation. Its coverage is limited to the electricity sector and will need to cover other renewable energy sectors. Moreover, it overlaps with the share of renewable to total final consumption (EE2) in the efficient and sustainable resource use dimension.

Figure 42. Relevance of the indicators to green growth

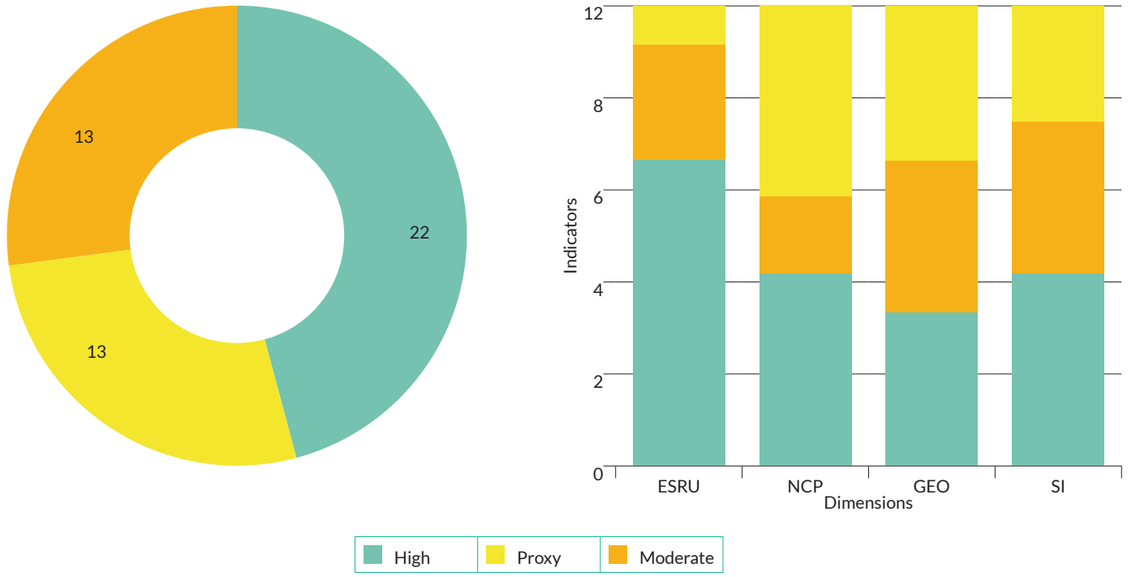


Table 6. Relevance of indicators for the Green Growth Index and desired improvements for proxy variables

Codes	Baseline indicators	Relevance	Desired improvement and remarks
EE1	Ratio of total primary energy supply to GDP (MJ per $2017 PPP GDP)	High	
EE2	Share of renewable to total final energy consumption (Percent)	High	
EE3	Efficiency in sustainable transport (Index)	Proxy	Can be replaced with indicator from SDG database when it becomes available.
EW1	Water use efficiency (USD per m^3)	High	
EW2	Share of freshwater withdrawal to available freshwater resources (Percent)	Moderate	Improvement of time series data
EW3	Sustainable fisheries as a proportion of GDP (Percent)	High	
SL1	Soil nutrient budget (Kilogram nitrogen per hectare)	High	
SL2	Share of organic agriculture to total agricultural land area (Percent)	Moderate	Improvement of time series data
SL3	Livestock per agricultural area (include only ruminant livestock)	Moderate	Can be replaced with indicator with ratio to total livestock area.
ME1	Total domestic material consumption (DMC) per unit of GDP (Kilogram per GDP)	High	
ME2	Total material footprint (MF) per capita (Tons per capita)	High	
ME3	Share of food loss to production and food waste to food consumption (Percent)	High	
EQ1	$PM_{2.5}$ air pollution, mean annual population-weighted exposure (Micrograms per m3)	Moderate	To be combined with PM_{10} as data availability improves.
EQ2	DALY rate due to unsafe water sources (DALY lost per 100,000 persons)	Proxy	Can be replaced with water pollution; no identified sources yet
EQ3	Municipal solid waste (MSW) generation per capita (Tons per year per capita)	Moderate	Improvement of time series data
GE1	Ratio of CO_2 emissions to population, including AFOLU (Tons per capita)	High	
GE2	Ratio of non-CO_2 emissions to population, excluding AFOLU (CO_2eq tons per capita)	High	
GE3	Ratio of non-CO_2 emissions in agriculture to population (CO_2eq tons per capita)	High	
BE1	Average proportion of key biodiversity areas covered by protected areas (Percent)	High	
BE2	Share of forest area to total land area (Percent)	Proxy	Can be replaced with indicator on SDG indicator 15.2.1 Forest area annual net change rate when time-series data and country coverage improve
BE3	Above-ground biomass stock in forest (Tons per hectare)	High	
CV1	Red list index (Index)	Proxy	Can be replaced by species of relevance to tourism, local, and indigenous communities
CV2	Tourism and recreation in coastal and marine areas (Score)	Proxy	Can be replaced by sustainable eco-tourism in different ecosystems; no identified sources yet
CV3	Share of terrestrial and marine protected areas to total territorial areas (Percent)	Proxy	Can be replaced by protected areas managed by indigenous and local communities

Table 6. Relevance of indicators for the Green Growth Index and desired improvements for proxy variables *(continued)*

Codes	Baseline indicators	Relevance	Desired improvement and remarks
GV1	Ratio of adjusted net savings to GNI, including particulate emission damage (5 yrs moving ave.)	Proxy	Can be replaced by investment in renewable energy or green technology
GV2	Degree of integrated water resources management implementation, financing (%)	High	
GV3	Total amount of funding to promote environmentally sound technologies per GDP (Ratio)	Proxy	This is a new SDG indicator currently using proxy variable
GT1	Share export of environmental goods (OECD and APEC class.) to total export (Percent)	Moderate	Improvement in the classification of environmental goods
GT2	CO_2 emissions embedded in trade (Percent)	High	
GT3	Water virtual trade flows (Tons squared per year)	High	
GJ1	"Share of green employment in total manufacturing employment (Percent)	Moderate	Improvement in the indicator to measure green employment in different economic sectors
GJ2	Renewable Energy Employment by Country to total renewable energy (Number of Jobs per toe of primary energy supply)	Moderate	Improvement of time series data
GJ3	Employed population below international poverty line, by sex and age (Percent)	Proxy	International experts' ratings during the consultation were low
GN1	7-Year rolling average, patents on environment technologies	High	
GN2	University-industry collaboration in Research & Development (Score)	Moderate	Improvement in the indicator to focus on green research and development
GN3	Installed renewable electricity-generating capacity (watts per capita)	Proxy	Improvement to cover other energy sectors
AB1	Population with access to basic services, i.e., Water, sanitation, electricity, and clean fuels (Percent)	High	
AB2	Prevalence of undernourishment (Percent)	High	
AB3	Universal access to sustainable transport (Index)	Proxy	Can be replaced with indicator from SDG database when it becomes available.
GB1	Proportion of seats held by women in national parliaments (Percent)	Moderate	Can be combined with an indicator on positions held by women in managerial positions; data currently scanty
GB2	Ratio female to male with an account at a financial institution or mobile-money-service provider, age 15+ (Ratio)	High	
GB3	Getting paid, covering laws and regulations for equal gender pay (Score)	Proxy	Can be replaced by an indicator measuring gender parity in salary and benefits
SE1	Inequality in income based on Palma ratio (Ratio)	High	
SE2	Population with access to basic services by urban/rural, i.e., electricity (Ratio)	Moderate	Improvement of the indicator to measure renewable electricity; to add safely managed drinking water and sanitation, which have scanty time-series data
SE3	Share of youth (aged 15–24 years) not in education, employment, or training (Percent)	Moderate	Improvement in time series data
SP1	Proportion of population above statutory pensionable age receiving a pension (Percent)	Moderate	Improvement in time series data
SP2	Universal health coverage (UHC) service coverage index (Index)	High	
SP3	Proportion of urban population living in slums (Percent)	Proxy	Can be replaced by indicator on inadequate housing, including homelessness; to be made available by UN-Habitat

6.2 Data availability and confidence level

Two indicators continue to have only one data point, including municipal solid waste (MSW) generation per capita (EQ3) and universal access to sustainable transport (AB3) (Table 7). These indicators were assumed to have a constant trend over time. The indicators with only a few data points needing data imputations for several years include efficiency in sustainable transport (EE3), sustainable fisheries as a proportion of GDP (EW3), the share of terrestrial and marine protected areas to total territorial areas (CV3), and degree of integrated water resources management implementation, financing (GV2). The data for the green growth indicators were mainly collected from international organizations, which offers important advantages for measuring performance across countries. For example, collecting data from national agencies for more than 100 countries will take time and effort. In contrast, the data from international organizations were already collected from national agencies and had already undergone consistency checks. Data for all the indicators included in the Green Growth Index were downloaded from online sources, except for the share export of environmental goods (OECD and APEC class.) to total export (GT1), the share of green employment in total manufacturing employment (GJ1), and water virtual trade flows (GT3). GGGI calculated them using data from online sources, and they are available for download on the Green Growth Index website (https://ggindex-simtool.gggi.org/SimulationDashBoard/data).

Data availability is a significant challenge that affects the interpretability of any global index and thus needs transparency. In the case of the 2023 Green Growth Index, there are three issues to consider.

First, some indicators have data only for a limited number of countries. The completeness of indicators or lack of data for indicators influences the scores for the Green Growth Index. For example, a country with complete data for all indicators for green economic opportunities will have lower scores if one of the four indicators has zero value, thus pulling down the values of other indicators. In contrast, another country with incomplete data will have a higher score because the fourth indicator, which may also have a value of zero but missing and unknown, will be excluded by default. Thus, the lack of data causes uncertainty in the Green Growth Index results. Allowing missing values is, however, necessary to enable the substitutability of indicators that represent the same concept defined by the pillar and maintain a more significant number of countries until the last level of aggregation. Not allowing substitutability at the first and second levels of aggregation will exclude countries with missing values. As a rule, 25 percent of the missing data were allowed to aggregate indicators (see Annex 1, Acosta, 2019[63]). The index could be computed for about 243 countries globally if there were no missing values. Due to data gaps, however, the current index was calculated only for 157 countries.

Second, the most recent available data vary across indicators (Table 7). To enable computation of the Green Growth Index for 2022, the most recent data were used as a baseline, and values were assumed to hold until 2022. For example, two of the 40 green growth indicators used 2018 data for the years 2020-2022, and a few others used 2019 for 2020-2021. This approach is commonly used in other global indices.

Third, for the missing data between the time series from 2010, the adjacent data were used to represent data for the missing years (i.e., imputed data). Imputation is essential to avoid a drastic drop or discontinuity in the Index trend from 2010 to 2022 due to missing data, which could be misinterpreted as a decline in performance. The confidence level is attached to the Index trend to highlight the uncertainty the missing data can cause. The level of confidence is based on data availability. Figure 43 presents the distribution of 157 countries with Index scores based on their data availability. Generally, data availability is around 75 percent because 25 percent was the missing data allowed in the aggregation rule. The mean for the data availability is 70 percent. Based on these statistics, the confidence levels were assigned as follows: Data availability of 70 percent and above has a high confidence level, between 60 and 70 percent has a moderate confidence level, and below 60 percent has a low confidence level.

Figure 44 presents the confidence level for the Green Growth Index by region and global for each dimension based on data availability from 2020 to 2022. The confidence level represents the 157 countries with Green Growth Index scores (i.e., ranked countries). The confidence levels for natural capital protection are high for most countries in all regions, about 70 percent of the countries globally, indicating a high data availability for the indicators in this dimension. The Americas show the most significant number of countries with a high confidence level, almost 90 percent. The social inclusion dimension shows a high confidence level for most American and European countries, with the latter representing nearly 90 percent. The confidence level is moderate, mainly in African countries, but low in Asian and Oceanian countries. However, globally, a high confidence level is observed. With regard to green economic opportunities, only the Americas have the most significant countries with a high level of confidence, albeit low at about 45 percent. A low confidence level dominates this dimension, particularly in Oceania and Europe, with about 100 and 95 percent of the countries, respectively. There is a huge data gap for green economic opportunities affecting the confidence level of scores in these regions and globally. This is the dimension where many indicators need data imputation to fill the data gaps. In no region does a high confidence level exceed moderate or low confidence levels in efficient and sustainable resource use. Most countries in all regions except Oceania have a moderate confidence level in this dimension. In Oceania, half of the ranked countries have a low confidence level, indicating a need for more data for efficient and sustainable resource use indicators. The confidence level results emphasize the need to improve data availability in many countries across dimensions to improve the ability of the Green Growth Index to track performance in the green growth transition. For this reason, GGGI annually assesses data availability for the indicators, particularly from the SDGs, to improve the Green Growth Index for many countries.

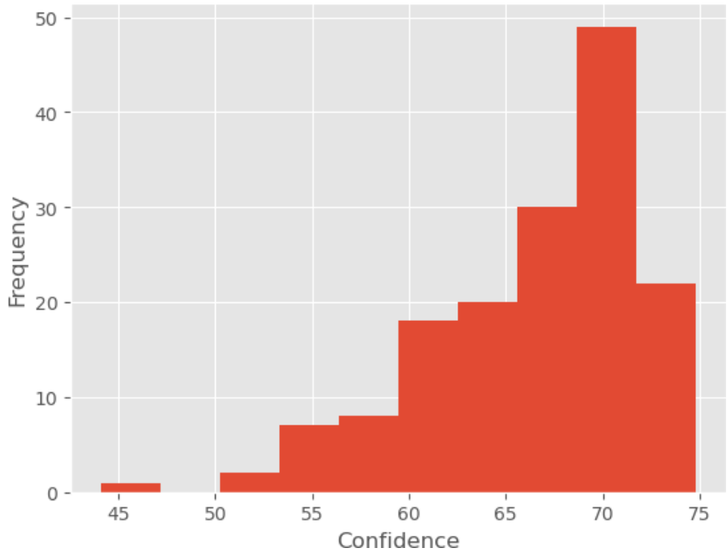
Table 7. Characteristics of the indicators in terms of data availability and required imputation

Codes	Available Data	Baseline Data	Data Downloaded Source	Website	Year(s) imputed for 2022 Index (only consider years between 2010 and 2021)
EE1	2000 - 2020	2020	UNSTATS	https://unstats.un.org/sdgs/indicators/database/	2021, 2022
EE2	2000 - 2020	2020	UNSTATS	https://unstats.un.org/sdgs/indicators/database/	2021, 2022
EE3	2007 - 2018	2018	WB data	https://lpi.worldbank.org/	2011, 2013, 2015, 2017, 2019, 2020, 2021, 2022
EW1	2000 - 2020	2020	UNSTATS	https://unstats.un.org/sdgs/indicators/database/	2021, 2022
EW2	2000 - 2020	2020	UNSTATS	https://unstats.un.org/sdgs/indicators/database/	2021, 2022
EW3	2011 - 2019	2019	UNSTATS	https://unstats.un.org/sdgs/indicators/database/	2010, 2012, 2014, 2016, 2018, 2020, 2021, 2022
SL1	1961 - 2021	2021	FAOSTAT	https://www.fao.org/faostat/en/#data/ESB	2022
SL2	2004 - 2021	2021	FAOSTAT	http://www.fao.org/faostat/en/#data/EL	2022
SL3	1961 - 2020	2020	FAOSTAT	https://www.fao.org/faostat/en/?fbclid=IwAR0dEJjoD4nMZkIqQehBdP04CfE2noGLbSUI7CHh_VfRbn4ugcAqEgAWgSc#data/EK	2021, 2022
ME1	2000 - 2019	2019	UNSTATS	https://unstats.un.org/sdgs/indicators/database/	2020, 2021, 2022
ME2	1970 - 2019	2019	UNEP-IRP	https://www.resourcepanel.org/global-material-flows-database	2020, 2021, 2022
ME3	2010 - 2020	2020	FAOSTAT	http://www.fao.org/faostat/en/#data/SCL	2021, 2022
EQ1	1990 - 2019	2019	WB data	https://data.worldbank.org/indicator	2020, 2021, 2022
EQ2	2019	2019	UNSTATS	https://unstats.un.org/sdgs/indicators/database/	2010-2018, 2020-2022
EQ3	2018	2018	WB Waste	https://datacatalog.worldbank.org/dataset/what-waste-global-database	2010-17, 2019-2022
GE1	1990 - 2022	2022	ClimateWatch and WB data	https://www.climatewatchdata.org/ghg-emissions AND https://data.worldbank.org/indicator	
GE2	1990 - 2022	2022	ClimateWatch and WB data	https://www.climatewatchdata.org/ghg-emissions AND https://data.worldbank.org/indicator	
GE3	1990 - 2022	2022	ClimateWatch and WB data	https://www.climatewatchdata.org/ghg-emissions AND https://data.worldbank.org/indicator	
BE1	2000 - 2022	2022	UNSTATS	https://unstats.un.org/sdgs/indicators/database/	
BE2	1990 - 2021	2021	WB data	https://data.worldbank.org/indicator	2022
BE3	2000 - 2020	2020	UNSTATS	https://unstats.un.org/sdgs/indicators/database/	2010-2014, 2021, 2022
CV1	1993 - 2022	2022	UNSTATS	https://unstats.un.org/sdgs/indicators/database/	
CV2	2012 - 2020	2020	OHI	http://ohi-science.org/ohi-global/download	2010, 2011, 2021, 2022
CV3	2016 - 2022	2022	WB data	https://data.worldbank.org/indicator	2010-2015

Table 7. Characteristics of the indicators in terms of data availability and required imputation *(continued)*

Codes	Available Data	Baseline Data	Data Downloaded Source	Website	Year(s) imputed for 2022 Index (only consider years between 2010 and 2021)
GV1	1990 - 2020	2020	WB data	https://data.worldbank.org/indicator	2021, 2022
GV2	2017 - 2020	2020	UNSTATS	https://unstats.un.org/sdgs/indicators/database/	2010-2016
GV3	2010 - 2020	2020	UNSTATS	https://unstats.un.org/sdgs/indicators/database/	2021, 2022
GT1	2000 - 2019	2019	UNCOMTRADE data	https://comtrade.un.org/data/	2020, 2021, 2022
GT2	1990 - 2020	2020	Our World in Data	https://ourworldindata.org/grapher/share-co2-embedded-in-trade	2021, 2022
GT3	1961 - 2021	2021	Waterfootprint and FAO	https://www.waterfootprintassessmenttool.org/countries/~AFG/scope AND https://www.fao.org/faostat/en/#data/TCL	2022
GJ1	2000 - 2020	2020	UNIDO	Not Available online,data computed and shared by the author	2021, 2022
GJ2	2001 - 2022	2022	IRENA and OECD	https://www.irena.org/Data/View-data-by-topic/Benefits/Renewable-Energy-Employment-by-Country AND https://data.oecd.org/energy/renewable-energy.htm#indicator-chart	
GJ3	2000 - 2022	2022	UNSTATS	https://unstats.un.org/sdgs/indicators/database/	
GN1	1995 - 2019	2019	OECD	https://data.oecd.org/envpolicy/patents-on-environment-technologies.htm	2020, 2021, 2022
GN2	2007 - 2017	2017	WB GovData360	https://govdata360.worldbank.org/indicators/	2018-2022
GN3	2000 - 2021	2021	UNSTATS	https://unstats.un.org/sdgs/indicators/database/	2022
AB1	2000 - 2022	2022	UNSTATS	https://unstats.un.org/sdgs/indicators/database/	
AB2	2001 - 2021	2021	UNSTATS	https://unstats.un.org/sdgs/indicators/database/	2022
AB3	2020	2020	Sum4all	https://www.sum4all.org/gra-tool/country-performance/global	2010-2019, 2021, 2022
GB1	2000 - 2022	2022	UNSTATS	https://unstats.un.org/sdgs/indicators/database/	
GB2	2000 - 2022	2022	UNSTATS	https://unstats.un.org/sdgs/indicators/database/	
GB3	1971 - 2022	2022	WB WBL	http://wbl.worldbank.org/en/reports	
SE1	1963 - 2022	2022	WB data	https://data.worldbank.org/indicator	
SE2	2000 - 2022	2022	UNSTATS	https://unstats.un.org/sdgs/indicators/database/	
SE3	2000 - 2022	2022	UNSTATS	https://unstats.un.org/sdgs/indicators/database/	2022
SP1	1996 - 2022	2022	UNSTATS	https://unstats.un.org/sdgs/indicators/database/	
SP2	2000 - 2021	2021	UNSTATS	https://unstats.un.org/sdgs/indicators/database/	
SP3	2000 - 2020	2020	UNSTATS	https://unstats.un.org/sdgs/indicators/database/	

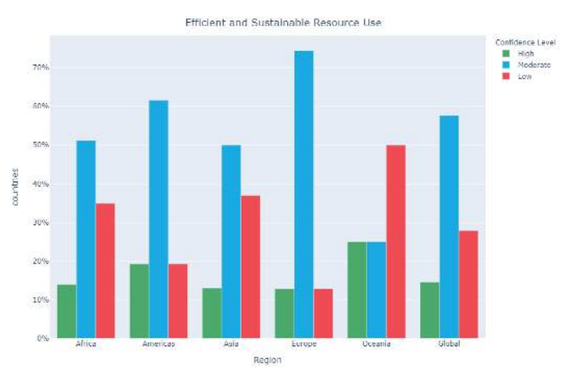
Figure 43. Confidence level based on data availability for 157 countries, 2010-2022



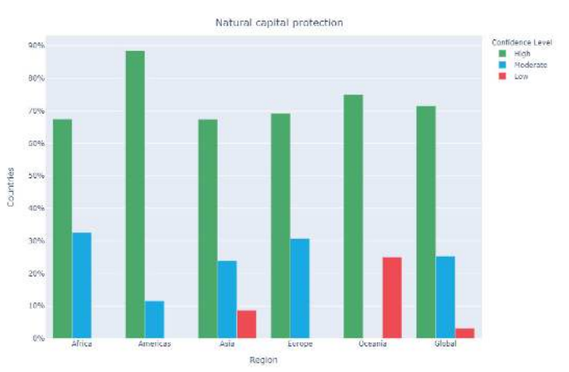
	Confidence
count	157.000000
mean	66.445166
std	5.441932
min	44.070513
25%	68.980769
50%	70.512821
75%	70.512821
max	74.839744

Figure 44. Distribution of confidence levels based on data availability by region and dimension, 2010-2022

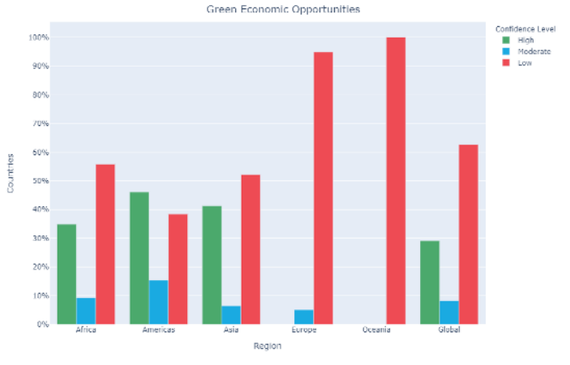
Efficient and Sustainable Resource Use



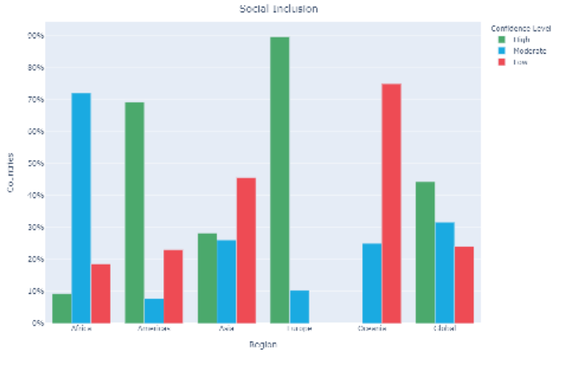
Natural Capital Protection



Green Economic Opportunities



Social Inclusion



6.3 Sustainability targets

The sustainability targets were essential inputs to the computation of the Green Growth Index (Annex 1). They were used to benchmark the green growth indicators to allow the Index scores to measure their distance to targets, i.e., a score of 100 implies that the sustainability targets were achieved. The targets were grouped into three types (Table 8), including (i) SDG targets, (ii) other targets whose sources are not from the SDG indicators, and (iii) the mean of the top five performers. If the targets are unavailable from the SDG indicators and other reliable literature, they were computed based on the average values of the top five performing countries (bottom five performing countries for the negative relationship to green growth). The targets in the Green Growth Index were aligned as much as possible with the SDG targets, using the information on sustainability targets applied in relevant global indices such as the SDSN's SDG Index and OECD's SDG Indicators. The SDG targets are either explicit or implicit, with the latter leaving room for interpretation. For the Green Growth Index, the GGPM team did not attempt to interpret the SDG targets but used the available interpretation, such as that suggested by the OECD[64] and SDSN[65]. Whenever the suggestions on the targets diverged, the SDSN targets were adopted because, as with the Green Growth Index, the SDSN methodology was developed based on the global context. The alignment with the SDG targets will continue to be essential to provide consistent policy recommendations to the countries.

Twenty targets for the 48 green growth indicators are based on the mean values of the top five performing countries (Table 8), allowing countries to reach the targets regardless of their performance on a given indicator. But the mean values were high enough that only a few countries could achieve the targets; the highest is 18 countries for the 7-year rolling average patents on environment technologies (GN1). Almost 90 percent of the 157 countries reached the target for the share of forest area to total land area (BE2). The target of 17 percent was based on the Aichi biodiversity target for 2030 and was also adopted by the OECD and SDSN.[66] The other indicator with the many countries reaching the target, over 75 percent, was the share of freshwater withdrawal to available freshwater resources (EW2). The FAO suggested a target between 25 and 75 percent for this indicator.[67] The targets not achieved by any countries include efficiency in sustainable transport (EE3) with five as the target score, DALY rate due to unsafe water sources (EQ2) with zero as target DALY lost per 100,000 persons, municipal solid waste (MSW) generation per capita (EQ3) with 0.001752675 ton as target per capita per year, the average proportion of Key Biodiversity Areas covered by protected areas with a target of 100 percent, Red list index (CV1) with one as target score, universal access to sustainable transport (AB3) with 100 as the target score, share of youth (aged 15-24 years) not in education, employment, or training (SE3) with zero percent as the target, universal health coverage (UHC) service coverage index (SP2) with 100 as the target score, and proportion of the urban population living in slums (SP3) with zero percent as the target.

Table 8. Details on the sustainability targets used to benchmark the indicators

Codes	Indicators	Unstat SDG Indicator	Targets	Countries Reaching Targets	Types of Targets	Source of data	Source of targets
EE1	Energy intensity level of primary energy (MJ per $2017 PPP GDP)	Yes	1.06 MJ per GDP	2	Mean top 5 performers	SE4ALL	Method based on Sachs et al. (2019)
EE2	Share renewable to total final energy consumption (Percent)	Yes	51.4 Percent	46	Other targets	SE4ALL	Sachs et al. (2019)
EE3	Efficiency in sustainable transport (Score)	No	5 Index score	0	Other targets	Sum4all	Sum4all
EW1	Water use efficiency (USD per m3)	Yes	265.7579346 USD per m	4	Other targets	FAO	OECD (2019)
EW2	Share freshwater withdrawal to available freshwater resources (Percent)	Yes	25 and 75 Percent	120	Other targets	FAO	FAO 2017
EW3	Sustainable fisheries as a proportion of GDP (Percent)	Yes	9.782 Percent	3	Mean top 5 performers	FAO	Method based on Sachs et al. (2019)
SL1	Soil nutrient budget (Nitrogen kilogram per hectare)	No	5 Kg per hectare	33	Other targets	FAO	FAO
SL2	Share agriculture organic to total agriculture land area (Percent)	No	11.90 Percent	13	Other targets	FAO	OECD 2017b
SL3	Share of ruminant livestock population to agricultural area (Percent)	No	0.028 Livestock units per hectare	3	Mean top 5 performers	FAO	Method based on Sachs et al. (2019)
ME1	Domestic material consumption per unit of GDP. by type of raw material	Yes	0.005392 kg per GDP	3	Mean top 5 performers	WESR / Global Material Flows Database.	Method based on Sachs et al. (2019)
ME2	"Total material footprint (MF) per capital population (Tons per capita)	Yes	5 MF tons per capita	2	Other targets	IRP	Stefan Bringezu (2015)
ME3	Share of food loss to production and food waste to food consumption (Percent)	Yes	7.755112 Percent	3	Mean top 5 performers	FAO (food loss) and UNEP (food waste)	Method based on Sachs et al. (2019)
EQ1	$PM_{2.5}$ air pollution, mean annual population- weighted exposure (Micrograms per m3	Yes	10 Micrograms per m^3	31	Other targets	Brauer et al. 2016	WHO 2005; OECD (2019)
EQ2	DALY rate due to unsafe water sources (DALY lost per 100,000 persons)	Yes	0 in every 100,000 population	0	SDG Target (implicit)	IHME	OECD (2019)
EQ3	Municipal solid waste (MSW) generation per capita (Tons per year per capita)	Yes	0.001752675 Ton per year per capita	0	Other targets	WB	Sachs et al. (2019)
GE1	Ratio of CO_2 emissions to population. including AFOLU (Tons per capita)	Yes	0.129375 Ton per capita	2	Mean top 5 performers	CAIT	Method based on Sachs et al. (2019)
GE2	Ratio non-CO_2 emissions (CH N2O and F-gas) excluding AFOLU to population (CO_2 tons per capita)	Yes	0.060997 Ton per capita	3	Mean top 5 performers	CAIT	Method based on Sachs et al. (2019)
GE3	"Ratio non-CO, emissions (CH N_2O and F-ges) in Agriculture and LUCF to population (CO tons per capita)	Yes	0 Ton per capita	6	Mean top 5 performers	CAIT	Method based on Sachs et al. (2019)

Table 8. Details on the sustainability targets used to benchmark the indicators *(continued)*

Codes	Indicators	Unstat SDG Indicator	Targets	Countries Reaching Targets	Types of Targets	Source of data	Source of targets
BE1	Average proportion of Key Biodiversity Areas covered by protected areas (Percent)	Yes	100 Percent	1	SDG Target (explicit)	IUCN, UNEP-WCMC	Sachs et al. (2019)
BE2	Share forest area to total land area (Percent)	Yes	17 Percent	138	Other targets	FAO	OECD (2019); Sachs et al. (2019)
BE3	Above-ground biomass stock in forest (Tons per hectare)	Yes	428.688 Tons per hectare	2	Mean top 5 performers	FAO	Method based on Sachs et al. (2019)
CV1	Red list index (Score)	Yes	1 Index score	0	Other targets	BirdLife International and IUCN	OECD (2019); Sachs et al. (2019)
CV2	Tourism and recreation in coastal and marine areas (Score)	No	100 Index score	20	Other targets	Ocean Health Index	Sachs et al. (2019)
CV3	Share of terrestrial and marine protected areas to total territorial areas (Percent)	Yes	13.5 Percent for both terrestrial and marine	79	"SDG Target (explicit) for marine; Other targets for terrestrial"	UNEP-WCMC	Leadly et. al. (2014)
GV1	Ratio of adjusted net savings to GNI, including particulate emission damange (5 yrs moving ave.)	No	31.612641 Percent of GNI	3	Mean top 5 performers	WB	Method based on Sachs et al. (2019)
GV2	Degree of integrated water resources management implementation, financing (Percent)	Yes	97.6 Percent	3	Mean top 5 performers	UNEP	Method based on Sachs et al. (2019)
GV3	Total amount of funding to promote environmentally sound technologies per GDP (Ratio)	Yes	14.2062 Percent	2	Mean top 5 performers	UNEP-WESR, WB, and OECD	Method based on Sachs et al. (2019)
GT1	Share export of environmental goods (OECD and APEC class.) to total export (Percent)	No	16.984286 Percent	1	Mean top 5 performers	UNCOMTRADE	Method based on Sachs et al. (2019)
GT2	CO2 emissions embedded in trade (Percent)	No	0 Percent	34	Other targets	Global Carbon Budget (2023)	Sachs et al. (2019)
GT3	Water virtual trade flows (Tonnes squared per year)	No	21540.93771 Tonnes squared per year	3	Mean top 5 performers	Waterfootprint and FAO	Method based on Sachs et al. (2019)
GJ1	"Share of green employment in total manufacturing employment (Percent)	No	14.6876 Percent	1	Mean top 5 performers	Moll de Alba and Todorov 2018,2019	Method based on Sachs et al. (2019)
GJ2	Renewable Energy Employment by Country to total renewable energy (Number of Jobs per toe of primary energy supply)	No	153.926527 Number of Jobs per toe of primary energy supply	1	Mean top 5 performers	IRENA and ILO (2022)	Method based on Sachs et al. (2019)
GJ3	Employed population below international poverty line, by sex and age (Percent)	Yes	0 Percent	2	Other targets	ILO modelled estimates	Sachs et al. (2019)
GN1	7-Year rolling average, patents on environment technologies	No	100 Percent	18	Mean top 5 performers	OECD	Method based on Sachs et al. (2019)
GN2	University-industry collaboration in Research & Development (Score)	No	5.675192 Score	3	Mean top 5 performers	WB	Method based on Sachs et al. (2019)
GN3	Installed renewable electricity-generating capacity (watts per capita)	Yes	1460.528 Watts per capita	1	Mean top 5 performers	IRENA and UN World Population Prospects	Method based on Sachs et al. (2019)

Table 8. Details on the sustainability targets used to benchmark the indicators *(continued)*

Codes	Indicators	Unstat SDG Indicator	Targets	Countries Reaching Targets	Types of Targets	Source of data	Source of targets
AB1	Population with access to basic services i.e. Water, sanitation, electricity. and clean fuels (Percent)	Yes	100 Percent for both water and sanitation	31	SDG Target (implicit)	WHO/ UNICEF	OECD (2019); Sachs et al. (2019)
AB2	Prevalence of undernourishment (Percent)	Yes	0 Percent	52	SDG Target (explicit)	FAO	Normative
AB3	Universal access to sustainable transport (Score)	Yes	100 Index score	0	Other targets	Sum4all	Normative
GB1	Proportion of seats held by women in national parliaments (Percent)	Yes	50 Percent	4	SDG Target (explicit)	IPU	OECD (2019); Sachs et al. (2019)
GB2	Share of adults (15 years and older) with an account at 8 financial institution or mobile- money-service provider (Percent)	Yes	1 Equality ratio	2	Other targets	WB	Normative
GB3	Getting paid, laws and regulations for equal gender pay (Score)	No	100 Percent	60	Other targets	WB	Normative
SE1	Inequality in income based Palma ratio (Ratio)	No	0.841778 Ratio	2	Mean top 5 performers	WB	Method based on Sachs et al. (2019)
SE2	Population with access to basic services by urban/ rural, i.e. electricity (Ratio)	Yes	1 Equality ratio	112	Other targets	SE4ALL	Normative
SE3	Share of youth (aged 15-24 years) not in education, employment or training (Percent)	Yes	0 Percent	0	SDG Target (implicit)	ILO	OECD (2019)
SP1	Proportion population above statutory pensionable age receiving a pension (Percent)	Yes	100 Percent	53	SDG Target (implicit)	ILO	OECD (2019)
SP2	Universal health coverage (UHC) service coverage index (Score)	Yes	100 Index score	0	Other targets	WHO	Normative
SP3	Proportion of urban population living in slums (Percent)	Yes	0 Percent	0	Other targets	UN-Habitat	Normative
SP3	Proportion of urban population living in slums (Percent)	Yes	0 Percent	0	Other targets	UN-Habitat	Normative

Data Sources: Leadley, P. W., Krug, C., Alkemade, R., Pereira, H. M., Sumaila, U. R., Walpole, M., ... Mumby, P. J. (2014). Progress towards the Aichi biodiversity targets: An assessment of biodiversity trends, policy scenarios and key actions.
OECD. (2019). Measuring Distance to the SDG Targets: Metadata. OECD Publishing.
Sachs, J., Schmidt-Traub, G., Kroll, C., Lafortune, G., & Fuller, G. (2019). Sustainable Development Report 2019. Bertelsmann Stiftung and Sustainable Development Solutions Network (SDSN).

7 Applications of the Green Growth Index

7.1 Completed projects 2023

7.1.1 Qatar green growth indicators

Collaborators: GGPM Team and GGGI Qatar Team

Duration: June 2022 – October 2023

Objectives: GGGI is cooperating with the Qatar Ministry of Environment and Climate Change (MOECC) in a multi-year cooperation program that consists of five work streams, including (1) Qatar Green Growth Pathway; (2) National Adaptation Planning; (3) Measurement, Reporting, and Verification (MRV) Development; (4) Circular Economy Promotion; and (5) Capacity Building and International Cooperation. To support the first work stream on the green growth pathway, a set of green growth indicators was identified that could be used to track key progress in achieving goals of the Qatar National Vision 2030, Second National Development Strategy, Qatar National Development Framework 2032, Qatar National Climate Change Action Plan, Qatar National Environment and Climate Change Strategy, revised Nationally Determined Contribution (NDC), and Qatar National Biodiversity Strategy and Action Plan 2015-2025 while meeting the SDGs. The project will produce a scoping report that proposes the green growth indicators for Qatar and discusses the rationale for selecting them. It assesses the social, economic, and environmental issues that set the scenes for the policy goals and development priorities and the challenges and opportunities for green growth transition. The knowledge gained from the assessment supported the checklist approach, which was applied to guide the systematic selection of the green growth indicators.

Main outputs:

- Scoping report proposing the green growth indicators for Qatar and discussing the rationale for selecting them
- Complete database of draft green growth indicators for Qatar with links for the online sources of data

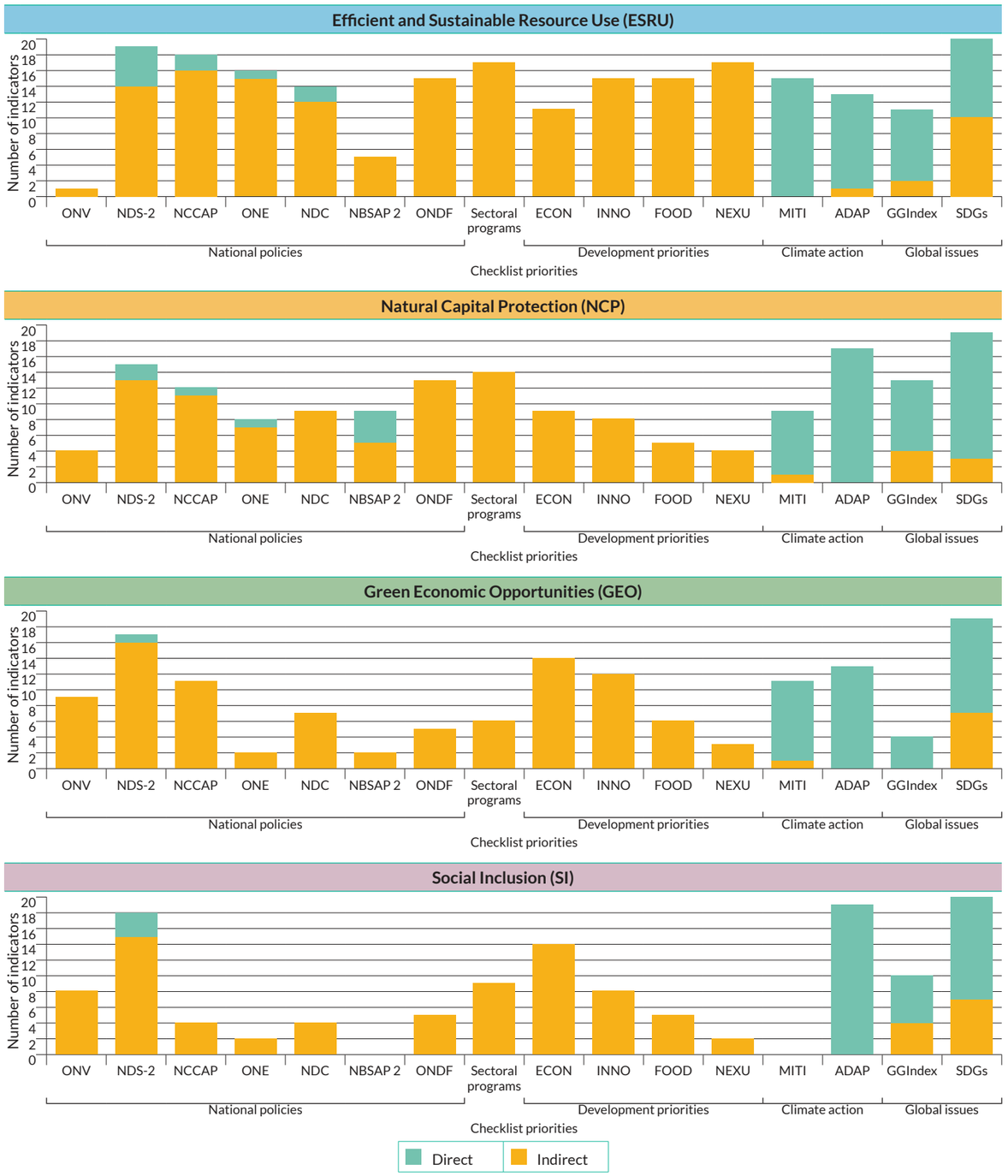
Twenty (20) indicators were identified for each green growth dimension, giving 80 indicators. The relevance of the indicators was assessed against five criteria, including national policies, sectoral programs, development priorities, climate action, and global issues. The relevance was measured at two levels – direct relevance, represented by a green check ☑, and indirect relevance, represented by a yellow check ☑ (Figure 45). Direct relevance indicates that the indicators are explicitly mentioned, including the measurement units (e.g., Share per GDP, Tons per capita, etc.), in the referenced documents (i.e., national policies, sectoral programs) and databases (i.e., Green Growth Index, SDG). The relevance levels for development priorities and climate action were based on expert judgment.

Overall, the selected green growth indicators are relevant to the SDGs, with 51 SDG indicators (64 percent of the 80). The remaining 29 indicators contribute to achieving the SDGs. The national policies implicitly mention many indicators, with the NDS-2 covering at least 15 indicators. National policies explicitly mentioned (i.e., direct relevance) a few indicators across all dimensions, i.e., seven in efficient and sustainable resources use, five in natural capital protection, one in green economic opportunities, and three in social inclusion. The number of indicators implicitly mentioned in sectoral programs varies across dimensions, with efficient and sustainable resource use and natural capital protection covering a more significant number. Economic diversification and green innovation cover more green growth indicators among the four development priorities. The relevance of the indicators to climate action depends on the dimension, with efficient and sustainable resource use represented mainly in mitigation and social inclusion in adaptation.

More than half of the green growth indicators in the efficient and sustainable resource use dimension are implicitly mentioned (i.e., have indirect relevance) in many national policies and sectoral programs (Figure C). Seven of them are explicitly mentioned in NDS-2, NCCAP, QNE, and NDC, including energy intensity (EE1), the share of renewables (EE2), cooling electricity savings (EE5), water re-use (EW4), wastewater use in agriculture (SL2), agricultural productivity (SL4), and safely treated domestic wastewater (ME5). Several indicators are also discussed in the sectoral programs, albeit none was explicitly mentioned (i.e., no direct relevance). Among the four green growth dimensions, indicators for efficient and sustainable resource use are most frequently mentioned in national policies and sectoral programs.
At least 14 indicators are relevant to three development priorities: green innovation, food self-sufficiency, and energy-water-food nexus. Fifteen and twelve indicators are directly relevant to climate mitigation and adaptation, particularly sustainable land use and material use efficiency indicators. About half of the green growth indicators are part of the Global Green Growth Index and SDG databases, particularly the efficient and sustainable water use and material use efficiency indicators.

Less than half of the 20 green growth indicators in the natural capital protection dimension are mentioned in QNV, QNE, NDC, and NBSAP-2 (Figure D). The five indicators with direct relevance to the national policies include solid waste generation per capita (EQ3), coastal water pollution (EQ5), red list index (CV1), terrestrial and marine protected areas (CV2), and tools to monitor economic and environmental aspects of tourism (CV3). EQ3 is explicitly mentioned in NDS-2 and NCCAP, and CV2 in NDS-2, QNE, and NBSAP-2. NBSAP-2 has explicitly mentioned four green growth indicators. However, fewer indicators have direct and indirect relevance to the national policies and sectoral programs in

Figure 45. Number of indicators showing direct and indirect relevance to the checklist criteria, by dimension



Data source: Direct relevance refers to the indicators with a green check and indirect relevance refers to the indicators with a yellow check in the checklist table (Table 3).
Notes: The national policies include Qatar National Vision 2030 (QNV), Qatar Second National Development Strategy 2018-2022 (NDS-2), Qatar National Climate Change Action Plan 2030 (NCCAP), Qatar National Environment and Climate Change Strategy (QNE), Nationally Determined Contribution (NDC), Qatar National Biodiversity Strategy and Action Plan 2015-2025 (NBSAP-2), and Qatar National Development Framework 2032 (QNDF). The development priorities include economic diversification (ECON), green innovation (INNO), Food self-sufficiency (FOOD), and energy-water-food nexus (NEXU). Climate action includes climate mitigation (MITI) and climate adaptation (ADAP), while global issues include the Green Growth Index (GGIndex) and Sustainable Development Goals (SDGs).

the natural capital protection dimension compared to the efficient and sustainable resource use dimension. In contrast, natural capital protection indicators are more frequently mentioned than green economic opportunities and social inclusion indicators. Less than half of the 20 green growth indicators in the natural capital protection dimension have relevance to the development priorities. More indicators in this dimension are directly relevant to climate adaptation than mitigation. The natural capital protection dimension has many SDG indicators, sixteen (16), the largest among the four dimensions. About half of the indicators are part of the Global Green Growth Index.

The only green economic opportunities indicator explicitly mentioned in national policies and sectoral programs is the ease of doing business (new business density) (GN2), particularly in NDS-2. With 16 green growth indicators, the most significant number of indicators with indirect relevance (i.e., implicit mention) is also found in NDS-2. Except for NCCAP, other national policies have implicitly mentioned less than half of the indicators in the green economic opportunities dimension. Among the four dimensions, the green economic opportunities dimension has the least number of indicators mentioned in sectoral programs. Economic diversification and green innovation are the development priorities relevant to more than half of the 20 green growth indicators. Like in efficient and sustainable resource use and natural capital protection, a number of the indicators are directly relevant to both climate mitigation and adaptation. The 2022 edition of the Global Green Growth Index only includes four indicators in the green economic opportunities dimension. They are all included in Qatar's green growth indicators, including adjusted net savings (GV3), share of export of environmental goods (GT1), share of green employment in manufacturing (GJ1), and share of patents in environmental technology (GN1). Twelve green growth indicators are from the SDGs, while seven contribute to achieving them.

Less than half of the 20 green growth indicators in the social inclusion dimension are mentioned in national policies, except for NDS-2. The three indicators with direct relevance to national policies are found in NDS-2, including the ratio of female-male labor force participation (GB2), tertiary school enrollment, gender parity index (GB5), and youth unemployment rate (SE3). None of the social inclusion indicators is mentioned in the NBSAP-2, and only two are implicitly mentioned in QNE. More indicators in the social inclusion dimension are indirectly relevant to sectoral programs than green economic opportunities. Like in natural capital protection and green economic opportunities dimensions, economic diversification, and green innovation are the development priorities most relevant to the indicators in the social inclusion dimension. While almost all indicators in this dimension are directly relevant to climate adaptation, none is directly relevant to mitigation. Thirteen of the 20 green growth indicators for social inclusion are SDG indicators, and the remaining seven contribute to achieving SDGs. Six indicators are part of the Global Green Growth Index, primarily representing gender balance and social protection.

7.1.2 Azerbaijan and Central Asian countries' inclusive and green growth transition

Collaborators: GGPM Team and the Asian Development Bank (ADB)

Duration: October - January 2023

Objectives: The fall of the Soviet Union in the early 1990s and the subsequent rise of independent states in Central Asia heralded a new era of growth for the region. The region's first major oil contracts for exploration and production started pouring in the 1990s and transformed several Central Asian (CA) economies into net exporters of fossil fuels and set the next stage of the region's country's rapid economic development. Azerbaijan, for example, transformed itself into an upper-middle-income country by 2009. By early 2015 poverty rate was down to five percent before going up again to 6.2 percent in 2020 at the height of the COVID-19 pandemic. Falling oil prices in 2014/2015 exposed the region's macroeconomic vulnerability and economic dependence on the volatile global price of hydrocarbons. Across the region, governments recognize the urgent need to reduce fiscal dependency on oil revenues and diversify the economy by finding new drivers of non-oil growth to achieve macroeconomic stability and more sustainable development. A central question of interest is to take stock of the ongoing efforts towards green growth and the opportunities, challenges, and options for Azerbaijan and Central Asian countries as they move towards a net zero economy.

Main outputs:

- Technical report on Azerbaijan and Central Asian countries' inclusive and green growth transition (https://greengrowthindex.gggi.org/wp-content/uploads/2023/12/Acosta-and-Hampel-2023-Azerbaijan-and-Central-Asia-green-growth.pdf)
- Central Asia +1 Green Growth Index website (https://azerbaijan-centralasia-ggindex.gggi.org/)
- Presentation during the Global Green Growth Week 2023 (https://www.youtube.com/watch?v=MxdiXwgEix0)

The co-occurrence coefficients measure how often issues relating to the green growth indicators were referenced in four main policy documents in Azerbaijan and the CA countries. Overall, the coefficients show that the green economic opportunities and social inclusion indicators are least referred to in the national policies across the countries. The Sankey visualization reveals that Azerbaijan's national policies show the least connection to the green growth indicators of the four green growth dimensions (Figure 46). Although their priorities vary, Uzbekistan and the Kyrgyz Republic have the longest edges (i.e., the blue vertical line

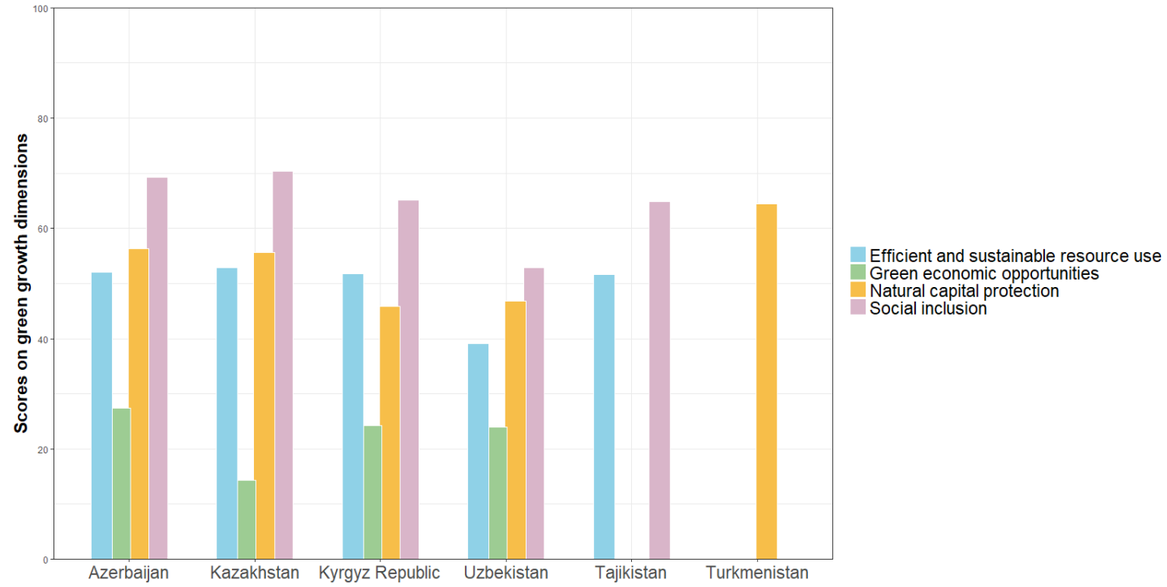
Figure 46. Sankey visualization of connections between national policies and green growth dimension by country

Note: The Sankey diagrams present data flows and connections, where data refers to the codes. Sankey applies a layout for its nodes and the edges connecting nodes to create an easily comprehensible data visualization. In this study, the nodes refer to the coded data of the green growth indicators, and the edges refer to the policy documents in Azerbaijan and CA countries. The Sankey diagrams thus provide a useful visualization of the greenness of the national policies according to the thickness of the data flows or connecting lines between the nodes and edges.

in Figure 46) and, thus, the greenest national policies. Uzbekistan's policies are heavily oriented toward natural capital protection and efficient and sustainable resource use. In contrast, the Kyrgyz Republic provides almost equal importance to all four green growth dimensions. Kazakhstan and Tajikistan emphasize efficient and sustainable resource use in their national policies. The degree of connections of this dimension to the national policies is almost equal to that of the Kyrgyz Republic. The Sankey diagram further confirms the less important attention to green economic opportunities and social inclusion in national policies. Relative frequencies of the co-occurrence of green growth indicators in the policy documents were computed for each country. On the one hand, the dimensions with the highest relative frequencies are natural capital protection in Azerbaijan and the Kyrgyz Republic, efficient and sustainable resource use in Kazakhstan and Tajikistan, and both dimensions in Uzbekistan. On the other hand, social inclusion in Azerbaijan, Kazakhstan, and Uzbekistan, and green economic opportunities in the Kyrgyz Republic and Tajikistan have the lowest relative frequencies.

Comparing aggregated scores between Azerbaijan and the CA countries shows that the most considerable prospects to improve green growth performance are creating green economic opportunities, including green investment, innovation, employment, and trade (Figure 47). Providing an additional focus on green economic opportunities in policy documents and tracking changes in indicators' scores when implementing policies could help improve performance in this dimension. The dimension scores for efficient and sustainable resource use and natural capital protection are expected to improve in all countries as they update their National Biodiversity Strategies and Action Plans (NBSAPs) and Nationally Determined Contributions (NDCs) to enhance environmental coverage and targets as well as re-orienting national development plans and strategies to green economy to meet their commitments to the SDG, Paris Climate, and

Figure 47. Comparison of green growth performance of Azerbaijan and CA countries at the dimension and Index levels, 2021



Note: Due to a lack of data, scores for all dimensions were not computed for Tajikistan and Turkmenistan

Biodiversity Targets. Opportunities for Azerbaijan and the CA countries to further improve performance in social inclusion will be in gender balance and social protection. Among the social inclusion pillars, however, gender balance is the least emphasized in the policy documents in all countries.

With a Green Growth Index score of 48.58, Azerbaijan's green growth performance is better than its CA neighbors from 2010 to 2021. Nonetheless, they share some common challenges and opportunities for green growth transition: (i) creating green economic opportunities, which have the lowest scores and lack policy emphasis, offers the most considerable prospects to improve green growth performance, (ii) reducing dependence on fossil fuels and increasing renewables in the energy mix, which can be achieved through green investment in their vast renewable resources, will be vital to reducing emissions, (iii) performance in cultural and social values could be increased by tapping on their rich biodiversity and ecosystem, for example, through sustainable eco-tourism and (iv), policies should not shift policy emphasis away from social inclusion indicators but address them simultaneously with economic and environmental issues to ensure a green and inclusive growth transition.

7.1.3 Kenya Green Growth Index

Collaborators: GGPM Team, The National Treasury and Economic Planning, and GGGI Africa Regional Office

Duration: May – December 2023

Objectives: Kenya is pursuing a green economic model of growth and is a leading country in Africa in implementing climate policy and spurring climate action. It is one of the few countries in Africa with a rating of 2°C compatibility, projecting that the country is on track to meet or exceed its Paris Agreement Commitments. However, the Medium-Term Review of its Green Economy Strategy and Implementation Plan (GESIP) noted that more efforts are yet needed to actualize the various strategic objectives. Strengthening collaboration and institutional coordination in the delivery of GESIP objectives and strategies, as well as building the capacity of the Green Growth Unit at the Ministry of Environment, Climate Change, and Forestry to enable it to monitor and coordinate the implementation of GESIP, is highly recommended to support the country's transition to a low carbon economy. Through membership to GGGI, Kenya aims to benefit from technical expertise and know-how that will scale up its green growth interventions and maximize good practices and approaches. It will help the country to leapfrog to a green economic model as per its Vision 2030, and the Green Growth Index is a useful tool to support the country's trajectory.

Main Outputs:

- Kenya Green Growth Index reports (http://kenya-greengrowthindex.gggi.org/DashBoard/downloads_report)
- Kenya Green Growth Index website (http://kenya-greengrowthindex.gggi.org/)

- Presentation during the Global Green Growth Week 2023 (https://www.youtube.com/watch?v=MxdiXwgEix0)
- Dissemination during the COP28 in Dubai, UAE

The highlights of the results are presented in Chapter 5 of this report.

7.1.4 Ghana Green Growth Index

Collaborators: GGPM Team, Ministry of Environment, Science, Technology and Innovation (MESTI), and GGGI Africa Regional Office

Duration: May – December 2023

Objectives: Ghana still needs to develop long-term contingency plans for dealing with climate change. Its low-carbon development strategy focuses on the period until 2030. Ghana wants to review progress towards meeting its NDC in 2025; however, only a few details about the modalities of this process are currently available. For this review to be effective, the country requires more technical support in tracking the progress of the NDCs and other climate goals, especially in aggregating the cumulative effects of individual mitigation actions. In this light, Ghana requested support from GGGI towards developing its National Green Growth Strategy, which starts with a Green Growth Performance Measurement (GGPM). The GGPM, through the Green Growth Index development, aimed at identifying the country's green growth priorities and guiding GGGI and the Government of Ghana by measuring the country's performance in achieving sustainability targets, including the SDGs, Paris Climate Agreement, and Aichi Biodiversity Targets. Moreover, guided by the Ghana Green Growth Index, the results and processes of the National Green Growth Strategy aim to set the pace and tools needed to support the Government of Ghana in unlocking access to climate finance through developing pipelines of projects.

Main Outputs:

- Ghana Green Growth Index reports (https://ghana-greengrowthindex-8af980b05521.herokuapp.com/DashBoard/downloads_report)
- Ghana Green Growth Index website (https://ghana-greengrowthindex-8af980b05521.herokuapp.com/)
- Presentation during the Global Green Growth Week 2023 (https://www.youtube.com/watch?v=MxdiXwgEix0)
- Baseline data and information for developing a National Green Growth Strategy

The highlights of the results are presented in Chapter 5 of this report.

7.1.5 Uzbekistan scoping for Strategic Environmental Assessment (SEA)

Collaborators: GGPM Team, Agence Française de Développement (AFD), and GGGI Uzbekistan Team

Duration: January - December 2023

Objectives: Uzbekistan does not use strategic environmental assessments (SEAs). It has yet to formalize environmental screening for its proposed policy, plans, and programs. The introduction of SEA could help Uzbekistan mainstream its green economy policy and environmental objectives. It is particularly relevant as the country is embarking on its new Green Growth Strategic Framework (GGSF). The Project aims to support the Government in piloting the first SEA to generalize the practice later. To do so, the technical assistance sought to (a) identify a relevant strategy/investment plan at the right stage of preparation to be the object of a SEA; (b) mainstream capacities on SEA among all parties of the Government involved; and (c) support the authorities in taking stock of this first experience. GGGI mobilized and provided the Government with technical support, policy advice, and facilitation for stakeholder consultations (notably workshops) to carry out these objectives.

Main outputs:

- Determine the content of the SEA scoping study and the criteria used for the assessment using the Green Growth Index framework
- Identify indicators and methodologies for the SEA implementation and process

In the SEA study, sustainable tourism indicators will require more emphasis on environmental dimensions while not neglecting economic and social dimensions. The global sustainable tourism frameworks, including the Statistical Framework for Measuring the Sustainability of Tourism (SF-MST), European Tourism Indicator System (ETIS), and Global Sustainable Tourism Council (GSTC) Criteria, were mapped against the indicator framework for green growth, which the GGGI developed to track country performance in four green growth dimensions. GGGI's green growth framework has four dimensions – efficient and sustainable resource use, natural capital protection, green economic opportunities, and social inclusion whereby each dimension has four pillars. This will help align the SEA study with the Green Growth Strategic Framework (GGSF).

Efficient and sustainable resource use and natural capital protection dimensions in GGGI's green growth indicator framework are represented in the environmental dimension of the SF-MST framework. Natural resources like energy, land, water, and waste (or materials) are covered in both GGGI's framework and SF-MST. GGGI's green growth indicator framework considers GHG emissions, biodiversity, and ecosystems as relevant indicators for natural capital protection. While the SF-MST includes culture and heritage in the social dimension, GGGI's green growth indicator framework considers it an important pillar of natural capital protection. There are two reasons for the latter. First, the sustainability of protected areas and cultural heritage can be ensured in the tourism sector if they are managed, protected, and conserved. Second, key biodiversity areas contribute to tourism if they have high cultural and social value. The SF-MST framework's social dimension aligns well with the GGGI's green growth indicator framework because they both cover accessibility (i.e., to basic services and resources), human rights (i.e., including gender balance), social equity (i.e., income and wealth), and social protection (i.e., health, decent work). In the economic dimension, GGGI's green growth indicator framework covers SF-MST indicators on investment and employment. To further fit the former for the SEA study of sustainable tourism, a green supply chain (formerly green trade) is included as one of the pillars for green economic opportunities, representing the sustainability of the goods and services offered by tourism enterprises. The tourism supply chain is one of the economic criteria in the ETIS framework.

Table 9. Checklist of indicators for the green growth framework

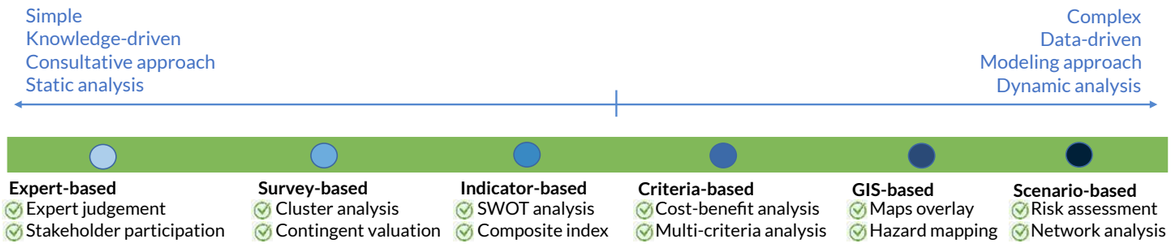
Pillars	Indicator framework*	Additional data collected	Environmental concerns
Efficient and sustainable resource use			
Efficient and sustainable energy** (EE)	☑		☑
Efficient and sustainable water use (EW)	☑	☑	☑
Sustainable land use (SL)	☑		☑
Waste and material use efficiency (ME)	☑	☑	☑
Natural capital protection			
Environmental quality EQ)	☑	☑	☑
GHG emissions reduction (GE)	☑	☑	
Biodiversity and ecosystem protection (BE)	☑		☑
Cultural and social value (CV)	☑	☑	
Green economic opportunities			
Green investment (GV)	☑		☑
Green innovation (GN)	☑		
Green employment (GJ)	☑		
Green supply chain (GS)	☑		
Social inclusion			
Access to basic services and resources (AB)	☑	☑	☑
Gender balance (GB)	☑		
Social equity (SE)	☑		
Social protection (SP)	☑		

* Based on the global sustainable tourism frameworks, i.e., Statistical Framework for Measuring the Sustainability of Tourism (SF-MST), European Tourism Indicator System (ETIS), and Global Sustainable Tourism Council (GSTC) Criteria
**This pillar includes transport.

Checklist of indicators for the green growth framework presents a checklist of indicators for the green growth framework. The sustainable tourism indicator framework for tourist destinations developed from the global tourism sustainable frameworks (i.e., SF-MST, GSTC, and ETIS) covers all the green growth pillars. The additional data only covers a few pillars in the green growth framework, and environmental concerns are collected through stakeholder consultations. The SEA study will address these gaps when collecting data and information during stakeholder consultations to facilitate the implementation of the recommended methodologies.

From a technical point of view, SEA refers to a range of "analytical and participatory approaches that aim to integrate environmental considerations into policies, plans, and programs and evaluate the interlinkages with economic and social considerations".[68] Practically all qualitative and quantitative analytical methodologies can be applied to SEA studies.[69] The choice of methods depends on the type and availability of data, the geographical coverage, the resources available for the analysis, and the desired outputs from the SEA. Experts suggest that quantitative methods are more useful in choosing alternatives and qualitative methods in identifying critical sustainability issues with the stakeholders, making consultations necessary in the SEA study to ensure technical credibility and policy relevance. Figure 48 provides an overview of the different approaches for SEA according

Figure 48. Overview of relevant SEA methodologies



Note: ✓refers to the methodologies to be conducted in the SEA study.

to the data types and complexity levels – expert-based, survey-based, indicator-based, criteria-based, GIS-based (geographic information system), and scenario-based. The "sheer variety of approaches can be confusing and impede the take-up of SEA"[70], so this scoping aims to simplify the overview of SEA methodologies to facilitate consultations. Two examples of the methods are provided for each approach. Different methods can be combined to improve SEA results. Depending on the data types and sources, the methods can be classified into different approaches. For example, network analysis can be classified as GIS-based if the networks are used or organized into spatial data. Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis can be classified as expert-based if the data were collected from the stakeholders.

The SEA study will incorporate four of the six approaches, including expert-based, survey-based, indicator-based, and criteria-based. At least one methodology is recommended in these approaches to ensure a comprehensive and coherent SEA study. Due to data scarcity and time constraints, GIS- and scenario-based methods are inappropriate for a pilot SEA project. The choice of methodologies was guided by the SEA objectives and coverage (i.e., tourist destination FTZ Charvak), data availability, duration of the SEA study, and suggested "good practices".

The application of SEA methodologies has two broad objectives: first, to appraise the performance of existing policies, plans, or programs; and second, to facilitate the methodical process of developing, assessing, amending, implementing, monitoring, and reviewing them.[71]
The methodologies recommended for the SEA study in this scoping aim to address both objectives. Moreover, the Good Practice Guidance for SEA in the field of development cooperation suggests that methodologies should:[72]

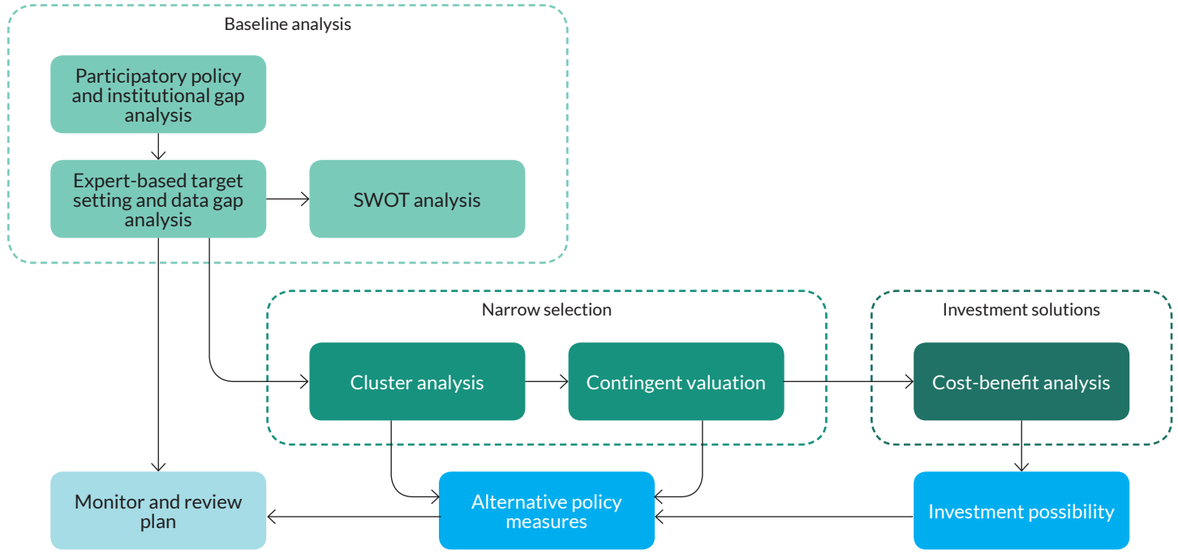
- **address key** issues and fit into the decision-making process (fit for purpose),
- integrate various substantive aspects, i.e., sectors and procedures (comprehensive),
- transparent, robust, and relevant to the objective and the practices,
- be understandable to all SEA stakeholders (not complex),
- be cost-effective (time and resources),
- offer alternatives, in addition to measures designed to mitigate any adverse impacts (comparison of alternatives) and
- allow for the accommodation of uncertainties (provide scenarios).

Except for providing scenarios that require the application of complex, primarily data-driven, and dynamic models, the recommended SEA methodologies cover the above guidelines. Although qualitative scenarios can be provided through environmental "scenario planning", a "method for thinking systematically about and understanding the nature and impact of the most uncertain and important driving forces affecting the future"[73], this will require significant time, technical, and budget resources for successive capacity-building and intensive engagement of diverse stakeholders.

Although they are stand-alone methodologies, aligning them with the scope of analysis will ensure the identification of coherent and relevant alternative measures for sustainable tourism in FTZ Charvak from the SEA study, as presented in Figure 49.

The first three methodologies will help to develop the baseline analysis of the Master Plan according to the national and regional government policies and knowledge. The participatory policy and institutional gaps will provide the contexts for analyzing the sustainability concerns raised by the stakeholders and identifying relevant indicators for setting sustainability targets. Expert-based target setting will provide goals or thresholds for monitoring the economic, environmental, and social sustainability of tourism development. The SWOT analysis, which will determine challenges and opportunities in tourism development from economic, social, and ecological perspectives, will guide the identification of indicators for setting sustainability targets for sustainable tourism.

Figure 49. Interlinkages between the recommended SEA methodologies



Source: Adapted from the work of Uzbekistan Country Team

Then, two methodologies will be used to narrow the selection of sustainability issues. To group the issues into "typology", the cluster analysis will systematically organize the multiple and diverse stakeholders' concerns into comprehensible qualitative data. The knowledge generated from the cluster analysis will guide the survey questions for the contingent valuation. This methodology will measure stakeholders' willingness to pay (e.g., hotel owners) to introduce a specific green measure. Therefore, it will quantitatively estimate the environmental costs and benefits. The knowledge generated from the contingent valuation will provide data inputs to the cost-benefit analysis. In this stage, the information will be gathered from the government, experts in the private sector, and civil society, but it is recommended to conduct the contingent valuation survey with local stakeholders, e.g., hotel and restaurant owners, to estimate their willingness to pay for adopting selected green measures (during the narrow phase) like energy efficiency measures or fees for waste collection which will address the sustainability issues.

After narrowing the selection of issues and possible green measures, the cost-benefit analysis will provide a sustainable economic and environmental appraisal of green investment solution(s) in the FTZ Charvak that points to specific sustainability issues relevant to the stakeholders and identified in the previous stages.

7.1.6 Green Growth Simulation Tool phase 2 applications

Collaborators: GGPM Team, GGGI Hungary and OECS Regional Team

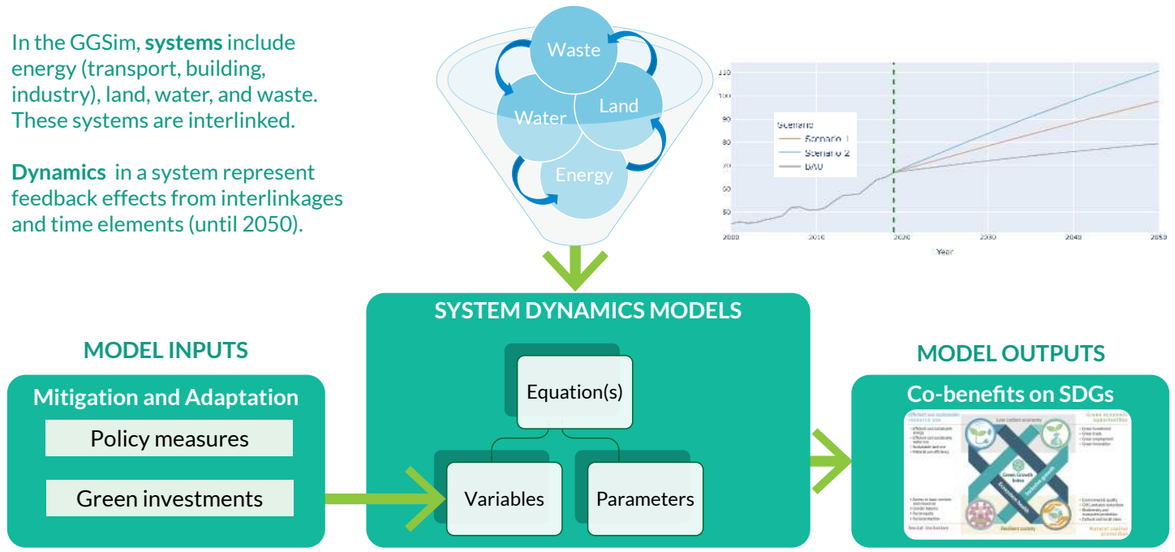
Duration: January 2022 - December 2023

Objectives: GGGI has developed both the Green Growth Index and Simulation (GGSim) Tool to support the integrated assessment of green growth policies and their impacts on green growth performance. The index measures the country-level performance based on a standard set of metrics in four green growth dimensions. The GGSim allows the users to enhance their knowledge of how the different policy

options, not only within these dimensions but also across sectors, influence a country's green growth performance. The validity of the underlying models and assumptions of the GGSim depends

on the policy relevance of the indicators that frame the Green Growth Index. Moreover, this Simulation Tool enhances users' understanding of green growth and allows an interactive learning experience. Users can manipulate input indicators, experiment with different policy choices, and simulate the impacts of their choices on green growth performance through their projected effects on output indicators.

Figure 50. Green Growth Simulation (GGSim) framework for assessing SDG co-benefits



Main outputs:

- Technical Report Green Growth Simulation Tool Phase 2 Applications to assess SDG co-benefits from climate mitigation and adaptation actions
- Interactive website to illustrate GGSim country applications (https://ggindex-simtool.gggi.org/SimulationDashBoard/country_level_applications)

The development of the Simulation Tool follows three phases:

Phase 1 consists of identifying and applying models that provide interlinkages among the indicators and require available data online. Models that require data to be collected from countries were kept first for use in Phase 2

Phase 2 involves conducting stakeholder dialogues to create/identify policy scenarios and collect feedback on the Phase 1 Simulation Tool. It also aims to improve the Phase 1 Simulation Tool by adding models that require data collected from agencies and integrating feedback from stakeholder dialogues.

Phase 3 consists of finalizing models and scenarios by adopting lessons learned from different country applications of the Phase 2 Simulation Tool and standardizing them for more global applications.

During Phase 1, completed in 2020, over 125 online tools related to green growth were reviewed to determine the best practices for developing online simulation tools and models. Also, over 200 peer-reviewed articles were assessed to identify the models that can be used in the Simulation Tool. Phase 1 developed a preliminary global simulation tool, available on this link: https://ggindex-simtool.gggi.org/SimulationDashBoard/simulation, which will be further improved after integrating lessons learned from Phase 2.

During Phase 2, several GGSim applications were conducted at the country level, assessing the SDG co-benefits of climate actions and green recovery plans based on a common framework (Figure 50). The country applications include:

1. SDG co-benefits of climate adaptation actions in Saint Lucia, in collaboration with the Organisation of Eastern Caribbean States (OECS) Commission and GGGI Caribbean Team, 2021

2. SDG co-benefits of Green Recovery Measures in Hungary, in collaboration with the Ministry for Innovation and Technology in Hungary and GGGI Hungary Country Team, 2021-2022

3. SDG co-benefits of the Low Emission Development Strategies (LEDS) in Ethiopia and Burkina Faso, in collaboration with various government agencies and GGGI Ethiopia and Burkina Faso Teams, 2021-2022

4. SDG co-benefits of the Green Emerging Senegal Plan (PSE), in collaboration with the Bureau Opérationnel de Suivi du Plan Sénégal Émergent (BOS) and GGGI Senegal Team, 2021-2022

Selected results from the Technical Report Green Growth Simulation Tool Phase 2 Applications to assess SDG co-benefits from climate mitigation and adaptation actions in Hungary and St. Lucia are presented below.

Hungary: The GGSim application in Hungary supports the SDG co-benefits assessment of the country's National Clean Development Strategy (NCDS). Two scenarios were evaluated: the Business-as-Usual (BAU) scenario, assuming current trends are followed, and the Early Action (EA) scenario, assuming climate neutrality by 2050 and considering the short- and medium-term benefits of the transition. Last year's Green Growth Index report presented results on SDG indicators. However, the GGSim also assessed impacts on non-SDG indicators supporting SDG achievement. The results presented here specifically focused on expanding Solar Photovoltaic Systems (SPVs) to sustain the growing electrification and introducing bioenergy for transport (Figure 51).

Solar Photovoltaic Systems (SPVs)

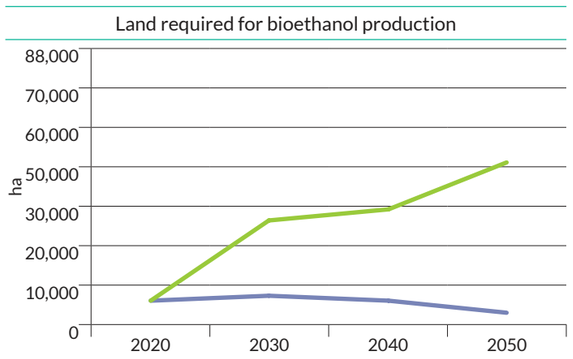
The EA scenario aims to reach a total solar capacity of 43.6 GW by 2050, compared to 0.2 GW in 2016. Most of this expansion is projected to take place between 2045 and 2050. Figure 51 presents the selected GGSim results on implementing SPVs. The land requirement to make it possible will reach approximately 132,000 ha, the equivalent of 1.45 percent of the country's total land area. This will lead to land use change emissions due to the allocation of forest land to replace the croplands used for SPVs. However, these emissions and the impacts on natural resources can be reduced when brownfields and rooftops are considered alternative areas for installing the solar capacity needed for the transition. By integrating the emissions over the whole period, it can be estimated that this alternative would save around 1.7 MtCO2eq or 83 percent of the emissions arising when using only croplands. In that case, land use change emissions only arise after 2045, as rooftops and brownfields can sustain the totality of the solar capacity expansion before the strong increase.

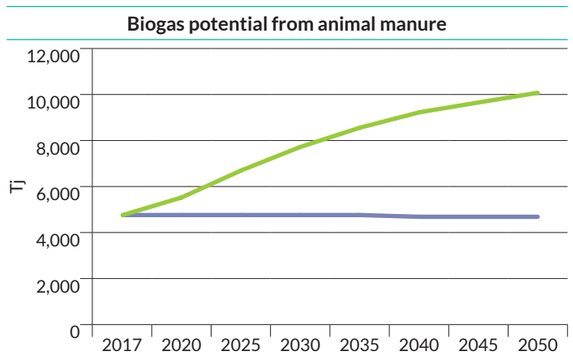
Bioenergy

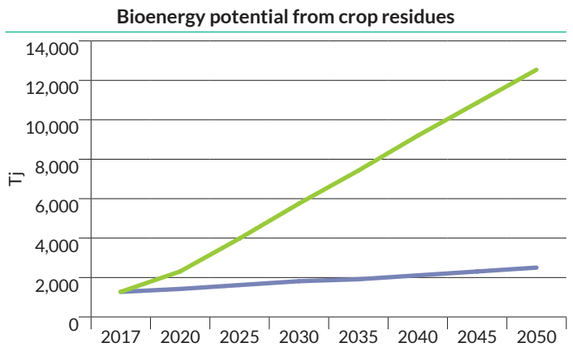
Additional areas of land will also be required to sustain the projected growing demand for biofuels in transport. Biofuels can either be first-generation, when crops used for production are especially grown for energy purposes, or second-generation, when agricultural waste is used for production. Only considering first-generation biofuels production will require around 70,000 ha to supply the demand in 2050, equivalent to 0.8 percent of the country's total land area (Figure 52). Increasing crop residue removal and decreasing the amount of manure left on pasture and applied to soil, will make these agricultural wastes available for biofuel production. The total bioenergy potential amounts to 22.6 PJ in 2050. Considering this potential in the total

Figure 51. Selected GGSim results on implementing Solar Photovoltaic Systems (SPVs) for climate mitigation in Hungary

Figure 52. Selected GGSim results on using bioenergy for climate mitigation in the transport sector in Hungary



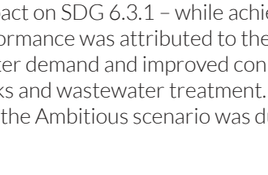




Scenarios:

Business-as-usual (BAU) scenario - assumes continuation of current trends

Early Action (EA) scenario - assumes climate neutrality by 2050 and considering the short- and medium-term benefits of the transition



biofuel demand would allow to save around 56,600 ha, or 81% of the total land requirement for first-generation biofuels.

Saint Lucia: The Green Growth Simulation Tool was applied to Saint Lucia to assess the alignment of the national adaptation strategies with SDG co-benefits. Three alternative scenarios were analyzed in addition to the BAU scenario, characterized by various levels of sectoral policy implementation and labeled as the Cautious, Ambitious, and Transformative scenarios. The Cautious scenario aims to perform better than the BAU scenario while ensuring investments can be afforded nationally. The Ambitious scenario aims to achieve ambitious adaptation and mitigation targets, assuming international support. The Transformative scenario prioritizes sustainable transformations, considering the social rather than economic costs of no action.
This application focused on the water sector, showing the impacts of the different water management policies on water use efficiency, wastewater treatment, and water pollution due to nutrient emissions Figure 53.

Water use efficiency

Water use efficiency was computed as a weighted sum of the sectoral water use efficiencies from the agricultural and municipal sectors. In all scenarios and throughout the transition period, agriculture accounts for most of the water withdrawals (from 70 to 86 percent). It has a significantly lower sectoral water use efficiency than the municipal sector, which makes it the principal driver of change in the indicator. The Ambitious and Transformative scenarios significantly increase water use efficiency while decreasing total water withdrawals by 26 percent and 48 percent, respectively, between 2017 and 2050. This highlights the effectiveness of technological innovation since both scenarios include transitioning from traditional surface irrigation to more efficient systems such as sprinkler and drip irrigation.
The BAU and Cautious scenarios led to a slighter increase in water use efficiency while increasing total water withdrawals by 16 percent and 8 percent, respectively, between 2017 and 2050. This increase in water use efficiency was due to a faster increase in sectoral value-added, which shows no decoupling between economic growth and water use under these scenarios.

Wastewater treatment

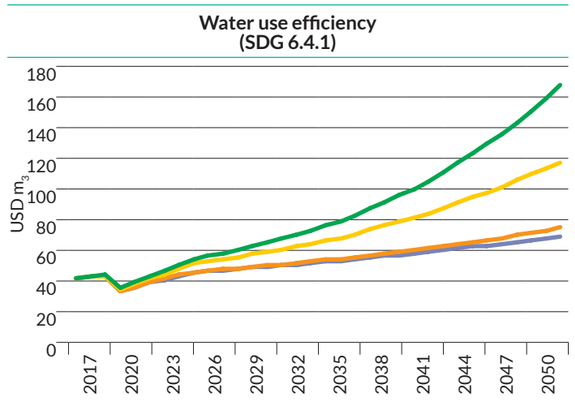
Municipal wastewater treatment has been historically mostly inexistent in Saint Lucia, and only the measures implemented in the Transformative scenario would have a significant impact on SDG 6.3.1 – while achieving a low score. This performance was attributed to the reduction in municipal water demand and improved connectivity to sewage networks and wastewater treatment. The poorer performance of the Ambitious scenario was due to the

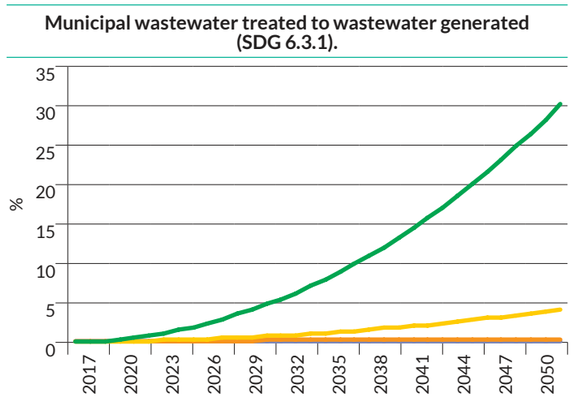
increase in municipal water withdrawals, offsetting the improvements in wastewater treatment. The Cautious scenario did not perform better than the BAU scenario, although additional wastewater policies were implemented. However, these were primarily improvements in connectivity to sewage networks, which did not automatically lead to improved wastewater treatment. Additionally, the measures on wastewater treatment involved primary treatment, which was not considered in the definition of the indicator. Moreover, this analysis considered that only wastewater collected by sewage networks could undergo treatment, disregarding wastewater collected by septic tanks. This is due to a lack of data, which would lead to better performance if included.

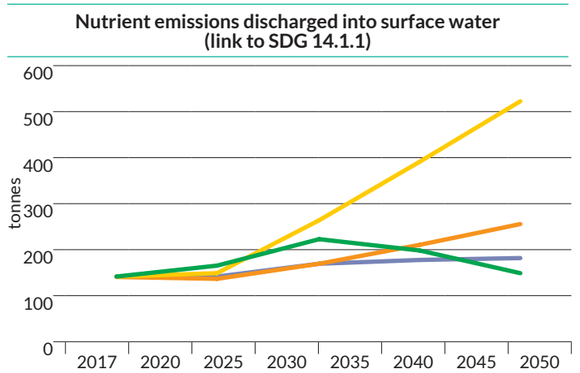
Water pollution due to nutrient emissions

Nutrient emissions discharged into surface water from human waste were estimated to provide preliminary investigations on environmental pollution. The distinction was made between point source emissions (connected sewage systems) and non-point source emissions (direct and diffuse sources). Point source emissions tended to increase, more or less depending on the scenario, due to higher connectivity to sewage networks. Non-point source emissions decreased in all alternative scenarios and remained at the same level in the BAU scenario. The most noticeable result was the massive increase in total nutrient emissions under the Ambitious scenario. In contrast, this increase was limited under the BAU and Cautious scenario, and the Transformative scenario goes back to initial levels after a temporary increase. This observation was attributed to the wastewater treatment measures under the Ambitious scenario being insufficient to deal with the increasing amount of wastewater collected, making the sewage network a significant cause of nutrient pollution. Yet, the Ambitious scenario performed better than the BAU and Cautious scenario in SDG 6.3.1. This highlights the importance of adopting a holistic approach to assessing a country's performance towards green growth.

Figure 53. Selected GGSim results on water management for climate adaptation in St. Lucia







Scenarios:

Business-as-usual (BAU) scenario - assumes continuation of current trends

Cautious scenario - aims to perform better than the BAU scenario while ensuring investments can be afforded nationally

Ambitious scenario - aims to achieve ambitious adaptation and mitigation targets, assuming international support

Transformative scenario - prioritizes sustainable transformations, considering the social rather than economic costs of no action

7.2 Ongoing projects 2023-2024

7.2.1 Lao PDR Green Growth Index

Collaborators: GGPM Team, Ministry of Planning and Investment (MPI), and GGGI Lao PDR Team

Duration: April 2022 – January 2024

Objectives: Under the National Green Growth Strategy (NGGS), a monitoring and evaluation framework included an early attempt at developing an index through which the Ministry of Planning and Investment (MPI) could monitor and track green investment in Lao PDR. However, this needed to be operationalized. As the Government of Lao PDR has scaled up its commitment to green growth over the past five years, an improved operational index is needed. Such an index will allow MPI to a) monitor the implementation of the National Green Growth Strategy, at the same time, be used as an essential tool in mainstreaming green growth into national, sub-national, and sectoral strategies and development plans in the more comprehensive manner, b) evaluate the implementation towards the outcomes, targets, and indicators set in the National Green Growth Strategy, and c) review and revise the national Green Growth Index for future update of the National Green Growth Strategy. GGGI has been leading global efforts at building and applying the Green Growth Index, and these experiences can be channeled into Lao PDR. For this, a new index needs to be built in collaboration with MPI, and the capacity of government officials to use and deploy this index needs to be built. Notably, MPI is creating a new internal policy think tank within MPI called the Development Research Institute (DRI), which will manage the Green Growth Index.

Main Outputs:

- Lao PDR Green Growth Index report
- Zambia Green Growth Index website (https://zambia-greengrowthindex.gggi.org/)
- Presentation during the Global Green Growth Week 2023 (https://www.youtube.com/live/MxdiXwgEix0?feature=shared)
- Baseline data and information for updating Lao PDR's National Green Growth Strategy

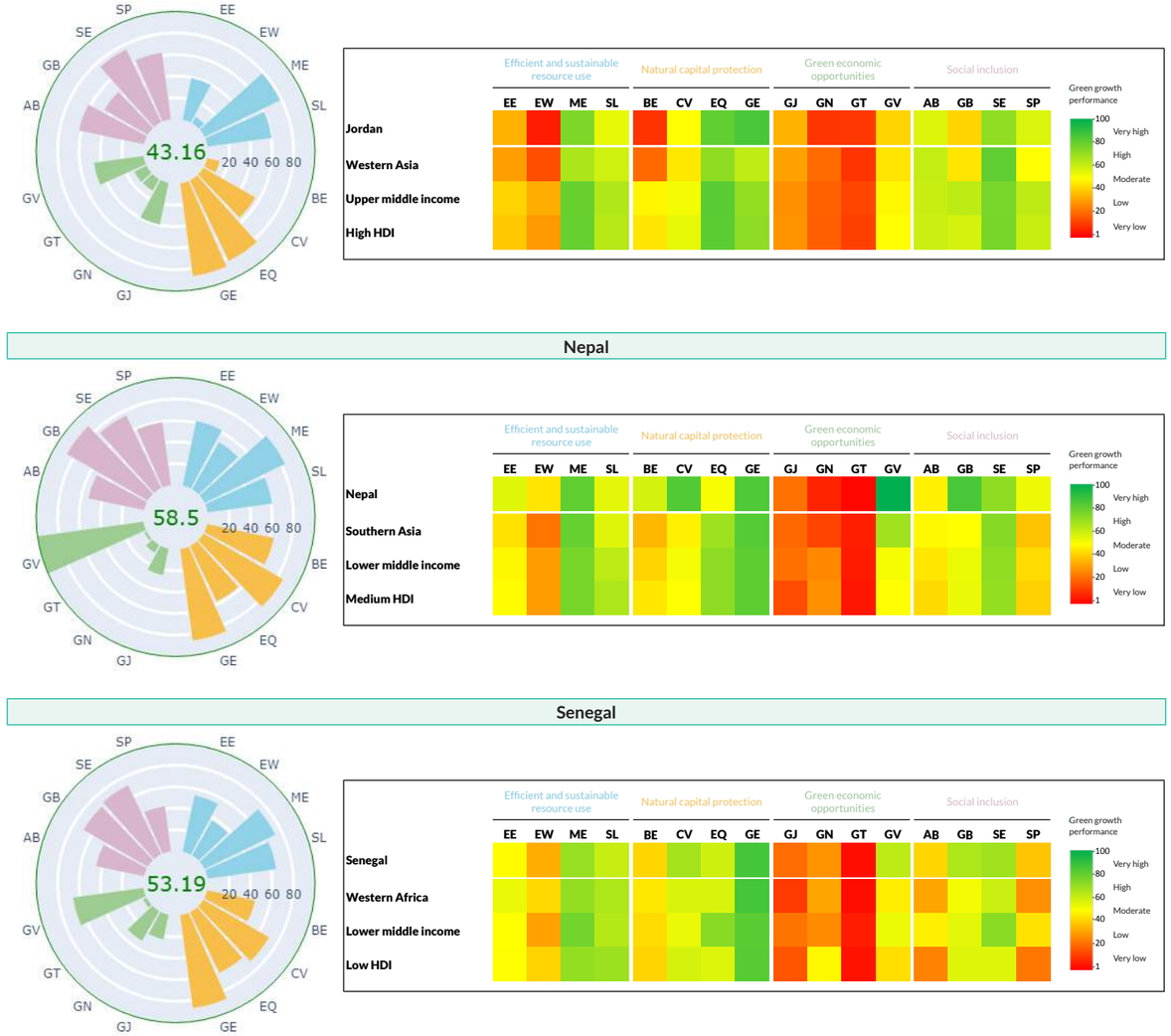
7.2.2 Green Growth Performance in Country Planning Frameworks

Collaborators: GGPM Team and GGGI Green Growth Planning & Implementation and Country Offices

GGGI's Country Planning Framework (CPF) is a 5-year in-country delivery strategy that identifies GGGI's contribution to green growth in member and partner countries in alignment with GGGI's Strategy 2030. The CPF process entails assessing green growth challenges, opportunities, and enabling conditions, identifying GGGI's in-country comparative advantage, and elaborating priority interventions and intended results. GGPM contributes to developing CPFs in GGGI Member Countries by providing relevant graphics and analysis for assessing green growth performance using selected Green Growth Index results (i.e., distance to targets, performance dashboard).

This year, Jordan, Nepal, and Senegal prepared their CPFs, including a brief assessment of the country's performance in achieving sustainability targets (Figure 54). Among the three countries, Nepal showed the best green growth performance with a score of 58.5, attributed to a very high score in green investment (GV), represented by the ratio of adjusted net savings to GNI, including particulate emission damage). Nepal far exceeded the performance of its peers in Southern Asia, lower middle-income, and medium-HDI (Human Development Index) countries. Nepal's performance in other pillars is at par with Senegal's, except for GV. Jordan showed the lowest performance, particularly in efficient and sustainable water use (EW) and biodiversity and ecosystem protection (BE). It performed very low in these countries compared to the Western Asian, Upper middle-income, and high-HDI countries. But these offer Jordan the best opportunities to improve its green growth performance. In Jordan, Nepal, and Senegal, improving green trade (GT) will help these countries to progress in their green growth transition. All three performed the least in this pillar.

Figure 54. Green growth performance in Jordan, Nepal, and Senegal CPFs, 2022



Efficient and sustainable resource use	Natural capital protection	Green economic opportunities	Social inclusion	Missing
EE – efficient and sustainable energy EW – efficient and sustainable water use SL – sustainable land use ME – waste and material use efficiency	EQ – environmental quality GE – greenhouse gas 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 equity SP – social protection	

7.3 Upcoming projects 2024

7.3.1 Lao PDR SDG co-benefits assessment

Collaborators: GGPM Team, Ministry of Planning and Investment (MPI), and GGGI Lao PDR Team

Objectives: Considering and assessing the economic impacts, avoided losses, and SDG co-benefits of different climate adaptation and green intervention measures in the vulnerable sectors align with the Lao PDR Ministry of Environment, Ministry of Agriculture, Ministry of Planning and Investment strategic priorities for enhanced adaptation to climate change in priority sectors and most vulnerable provinces. The modelling approach would allow the analysis of short- to medium-term climate adaptation and green interventions and policies in priority sectors, aligned with the main Government needs of developing and implementing robust and impactful national, sub-national, and sectoral NAPs as well as improved NGGS. In addition, the project will support the country's development of NAP and sectoral adaptation plans, including NAP for the agriculture sector, and revised NGGS while addressing SDG 13, and indirectly SDGs 1 and 2. Furthermore, the climate adaptation economic and SDG co-benefits modelling and assessment will support a deeper understanding of the interconnections between, on the one hand, climate adaptation and green growth objectives and, on the other hand, the country's development priorities.

Main outputs:

- Technical report on SDG co-benefits on selected adaptation measures to enhance social resilience
- Capacity building on developing scenarios and applying simulation tool to assess SDG co-benefits

7.3.2 Togo National Green Growth Index

Collaborators: GGPM Team, GGGI African Regional Office

Objectives: GGGI will support the government of Togo in developing a National Green Growth Index, with the aim of building capacity to identify green growth indicators and assess challenges and opportunities for the country's transition to green growth. Moreover, a pipeline of projects to support the green growth transition will be identified.

Main outputs:

- Togo Green Growth Index reports
- Togo Green Growth Index website
- Presentation during the Global Green Growth Week 2024

7.3.3 African LDCs Green Growth Index

Collaborators: GGPM Team, GGGI African Regional Office

Objectives: GGGI will develop a regional Green Growth Index for the GGGI African Member Countries with Least Developing Countries (LDCS) status, including Burkina Faso, Ethiopia, Mozambique, Rwanda, Senegal, Togo, Uganda, and Zambia. The project will conduct a cross-country comparative analysis to determine the potential for a transition to green growth in these countries. The green growth indicators most relevant for the comparative analysis will be identified using a systematic analysis of policies and development priorities in these African countries. The project's outcome will help develop projects supporting green growth transition.

Main outputs:

- African LDCs Green Growth Index report
- African LDCs Green Growth Index website
- Potential green growth relevant projects

8 Statistical Tables

8.1 Green Growth Index and dimension scores by subregion

Table 10. Green growth dimension sub-indices and Green Growth Index and ranks for the African countries

African Countries/ Territories	Africa Subregion	Dimensions				Green Growth Index		
		Efficient and Sustainable Resource Use	Natural Capital Protection	Green Economic Opportunities	Social Inclusion	Scores	Level	Rank
Gabon	Middle	77.78	72.85	42.62	59.14	61.48	High	1
Cabo Verde	Western	64.00	61.34	51.85	69.68	61.37	High	2
Seychelles	Eastern	51.44	78.04	41.13	76.95	59.70	Moderate	3
Botswana	Southern	73.63	64.99	41.39	57.56	58.11	Moderate	4
Namibia	Southern	60.60	66.17	38.61	64.11	56.13	Moderate	5
Mauritius	Eastern	60.90	52.20	38.55	80.21	55.99	Moderate	6
Togo	Western	61.40	69.92	42.28	53.71	55.88	Moderate	7
Senegal	Western	59.70	65.00	41.59	56.42	54.93	Moderate	8
Morocco	Northern	47.69	66.05	40.99	68.46	54.53	Moderate	9
Burkina Faso	Western	67.53	73.04	48.67	36.32	54.34	Moderate	10
Cote d'Ivoire	Western	72.04	66.31	37.89	47.28	54.08	Moderate	11
Tanzania	Eastern	68.17	67.63	36.08	51.02	53.97	Moderate	12
Zambia	Eastern	63.21	71.55	42.83	43.70	53.94	Moderate	13
Guinea	Western	60.15	67.33	45.19	46.06	53.88	Moderate	14
Uganda	Eastern	64.87	72.82	36.63	47.79	53.63	Moderate	15
Ghana	Western	61.21	64.79	37.19	55.29	53.44	Moderate	16
Rwanda	Eastern	69.23	69.67	30.44	54.31	53.14	Moderate	17
Kenya	Eastern	59.61	63.73	37.69	54.69	52.90	Moderate	18
South Africa	Southern	39.53	64.49	43.64	69.57	52.74	Moderate	19
Cameroon	Middle	61.84	61.55	36.51	55.08	52.60	Moderate	20
Ethiopia	Eastern	62.20	70.84	41.12	42.22	52.59	Moderate	21
Zimbabwe	Eastern	56.70	77.08	32.34	51.64	51.98	Moderate	22
Benin	Western	63.27	63.71	41.01	39.97	50.70	Moderate	23
Gambia	Western	62.39	63.66	29.78	52.16	49.84	Moderate	24

Table 10. Green growth dimension sub-indices and Green Growth Index and ranks for the African countries *(continued)*

African Countries/ Territories	Africa Subregion	Dimensions				Green Growth Index		
		Efficient and Sustainable Resource Use	Natural Capital Protection	Green Economic Opportunities	Social Inclusion	Scores	Level	Rank
Lesotho	Southern	62.34	41.46	40.13	53.01	48.42	Moderate	25
Tunisia	Northern	30.01	60.91	41.65	72.16	48.41	Moderate	26
Malawi	Eastern	64.69	77.06	24.45	44.75	48.33	Moderate	27
Mali	Western	65.43	60.68	30.04	44.55	48.01	Moderate	28
Burundi	Eastern	63.74	68.46	30.31	40.00	47.96	Moderate	29
Nigeria	Western	62.19	61.26	27.03	43.65	46.05	Moderate	30
Mauritania	Western	66.73	36.60	46.44	39.09	45.89	Moderate	31
Algeria	Northern	28.52	51.19	40.66	73.30	45.67	Moderate	32
Sierra Leone	Western	70.74	59.45	28.83	35.83	45.65	Moderate	33
Mozambique	Eastern	57.58	68.15	27.02	39.84	45.33	Moderate	34
Angola	Middle	70.13	58.64	24.23	38.52	44.26	Moderate	35
Niger	Western	64.26	54.46	26.81	32.51	41.79	Moderate	36
Eswatini	Southern	21.03	61.07	35.87	64.04	41.45	Moderate	37
Madagascar	Eastern	61.38	61.88	21.42	27.07	38.52	Low	38
Sudan	Northern	27.49	50.81	35.66	42.77	38.20	Low	39
Egypt	Northern	16.26	56.00	35.39	62.93	37.74	Low	40
DR Congo	Middle	55.62	68.28	17.20	30.00	37.42	Low	41
Central African Republic	Middle	70.21	55.40	20.04	22.55	36.41	Low	42
Libya	Northern	23.77	28.86	36.31	52.52	33.82	Low	43
Chad	Middle	71.11	53.23	-	22.12	-	-	-
Comoros	Eastern	73.22	60.18	-	55.37	-	-	-
Congo Republic	Middle	64.60	74.24	-	44.48	-	-	-
Djibouti	Eastern	62.36	38.49	-	45.53	-	-	-
Guinea-Bissau	Western	61.11	64.71	-	24.01	-	-	-
Liberia	Western	58.03	59.67	-	38.05	-	-	-
Sao Tome and Principe	Middle	74.25	70.84	-	59.09	-	-	-
Somalia	Eastern	53.22	48.08	-	38.52	-	-	-
South Sudan	Eastern	76.04	65.14	-	27.66	-	-	-
Equatorial Guinea	Middle	64.30	56.22	-	-	-	-	-
Eritrea	Eastern	69.60	48.61	-	-	-	-	-

Table 11. Green growth dimension sub-indices and Green Growth Index and ranks for the American countries

American Countries/ Territories	America Subregion	Dimensions				Green Growth Index		
		Efficient and Sustainable Resource Use	Natural Capital Protection	Green Economic Opportunities	Social Inclusion	Scores	Level	Rank
United States	Northern	47.08	62.79	64.64	86.27	63.72	High	1
Paraguay	South	65.93	66.12	51.04	73.56	63.61	High	2
Brazil	South	67.83	71.14	46.14	72.79	63.45	High	3
Costa Rica	Central	57.59	71.66	44.83	73.44	60.71	High	4
Mexico	Central	49.56	73.17	45.61	80.42	60.39	High	5
Chile	South	51.12	74.03	44.59	78.51	60.33	High	6
Honduras	Central	61.48	72.70	50.80	57.01	59.98	Moderate	7
Uruguay	South	66.00	58.70	39.96	82.09	59.71	Moderate	8
Panama	Central	61.01	73.46	40.66	68.46	59.43	Moderate	9
Jamaica	Caribbean	54.15	66.47	52.23	64.43	58.99	Moderate	10
Bolivia	South	57.31	71.62	37.01	78.24	58.71	Moderate	11
Dominican Republic	Caribbean	61.06	75.22	36.40	67.40	57.94	Moderate	12
El Salvador	Central	57.51	64.03	42.17	71.63	57.75	Moderate	13
Ecuador	South	56.42	70.62	37.57	71.67	57.23	Moderate	14
Colombia	South	57.29	71.04	39.48	64.81	56.80	Moderate	15
Peru	South	59.09	70.87	35.27	69.47	56.60	Moderate	16
Nicaragua	Central	59.94	69.73	39.19	60.01	56.00	Moderate	17
Guatemala	Central	61.70	66.14	39.90	58.33	55.51	Moderate	18
Canada	Northern	48.51	58.96	37.06	87.28	55.15	Moderate	19
Suriname	South	52.48	64.12	37.74	71.64	54.92	Moderate	20
Venezuela	South	53.64	70.70	37.04	64.51	54.86	Moderate	21
Belize	Central	57.78	71.81	32.46	64.79	54.35	Moderate	22
Argentina	South	57.14	59.44	33.24	76.81	54.26	Moderate	23
Guyana	South	53.06	62.12	32.08	74.21	52.93	Moderate	24
Trinidad and Tobago	Caribbean	33.32	52.79	44.24	78.42	49.70	Moderate	25
Barbados	Caribbean	36.37	58.76	30.94	67.06	45.89	Moderate	26
Antigua and Barbuda	Caribbean	62.00	62.94	27.11	-	-	-	-
Bahamas	Caribbean	60.98	66.66	-	62.60	-	-	-
Cuba	Caribbean	63.81	65.33	-		-	-	-
Dominica	Caribbean	56.11	64.79	-	62.14	-	-	-
Grenada	Caribbean	62.71	61.13	-	69.01	-	-	-
Haiti	Caribbean	60.03	54.18	-	39.40	-	-	-
Puerto Rico	Caribbean	62.81	45.97	-	-	-	-	-
St. Kitts and Nevis	Caribbean	48.63	67.82	-	-	-	-	-
St. Lucia	Caribbean	-	71.74	-	61.57	-	-	-
St. Vincent and the Grenadines	Caribbean	62.41	71.47	-	54.41	-	-	-
Bermuda	Northern	61.91	52.37	-	-	-	-	-
Greenland	Northern	-	39.71	-	-	-	-	-
United States Virgin Islands	Caribbean	-	44.96	-	-	-	-	-

Table 12. Green growth dimension sub-indices and Green Growth Index and ranks for the n countries

n Countries/ Territories	Asia Subregion	Dimensions				Green Growth Index		
		Efficient and Sustainable Resource Use	Natural Capital Protection	Green Economic Opportunities	Social Inclusion	Scores	Level	Rank
Japan	Eastern	61.95	70.20	49.29	77.52	63.85	High	1
China	Eastern	53.81	63.33	62.68	76.65	63.61	High	2
Laos	South-eastern	59.35	76.22	52.54	65.42	62.79	High	3
Thailand	South-eastern	57.91	73.17	47.31	76.97	62.68	High	4
Bhutan	Southern	62.10	78.79	49.82	57.25	61.12	High	5
Georgia	Western	54.59	72.73	45.33	76.17	60.85	High	6
Nepal	Southern	63.73	72.97	41.49	68.78	60.36	High	7
Malaysia	South-eastern	56.83	66.56	51.97	65.21	59.84	Moderate	8
Philippines	South-eastern	61.51	73.88	39.64	66.36	58.80	Moderate	9
Cyprus	Western	55.04	74.79	35.60	80.93	58.68	Moderate	10
Indonesia	South-eastern	57.56	64.62	47.74	65.32	58.36	Moderate	11
Azerbaijan	Western	44.78	64.37	54.57	67.98	57.18	Moderate	12
Armenia	Western	43.44	69.11	46.62	75.81	57.07	Moderate	13
Maldives	Southern	60.24	52.31	47.38	69.89	56.83	Moderate	14
Cambodia	South-eastern	60.62	77.26	36.86	58.88	56.47	Moderate	15
Vietnam	South-eastern	48.45	62.10	47.74	70.66	56.44	Moderate	16
Kyrgyz Republic	Central	42.49	63.54	45.68	72.88	54.75	Moderate	17
Kazakhstan	Central	49.99	53.20	41.36	79.00	54.29	Moderate	18
Israel	Western	49.96	48.27	42.60	82.29	53.92	Moderate	19
Tajikistan	Central	37.35	61.73	48.86	68.86	52.78	Moderate	20
Brunei Darussalam	South-eastern	42.88	56.08	43.93	72.44	52.60	Moderate	21
South Korea	Eastern	28.66	57.46	58.60	79.27	52.59	Moderate	22
Timor-Leste	South-eastern	69.10	63.88	22.95	73.27	52.20	Moderate	23
United Arab Emirates	Western	36.53	48.22	52.38	71.95	50.76	Moderate	24
Singapore	South-eastern	29.47	58.21	46.40	78.92	50.06	Moderate	25
Palestine	Western	45.84	41.45	49.50	64.66	49.66	Moderate	26
India	Southern	40.62	53.30	45.41	57.72	48.81	Moderate	27
Myanmar	South-eastern	62.05	60.63	27.47	54.28	48.67	Moderate	28
Mongolia	Eastern	43.70	54.81	31.58	73.79	48.60	Moderate	29
Bangladesh	Southern	55.94	54.46	32.17	55.94	48.39	Moderate	30
Sri Lanka	Southern	37.92	63.67	36.84	58.50	47.76	Moderate	31
Qatar	Western	48.26	33.97	51.59	55.36	46.52	Moderate	32
Jordan	Western	36.33	48.39	39.42	66.07	46.26	Moderate	33
Lebanon	Western	45.99	58.45	24.87	57.49	44.28	Moderate	34
Uzbekistan	Central	19.26	56.67	45.38	71.56	43.39	Moderate	35
Oman	Western	32.48	40.31	39.85	53.62	40.90	Moderate	36
Saudi Arabia	Western	31.50	35.99	39.43	61.80	40.77	Moderate	37
Pakistan	Southern	26.67	52.22	37.72	47.61	39.77	Low	38
Afghanistan	Southern	48.93	54.71	23.57	38.91	39.58	Low	39
Bahrain	Western	37.45	23.11	46.42	60.54	39.49	Low	40
Kuwait	Western	29.13	34.60	46.98	50.61	39.35	Low	41
Iran	Southern	13.62	57.26	41.43	60.28	37.35	Low	42

Table 12. Green growth dimension sub-indices and Green Growth Index and ranks for the n countries *(continued)*

n Countries/ Territories	Asia Subregion	Dimensions				Green Growth Index		
		Efficient and Sustainable Resource Use	Natural Capital Protection	Green Economic Opportunities	Social Inclusion	Scores	Level	Rank
Iraq	Western	22.59	37.24	27.02	56.25	33.63	Low	43
Yemen	Western	27.24	39.26	38.00	27.19	32.42	Low	44
Syria	Western	10.52	40.61	31.13	50.84	28.68	Low	45
Turkmenistan	Central	17.51	45.42	-	76.29	-	-	-
North Korea	Eastern	59.46	56.50	-	-	-	-	-
Turkey	Western	-	40.49	-	-	-	-	-
Hong Kong	Eastern	-	-	-	93.73	-	-	-
Macau	Eastern	-	-	-	-	-	-	-

Table 13. Green growth dimension sub-indices and Green Growth Index and ranks for the European countries

European Countries/ Territories	Europe Subregion	Dimensions				Green Growth Index		
		Efficient and Sustainable Resource Use	Natural Capital Protection	Green Economic Opportunities	Social Inclusion	Scores	Level	Rank
Switzerland	Western	84.90	79.97	56.62	94.01	77.53	High	1
Austria	Western	80.24	80.43	53.46	93.83	75.43	High	2
Germany	Western	66.99	82.65	62.63	92.67	75.29	High	3
Denmark	Northern	78.23	71.30	58.76	91.22	73.94	High	4
Sweden	Northern	76.31	78.17	50.59	94.69	73.11	High	5
Czech Republic	Eastern	70.80	81.53	53.89	86.93	72.11	High	6
United Kingdom	Northern	67.89	78.52	51.45	91.47	70.77	High	7
Finland	Northern	68.39	72.23	54.70	92.15	70.64	High	8
Belarus	Eastern	62.63	72.91	57.48	88.25	69.37	High	9
France	Western	67.23	78.69	44.52	92.75	68.36	High	10
Italy	Southern	65.90	80.29	47.04	87.32	68.28	High	11
Slovakia	Eastern	72.09	84.03	43.11	82.72	68.17	High	12
Hungary	Eastern	65.45	80.80	46.95	83.06	67.39	High	13
Slovenia	Southern	61.63	78.77	49.10	86.30	67.35	High	14
Netherlands	Western	57.72	71.04	53.55	93.39	67.29	High	15
Portugal	Southern	64.63	78.44	41.85	91.20	66.32	High	16
Norway	Northern	61.51	69.76	46.77	93.06	65.74	High	17
Estonia	Northern	63.51	75.18	44.86	87.02	65.71	High	18
Lithuania	Northern	68.60	72.48	42.14	84.62	64.89	High	19
Spain	Southern	60.10	76.18	41.40	92.18	64.65	High	20
Poland	Eastern	59.60	75.58	43.57	88.15	64.49	High	21
Luxembourg	Western	71.39	75.32	35.78	88.40	64.22	High	22
Bosnia and Herzegovina	Southern	68.86	65.33	51.44	72.56	64.01	High	23
Belgium	Western	51.98	76.65	45.78	91.52	63.92	High	24
Albania	Southern	66.01	82.32	38.31	79.35	63.75	High	25
Latvia	Northern	72.92	76.22	35.05	84.69	63.73	High	26
Romania	Eastern	62.05	77.24	39.31	84.65	63.20	High	27
Croatia	Southern	63.93	83.79	35.39	83.32	63.04	High	28
Macedonia	Southern	59.01	74.97	45.08	73.25	61.82	High	29
Bulgaria	Eastern	53.32	80.31	40.34	82.79	61.50	High	30
Serbia	Southern	61.33	69.44	38.75	77.07	59.72	Moderate	31
Greece	Southern	64.35	76.80	29.10	85.76	59.26	Moderate	32
Russia	Eastern	53.06	57.54	47.55	78.14	58.03	Moderate	33
Ukraine	Eastern	56.05	65.95	39.47	74.45	57.41	Moderate	34
Ireland	Northern	59.47	58.31	32.73	88.63	56.31	Moderate	35
Moldova	Eastern	61.10	66.99	29.20	82.78	56.08	Moderate	36
Iceland	Northern	55.66	44.37	36.22	88.16	52.99	Moderate	37
Malta	Southern	45.11	63.04	24.33	82.36	48.86	Moderate	38
Montenegro	Southern	31.07	66.46	32.01	71.03	46.55	Moderate	39
Andorra	Southern	-	74.26	-	-	-	-	-
Liechtenstein	Western	-	84.14	-	-	-	-	-
Monaco	Western	-	16.19	-	-	-	-	-

Table 14. Green growth dimension sub-indices and Green Growth Index and ranks for the Oceania countries

Oceania Countries/ Territories	Oceania Subregion	Dimensions				Green Growth Index		
		Efficient and Sustainable Resource Use	Natural Capital Protection	Green Economic Opportunities	Social Inclusion	Scores	Level	Rank
New Zealand	Australia and New Zealand	59.38	68.36	41.10	87.98	61.89	High	1
Fiji	Melanesia	59.54	68.28	47.45	64.74	59.45	Moderate	2
Australia	Australia and New Zealand	68.05	52.56	37.18	89.16	58.68	Moderate	3
Papua New Guinea	Melanesia	78.68	55.00	36.91	23.08	43.82	Moderate	4
Samoa	Polynesia	88.71	66.25	-	63.16	-	-	-
Tonga	Polynesia	60.47	62.40	-	56.96	-	-	-
Solomon Islands	Melanesia	76.64	50.91	-	37.27	-	-	-
Vanuatu	Melanesia	76.41	63.86	-	38.57	-	-	-
Kiribati	Micronesia	80.82	53.74	-	59.55	-	-	-
Marshall Islands	Micronesia	-	64.11	-	56.80	-	-	-
Micronesia, Fed. Sts.	Micronesia	-	58.73	-	57.86	-	-	-
Nauru	Micronesia	69.97	23.95	-	-	-	-	-
Palau	Micronesia	-	75.87	-	69.44	-	-	-
Tuvalu	Polynesia	77.45	72.40	-	-	-	-	-
American Samoa	Polynesia	-	74.31	-	-	-	-	-
French Polynesia	Polynesia	73.13	-	-	-	-	-	-
New Caledonia	Melanesia	30.62	-	-	-	-	-	-
Guam	Micronesia	-	14.88	-	-	-	-	-
Northern Mariana Islands	Micronesia	-	67.99	-	-	-	-	-

8.2 Green growth dimension and pillar scores by region

Table 15. 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
AFRICA						
Gabon	1	77.78	58.89	68.55	98.70	91.86
South Sudan	-	76.04	-	52.06	96.43	87.58
Sao Tome and Principe	-	74.25	62.80	50.51	98.94	96.85
Botswana	4	73.63	59.65	61.90	91.11	87.37
Comoros	-	73.22	65.70	66.80	68.76	95.27
Cote d'Ivoire	11	72.04	73.62	57.64	67.90	93.46
Chad	-	71.11	64.86	52.41	97.40	77.22
Sierra Leone	33	70.74	57.95	59.65	79.05	91.66
Central African Republic	42	70.21	55.00	53.74	97.34	84.47
Angola	35	70.13	65.02	58.00	66.58	96.32
Eritrea	-	69.60	53.48	51.08	98.84	86.88
Rwanda	17	69.23	69.54	52.71	66.31	94.50
Tanzania	12	68.17	64.83	52.11	68.75	93.00
Burkina Faso	10	67.53	62.81	52.95	68.32	91.55
Mauritania	31	66.73	47.63	51.19	96.25	84.50
Mali	28	65.43	63.52	50.83	66.88	84.87
Uganda	15	64.87	46.09	57.68	72.71	91.61
Malawi	27	64.69	69.02	51.51	57.93	85.04
Congo Republic	-	64.60	59.34	45.44	100.00	-
Equatorial Guinea	-	64.30	36.43	51.31	99.97	91.47
Niger	36	64.26	59.02	50.98	66.86	84.76
Cabo Verde	2	64.00	67.12	41.27	62.61	96.76
Burundi	29	63.74	51.99	51.80	66.15	92.63
Benin	23	63.27	62.49	39.63	68.61	94.29
Zambia	13	63.21	57.28	53.03	62.37	84.29
Gambia	24	62.39	64.80	57.00	65.75	-
Djibouti	-	62.36	60.93	52.22	53.49	88.83
Lesotho	25	62.34	47.08	58.55	66.16	82.84
Ethiopia	21	62.20	56.67	44.27	66.15	90.16
Nigeria	30	62.19	60.66	38.39	67.02	95.84
Cameroon	20	61.84	60.89	37.66	66.79	95.49
Togo	7	61.40	54.30	37.64	75.99	91.51
Madagascar	38	61.38	50.37	46.21	67.09	90.89
Ghana	16	61.21	61.43	39.17	67.69	86.18
Guinea-Bissau	-	61.11	55.28	40.73	66.99	92.45
Mauritius	6	60.90	43.53	53.48	64.37	91.77
Namibia	5	60.60	58.58	43.36	66.62	79.69

Table 15. Scores on pillars for efficient and sustainable resource use by region and rank *(continued)*

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
Guinea	14	60.15	62.53	40.37	65.93	78.63
Senegal	8	59.70	56.42	37.52	65.09	92.20
Kenya	18	59.61	66.55	30.59	66.04	93.94
Liberia	-	58.03	39.87	51.26	65.39	84.85
Mozambique	34	57.58	48.47	36.69	65.96	93.71
Zimbabwe	22	56.70	41.71	40.99	66.71	90.65
DR Congo	41	55.62	42.41	59.94	67.71	-
Somalia	-	53.22	49.49	50.50	65.44	49.03
Seychelles	3	51.44	43.83	19.27	93.11	89.04
Morocco	9	47.69	42.04	20.02	66.98	91.78
South Africa	19	39.53	44.63	9.64	65.14	87.11
Tunisia	26	30.01	42.79	2.83	73.46	91.15
Algeria	32	28.52	29.80	3.54	66.93	93.74
Sudan	39	27.49	63.05	1.50	65.75	91.86
Libya	43	23.77	23.49	1.62	99.14	84.60
Eswatini	37	21.03	86.37	1.61	67.08	-
Egypt	40	16.26	46.06	1.87	49.93	-
Reunion	-	-	-	-	65.74	-
THE AMERICAS						
Brazil	3	67.83	72.55	54.43	60.77	88.19
Uruguay	8	66.00	74.04	35.73	86.02	83.38
Paraguay	2	65.93	69.83	53.05	63.83	79.91
Cuba	-	63.81	51.42	52.55	66.19	92.67
Puerto Rico	-	62.81	52.87	55.75	53.01	99.61
Grenada	-	62.71	42.89	54.04	67.47	98.89
St. Vincent and the Grenadines	-	62.41	49.36	50.60	97.32	-
Antigua and Barbuda	-	62.00	34.90	48.12	91.46	96.19
Bermuda	-	61.91	50.10	50.75		93.32
Guatemala	18	61.70	66.50	36.36	66.37	90.30
Honduras	7	61.48	68.41	35.51	63.90	92.03
Dominican Republic	12	61.06	50.04	37.59	77.75	95.02
Panama	9	61.01	63.84	39.83	59.79	91.17
Bahamas	-	60.98	38.82	-	58.74	99.47
Haiti	-	60.03	58.49	35.70	65.37	95.15
Nicaragua	17	59.94	64.46	35.96	64.07	86.92
Peru	16	59.09	62.47	35.10	67.82	82.00
Belize	22	57.78	58.97	37.57	58.13	86.57
Costa Rica	4	57.59	65.73	36.18	52.00	88.95
El Salvador	13	57.51	51.90	35.84	62.94	93.41
Bolivia	11	57.31	43.90	52.88	52.21	89.00
Colombia	15	57.29	61.21	35.15	54.38	92.07
Argentina	23	57.14	43.86	36.10	74.02	90.95

Table 15. Scores on pillars for efficient and sustainable resource use by region and rank *(continued)*

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
Ecuador	14	56.42	52.17	35.74	58.90	92.23
Dominica	-	56.11	50.51	51.71	76.56	49.56
Jamaica	10	54.15	41.35	35.73	64.44	90.34
Venezuela	21	53.64	50.85	51.21	59.27	-
Guyana	24	53.06	43.06	36.59	65.13	77.22
Suriname	20	52.48	50.92	39.63	56.61	66.39
Chile	6	51.12	56.53	35.27	58.90	58.17
Mexico	5	49.56	47.15	22.61	62.96	89.91
St. Kitts and Nevis	-	48.63	46.07	25.74	96.97	-
Canada	19	48.51	57.28	39.16	69.03	35.77
United States	1	47.08	53.20	37.27	52.64	-
Barbados	26	36.37	42.44	6.28	66.58	98.60
Trinidad and Tobago	25	33.32	7.67	40.74	44.19	89.28
Aruba	-	-	47.59	-	-	89.96
Cayman Islands	-	-	46.87	-	-	96.94
St. Lucia	-	-	51.19	-	62.19	
Turks and Caicos Islands	-	-	31.17	-	-	97.13
British Virgin Islands	-	-	-	-	-	98.92
Curacao	-	-	19.99	-	-	-
Guadeloupe	-	-	-	-	60.30	-
Martinique	-	-	-	-	59.48	-
Sint Maarten	-	-	23.55	-	-	-
Greenland	-	-	-	-	-	94.26
ASIA						
Timor-Leste	23	69.10	58.68	47.51	88.42	92.48
Nepal	7	63.73	61.92	50.95	59.72	87.56
Bhutan	5	62.10	55.27	51.59	67.10	77.74
Myanmar	28	62.05	64.89	40.14	61.60	92.42
Japan	1	61.95	55.32	49.85	60.01	88.97
Philippines	9	61.51	63.19	35.73	69.73	90.93
Cambodia	15	60.62	62.22	36.87	64.34	91.50
Maldives	14	60.24	37.04	63.71	-	92.64
North Korea	-	59.46	44.33	48.05	98.67	-
Laos	3	59.35	63.17	50.84	65.09	-
Thailand	4	57.91	55.42	35.92	63.89	88.44
Indonesia	11	57.56	54.65	34.89	62.20	92.52
Malaysia	8	56.83	47.16	43.02	65.03	79.06
Bangladesh	30	55.94	57.00	35.83	49.09	97.65
Cyprus	10	55.04	53.66	35.01	69.55	70.22
Georgia	6	54.59	50.24	35.07	57.76	87.29
China	2	53.81	49.32	38.92	53.44	81.73
Kazakhstan	18	49.99	31.82	42.84	67.13	68.26
Israel	19	49.96	52.17	25.97	57.45	80.04

Table 15. Scores on pillars for efficient and sustainable resource use by region and rank *(continued)*

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
Afghanistan	39	48.93	41.51	21.15	66.92	97.53
Vietnam	16	48.45	53.64	38.11	55.61	-
Qatar	32	48.26	35.73	36.83	82.91	49.74
Lebanon	34	45.99	39.67	20.42	60.50	91.26
Palestine	26	45.84	57.12	30.40	55.47	-
Azerbaijan	12	44.78	31.50	20.85	66.00	92.78
Mongolia	29	43.70	28.96	54.72	51.13	45.02
Armenia	13	43.44	38.34	19.35	53.99	88.91
Brunei Darussalam	21	42.88	30.08	51.71	38.26	56.81
Kyrgyz Republic	17	42.49	47.45	25.83	62.60	-
India	27	40.62	64.86	7.59	59.47	92.95
Sri Lanka	31	37.92	73.54	3.97	73.38	96.50
Bahrain	40	37.45	29.93	10.46	76.63	81.91
Tajikistan	20	37.35	56.89	6.16	62.84	88.39
United Arab Emirates	24	36.53	45.77	14.84	49.14	53.35
Jordan	33	36.33	43.24	7.04	61.90	92.46
Oman	36	32.48	33.60	7.57	61.01	71.77
Saudi Arabia	37	31.50	37.02	5.64	62.01	76.11
Singapore	25	29.47	56.46	-	7.29	62.17
Kuwait	41	29.13	29.32	12.93	31.55	60.16
South Korea	22	28.66	45.96	11.10	46.13	-
Yemen	44	27.24	37.50	5.40	99.87	-
Pakistan	38	26.67	62.15	1.64	52.72	94.20
Iraq	43	22.59	30.04	1.41	66.10	92.89
Uzbekistan	35	19.26	25.87	1.26	47.37	89.13
Turkmenistan	-	17.51	14.22	1.18	65.43	85.63
Iran	42	13.62	19.58	2.12	60.94	-
Syria	45	10.52	14.86	1.16	67.30	-
Hong Kong	-	-	55.96	-	39.01	-
Macau	-	-	61.11	-	-	-
EUROPE						
Switzerland	1	84.90	72.83	100.00	83.25	85.68
Austria	2	80.24	74.77	68.75	92.47	87.20
Denmark	4	78.23	80.59	66.31	89.81	78.04
Sweden	5	76.31	83.03	57.40	93.10	76.43
Latvia	26	72.92	73.86	51.13	96.47	77.63
Slovakia	12	72.09	52.43	78.40	91.15	-
Luxembourg	22	71.39	62.99	100.00	69.51	59.33
Czech Republic	6	70.80	52.20	75.16	90.46	-
Bosnia and Herzegovina	23	68.86	56.92	-	63.70	90.03
Lithuania	19	68.60	65.39	54.49	84.85	73.27
Finland	8	68.39	78.87	41.46	96.17	69.57
United Kingdom	7	67.89	58.82	67.07	60.87	88.45

Table 15. Scores on pillars for efficient and sustainable resource use by region and rank *(continued)*

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
France	10	67.23	60.70	44.06	85.69	89.12
Germany	3	66.99	65.11	41.84	87.13	84.83
Albania	25	66.01	65.61	52.72	59.50	92.28
Italy	11	65.90	61.55	36.50	91.35	91.88
Hungary	13	65.45	50.87	55.02	77.32	84.77
Portugal	16	64.63	66.20	37.89	79.25	87.79
Greece	32	64.35	61.52	36.09	88.61	87.16
Croatia	28	63.93	64.41	38.49	77.45	87.00
Estonia	18	63.51	70.39	37.61	94.85	64.79
Belarus	9	62.63	35.94	57.07	86.31	86.90
Romania	27	62.05	59.84	37.55	76.05	86.75
Slovenia	14	61.63	57.23	39.12	82.54	78.09
Norway	17	61.51	80.35	52.20	60.91	56.04
Serbia	31	61.33	49.74	51.68	68.27	80.62
Moldova	36	61.10	45.50	52.04	70.32	83.69
Spain	20	60.10	63.65	26.60	86.09	89.53
Poland	21	59.60	56.37	37.12	72.22	83.49
Ireland	35	59.47	60.43	63.42	45.24	72.11
Macedonia	29	59.01	54.11	40.17	65.09	85.70
Netherlands	15	57.72	59.27	44.76	57.32	72.96
Ukraine	34	56.05	33.27	51.88	69.78	81.92
Iceland	37	55.66	55.43	48.91	55.18	64.15
Bulgaria	30	53.32	52.20	26.87	66.37	86.87
Russia	33	53.06	26.07	53.99	67.17	83.80
Belgium	24	51.98	57.47	28.58	56.12	79.22
Malta	38	45.11	53.95	24.07	44.40	71.82
Montenegro	39	31.07	62.19	4.49	38.60	86.51
Andorra	-	-	-	-	-	81.73
Faeroe Islands	-	-	-	-	34.69	-
Kosovo	-	-	57.58	-	-	-
Liechtenstein	-	-	-	-	-	99.92
Monaco	-	-	-	-	-	100.00
San Marino	-	-	-	-	-	99.98
OCEANIA						
Samoa	-	88.71	75.13	-	99.35	93.54
Kiribati	-	80.82	71.32	-	79.92	92.62
Papua New Guinea	4	78.68	64.35	-	83.71	90.40
Tuvalu	-	77.45	51.29	-	91.07	99.44
Solomon Islands	-	76.64	66.58	-	77.09	87.69
Vanuatu	-	76.41	63.33	-	76.06	92.61
French Polynesia	-	73.13	52.55	-	75.92	98.03
Nauru	-	69.97	36.72	-	98.65	94.57
Australia	3	68.05	51.76	67.29	92.99	66.21

Table 15. Scores on pillars for efficient and sustainable resource use by region and rank *(continued)*

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
Tonga		60.47	41.43	-	75.31	70.87
Fiji	2	59.54	56.33	40.13	93.39	-
New Zealand	1	59.38	63.33	40.71	65.71	73.38
New Caledonia	-	30.62	7.40	-	59.02	65.72
Marshall Islands	-	-	29.52	-	-	98.54
Micronesia, Fed. Sts.	-	-	35.49	-	99.22	-
Palau	-	-	15.90	-	-	94.93
Cook Islands	-	-	-	-	60.84	-
Niue	-	-	-	-	73.70	-

Table 16. 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
AFRICA						
Seychelles	3	78.04	81.62	77.12	71.70	82.17
Zimbabwe	22	77.08	79.66	78.39	68.26	82.83
Malawi	25	77.06	81.77	91.49	56.04	84.11
Congo Republic	-	74.24	73.49	84.48	72.50	67.50
Burkina Faso	10	73.04	55.55	85.84	60.37	98.89
Gabon	1	72.85	76.60	80.65	69.53	65.59
Uganda	15	72.82	74.00	89.23	53.43	79.67
Zambia	13	71.55	75.92	68.77	55.90	89.80
Ethiopia	20	70.84	73.46	86.74	45.18	87.50
Sao Tome and Principe	-	70.84	81.50	95.46	74.97	43.17
Togo	7	69.92	65.15	93.12	61.02	64.55
Rwanda	17	69.67	70.67	96.59	46.51	74.24
Burundi	28	68.46	64.20	96.25	51.25	69.35
DR Congo	41	68.28	65.65	81.35	67.40	60.40
Mozambique	32	68.15	76.97	81.13	57.57	60.01
Tanzania	12	67.63	78.26	82.66	55.39	58.37
Guinea	14	67.33	58.82	79.14	69.11	63.89
Cote d'Ivoire	11	66.31	57.77	93.76	51.33	69.51
Namibia	5	66.17	79.58	59.76	50.78	79.37
Morocco	9	66.05	82.37	90.57	48.92	52.16
South Sudan	-	65.14	57.97	59.19	55.72	94.14
Senegal	8	65.00	62.44	87.32	46.15	70.92
Botswana	4	64.99	81.47	38.99	57.30	97.99
Ghana	16	64.79	67.44	90.20	61.11	47.40
Guinea-Bissau	-	64.71	58.89	86.02	49.55	69.85
South Africa	19	64.49	73.41	76.79	47.69	64.34
Kenya	18	63.73	81.37	88.81	40.89	55.83
Benin	23	63.71	59.31	90.91	47.47	64.36
Gambia	24	63.66	64.46	91.62	52.15	53.33
Madagascar	38	61.88	78.80	90.07	57.10	36.18
Cameroon	21	61.55	55.27	70.25	65.63	56.34
Cabo Verde	2	61.34	71.09	95.70	33.62	61.87
Nigeria	30	61.26	43.33	91.24	63.06	56.50
Eswatini	37	61.07	73.82	83.00	44.84	50.62
Tunisia	26	60.91	83.94	88.62	27.98	66.10
Mali	27	60.68	51.09	82.04	42.34	76.40
Comoros	-	60.18	78.61	95.68	59.32	29.39
Liberia	-	59.67	65.73	82.09	62.19	37.79
Sierra Leone	33	59.45	54.40	92.44	61.54	40.36
Angola	35	58.64	70.56	79.65	48.50	43.39
Equatorial Guinea	-	56.22	69.80	58.31	75.26	32.61
Egypt	40	56.00	66.54	90.13	22.90	71.58

Table 16. Scores on pillars for natural capital protection by region and rank *(continued)*

Country	Regional Rank	Natural Capital Protection	Indicator categories			
			Environmental Quality	GHG Emissions Reductions	Biodiversity and Ecosystem Protection	Cultural and Social Value
Central African Republic	42	55.40	44.79	29.67	74.82	94.70
Niger	36	54.46	38.71	82.98	29.00	94.45
Chad	-	53.23	42.09	60.12	34.16	92.89
Mauritius	6	52.20	87.63	77.73	46.34	23.52
Algeria	31	51.19	81.04	80.40	23.39	45.06
Sudan	39	50.81	72.60	78.74	29.64	39.33
Eritrea	-	48.61	57.42	81.69	23.46	50.74
Somalia	-	48.08	53.98	82.72	27.16	44.06
Lesotho	29	41.46	58.24	85.35	12.51	47.50
Djibouti	-	38.49	68.20	91.02	8.34	42.40
Mauritania	34	36.60	58.05	76.68	9.66	41.72
Libya	43	28.86	78.11	51.26	5.03	34.41
British Indian Ocean Territory	-	-	-	-	-	52.95
Mayotte	-	-	-	-	-	65.41
Reunion	-	-	-	-	41.26	
St. Helena	-	-	-	-	-	39.50
Western Sahara	-	-	-	-	-	59.50
THE AMERICAS						
Dominican Republic	12	75.22	85.31	85.06	68.17	64.70
Chile	6	74.03	84.24	87.28	63.34	64.50
Panama	9	73.46	88.25	77.94	65.08	65.06
Mexico	5	73.17	84.16	79.94	52.80	80.67
Honduras	7	72.70	86.06	86.10	65.74	57.35
Belize	22	71.81	86.75	54.15	64.83	87.33
St. Lucia	-	71.74	82.48	80.69	67.76	58.73
Costa Rica	4	71.66	88.36	86.55	64.36	53.57
Bolivia	11	71.62	82.49	58.25	60.71	90.20
St. Vincent and the Grenadines	-	71.47	86.29	90.27	62.88	53.27
Brazil	3	71.14	87.92	66.21	62.79	70.07
Colombia	15	71.04	87.18	75.90	65.62	58.65
Peru	16	70.87	81.54	82.03	64.90	58.11
Venezuela	21	70.70	85.11	62.22	75.47	62.51
Ecuador	14	70.62	86.06	81.35	62.42	56.90
Nicaragua	17	69.73	87.74	74.04	62.81	57.96
St. Kitts and Nevis	-	67.82	78.37	72.22	59.12	63.21
Bahamas	-	66.66	80.32	82.03	42.02	71.33
Jamaica	10	66.47	88.14	92.22	52.55	45.70
Guatemala	18	66.14	82.67	88.79	54.04	48.25
Paraguay	1	66.12	90.73	39.83	55.00	96.19
Cuba	-	65.33	87.45	83.11	66.92	37.45
Dominica	-	64.79	87.72	88.05	54.63	41.77
Suriname	20	64.12	88.93	41.35	79.24	58.00

Table 16. Scores on pillars for natural capital protection by region and rank *(continued)*

Country	Regional Rank	Natural Capital Protection	Indicator categories			
			Environmental Quality	GHG Emissions Reductions	Biodiversity and Ecosystem Protection	Cultural and Social Value
El Salvador	13	64.03	85.94	90.30	58.81	36.83
Antigua and Barbuda		62.94	88.20	56.41	52.88	59.63
United States	2	62.79	79.87	50.78	52.96	72.38
Guyana	24	62.12	86.74	35.42	100.00	48.47
Grenada	-	61.13	85.83	61.17	52.94	50.25
Argentina	23	59.44	84.49	53.03	48.52	57.42
Canada	19	58.96	82.38	37.24	51.56	76.39
Barbados	26	58.76	77.35	58.83	44.23	59.25
Uruguay	8	58.70	89.71	56.95	39.92	58.24
Haiti	-	54.18	81.77	94.45	39.55	28.21
Trinidad and Tobago	25	52.79	81.00	54.13	48.00	36.90
Bermuda	-	52.37	54.77	-	57.42	45.66
Puerto Rico	-	45.97	57.08	-	53.77	31.66
United States Virgin Islands	-	44.96	50.50	-	44.93	40.06
Greenland	-	39.71	68.61	-	12.08	75.56
Anguilla	-	-	-	-	30.42	93.79
Aruba	-	-	-	-	15.35	65.08
British Virgin Islands	-	-	-	-	51.27	53.81
Cayman Islands	-	-	-	-	70.77	56.13
Curacao	-	-	-	-	14.78	59.59
Falkland Islands	-	-	-	-	5.93	50.95
French Guiana	-	-	-	-	72.48	59.96
Saint-Martin	-	-	-	-	55.83	95.38
Sint Maarten	-	-	-	-	34.11	86.34
St. Pierre and Miquelon	-	-	-	-	4.44	35.56
Turks and Caicos Islands	-	-	-	-	37.25	59.38
Guadeloupe	-	-	-	-	74.22	-
Martinique	-	-	-	-	85.00	-
Montserrat	-	-	-	-	-	84.05
St. Barths	-	-	-	-	31.14	-
ASIA						
Bhutan	5	78.79	77.00	87.14	68.90	83.37
Cambodia	15	77.26	86.85	78.08	59.50	88.32
Laos	4	76.22	86.81	78.74	58.28	84.72
Cyprus	10	74.79	81.64	81.88	57.95	80.75
Philippines	9	73.88	86.75	90.78	66.49	56.90
Thailand	3	73.17	78.71	73.24	64.28	77.38
Nepal	7	72.97	59.36	86.53	63.98	86.27
Georgia	6	72.73	90.18	77.83	56.04	71.12
Japan	1	70.20	87.45	81.82	64.13	52.92
Armenia	13	69.11	83.27	83.89	38.01	85.89
Malaysia	8	66.56	81.75	66.07	61.49	59.09
Indonesia	11	64.62	84.29	79.05	57.52	45.49

Table 16. Scores on pillars for natural capital protection by region and rank *(continued)*

Country	Regional Rank	Natural Capital Protection	Indicator categories			
			Environmental Quality	GHG Emissions Reductions	Biodiversity and Ecosystem Protection	Cultural and Social Value
Azerbaijan	12	64.37	84.52	54.39	58.88	63.42
Timor-Leste	23	63.88	89.10	60.99	55.11	55.61
Sri Lanka	31	63.67	90.88	93.12	53.95	35.99
Kyrgyz Republic	17	63.54	88.42	88.45	28.27	73.71
China	2	63.33	75.54	75.12	42.17	67.22
Vietnam	16	62.10	90.29	82.80	50.91	39.09
Tajikistan	21	61.73	78.89	90.80	20.49	98.97
Myanmar	29	60.63	84.32	78.48	52.38	39.00
Lebanon	34	58.45	81.96	83.43	35.30	48.35
Singapore	24	58.21	85.28	57.93	46.46	50.02
South Korea	20	57.46	80.89	68.37	55.14	35.74
Iran	42	57.26	81.06	68.31	40.20	48.29
Uzbekistan	35	56.67	84.63	61.87	28.43	69.31
North Korea	-	56.50	74.62	88.75	38.80	39.67
Brunei Darussalam	22	56.08	87.25	31.21	66.76	54.41
Mongolia	28	54.81	63.42	38.95	37.84	96.52
Afghanistan	39	54.71	71.19	79.05	31.65	50.29
Bangladesh	30	54.46	67.28	92.80	40.19	35.06
India	27	53.30	50.89	91.53	41.66	41.61
Kazakhstan	18	53.20	87.64	54.64	20.23	82.70
Maldives	14	52.31	86.47	88.44	16.70	58.62
Pakistan	38	52.22	58.90	89.42	26.02	54.28
Jordan	33	48.39	82.87	88.59	12.23	61.04
Israel	19	48.27	79.54	65.05	21.04	49.87
United Arab Emirates	25	48.22	70.84	31.74	30.86	77.91
Turkmenistan	-	45.42	88.52	34.61	22.99	60.41
Palestine	26	41.45	73.38	-	13.35	72.66
Syria	45	40.61	82.22	90.35	10.37	35.31
Turkey	-	40.49	74.04	82.88	-	10.82
Oman	36	40.31	73.43	56.73	14.39	44.03
Yemen	44	39.26	74.82	96.43	12.19	27.02
Iraq	43	37.24	72.45	88.19	10.01	30.08
Saudi Arabia	37	35.99	63.94	46.41	10.82	52.24
Kuwait	40	34.60	62.86	32.75	12.38	56.23
Qatar	32	33.97	58.79	36.81	10.90	56.47
Bahrain	41	23.11	61.64	33.65	3.65	37.62
Hong Kong	-	-	-	-	-	86.85
EUROPE						
Liechtenstein	-	84.14	-	85.19	70.44	99.25
Slovakia	12	84.03	84.95	80.27	76.12	96.04
Croatia	28	83.79	84.66	82.14	75.20	94.25
Germany	3	82.65	83.58	77.50	74.40	96.83
Albania	25	82.32	85.91	82.89	81.79	78.85

Table 16. Scores on pillars for natural capital protection by region and rank *(continued)*

Country	Regional Rank	Natural Capital Protection	Indicator categories			
			Environmental Quality	GHG Emissions Reductions	Biodiversity and Ecosystem Protection	Cultural and Social Value
Czech Republic	6	81.53	83.63	69.55	77.87	97.57
Hungary	13	80.80	87.16	78.48	70.15	88.82
Austria	2	80.43	84.33	78.01	69.66	91.32
Bulgaria	30	80.31	85.08	84.12	80.65	72.08
Italy	11	80.29	84.33	81.16	68.36	88.84
Switzerland	1	79.97	82.23	84.60	63.40	92.74
Slovenia	14	78.77	84.20	76.40	78.21	76.51
France	10	78.69	85.14	79.26	71.54	79.42
United Kingdom	8	78.52	86.80	79.34	64.09	86.14
Portugal	16	78.44	85.42	78.84	61.35	91.61
Sweden	5	78.17	88.25	87.50	60.69	79.68
Romania	27	77.24	88.27	80.14	75.22	66.90
Greece	32	76.80	82.94	75.57	65.38	84.89
Belgium	24	76.65	87.06	75.38	70.58	74.52
Latvia	26	76.22	87.73	73.52	67.87	77.08
Spain	20	76.18	87.56	80.10	59.19	81.15
Poland	21	75.58	84.42	70.10	76.66	71.94
Luxembourg	22	75.32	80.47	66.10	61.26	98.75
Estonia	18	75.18	90.32	66.59	66.46	79.89
Macedonia	29	74.97	83.35	81.09	54.98	85.02
Andorra	-	74.26	81.39	78.17	51.62	92.61
Belarus	9	72.91	85.81	60.96	65.60	82.35
Lithuania	19	72.48	87.69	65.86	66.61	71.74
Finland	7	72.23	86.25	67.71	63.79	73.04
Denmark	4	71.30	78.45	70.80	62.95	73.91
Netherlands	15	71.04	85.81	72.07	48.34	85.18
Norway	17	69.76	80.25	76.30	59.01	65.55
Serbia	31	69.44	83.69	66.77	55.96	74.36
Moldova	36	66.99	70.37	78.63	59.44	61.25
Montenegro	39	66.46	81.67	74.77	51.05	62.59
Ukraine	34	65.95	89.09	75.96	65.13	42.91
Bosnia and Herzegovina	23	65.33	82.15	77.75	62.71	45.48
Malta	38	63.04	80.52	87.15	28.66	78.50
Ireland	35	58.31	84.82	49.11	59.03	47.02
Russia	33	57.54	88.18	47.20	49.29	53.42
Iceland	37	44.37	83.55	58.97	12.61	62.42
Monaco	-	16.19	55.36	-	1.00	76.67
Faeroe Islands	-	-	-	-	5.19	39.93
Gibraltar	-	-	-	-	1.00	60.65
Isle of Man	-	-	-	-	31.79	98.59
San Marino	-	-	81.54	-	60.04	
Jersey	-	-	-	-	-	41.43
Guernsey	-	-	-	-	-	42.09

Table 16. Scores on pillars for natural capital protection by region and rank *(continued)*

Country	Regional Rank	Natural Capital Protection	Indicator categories			
			Environmental Quality	GHG Emissions Reductions	Biodiversity and Ecosystem Protection	Cultural and Social Value
Svalbard and Jan Mayen Islands	-	-	-	-	39.13	-
OCEANIA						
Palau	-	75.87	84.36	71.35	75.97	72.47
American Samoa	-	74.31	87.83	-	64.69	72.23
Tuvalu	-	72.40	87.19	89.39	-	48.70
New Zealand	1	68.36	81.98	48.60	69.18	79.22
Fiji	2	68.28	90.58	86.68	52.36	52.88
Northern Mariana Islands	-	67.99	78.36	-	63.37	63.29
Samoa	-	66.25	93.22	81.78	53.37	47.34
Marshall Islands	-	64.11	94.21	85.83	45.65	45.77
Vanuatu	-	63.86	83.75	77.94	51.73	49.24
Tonga	-	62.40	93.36	85.28	43.83	43.46
Micronesia, Fed. Sts.	-	58.73	89.01	91.72	67.13	21.71
Papua New Guinea	4	55.00	85.40	79.11	48.92	27.68
Kiribati	-	53.74	79.45	97.74	14.27	75.27
Australia	3	52.56	85.99	19.62	59.33	76.23
Solomon Islands	-	50.91	79.62	60.10	42.03	33.40
Nauru	-	23.95	83.07	94.69	1.00	41.82
Guam	-	14.88	68.40	-	43.11	1.12
French Polynesia	-	-	-	-	45.46	45.42
New Caledonia	-	-	-	-	56.15	77.60
Niue	-	-	-	-	29.66	73.21
Tokelau	-	-	-	-	1.00	75.69
Wallis and Futuna Islands	-	-	-	-	23.24	77.12
Christmas Island	-	-	-	-	-	48.77
Cocos (Keeling) Islands	-	-	-	-	-	75.60
Cook Islands	-	-	-	-	-	72.21
Norfolk Island	-	-	-	-	-	68.93
Pitcairn	-	-	-	-	-	66.94

Table 17. Scores on pillars for green economic opportunities by region and rank

Country	Regional Rank	Green Economic Opportunities	Indicator categories			
			Green Investment	Green Trade	Green Employment	Green Innovation
AFRICA						
Cabo Verde	2	51.85	56.00	-	52.06	47.81
Burkina Faso	10	48.67	37.56	66.58	-	46.09
Mauritania	34	46.44	46.65	50.50	-	42.52
Guinea	14	45.19	32.17	66.06	-	43.43
South Africa	19	43.64	36.70	81.79	40.78	29.61
Zambia	13	42.83	48.26	68.96	20.24	49.97
Gabon	1	42.62	51.72	53.65	49.49	24.03
Togo	7	42.28	33.39	57.99	-	39.04
Tunisia	26	41.65	56.24	79.93	51.29	13.06
Senegal	8	41.59	39.61	66.40	37.34	30.46
Botswana	4	41.39	45.42	60.32	32.98	32.47
Seychelles	3	41.13	37.57	50.97	-	36.32
Ethiopia	20	41.12	36.99	67.07	36.60	31.51
Benin	23	41.01	37.49	66.58	-	27.63
Morocco	9	40.99	52.23	69.07	36.31	21.54
Algeria	31	40.66	49.62	52.45	58.36	17.99
Lesotho	29	40.13	27.90	53.43	37.57	46.32
Namibia	5	38.61	43.80	58.63	42.75	20.23
Mauritius	6	38.55	45.06	65.14	37.79	19.91
Cote d'Ivoire	11	37.89	50.99	47.81	-	22.31
Kenya	18	37.69	29.23	66.01	30.48	34.31
Ghana	16	37.19	39.38	66.73	32.29	22.55
Uganda	15	36.63	42.36	65.31	31.24	20.83
Cameroon	21	36.51	26.43	67.42	48.04	20.76
Libya	43	36.31	55.28	50.80	-	17.05
Tanzania	12	36.08	65.44	59.56	22.79	19.08
Eswatini	37	35.87	36.10	-	48.21	26.53
Sudan	39	35.66	34.01	50.51	-	26.40
Egypt	40	35.39	35.79	71.46	51.14	11.99
Zimbabwe	22	32.34	31.96	66.64	23.37	21.98
Rwanda	17	30.44	34.76	65.23	15.85	23.90
Burundi	28	30.31	15.90	52.23	22.60	44.94
Mali	27	30.04	31.33	51.36	-	16.85
Gambia	24	29.78	42.87	51.32	46.59	7.67
Sierra Leone	33	28.83	16.42	51.26	-	28.46
Nigeria	30	27.03	33.84	66.94	26.79	8.79
Mozambique	32	27.02	30.80	59.97	13.00	22.19
Niger	36	26.81	34.93	51.06	25.43	11.40
Malawi	25	24.45	25.61	62.36	15.90	14.08
Angola	35	24.23	24.66	51.06	22.08	12.40
Madagascar	38	21.42	15.85	65.01	6.68	30.58
Central African Republic	42	20.04	14.10	51.43	-	11.09
DR Congo	41	17.20	38.80	-	8.51	15.42

Table 17. Scores on pillars for green economic opportunities by region and rank *(continued)*

Country	Regional Rank	Green Economic Opportunities	Indicator categories			
			Green Investment	Green Trade	Green Employment	Green Innovation
Comoros	-	-	16.39	50.62	-	-
Congo Republic	-	-	30.94	-	-	51.81
Djibouti	-	-	47.15	-	-	16.58
Eritrea	-	-	-	54.27	-	50.73
Guinea-Bissau	-	-	22.45	50.50	-	-
Chad	-	-	-	-	-	11.23
Liberia	-	-	-	-	-	22.93
Reunion	-	-	-	-	-	26.47
Sao Tome and Principe	-	-	15.05	-	-	-
Somalia	-	-	-	-	-	50.53
South Sudan	-	-	23.19	-	-	-
THE AMERICAS						
United States	2	64.64	59.65	71.58	76.29	53.61
Jamaica	10	52.23	44.62	70.71	68.38	34.49
Paraguay	1	51.04	36.00	63.95	47.25	62.36
Honduras	7	50.80	39.41	67.86	-	49.04
Brazil	3	46.14	38.22	71.46	47.89	34.65
Mexico	5	45.61	41.13	80.27	53.95	24.30
Costa Rica	4	44.83	42.44	66.17	41.95	34.30
Chile	6	44.59	32.69	67.62	48.52	36.87
Trinidad and Tobago	25	44.24	61.81	98.01	53.85	11.74
El Salvador	13	42.17	29.68	68.85	50.23	30.80
Panama	9	40.66	38.49	67.41	37.50	28.09
Uruguay	8	39.96	24.25	62.90	38.92	42.94
Guatemala	18	39.90	27.67	67.35	48.66	27.95
Colombia	15	39.48	30.79	66.36	47.71	24.91
Nicaragua	17	39.19	38.58	65.18	49.71	18.88
Suriname	20	37.74	41.00	51.18	-	25.62
Ecuador	14	37.57	22.70	65.88	49.69	26.81
Canada	19	37.06	22.16	52.49	39.20	41.35
Venezuela	21	37.04	-	50.89	32.96	30.29
Bolivia	11	37.01	44.98	50.74	49.48	16.61
Dominican Republic	12	36.40	34.67	68.32	39.64	18.69
Peru	16	35.27	32.45	66.79	41.78	17.09
Argentina	23	33.24	20.63	61.63	43.40	22.12
Belize	22	32.46	23.19	55.75	-	26.45
Guyana	24	32.08	28.86	53.78	-	21.28
Barbados	26	30.94	25.55	56.67	-	20.46
Antigua and Barbuda	-	27.11	17.00	51.62	-	22.70
Bahamas	-	-	48.71	-	-	9.97
Cuba	-	-	-	52.63	-	9.92
Grenada	-	-	27.75	-	-	17.57
Haiti	-	-	43.60	-	-	3.77
British Virgin Islands	-	-	-	-	-	7.31

Table 17. Scores on pillars for green economic opportunities by region and rank *(continued)*

Country	Regional Rank	Green Economic Opportunities	Indicator categories			
			Green Investment	Green Trade	Green Employment	Green Innovation
Dominica	-	-	43.16	-	-	-
French Guiana	-	-	-	-	-	70.91
Guadeloupe	-	-	-	-	-	67.56
Puerto Rico	-	-	-	-	-	27.34
St. Kitts and Nevis	-	-	-	-	-	29.29
St. Lucia	-	-	-	-	-	51.25
St. Vincent and the Grenadines	-	-	-	-	-	52.94
United States Virgin Islands	-	-	-	-	-	19.99
ASIA						
China	2	62.68	57.65	77.26	83.67	41.43
South Korea	20	58.60	69.53	73.16	62.25	37.24
Azerbaijan	12	54.57	39.16	67.04	60.95	55.40
Laos	4	52.54	47.15	50.52	48.96	65.34
United Arab Emirates	25	52.38	71.87	56.04	58.90	31.74
Malaysia	8	51.97	53.62	76.21	47.55	37.55
Qatar	32	51.59	57.06	67.00	-	35.92
Bhutan	5	49.82	42.94	55.93	-	51.48
Palestine	26	49.50	-	54.16	57.49	38.95
Japan	1	49.29	51.12	84.62	32.23	42.35
Tajikistan	21	48.86	37.25	95.79	35.04	45.57
Indonesia	11	47.74	47.56	69.94	44.88	34.80
Vietnam	16	47.74	57.60	69.87	46.86	27.54
Maldives	14	47.38	38.04	-	53.15	52.61
Thailand	3	47.31	52.19	76.51	50.91	24.64
Kuwait	40	46.98	57.83	67.56	-	26.55
Armenia	13	46.62	38.97	68.86	68.14	25.83
Bahrain	41	46.42	38.91	68.98	-	37.28
Singapore	24	46.40	97.85	48.04	28.63	34.44
Kyrgyz Republic	17	45.68	41.68	61.13	36.80	46.42
India	27	45.41	39.19	69.82	55.48	28.01
Uzbekistan	35	45.38	43.66	51.02	41.96	-
Georgia	6	45.33	30.20	73.12	61.23	31.23
Brunei Darussalam	22	43.93	64.86	68.75	-	19.01
Israel	19	42.60	61.48	77.70	13.28	51.91
Nepal	7	41.49	45.25	61.58	60.95	17.44
Iran	42	41.43	-	53.33	73.22	18.21
Kazakhstan	18	41.36	40.26	64.07	42.30	26.82
Oman	36	39.85	36.70	70.96	-	24.30
Philippines	9	39.64	40.58	70.61	41.54	20.74
Saudi Arabia	37	39.43	41.13	68.76	-	21.68
Jordan	33	39.42	37.01	69.64	45.10	20.78
Yemen	44	38.00	-	52.36	26.79	39.13

Table 17. Scores on pillars for green economic opportunities by region and rank *(continued)*

Country	Regional Rank	Green Economic Opportunities	Indicator categories			
			Green Investment	Green Trade	Green Employment	Green Innovation
Pakistan	38	37.72	38.65	67.31	39.83	19.54
Cambodia	15	36.86	53.83	59.70	29.95	19.18
Sri Lanka	31	36.84	38.33	65.54	37.30	19.67
Cyprus	10	35.60	47.56	70.50	16.53	28.97
Bangladesh	30	32.17	53.29	63.77	35.32	8.92
Mongolia	28	31.58	28.87	67.22	35.19	14.56
Syria	45	31.13	32.24	-	31.35	29.85
Myanmar	29	27.47	37.96	52.52	39.94	7.15
Iraq	43	27.02	30.39	-	71.35	9.10
Lebanon	34	24.87	7.38	56.95	46.15	19.71
Afghanistan	39	23.57	14.38	52.88	-	17.22
Timor-Leste	23	22.95	19.82	52.15	-	11.70
Hong Kong	-	-	-	40.37	-	46.17
Turkmenistan	-	-	-	-	51.75	50.50
North Korea	-	-	-	-	-	9.64
Turkey	-	-	-	62.74	-	-
Macau	-	-	-	-	-	-
Taiwan	-	-	-	-	-	-
EUROPE						
Germany	3	62.63	64.49	85.79	53.37	52.11
Denmark	4	58.76	70.39	78.54	44.31	48.66
Belarus	9	57.48	48.14	72.39	54.48	-
Switzerland	1	56.62	61.95	61.62	50.69	53.11
Finland	7	54.70	52.52	79.22	38.89	55.34
Czech Republic	6	53.89	71.41	79.03	46.45	32.17
Netherlands	15	53.55	81.93	63.82	29.90	52.60
Austria	2	53.46	64.06	82.78	33.94	45.37
United Kingdom	8	51.45	57.75	68.10	34.77	51.24
Bosnia and Herzegovina	23	51.44	41.29	67.47	66.25	37.94
Sweden	5	50.59	65.74	74.98	26.63	49.88
Slovenia	14	49.10	74.57	76.00	34.48	29.76
Russia	33	47.55	47.96	54.42	66.27	29.56
Italy	11	47.04	57.01	82.44	34.42	30.28
Hungary	13	46.95	75.19	80.78	32.72	24.46
Norway	17	46.77	50.16	73.75	28.65	45.14
Belgium	24	45.78	53.70	68.86	24.60	48.27
Macedonia	29	45.08	64.07	-	46.64	30.67
Estonia	18	44.86	68.56	77.88	26.75	28.35
France	10	44.52	55.66	65.40	29.00	37.21
Poland	21	43.57	57.55	77.19	35.43	22.89
Slovakia	12	43.11	47.11	80.40	35.76	25.50
Lithuania	19	42.14	62.32	75.25	20.86	32.23
Portugal	16	41.85	45.18	80.21	24.96	33.91
Spain	20	41.40	46.39	72.87	32.34	26.86

Table 17. Scores on pillars for green economic opportunities by region and rank *(continued)*

Country	Regional Rank	Green Economic Opportunities	Indicator categories			
			Green Investment	Green Trade	Green Employment	Green Innovation
Bulgaria	30	40.34	50.65	74.70	26.61	26.30
Ukraine	34	39.47	29.52	54.75	54.83	27.40
Romania	27	39.31	47.68	87.52	27.33	20.94
Serbia	31	38.75	39.05	64.27	41.70	21.55
Albania	25	38.31	24.10	65.55	38.48	35.43
Iceland	37	36.22	44.71	53.00	17.61	41.23
Luxembourg	22	35.78	60.10	80.25	7.82	43.48
Croatia	28	35.39	58.83	71.71	27.69	13.42
Latvia	26	35.05	42.32	66.40	23.94	22.43
Ireland	35	32.73	53.39	68.55	7.06	44.37
Montenegro	39	32.01	21.68	54.34	39.01	22.85
Moldova	36	29.20	38.39		45.27	14.33
Greece	32	29.10	38.13	72.96	19.20	13.42
Malta	38	24.33	50.84	41.41	5.21	31.91
Andorra	-	-	22.18	-	-	-
OCEANIA						
Fiji	2	47.45	51.17	52.15	49.90	38.07
New Zealand	1	41.10	42.59	68.63	22.40	43.56
Australia	3	37.18	50.79	36.60	27.81	36.97
Papua New Guinea	4	36.91	30.84	51.89	-	31.41
Kiribati	-	-	10.42	-	-	17.32
Solomon Islands	-	-	28.01	-	-	30.44
Marshall Islands	-	-	-	-	-	15.89
New Caledonia	-	-	-	-	-	38.31
Palau	-	-	11.04	-	-	-
Samoa	-	-	42.00	-	-	-
Tonga	-	-	28.52	-	-	-
Tuvalu	-	-	-	-	-	12.72
Vanuatu	-	-	42.56	-	-	-

Table 18. 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
AFRICA						
Mauritius	6	80.21	78.12	80.05	84.95	77.92
Seychelles	3	76.95	83.61	59.12	85.43	83.00
Algeria	31	73.30	72.11	62.84	89.06	71.55
Tunisia	26	72.16	75.20	56.35	82.49	77.56
Cabo Verde	2	69.68	65.01	62.19	79.72	73.17
South Africa	19	69.57	63.83	97.73	51.95	72.28
Morocco	9	68.46	63.90	60.00	92.00	62.29
Namibia	5	64.11	46.73	95.84	54.86	68.75
Eswatini	37	64.04	61.08	55.58	64.95	76.30
Egypt	40	62.93	67.17	42.42	83.90	65.63
Gabon	1	59.14	73.28	51.46	78.72	41.20
Sao Tome and Principe	-	59.09	46.48	56.12	90.53	51.63
Botswana	4	57.56	46.12	64.30	56.28	65.77
Senegal	8	56.42	45.48	69.06	74.70	43.18
Comoros	-	55.37	62.37	68.52	79.54	27.65
Ghana	16	55.29	52.68	58.09	80.31	38.02
Cameroon	21	55.08	57.55	62.22	71.56	35.93
Kenya	18	54.69	40.83	80.72	84.08	32.29
Rwanda	17	54.31	38.09	98.64	73.46	31.52
Togo	7	53.71	44.00	77.93	70.47	34.46
Lesotho	29	53.01	22.40	73.91	70.37	67.80
Libya	43	52.52	46.69	68.23	-	45.49
Gambia	24	52.16	44.83	63.76	74.92	34.56
Zimbabwe	22	51.64	27.22	78.52	71.79	46.34
Tanzania	12	51.02	33.46	89.68	78.89	28.62
Uganda	15	47.79	27.55	89.66	73.58	28.70
Cote d'Ivoire	11	47.28	45.33	54.01	81.27	25.12
Guinea	14	46.06	43.96	62.21	70.46	23.36
Djibouti	-	45.53	43.38	62.67	78.86	20.05
Malawi	25	44.75	34.32	80.70	54.04	26.80
Mali	27	44.55	38.17	55.91	65.84	28.04
Congo Republic	-	44.48	41.43	48.80	60.27	32.13
Zambia	13	43.70	31.21	77.51	46.04	32.76
Nigeria	30	43.65	40.57	49.56	70.98	25.43
Sudan	39	42.77	46.34	46.43	78.50	19.82
Ethiopia	20	42.22	35.39	65.52	83.76	16.37
Burundi	28	40.00	19.09	82.10	56.82	28.75
Benin	23	39.97	39.70	52.65	68.70	17.78
Mozambique	32	39.84	27.73	73.89	31.20	39.41
Mauritania	34	39.09	44.47	51.66	43.58	23.32
Angola	35	38.52	40.42	66.50	38.34	21.37
Somalia	-	38.52	14.37	64.91	61.27	-

Table 18. Scores on pillars for social inclusion by region and rank *(continued)*

Country	Regional Rank	Social Inclusion	Indicator categories			
			Access to Basic Services and Resources	Gender Balance	Social Equity	Social Protection
Liberia	-	38.05	23.79	72.29	58.41	20.87
Burkina Faso	10	36.32	28.59	47.36	40.03	32.10
Sierra Leone	33	35.83	25.42	56.67	47.49	24.10
Niger	36	32.51	27.28	65.25	42.29	14.85
DR Congo	41	30.00	17.45	58.21	45.34	17.59
South Sudan	-	27.66	30.31	81.02	75.85	3.14
Madagascar	38	27.07	9.21	53.34	70.47	15.51
Guinea-Bissau	-	24.01	17.43	14.59	74.79	17.47
Central African Republic	42	22.55	11.03	43.02	39.85	13.67
Chad	-	22.12	14.87	55.07	44.93	6.51
Equatorial Guinea	-	-	39.48	72.28	-	-
Eritrea	-	-	28.45	59.91	-	-
THE AMERICAS						
Canada	19	87.28	78.71	85.46	91.95	93.84
United States	2	86.27	89.60	76.81	88.99	90.45
Uruguay	8	82.09	80.45	72.82	86.08	90.06
Mexico	5	80.42	69.31	89.23	82.33	82.16
Chile	6	78.51	75.67	73.59	83.88	81.33
Trinidad and Tobago	25	78.42	67.10	78.05	86.91	83.10
Bolivia	11	78.24	62.91	99.04	88.67	67.82
Argentina	23	76.81	66.31	76.48	84.29	81.42
Guyana	24	74.21	61.99	83.50	68.78	85.20
Paraguay	1	73.56	59.54	76.70	82.47	77.76
Costa Rica	4	73.44	64.13	75.06	79.83	75.68
Brazil	3	72.79	71.95	68.09	72.63	78.87
Ecuador	14	71.67	62.58	91.30	82.52	55.96
Suriname	20	71.64	55.90	67.24	86.76	80.76
El Salvador	13	71.63	71.67	76.94	82.52	57.84
Peru	16	69.47	61.18	85.04	81.53	54.92
Grenada	-	69.01	61.27	96.70	-	55.47
Panama	9	68.46	72.20	64.87	76.94	60.94
Dominican Republic	12	67.40	59.25	76.61	81.69	55.66
Barbados	26	67.06	84.71	45.55	79.09	66.29
Colombia	15	64.81	54.91	62.01	72.68	71.27
Belize	22	64.79	72.26	55.64	69.09	63.46
Venezuela	21	64.51	44.61	72.71	80.58	66.26
Jamaica	10	64.43	68.67	61.74	77.01	52.77
Bahamas	-	62.60	60.16	50.82	-	80.22
Dominica	-	62.14	70.73	59.79	-	56.75
St. Lucia	-	61.57	62.89	67.00	66.95	50.94
Nicaragua	17	60.01	48.09	86.94	76.92	40.32
Guatemala	18	58.33	60.63	62.71	75.35	40.42
Honduras	7	57.01	52.91	61.72	75.02	43.13

Table 18. Scores on pillars for social inclusion by region and rank *(continued)*

Country	Regional Rank	Social Inclusion	Indicator categories			
			Access to Basic Services and Resources	Gender Balance	Social Equity	Social Protection
St. Vincent and the Grenadines	-	54.41	77.48	38.66	-	53.78
Haiti	-	39.40	24.32	67.67	50.76	28.85
Antigua and Barbuda	-	-	-	49.12	-	71.70
Cuba	-	-	70.71	-	-	56.47
St. Kitts and Nevis	-	-	-	42.25	-	67.05
Aruba	-	-	-	-	88.04	-
Bermuda	-	-	-	-	95.08	-
Curacao	-	-	-	-	87.39	-
Puerto Rico	-	-	-	86.64	-	-
Asia						
Hong Kong	-	93.73	99.38	87.55	94.64	-
Israel	19	82.29	85.43	68.52	87.23	89.77
Cyprus	10	80.93	77.59	70.48	91.23	85.98
South Korea	20	79.27	90.34	53.60	88.18	92.48
Kazakhstan	18	79.00	76.20	59.75	94.52	90.51
Singapore	24	78.92	91.54	74.43	96.75	58.86
Japan	1	77.52	87.48	48.60	96.05	88.42
Thailand	3	76.97	66.26	68.78	89.71	85.85
China	2	76.65	72.24	58.54	93.74	87.06
Turkmenistan	-	76.29	64.43	73.66	91.30	78.16
Georgia	6	76.17	71.33	69.27	85.15	80.02
Armenia	13	75.81	73.40	73.22	86.47	71.08
Mongolia	28	73.79	60.73	69.98	88.77	78.57
Timor-Leste	23	73.27	59.05	88.58	83.84	65.73
Kyrgyz Republic	17	72.88	66.88	54.54	90.19	85.78
Brunei Darussalam	22	72.44	79.44	47.12	86.52	85.03
United Arab Emirates	25	71.95	77.87	79.29	94.65	45.87
Uzbekistan	35	71.56	70.54	62.58	-	83.00
Vietnam	16	70.66	64.48	67.99	88.86	63.98
Maldives	14	69.89	64.77	60.92	86.19	70.14
Tajikistan	21	68.86	59.63	63.05	76.87	77.79
Nepal	7	68.78	54.01	87.61	80.80	58.54
Azerbaijan	12	67.98	72.97	44.74	98.83	66.19
Philippines	9	66.36	62.99	84.30	85.70	42.61
Jordan	33	66.07	58.35	64.81	80.02	62.96
Laos	4	65.42	73.27	76.74	82.68	39.39
Indonesia	11	65.32	60.76	71.88	93.20	44.72
Malaysia	8	65.21	79.21	60.29	87.28	43.39
Palestine	26	64.66	-	45.41	81.65	72.92
Saudi Arabia	37	61.80	63.98	53.74	86.13	49.26
Bahrain	41	60.54	73.16	43.08		70.41
Iran	42	60.28	70.88	53.73	79.93	43.37
Cambodia	15	58.88	50.93	72.15	90.22	36.26

Table 18. Scores on pillars for social inclusion by region and rank *(continued)*

Country	Regional Rank	Social Inclusion	Indicator categories			
			Access to Basic Services and Resources	Gender Balance	Social Equity	Social Protection
Sri Lanka	31	58.50	65.62	45.77	85.22	45.76
India	27	57.72	55.13	52.11	82.06	47.11
Lebanon	34	57.49	43.92	50.84	86.71	56.42
Bhutan	5	57.25	47.44	74.51	93.06	32.65
Iraq	43	56.25	51.58	64.78	80.92	37.03
Bangladesh	30	55.94	54.37	53.48	84.58	39.82
Qatar	32	55.36	68.84	56.30		43.78
Myanmar	29	54.28	56.79	57.49	89.25	29.78
Oman	36	53.62	68.87	41.98		53.33
Syria	45	50.84	54.19	40.37	91.71	33.30
Kuwait	40	50.61	77.77	34.30		48.60
Pakistan	38	47.61	51.27	49.57	82.97	24.37
Afghanistan	39	38.91	40.64	39.65	62.41	22.79
Yemen	44	27.19	29.37	9.25	72.86	27.60
Macau	-	-	86.09	-	96.40	-
North Korea	-	-	36.00	-	-	-
Europe						
Sweden	5	94.69	95.22	97.41	96.57	89.77
Switzerland	1	94.01	97.21	94.99	93.49	90.45
Austria	2	93.83	96.93	94.40	92.79	91.30
Netherlands	15	93.39	96.73	89.85	97.48	89.77
Norway	17	93.06	90.61	94.28	96.87	90.62
France	10	92.75	96.17	92.99	92.19	89.77
Germany	3	92.67	97.08	87.66	94.39	91.80
Spain	20	92.18	92.88	95.27	91.79	88.88
Finland	7	92.15	86.47	96.98	95.63	89.94
Belgium	24	91.52	87.14	92.92	95.25	90.96
United Kingdom	8	91.47	92.72	88.71	92.71	91.80
Denmark	4	91.22	88.59	93.18	95.61	87.74
Portugal	16	91.20	91.46	93.07	93.34	87.05
Ireland	35	88.63	90.51	81.60	93.90	88.96
Luxembourg	22	88.40	83.63	86.18	94.56	89.60
Belarus	9	88.25	87.99	76.87	100.00	89.67
Iceland	37	88.16	85.67	92.67	97.16	78.32
Poland	21	88.15	93.62	85.65	94.55	79.62
Italy	11	87.32	85.14	90.55	87.37	86.32
Estonia	18	87.02	84.47	84.94	93.25	85.71
Czech Republic	6	86.93	85.64	81.67	96.30	84.79
Slovenia	14	86.30	82.73	77.71	96.81	89.10
Greece	32	85.76	87.84	80.68	91.64	83.29
Latvia	26	84.69	83.18	84.70	92.40	79.04
Romania	27	84.65	87.09	80.04	90.04	81.82
Lithuania	19	84.62	84.71	81.56	90.99	81.57

Table 18. Scores on pillars for social inclusion by region and rank *(continued)*

Country	Regional Rank	Social Inclusion	Indicator categories			
			Access to Basic Services and Resources	Gender Balance	Social Equity	Social Protection
Croatia	28	83.32	79.78	80.08	92.75	81.34
Hungary	13	83.06	89.96	66.69	93.55	84.81
Bulgaria	30	82.79	83.46	81.80	87.45	78.68
Moldova	36	82.78	81.28	82.43	91.76	76.40
Slovakia	12	82.72	82.72	71.97	94.66	83.09
Malta	38	82.36	81.00	67.48	93.76	89.77
Albania	25	79.35	64.53	85.99	86.40	82.72
Russia	33	78.14	79.11	60.86	90.34	85.71
Serbia	31	77.07	69.80	93.35	89.11	60.75
Ukraine	34	74.45	81.53	46.97	91.74	87.48
Macedonia	29	73.25	64.42	75.31	88.86	66.78
Bosnia and Herzegovina	23	72.56	68.96	63.16	87.00	73.14
Montenegro	39	71.03	73.31	49.75	86.02	81.13
Kosovo	-	-	-	96.14	-	-
San Marino	-	-	-	71.12	-	-
OCEANIA						
Australia	3	89.16	85.34	87.51	92.86	91.13
New Zealand	1	87.98	85.52	85.37	91.42	89.77
Palau	-	69.44	-	50.50	86.98	76.23
Fiji	2	64.74	58.18	45.16	88.60	75.43
Samoa	-	63.16	62.57	48.03	81.22	65.20
Kiribati	-	59.55	47.11	56.95	76.02	61.65
Micronesia, Fed. Sts.	-	57.86	56.77	38.13	80.04	64.72
Tonga	-	56.96	39.82	45.46	88.31	65.86
Marshall Islands	-	56.80		44.12	75.89	54.72
Vanuatu	-	38.57	57.99	25.75	79.04	18.75
Solomon Islands	-	37.27	48.59	17.41	92.40	24.69
Papua New Guinea	4	23.08	23.94	13.38	63.01	14.07
Nauru	-	-	-	-	80.34	70.72
New Caledonia	-	-	94.50	-	76.18	-
Tuvalu	-	-	-	-	78.49	25.35
Cook Islands	-	-	-	-	-	72.00
French Polynesia	-	-	90.74	-	-	-

8.3 Normalized values of green growth indicators by dimension and region

Table 19. Normalized values of green growth indicators for efficient and sustainable resource use

Country	Regional Rank	Indicators											
		EE1	EE2	EE3	EW1	EW2	EW3	SL1	SL2	SL3	ME1	ME2	ME3
Africa													
Gabon	1	59.75	100.00	16.92	37.10	100.00	-	97.46	-	99.95	97.44	86.28	-
Cabo Verde	2	88.14	46.11	-	19.46	100.00	4.34	88.04	1.00	98.78	93.69	-	99.83
Seychelles	3	84.08	3.58	-	31.87	-	6.67	89.20	-	97.02	97.11	80.97	-
Botswana	4	86.33	53.41	39.21	23.80	100.00	-	82.22	-	100.00	91.40	70.85	99.88
Namibia	5	81.60	61.29	32.84	12.29	100.00	17.80	98.89	1.00	99.98	87.59	71.79	-
Mauritius	6	91.37	19.12	20.10	6.96	100.00	-	95.35	1.08	96.69	96.41	87.14	-
Togo	7	42.78	100.00	20.10	8.90	100.00	4.04	99.00	29.54	99.43	87.80	95.21	-
Senegal	8	81.60	75.42	12.22	3.06	100.00	9.50	94.83	1.25	99.18	89.98	94.42	-
Morocco	9	82.73	22.03	21.37	4.17	49.02	6.87	100.00	1.33	99.61	93.31	90.25	-
Burkina Faso	10	74.70	100.00	13.74	5.91	100.00	-	100.00	6.16	98.80	79.87	94.93	99.84
Cote d'Ivoire	11	82.20	100.00	38.64	15.28	100.00	-	100.00	3.83	99.86	93.12	93.81	-
Tanzania	12	58.78	100.00	35.71	4.22	100.00	-	100.00	6.95	99.31	89.50	96.50	-
Zambia	13	50.89	100.00	20.94	6.05	100.00	-	86.17	1.08	99.85	79.31	89.26	-
Guinea	14	67.49	100.00	20.10	4.83	100.00	16.28	97.27	1.08	99.45	69.68	87.58	-
Uganda	15	15.75	100.00	22.51	15.37	100.00	-	100.00	19.30	98.83	86.07	97.14	-
Ghana	16	85.66	78.52	20.10	13.07	100.00	4.44	100.00	3.50	99.58	85.10	87.26	-
Rwanda	17	78.98	100.00	29.66	5.43	100.00	-	97.23	2.91	98.80	91.24	97.76	-
Kenya	18	69.52	100.00	30.13	6.48	83.68	1.61	94.49	4.83	98.80	92.31	95.58	-
South Africa	19	55.77	19.80	58.31	6.06	20.74	2.11	93.77	1.83	99.81	93.39	80.84	-
Cameroon	20	75.30	100.00	7.37	10.26	100.00	2.72	100.00	1.17	99.20	91.04	95.58	99.86
Ethiopia	21	53.82	100.00	16.18	2.92	85.63	-	94.77	5.83	97.85	84.11	96.22	-
Zimbabwe	22	5.02	100.00	20.10	2.59	79.39	-	99.34	1.08	99.70	87.73	93.57	-
Benin	23	64.63	89.98	32.84	15.67	100.00	3.23	100.00	6.62	99.21	88.10	94.90	99.87
Gambia	24	83.86	96.80	13.74	5.22	100.00	65.77	97.00	1.08	99.18	87.12	-	-
Lesotho	25	47.44	80.78	13.01	17.10	100.00	-	97.76	1.00	99.71	73.95	91.73	-
Tunisia	26	80.25	25.81	22.32	4.66	1.00	-	95.81	24.96	99.61	93.88	88.42	-
Malawi	27	84.23	100.00	22.83	3.01	100.00	-	73.79	1.08	98.92	73.34	96.74	-
Mali	28	67.26	100.00	23.29	1.65	100.00	-	99.89	1.25	99.51	77.05	92.68	-
Burundi	29	49.77	100.00	6.21	3.60	100.00	-	97.92	1.25	99.30	79.16	98.86	99.86
Nigeria	30	58.70	100.00	23.29	12.15	100.00	3.02	100.00	1.67	99.40	95.72	95.96	-
Mauritania	31	82.35	46.80	13.74	2.38	100.00	-	92.62	-	99.88	82.89	86.11	-
Algeria	32	68.01	1.29	20.10	6.07	1.00	-	100.00	1.00	99.80	93.73	87.58	99.90
Sierra Leone	33	67.19	100.00	6.67	4.06	100.00	74.88	95.66	41.85	99.63	86.19	97.13	-
Mozambique	34	19.43	100.00	25.97	3.82	100.00	6.26	96.65	1.29	99.95	90.06	97.37	-
Angola	35	87.69	100.00	7.37	49.02	100.00	24.99	98.80	1.00	99.93	96.10	93.07	99.79
Niger	36	70.64	100.00	6.41	1.95	100.00	-	100.00	1.00	99.58	73.94	95.58	-
Eswatini	37	72.74	100.00	-	2.21	1.00	-	100.00	1.71	99.53	89.68	-	-
Madagascar	38	37.38	100.00	13.74	1.19	100.00	37.43	98.53	2.91	99.83	83.84	97.95	-

Table 19. Normalized values of green growth indicators for efficient and sustainable resource use *(continued)*

Country	Regional Rank	Indicators											
		EE1	EE2	EE3	EW1	EW2	EW3	SL1	SL2	SL3	ME1	ME2	ME3
Sudan	39	72.22	100.00	16.92	2.00	1.00	-	96.49	1.44	99.31	91.85	91.87	-
Egypt	40	85.43	13.54	39.21	2.74	1.00	-	27.16	24.96	97.68	92.97	-	-
DR Congo	41	7.12	100.00	20.10	19.87	100.00	-	100.00	3.16	99.96	79.08	-	-
Central African Republic	42	44.89	100.00	20.10	7.48	100.00	-	95.71	-	98.97	72.77	96.16	-
Libya	43	62.46	7.01	1.00	2.24	1.00	-	98.40	-	99.88	92.79	76.41	-
Chad	-	77.10	100.00	17.48	4.83	100.00	-	95.79	-	99.00	64.39	90.04	-
Comoros	-	81.15	94.01	21.92	27.04	100.00	73.36	100.00	6.82	99.46	92.36	98.18	-
Congo Republic	-	54.72	100.00	23.29	32.37	100.00	3.93	100.00	-	100.00	93.06	-	-
Djibouti	-	93.84	62.46	26.47	-	100.00	4.44	7.24	-	99.75	93.43	84.24	-
Equatorial Guinea	-	80.55	14.42	14.30	-	100.00	2.62	100.00	-	99.93	98.89	84.06	-
Eritrea	-	-	100.00	6.96	2.16	100.00	-	98.02	-	99.66	79.37	94.39	-
Guinea-Bissau	-	42.56	100.00	23.29	2.67	100.00	19.52	91.11	11.07	98.80	86.30	98.61	-
Liberia	-	2.69	100.00	16.92	2.52	100.00	-	95.01	1.31	99.83	74.77	94.93	-
Sao Tome and Principe	-	82.28	81.14	24.98	3.88	100.00	47.66	97.30	100.00	99.53	95.03	98.67	-
Somalia	-	44.29	100.00	4.18	1.00	100.00	-	95.66	1.00	99.66	1.00	97.07	-
South Sudan	-	-	64.98	-	4.12	100.00	-	93.40	-	99.45	79.47	95.69	-
Reunion	-	-	32.59	-	-	100.00	-	-	37.69	93.79	-	-	-
Mayotte	-	-	20.18	-	-	-	-	-	3.62	-	-	-	-
St. Helena	-	-	15.27	-	-	-	-	-	-	-	-	-	-
The Americas													
United States	1	75.60	22.49	61.50	16.97	93.74	1.10	-	5.74	99.55	98.88	-	-
Paraguay	2	83.03	100.00	26.47	6.11	100.00	-	88.23	4.24	99.02	88.96	70.85	-
Brazil	3	77.85	97.40	42.39	8.86	100.00	-	77.40	6.16	98.75	92.87	71.77	99.93
Costa Rica	4	93.17	71.17	32.84	7.45	100.00	1.10	51.55	5.74	98.70	97.37	80.54	-
Mexico	5	83.86	24.75	32.84	5.36	60.76	1.71	86.52	3.08	99.28	96.54	83.28	-
Chile	6	81.08	52.48	36.03	3.51	100.00	2.32	64.11	12.98	99.60	88.50	27.84	-
Honduras	7	74.92	97.48	32.84	5.32	100.00	1.20	76.56	16.39	98.75	92.55	91.52	-
Uruguay	8	86.11	100.00	36.03	5.68	100.00	1.51	59.10	100.00	98.95	96.70	70.06	-
Panama	9	96.55	55.76	39.21	16.25	100.00	3.23	77.18	3.25	98.93	98.13	84.20	-
Jamaica	10	80.93	23.01	20.10	3.95	100.00	3.23	93.64	1.00	98.68	94.92	85.76	-
Bolivia	11	81.30	33.47	16.92	5.76	100.00	-	-	4.91	99.51	86.47	80.62	99.91
Dominican Republic	12	93.69	33.15	23.29	3.98	71.19	-	94.89	41.18	97.19	96.99	93.06	-
El Salvador	13	82.58	46.65	26.47	4.50	100.00	3.02	87.11	2.75	98.95	95.47	91.36	-
Ecuador	14	84.53	39.71	32.26	4.10	100.00	3.13	70.28	7.95	98.48	96.06	88.40	-
Colombia	15	89.49	61.31	32.84	4.14	100.00	1.30	62.25	1.67	99.21	96.33	87.81	-
Peru	16	89.49	61.90	36.03	2.57	100.00	2.72	83.61	20.38	99.45	90.97	73.03	-
Nicaragua	17	73.27	100.00	20.10	3.74	100.00	4.14	86.50	7.07	98.63	85.77	88.08	-
Guatemala	18	76.20	100.00	23.29	7.67	100.00	1.40	86.94	13.89	98.27	93.30	87.30	-
Canada	19	57.05	46.94	67.87	15.98	100.00	1.51	88.83	18.72	99.55	96.29	10.01	1.00
Suriname	20	72.59	29.24	-	3.51	100.00	15.37	70.10	1.58	98.15	81.24	51.54	-
Venezuela	21	92.87	45.94	13.74	2.42	100.00	-	77.77	1.08	98.95	94.79	-	-
Belize	22	58.78	59.17	-	5.22	100.00	7.48	71.31	4.08	99.00	88.81	70.98	99.92
Argentina	23	81.98	19.95	29.66	5.18	100.00	3.13	92.97	29.70	99.38	96.37	76.52	99.97

Table 19. Normalized values of green growth indicators for efficient and sustainable resource use *(continued)*

Country	Regional Rank	Indicators											
		EE1	EE2	EE3	EW1	EW2	EW3	SL1	SL2	SL3	ME1	ME2	ME3
Guyana	24	88.06	24.19	16.92	2.39	100.00	7.38	91.54	4.33	99.53	85.91	68.54	-
Trinidad and Tobago	25	1.00	1.91	20.10	20.82	100.00	1.40	1.00	-	87.39	98.72	79.84	-
Barbados	26	75.07	9.80	-	16.43	1.00	1.40	42.92	-	90.25	99.44	96.42	99.93
Antigua and Barbuda	-	69.44	2.43	32.84	37.49	100.00	6.87	84.73	-	98.20	98.21	90.49	99.89
Bahamas	-	86.26	3.72	26.47	-	-	5.35	76.26	4.16	95.81	99.02	-	99.92
Cuba	-	96.62	47.09	10.55	5.10	100.00	-	98.22	1.25	99.12	96.64	88.70	-
Dominica	-	84.01	17.01	-	-	100.00	3.43	99.33	31.18	99.17	98.12	1.00	-
Grenada	-	87.61	20.95	20.10	-	100.00	8.08	94.26	9.86	98.30	99.24	98.54	-
Haiti	-	68.09	100.00	7.37	3.88	100.00	3.23	95.50	2.25	98.37	91.92	98.37	-
Puerto Rico	-	100.00	5.74	-	11.49	100.00	-	61.73	1.08	96.20	99.80	99.42	-
St. Kitts and Nevis	-	88.51	3.62	-	-	48.86	2.62	95.03	-	98.92	98.84	-	-
St. Lucia	-	82.20	20.18	-	-	100.00	-	86.34	3.08	97.15	98.81	-	-
St. Vincent and the Grenadines	-	88.29	10.44	-	-	100.00	1.20	96.58	-	98.07	97.19	-	-
Bermuda	-	97.37	2.83	-	-	100.00	1.51	-	-	-	99.68	86.96	-
Aruba	-	77.47	17.70	-	-	-	-	-	-	-	98.76	81.17	-
British Virgin Islands	-	-	3.74	-	-	-	-	-	4.08	-	99.82	98.02	-
Cayman Islands	-	92.72	1.02	-	-	-	1.40	-	-	-	99.79	94.09	-
Greenland	-	-	23.07	-	-	-	100.00	-	-	-	99.79	88.74	-
Turks and Caicos Islands	-	60.35	1.98	-	-	-	2.62	-	-	-	99.45	94.81	-
Anguilla	-	-	2.50	-	-	-	13.95	-	-	-	99.47	-	-
Curacao	-	33.62	6.35	-	-	-	-	-	-	-	100.00	-	-
Guadeloupe	-	-	6.78	-	-	-	-	-	22.63	97.97	-	-	-
Martinique	-	-	5.89	-	-	-	-	-	20.38	98.58	-	-	-
Montserrat	-	-	2.27	-	-	-	2.21	-	-	-	92.95	-	-
Sint Maarten	-	46.01	1.10	-	-	-	-	-	-	-	100.00	-	-
United States Virgin Islands	-	-	10.88	-	-	-	-	-	8.57	-	-	-	-
Falkland Islands	-	-	9.96	-	-	-	-	-	24.54	-	-	-	-
French Guiana	-	-	57.63	-	-	-	-	-	100.00	-	-	-	-
Bonaire, Saint Eustatius and Saba	-	-	20.97	-	-	-	-	-	-	-	-	-	-
St. Pierre and Miquelon	-	-	3.04	-	-	-	-	-	-	-	-	-	-
Asia													
Japan	1	84.01	17.28	64.68	21.59	78.12	-	80.22	3.16	96.64	99.28	78.66	-
China	2	60.13	29.53	58.31	10.55	67.29	-	55.63	5.41	99.28	93.27	70.19	-
Laos	3	75.45	97.13	16.92	1.69	100.00	-	94.18	4.24	96.84	83.02	-	-
Thailand	4	73.19	41.12	51.95	3.64	100.00	4.14	85.31	6.91	99.45	94.67	82.21	-
Bhutan	5	45.71	100.00	20.10	3.19	100.00	-	91.79	10.07	99.43	74.18	59.11	99.94
Georgia	6	78.08	46.17	26.47	4.01	100.00	1.20	72.26	1.54	99.48	92.51	82.08	-
Nepal	7	65.24	100.00	20.52	1.91	100.00	-	79.75	2.91	96.49	81.62	93.50	-
Malaysia	8	74.10	12.25	55.13	22.30	100.00	6.77	94.70	1.08	99.30	94.53	63.59	-
Philippines	9	87.01	56.97	45.58	2.38	97.53	7.27	95.11	15.23	98.85	93.02	88.84	-

Table 19. Normalized values of green growth indicators for efficient and sustainable resource use *(continued)*

Country	Regional Rank	Indicators											
		EE1	EE2	EE3	EW1	EW2	EW3	SL1	SL2	SL3	ME1	ME2	ME3
Cyprus	10	88.66	29.93	42.39	28.86	75.07	1.10	69.16	41.02	98.48	95.71	44.74	-
Indonesia	11	84.53	43.39	36.03	2.45	90.69	11.53	85.92	2.08	98.62	94.93	90.11	-
Azerbaijan	12	72.67	3.37	18.46	2.28	39.41	-	91.23	7.66	99.10	94.71	83.67	99.96
Armenia	13	77.77	17.14	20.10	2.23	36.46	-	61.18	1.25	99.53	88.68	78.08	99.96
Maldives	14	82.28	3.47	25.37	-	100.00	27.41	82.31	-	-	96.86	88.43	-
Cambodia	15	69.74	100.00	16.92	3.84	100.00	6.77	89.88	3.91	99.23	84.55	90.14	99.80
Vietnam	16	77.55	37.81	45.58	1.91	100.00	12.44	63.69	5.20	97.95	89.66	-	-
Kyrgyz Republic	17	69.74	58.86	13.74	1.25	50.42	-	84.66	3.41	99.73	79.23	-	-
Kazakhstan	18	64.56	4.43	26.47	3.69	81.98	-	100.00	1.42	99.98	92.14	44.38	-
Israel	19	89.56	11.81	55.13	50.94	1.00	-	67.02	7.74	97.60	98.34	61.74	-
Tajikistan	20	74.92	75.64	20.10	1.31	11.02	-	86.13	3.08	99.30	83.86	92.93	-
Brunei Darussalam	21	62.53	1.02	26.68	-	100.00	3.43	1.00	-	75.51	99.04	14.58	-
South Korea	22	68.39	7.99	61.50	21.21	1.00	-	23.49	22.13	92.78	98.35	-	-
Timor-Leste	23	94.37	23.00	-	1.50	93.53	-	87.51	79.70	98.05	90.35	94.60	-
United Arab Emirates	24	66.66	2.77	67.87	28.68	1.00	-	39.75	12.48	95.19	98.27	8.44	-
Singapore	25	89.19	2.77	77.42	-	1.00	-	1.00	19.88	1.00	98.99	25.35	-
Palestine	26	84.31	29.93	-	10.81	49.99	-	-	11.61	99.33	94.86	-	-
India	27	75.82	69.99	48.76	2.00	17.85	2.92	66.65	13.40	98.35	92.00	93.90	-
Myanmar	28	81.00	100.00	13.66	1.61	100.00	18.81	86.25	1.67	96.89	91.43	93.41	-
Mongolia	29	58.10	8.67	20.10	9.44	100.00	-	52.51	1.00	99.88	66.34	23.70	-
Bangladesh	30	92.87	54.85	23.29	3.57	100.00	3.93	49.86	1.08	96.32	95.30	97.73	99.92
Sri Lanka	31	94.97	95.99	29.66	3.23	1.00	7.68	100.00	20.72	99.43	97.44	95.55	-
Qatar	32	54.12	1.12	51.95	72.66	1.00	-	72.30	-	93.51	98.48	1.00	-
Jordan	33	81.38	22.26	26.09	13.07	1.00	-	84.65	2.16	98.90	95.12	89.79	-
Lebanon	34	78.08	13.92	27.01	7.75	33.10	-	80.48	3.08	97.95	96.02	86.51	-
Uzbekistan	35	51.34	2.98	23.29	1.52	1.00	-	41.71	1.04	99.35	90.27	87.98	-
Oman	36	54.12	1.10	45.58	15.13	1.00	6.57	82.94	1.00	99.08	94.83	48.71	-
Saudi Arabia	37	61.18	1.12	48.76	10.28	1.00	-	84.87	1.17	100.00	97.05	55.17	-
Pakistan	38	78.15	90.75	17.53	1.50	1.00	2.42	58.88	2.58	96.69	92.25	96.14	-
Afghanistan	39	88.66	34.86	1.00	1.22	41.08	-	100.00	1.00	99.76	93.34	99.45	99.80
Bahrain	40	36.85	1.00	51.95	28.78	1.00	1.61	75.25	-	78.01	97.01	48.94	99.78
Kuwait	41	44.36	1.19	42.39	36.70	1.00	1.10	1.00	1.17	92.48	97.27	23.05	-
Iran	42	42.03	2.98	13.74	2.42	1.00	2.92	82.29	1.25	99.30	93.85	-	-
Iraq	43	70.12	3.08	16.92	2.04	1.00	1.20	97.84	1.00	99.45	96.94	88.84	-
Yemen	44	94.14	7.80	10.55	2.86	1.00	12.34	100.00	-	99.73	93.93	-	-
Syria	45	27.77	3.08	13.74	1.33	1.00	-	100.00	2.16	99.75	91.49	-	-
Turkmenistan	-	24.31	1.12	17.23	1.36	1.00	-	30.97	-	99.90	94.69	76.56	-
North Korea	-	63.21	25.46	-	1.52	94.57	-	98.27	-	99.07	81.33	-	-
Hong Kong	-	98.50	1.52	67.87	-	-	-	1.00	-	77.03	98.84	-	-
Macau	-	100.00	22.23	-	-	-	-	-	-	-	99.55	-	-
Turkey	-	-	-	48.76	-	-	-	-	-	-	-	-	-
Taiwan	-	-	-	64.68	-	-	-	-	-	-	-	-	-
Europe													
Switzerland	1	95.65	51.79	71.05	100.00	100.00	-	51.79	100.00	97.95	99.65	71.71	-

Table 19. Normalized values of green growth indicators for efficient and sustainable resource use *(continued)*

Country	Regional Rank	Indicators											
		EE1	EE2	EE3	EW1	EW2	EW3	SL1	SL2	SL3	ME1	ME2	ME3
Austria	2	86.56	69.90	67.87	37.49	100.00	-	78.87	100.00	98.53	98.98	62.63	100.00
Germany	3	87.46	36.82	71.05	41.34	83.17	1.00	82.67	80.37	98.37	98.99	70.67	-
Denmark	4	93.24	77.46	71.05	100.00	97.23	1.71	73.53	98.84	97.05	99.00	57.09	-
Sweden	5	81.23	100.00	67.87	70.99	100.00	1.20	80.25	100.00	99.05	98.81	54.05	-
Czech Republic	6	77.32	33.69	45.58	50.31	100.00	-	71.92	100.00	99.46	97.68	-	-
United Kingdom	7	91.14	27.00	58.31	100.00	100.00	1.20	59.57	24.46	98.58	99.29	77.62	-
Finland	8	69.89	92.47	74.24	23.08	100.00	1.30	89.29	100.00	99.21	97.99	41.15	-
Belarus	9	64.18	17.16	26.47	14.13	100.00	-	73.34	-	99.28	-	73.79	100.00
France	10	83.93	33.49	64.68	30.98	100.00	1.20	76.48	81.86	98.72	99.14	79.10	-
Italy	11	89.34	37.00	58.31	17.93	90.48	1.10	75.14	100.00	98.92	99.25	84.52	-
Slovakia	12	76.72	34.98	45.58	56.80	100.00	-	80.04	93.84	99.56	98.02	-	-
Hungary	13	80.78	29.43	42.39	10.04	100.00	-	83.07	49.42	99.48	96.82	72.72	-
Slovenia	14	81.98	44.14	45.58	16.36	100.00	1.00	77.12	71.55	98.95	98.36	57.82	-
Netherlands	15	84.98	21.78	71.05	32.98	100.00	1.30	42.64	36.02	93.31	99.13	46.79	-
Portugal	16	88.74	61.11	48.76	11.55	100.00	2.11	73.00	65.72	99.03	97.74	77.83	-
Norway	17	82.73	100.00	58.31	49.23	100.00	7.38	46.12	38.94	97.68	99.01	13.08	-
Estonia	18	78.00	78.04	55.13	10.73	100.00	2.11	84.93	100.00	99.63	95.90	33.68	-
Lithuania	19	85.36	62.06	48.76	61.95	100.00	1.51	86.13	68.68	99.75	97.23	49.31	-
Spain	20	87.99	38.27	64.68	14.43	63.87	1.51	82.02	77.21	99.03	99.04	80.02	-
Poland	21	81.90	32.09	55.13	20.16	90.10	1.10	87.64	29.95	99.07	96.54	70.45	-
Luxembourg	22	92.79	41.04	55.13	100.00	100.00	-	72.27	38.64	97.60	99.42	19.24	-
Bosnia and Herzegovina	23	61.11	73.63	36.03	-	100.00	-	89.67	1.92	99.53	93.70	76.42	99.97
Belgium	24	79.88	24.65	67.87	37.27	47.37	1.10	9.71	63.06	95.59	98.80	38.86	100.00
Albania	25	89.86	86.86	20.10	5.44	100.00	-	77.76	1.58	99.15	92.80	84.05	99.97
Latvia	26	84.38	85.27	51.95	51.47	100.00	1.91	89.62	100.00	99.78	97.41	57.84	-
Romania	27	89.79	47.34	42.39	11.54	100.00	1.10	90.74	37.77	99.65	96.23	77.27	-
Croatia	28	84.31	63.35	45.58	13.78	100.00	1.71	72.13	60.94	99.26	97.87	76.13	-
Macedonia	29	83.11	40.02	39.21	7.47	72.87	-	92.08	3.50	99.70	92.47	78.94	-
Bulgaria	30	72.59	41.60	42.39	4.29	75.21	1.10	84.07	15.23	99.81	93.06	67.63	99.94
Serbia	31	68.46	51.10	29.66	3.36	100.00	-	98.88	6.66	99.28	91.85	69.38	-
Greece	32	86.56	39.68	58.31	6.75	100.00	1.51	89.52	76.79	99.53	98.21	76.11	-
Russia	33	46.76	8.16	23.29	7.98	100.00	-	98.16	3.50	99.86	95.49	72.12	-
Ukraine	34	55.55	17.80	26.47	3.77	100.00	-	100.00	9.49	99.85	83.51	80.33	-
Ireland	35	98.80	27.37	55.13	88.97	100.00	1.30	20.50	17.64	97.58	99.05	45.17	-
Moldova	36	69.82	46.57	20.10	4.08	100.00	-	100.00	11.40	99.55	87.51	79.88	-
Iceland	37	11.17	100.00	55.13	23.36	100.00	23.37	61.96	3.66	99.91	98.74	29.56	-
Malta	38	97.60	18.68	45.58	70.21	1.00	1.00	29.10	7.16	96.95	98.79	44.86	-
Montenegro	39	79.73	77.20	29.66	7.98	-	1.00	1.00	15.31	99.48	92.37	80.65	-
Andorra	-	-	43.10	-	-	-	-	-	1.08	-	97.46	65.99	-
Liechtenstein	-	-	100.00	-	-	-	-	-	100.00	-	99.99	99.86	-
Faeroe Islands	-	-	11.27	-	-	-	100.00	1.00	3.16	99.90	-	-	-

Table 19. Normalized values of green growth indicators for efficient and sustainable resource use *(continued)*

Country	Regional Rank	Indicators											
		EE1	EE2	EE3	EW1	EW2	EW3	SL1	SL2	SL3	ME1	ME2	ME3
Monaco	-	-	-	-	-	-	-	-	-	-	100.00	100.00	-
San Marino	-	-	-	-	-	-	-	-	-	-	99.96	100.00	-
Kosovo	-	64.26	50.90	-	-	-	-	-	-	-	-	-	-
Gibraltar	-	-	1.00	-	-	-	-	-	-	-	-	-	-
Guernsey	-	-	4.06	-	-	-	-	-	-	-	-	-	-
Isle of Man	-	-	5.14	-	-	-	-	-	-	-	-	-	-
Jersey	-	-	35.80	-	-	-	-	-	-	-	-	-	-
Oceania													
New Zealand	1	78.75	56.10	55.13	15.35	100.00	6.77	91.54	7.49	98.08	97.66	49.10	-
Fiji	2	93.02	62.23	13.74	14.14	100.00	6.26	99.60	81.61	98.95	97.31	-	-
Australia	3	75.00	21.97	58.31	34.57	100.00	-	96.35	82.70	99.91	97.66	1.00	99.96
Papua New Guinea	4	66.59	100.00	26.47	-	100.00	-	100.00	51.83	99.30	91.56	89.24	-
French Polynesia	-	88.44	16.66	-	-	-	20.94	100.00	28.29	99.46	99.37	96.68	-
Samoa	-	76.95	73.30	-	-	-	17.90	100.00	100.00	98.05	94.16	92.92	-
Tonga	-	78.23	4.64	-	-	-	17.40	100.00	27.62	98.32	74.68	67.07	-
New Caledonia	-	2.16	12.63	-	-	-	-	73.07	4.58	99.41	95.43	36.02	-
Solomon Islands	-	74.70	95.40	29.66	-	-	-	100.00	31.53	99.73	84.74	90.65	-
Vanuatu	-	75.52	51.14	-	-	-	5.15	100.00	28.95	99.23	91.59	93.64	-
Kiribati	-	59.30	83.34	-	-	-	-	100.00	40.18	99.58	89.81	95.42	-
Cook Islands	-	-	26.25	-	-	-	4.95	79.85	7.74	94.92	99.47	-	-
Micronesia, Fed. Sts.	-	66.06	4.91	-	-	-	95.73	100.00	-	98.45	96.50	-	-
Nauru	-	69.74	3.70	-	-	-	-	100.00	-	97.30	97.25	91.89	-
Tuvalu	-	88.74	13.85	-	-	-	-	85.31	-	96.84	99.27	99.62	-
Marshall Islands	-	34.98	24.06	-	-	-	100.00	-	-	-	98.65	98.43	-
Palau	-	29.12	2.68	-	-	-	14.16	-	-	-	98.38	91.47	-
Niue	-	-	44.78	-	-	-	-	100.00	21.30	99.81	-	-	-
Wallis and Futuna Islands	-	-	7.66	-	-	-	-	-	-	-	-	-	-
American Samoa	-	-	1.98	-	-	-	-	-	-	-	-	-	-
Guam	-	-	7.95	-	-	-	-	-	-	-	-	-	-
Northern Mariana Islands	-	-	1.62	-	-	-	-	-	-	-	-	-	-
Tokelau	-	-	-	-	-	-	-	-	-	99.36	-	-	-

Definitions:
EE1: Energy intensity level of primary energy
EE2: Share renewable to total final energy consumption
EE3: Efficiency in sustainable transport
EW1: Water use efficiency
EW2: Share freshwater withdrawal to available freshwater resource
EW3: Sustainable fisheries as a proportion of GDP
SL1: Soil nutrient budget
SL2: Share agriculture organic to total agriculture land area
SL3: Share of ruminant livestock population to agricultural area
ME1: Domestic material consumption per unit of GDP by type of raw material
ME2: Total material footprint (MF) per capital population
ME3: Share of food loss to production and food waste to food consumption

Table 20. Normalized values of green growth indicators for natural capital protection

Country	Regional Rank	Indicators											
		EQ1	EQ2	EQ3	GE1	GE2	GE3	BE1	BE2	BE3	CV1	CV2	CV3
Africa													
Gabon	1	63.83	81.56	84.41	74.69	74.70	92.55	56.02	100.00	52.56	92.21	4.56	100.00
Cabo Verde	2	44.39	87.23	81.64	95.76	96.65	94.70	10.43	67.50	22.94	84.49	100.00	1.11
Seychelles	3	92.47	91.19	61.20	69.65	61.72	100.00	74.19	100.00	40.91	46.50	100.00	100.00
Botswana	4	80.09	71.70	92.61	6.46	73.08	37.44	35.06	100.00	36.85	95.97	-	100.00
Namibia	5	80.80	69.63	88.32	70.87	88.18	20.24	88.30	47.46	16.57	94.96	43.15	100.00
Mauritius	6	93.35	94.23	75.29	85.85	50.73	96.60	9.34	100.00	29.68	2.57	66.92	1.08
Togo	7	51.03	55.30	89.12	98.68	91.53	89.14	54.13	100.00	28.93	76.56	17.10	100.00
Senegal	8	32.09	66.53	88.70	95.96	86.93	79.08	27.23	100.00	11.22	89.78	22.98	100.00
Morocco	9	66.12	95.20	85.81	91.79	92.83	87.08	60.47	76.07	10.21	81.11	62.75	12.62
Burkina Faso	10	40.94	35.79	89.92	93.60	97.20	66.73	69.07	100.00	12.04	97.78	-	100.00
Cote d'Ivoire	11	38.30	50.50	84.52	93.52	94.67	93.09	80.30	50.88	22.81	83.82	24.71	100.00
Tanzania	12	80.06	68.15	86.57	94.14	86.34	67.50	53.94	100.00	12.22	49.90	25.21	100.00
Zambia	13	78.46	62.29	87.02	89.44	89.76	27.12	56.53	100.00	11.16	79.59	-	100.00
Guinea	14	42.50	39.11	94.85	94.33	88.88	54.20	76.02	100.00	31.30	82.40	9.27	100.00
Uganda	15	65.89	70.39	85.73	98.34	90.12	79.24	69.44	67.70	23.17	59.35	-	100.00
Ghana	16	40.51	73.47	88.35	93.70	86.33	90.58	60.00	100.00	23.32	73.58	11.27	57.35
Rwanda	17	64.59	73.64	73.77	99.63	98.28	91.87	38.40	66.39	34.73	80.72	-	67.77
Kenya	18	84.29	69.39	90.42	99.49	93.62	73.33	37.44	37.95	47.28	66.44	23.00	78.04
South Africa	19	74.74	70.91	74.57	66.75	79.27	84.34	39.61	82.68	20.78	62.67	35.93	94.41
Cameroon	20	26.33	50.18	89.29	92.22	34.08	84.43	34.69	100.00	62.21	73.35	14.17	81.49
Ethiopia	21	67.84	57.11	95.42	98.50	91.79	69.95	17.82	88.70	29.01	75.00	-	100.00
Zimbabwe	22	85.35	61.84	91.80	69.47	88.20	77.49	81.84	100.00	22.93	65.66	-	100.00
Benin	23	50.15	36.56	91.21	93.06	93.48	86.18	17.50	100.00	24.92	84.41	8.66	100.00
Gambia	24	34.97	68.87	89.54	98.38	92.05	84.41	45.80	100.00	10.65	96.56	41.24	22.18
Lesotho	25	76.30	1.00	97.42	95.43	79.13	81.49	11.88	7.62	18.02	90.31	-	4.69
Tunisia	26	72.37	96.70	82.76	89.98	87.49	88.41	41.98	27.40	14.57	95.26	63.85	39.20
Malawi	27	83.30	67.52	94.50	98.13	88.91	87.43	48.95	100.00	19.17	68.23	-	100.00
Mali	28	31.53	30.30	91.44	99.68	96.73	49.71	50.86	64.46	11.71	96.61	-	56.20
Burundi	29	68.51	43.87	80.23	99.08	98.17	91.49	60.75	64.41	28.57	82.02	-	56.67
Nigeria	30	18.32	24.38	87.30	96.76	88.35	88.62	57.05	100.00	32.12	75.52	7.84	86.15
Mauritania	31	23.16	60.16	90.83	97.50	97.89	34.66	12.98	2.74	13.27	95.95	20.28	8.93
Algeria	32	69.12	95.73	78.28	81.62	68.37	91.21	56.59	5.79	7.79	84.99	16.93	33.27
Sierra Leone	33	44.42	26.70	92.07	97.92	94.64	84.76	64.68	100.00	19.94	88.34	7.57	25.18
Mozambique	34	85.43	51.97	93.53	90.80	92.85	59.73	48.29	100.00	24.41	65.81	14.23	100.00
Angola	35	75.09	48.50	88.08	92.14	85.88	60.93	37.49	100.00	8.00	88.20	4.26	37.70
Niger	36	5.18	25.94	85.00	99.93	88.17	60.83	71.26	5.91	9.82	88.90	-	100.00
Eswatini	37	81.95	51.03	88.47	96.31	78.30	74.39	15.96	100.00	18.56	69.00	-	32.23
Madagascar	38	89.37	57.77	89.27	98.51	97.35	74.37	32.62	100.00	38.69	58.80	26.13	23.62
Sudan	39	39.58	83.37	94.86	95.82	93.36	47.05	17.28	57.70	13.93	87.46	9.35	21.19
Egypt	40	21.71	94.93	82.99	90.42	88.78	91.18	38.74	1.26	28.71	85.45	43.58	85.71
DR Congo	41	65.02	44.89	87.03	67.15	92.88	84.01	47.86	100.00	54.35	80.20	1.00	100.00
Central African Republic	42	50.80	1.00	82.57	87.01	1.00	1.00	73.33	100.00	51.13	89.40	-	100.00
Libya	43	61.33	97.73	75.29	66.58	1.00	86.20	1.00	1.72	12.38	94.73	5.90	2.61

Table 20. Normalized values of green growth indicators for natural capital protection *(continued)*

Country	Regional Rank	Indicators											
		EQ1	EQ2	EQ3	GE1	GE2	GE3	BE1	BE2	BE3	CV1	CV2	CV3
Chad	-	33.35	1.00	91.92	92.96	86.42	1.00	59.97	20.43	22.07	85.77	-	100.00
Comoros	-	90.32	53.77	91.72	98.18	100.00	88.85	61.73	100.00	16.24	57.13	24.82	6.24
Congo Republic	-	60.37	72.19	87.91	85.52	88.97	78.97	70.58	100.00	46.91	94.22	8.27	100.00
Djibouti	-	55.14	60.39	89.07	98.64	94.85	79.57	1.55	2.48	20.98	68.55	48.61	10.04
Equatorial Guinea	-	52.28	68.65	88.47	74.33	1.00	99.61	75.25	100.00	50.54	66.79	17.09	13.95
Eritrea	-	53.92	29.87	88.47	98.99	86.30	59.78	1.00	51.62	17.75	82.07	47.46	22.69
Guinea-Bissau	-	40.40	47.87	88.40	96.05	94.66	67.34	28.27	100.00	20.40	86.55	23.93	99.08
Liberia	-	45.09	63.50	88.60	85.98	63.40	96.89	38.13	100.00	48.43	83.71	19.77	9.88
Sao Tome and Principe	-	71.52	82.44	90.53	92.24	95.57	98.58	86.39	100.00	38.53	64.45	62.27	2.79
Somalia	-	72.46	1.00	88.47	95.04	94.99	58.14	1.00	55.80	24.67	83.52	47.65	1.00
South Sudan	-	62.74	28.23	82.94	94.38	82.20	1.00	44.49	66.96	-	88.28	-	100.00
British Indian Ocean Territory	-	-	-	-	-	-	-	50.48	-	-	63.82	42.07	-
Mayotte	-	-	-	-	-	-	-	70.50	-	-	76.94	53.88	-
Reunion	-	-	-	-	-	-	-	52.65	-	29.87	27.99	-	-
St. Helena	-	-	-	-	-	-	-	29.97	-	-	43.75	35.24	-
Western Sahara	-	-	-	-	-	-	-	-	-	10.21	89.33	29.67	-
French Southern Territories	-	-	-	-	-	-	-	67.21	-	-	68.85	-	-
The Americas													
United States	1	100.00	97.62	42.00	38.23	50.21	63.91	36.02	100.00	22.86	72.34	44.80	100.00
Paraguay	2	96.59	95.10	80.50	59.39	59.09	1.00	47.87	100.00	17.13	92.38	-	100.00
Brazil	3	97.76	93.02	72.96	81.48	88.42	28.73	47.68	100.00	40.70	83.48	26.71	100.00
Costa Rica	4	89.96	96.97	78.14	100.00	83.43	76.23	46.81	100.00	46.26	69.36	55.27	36.08
Mexico	5	86.31	96.27	69.92	84.81	78.56	76.45	45.29	100.00	13.11	46.99	95.03	100.00
Chile	6	82.73	97.61	72.39	93.40	85.20	83.25	38.40	100.00	51.64	61.41	32.08	100.00
Honduras	7	82.59	92.48	83.12	93.41	87.36	77.52	71.79	100.00	25.41	57.56	32.86	81.62
Uruguay	8	100.00	95.31	73.82	93.43	76.41	1.00	27.08	69.28	23.40	76.08	79.71	18.91
Panama	9	95.67	95.53	73.56	84.24	75.06	74.50	60.73	100.00	34.51	55.17	63.58	76.43
Jamaica	10	92.85	97.58	73.98	89.94	92.92	93.78	20.05	100.00	37.60	44.30	81.48	11.31
Bolivia	11	77.23	84.95	85.29	64.01	86.40	24.34	50.81	100.00	31.31	80.40	-	100.00
Dominican Republic	12	89.55	93.90	72.48	90.68	90.37	74.12	84.41	100.00	20.10	55.87	38.24	100.00
El Salvador	13	83.33	93.53	80.96	94.09	88.70	88.13	49.20	100.00	27.24	67.56	26.30	16.61
Ecuador	14	86.51	95.05	76.62	83.53	81.67	78.86	45.39	100.00	41.88	47.13	23.56	100.00
Colombia	15	83.76	96.43	81.36	84.83	80.69	62.17	53.34	100.00	43.52	56.61	19.34	100.00
Peru	16	71.83	92.00	80.79	80.33	89.48	76.29	38.78	100.00	55.91	55.42	20.34	98.57
Nicaragua	17	85.88	96.30	81.03	82.46	91.02	48.65	66.40	100.00	22.02	70.17	29.65	74.06
Guatemala	18	76.13	83.90	87.96	94.41	90.62	81.33	32.47	100.00	29.65	53.48	16.16	75.12
Canada	19	100.00	97.58	49.56	23.79	38.46	49.48	32.81	100.00	21.88	94.06	50.66	84.46
Suriname	20	84.88	92.52	89.41	1.46	56.69	65.92	52.91	100.00	84.80	97.81	12.98	63.21
Venezuela	21	84.11	94.54	76.69	80.02	50.11	56.51	78.13	100.00	48.28	70.93	16.59	100.00
Belize	22	84.88	95.45	79.91	24.69	68.07	69.69	44.77	100.00	49.73	62.35	99.64	100.00
Argentina	23	95.25	87.93	70.28	79.60	67.94	11.53	40.09	61.57	43.89	73.99	28.36	69.90
Guyana	24	86.34	90.96	82.92	1.39	90.31	14.56	100.00	100.00	100.00	79.26	27.27	38.87

Table 20. Normalized values of green growth indicators for natural capital protection *(continued)*

Country	Regional Rank	Indicators											
		EQ1	EQ2	EQ3	GE1	GE2	GE3	BE1	BE2	BE3	CV1	CV2	CV3
Trinidad and Tobago	25	83.81	98.30	60.88	49.20	19.20	93.98	22.18	100.00	21.82	67.02	27.90	15.77
Barbados	26	84.66	91.87	55.52	80.96	1.00	94.52	2.14	86.32	-	83.19	93.49	1.06
Antigua and Barbuda	-	89.73	97.39	77.48	74.88	1.00	93.35	9.13	100.00	49.50	81.82	93.27	3.80
Bahamas	-	92.44	97.25	51.26	69.92	78.45	97.73	15.86	100.00	10.19	50.24	100.00	63.74
Cuba	-	89.55	89.74	83.05	91.11	87.25	70.97	73.54	100.00	27.23	44.30	17.58	50.48
St. Kitts and Nevis	-	100.00	-	56.74	76.20	46.90	93.56	27.86	100.00	49.50	55.90	100.00	33.74
St. Lucia	-	84.82	93.87	68.76	90.80	58.12	93.17	34.37	100.00	68.90	68.37	100.00	7.83
St. Vincent and the Grenadines	-	84.95	94.46	79.47	90.02	86.67	94.14	37.02	100.00	51.61	59.98	95.40	4.42
Dominica	-	88.36	-	87.08	90.21	90.84	83.11	9.25	100.00	-	44.66	75.22	5.43
Grenada	-	84.47	92.96	80.06	87.50	1.00	95.01	32.55	100.00	26.26	48.07	100.00	2.69
Haiti	-	87.78	72.66	84.86	98.92	96.62	87.81	22.08	73.73	22.83	53.42	9.94	21.28
Bermuda	-	100.00	-	9.55	-	-	-	14.85	100.00	-	35.96	100.00	1.00
Greenland	-	100.00	-	37.22	-	-	-	23.15	1.00	-	85.04	41.66	100.00
Puerto Rico	-	100.00	-	14.17	-	-	-	41.70	100.00	19.60	47.00	-	16.32
United States Virgin Islands	-	100.00	-	1.00	-	-	-	21.67	100.00	13.12	71.92	-	8.21
Aruba	-	-	-	38.98	-	-	-	16.12	14.59	-	93.21	100.00	2.04
British Virgin Islands	-	-	-	26.97	-	-	-	4.32	100.00	49.50	60.24	100.00	1.18
Cayman Islands	-	-	-	27.54	-	-	-	41.54	100.00	-	70.44	96.20	1.76
Curacao	-	-	-	88.61	-	-	-	23.17	1.92	19.24	75.80	100.00	2.96
Saint-Martin	-	-	-	64.32	-	-	-	37.75	100.00	29.75	88.53	97.62	100.00
Sint Maarten	-	-	-	-	-	-	-	3.84	64.37	-	98.59	100.00	60.44
St. Pierre and Miquelon	-	-	-	-	-	-	-	1.81	-	7.06	24.53	46.59	-
Turks and Caicos Islands	-	-	-	-	-	-	-	14.73	65.49	31.54	74.89	99.41	3.84
Anguilla	-	-	-	-	-	-	-	11.35	-	49.50	87.58	100.00	-
Falkland Islands	-	-	-	-	-	-	-	10.86	-	1.00	55.33	46.57	-
French Guiana	-	-	-	-	-	-	-	59.68	-	85.29	89.61	30.31	-
Martinique	-	-	-	-	-	-	-	98.34	-	71.67	60.35	-	-
Guadeloupe	-	-	-	-	-	-	-	67.31	-	81.14	37.41	-	-
Montserrat	-	-	-	-	-	-	-	22.18	-	-	68.11	100.00	-
St. Barths	-	-	-	-	-	-	-	32.53	-	29.75	98.49	-	-
Bonaire, Saint Eustatius and Saba	-	-	-	-	-	-	-	34.66	-	-	80.36	-	-
South Georgia and South Sandwich Is.	-	-	-	-	-	-	-	17.46	-	-	83.91	-	-
Bouvet Island	-	-	-	-	-	-	-	100.00	-	-	-	-	-
Asia													
Japan	1	95.31	91.11	75.94	61.28	89.42	94.76	65.28	100.00	27.10	60.28	23.96	74.53
China	2	49.05	97.68	79.91	63.68	76.33	85.35	10.55	100.00	15.95	56.85	44.80	100.00
Laos	3	85.74	78.36	96.32	81.24	98.40	56.59	45.78	100.00	29.06	69.43	-	100.00
Thailand	4	76.46	87.56	72.11	80.93	68.78	70.00	58.92	100.00	33.91	63.27	70.35	98.53
Bhutan	5	59.02	83.47	88.50	99.93	82.63	78.86	43.49	100.00	63.20	66.75	-	100.00

Table 20. Normalized values of green growth indicators for natural capital protection *(continued)*

Country	Regional Rank	Indicators											
		EQ1	EQ2	EQ3	GE1	GE2	GE3	BE1	BE2	BE3	CV1	CV2	CV3
Georgia	6	89.38	96.47	84.70	86.66	64.40	82.42	39.56	100.00	28.56	81.52	78.32	53.54
Nepal	7	1.13	81.23	95.73	97.63	89.52	72.43	50.11	100.00	41.83	72.53	-	100.00
Malaysia	8	91.09	84.80	69.37	52.93	59.81	85.47	35.02	100.00	49.47	52.42	58.98	65.87
Philippines	9	88.06	82.21	89.97	94.43	94.86	83.06	47.73	100.00	51.75	46.60	100.00	24.09
Cyprus	10	92.46	98.31	54.16	74.26	81.81	89.58	63.17	100.00	10.68	98.61	60.79	82.85
Indonesia	11	87.33	83.32	82.23	81.14	83.66	72.35	30.23	100.00	42.33	60.89	35.96	39.64
Azerbaijan	12	79.04	96.16	78.37	84.53	1.00	77.64	36.20	81.56	-	85.37	-	41.47
Armenia	13	68.01	93.85	87.97	88.28	82.50	80.90	26.24	68.15	19.64	71.78	-	100.00
Maldives	14	98.72	97.58	63.11	86.63	78.70	100.00	1.00	16.92	32.18	74.62	99.75	1.50
Cambodia	15	83.62	81.94	95.00	85.84	93.58	54.83	61.50	100.00	17.00	64.96	100.00	100.00
Vietnam	16	85.95	92.70	92.22	82.52	88.67	77.21	37.24	100.00	15.48	54.05	40.72	22.48
Kyrgyz Republic	17	80.97	97.56	86.73	96.14	94.79	74.42	30.86	41.49	12.47	97.24	-	50.17
Kazakhstan	18	86.08	96.60	80.24	43.86	61.98	58.08	32.13	8.52	20.05	78.32	-	87.07
Israel	19	86.80	97.84	53.99	68.18	32.34	94.62	21.68	38.68	2.78	54.50	16.82	78.29
Tajikistan	20	61.70	90.51	84.46	95.72	97.56	79.11	22.15	18.82	-	97.94	-	100.00
Brunei Darussalam	21	100.00	98.22	63.53	1.00	1.00	91.62	42.24	100.00	58.04	76.02	20.30	66.92
South Korea	22	76.41	94.51	71.74	49.24	64.31	91.57	33.99	100.00	31.41	50.28	12.94	43.99
Timor-Leste	23	92.36	78.46	96.50	97.08	8.27	77.63	29.70	100.00	35.64	75.37	52.41	39.05
United Arab Emirates	24	54.47	99.10	58.96	1.00	1.00	93.23	47.37	27.02	18.19	75.83	57.91	100.00
Singapore	25	88.14	91.05	76.64	61.34	12.54	99.89	7.04	100.00	32.34	75.68	55.30	19.07
Palestine	26	71.19	-	75.57	-	-	-	15.90	10.81	-	83.01	-	62.30
India	27	1.00	61.60	90.06	92.87	97.43	84.30	8.10	100.00	16.87	46.73	51.58	26.51
Myanmar	28	73.72	86.40	92.84	87.72	97.30	50.42	27.15	100.00	29.99	66.80	20.31	29.87
Mongolia	29	62.05	96.66	31.55	32.90	82.95	1.00	45.85	53.99	13.68	93.03	-	100.00
Bangladesh	30	27.74	80.78	93.31	97.49	97.26	83.66	19.80	85.26	15.51	57.13	11.22	36.85
Sri Lanka	31	86.52	94.90	91.22	94.97	92.44	91.94	42.58	100.00	19.28	29.53	52.65	25.78
Qatar	32	10.67	99.55	66.15	1.00	13.20	96.24	30.69	1.00	1.00	69.63	55.92	43.86
Jordan	33	72.08	97.95	78.58	91.23	77.77	96.76	15.16	7.39	14.14	94.29	55.03	33.80
Lebanon	34	74.36	97.48	74.05	80.90	73.86	95.52	7.81	82.93	15.15	88.68	47.72	8.65
Uzbekistan	35	66.48	96.94	90.49	83.82	34.39	67.40	23.05	50.10	12.13	95.33	-	43.30
Oman	36	53.24	98.31	68.76	21.17	60.76	88.26	16.27	1.05	25.87	81.64	41.97	8.47
Saudi Arabia	37	30.34	97.96	63.53	28.14	16.47	94.60	21.67	3.65	7.15	84.42	38.09	34.21
Pakistan	38	28.89	59.10	88.71	96.30	97.35	74.61	30.82	28.83	18.39	75.60	14.40	72.83
Afghanistan	39	42.63	82.46	88.48	99.48	49.47	88.19	51.52	11.79	-	72.90	-	27.67
Bahrain	40	33.44	99.17	52.30	1.00	1.00	98.96	1.00	6.31	-	59.65	39.86	13.37
Kuwait	41	31.07	99.17	58.33	1.00	1.00	96.26	21.72	3.04	-	73.39	15.70	79.59
Iran	42	62.11	96.92	84.16	64.41	51.86	88.65	48.17	39.64	32.79	74.24	13.40	57.22
Iraq	43	47.97	95.32	74.06	80.85	89.09	94.61	5.16	12.07	12.80	66.17	11.85	12.23
Yemen	44	53.38	83.51	87.55	99.07	98.10	92.12	25.28	7.06	4.23	72.60	3.02	5.44
Syria	45	71.66	90.36	84.64	94.38	86.35	90.31	1.00	17.56	12.54	90.32	9.74	5.86
North Korea	-	53.57	95.68	-	89.69	82.53	94.04	1.00	100.00	15.39	86.74	22.03	10.24
Turkey	-	78.32	-	69.76	77.66	89.16	81.83	-	100.00	-	-	19.24	2.40
Turkmenistan	-	78.09	94.03	93.43	48.45	1.00	54.36	14.86	52.14	1.98	96.27	-	24.56

Table 20. Normalized values of green growth indicators for natural capital protection *(continued)*

Country	Regional Rank	Indicators											
		EQ1	EQ2	EQ3	GE1	GE2	GE3	BE1	BE2	BE3	CV1	CV2	CV3
Taiwan	-	-	-	77.70	-	-	-	-	-	-	-	26.06	-
Hong Kong	-	-	-	44.47	-	-	-	39.37	-	-	73.70	-	100.00
Macau	-	-	-	55.92	-	-	-	1.00	-	-	87.14	-	-
Europe													
Switzerland	1	100.00	97.33	49.37	81.10	92.48	80.23	44.62	100.00	45.58	95.46	-	90.03
Austria	2	97.07	97.91	58.02	70.84	88.76	74.43	68.19	100.00	40.79	82.65	-	100.00
Germany	3	97.56	96.65	56.52	64.43	89.60	78.46	79.46	100.00	43.76	96.98	93.50	100.00
Denmark	4	100.00	95.63	39.70	74.85	91.38	46.15	69.09	92.63	27.12	95.68	26.06	100.00
Sweden	5	100.00	96.79	67.97	89.85	93.86	78.80	64.33	100.00	17.74	98.71	40.32	100.00
Czech Republic	6	90.87	95.70	64.32	60.47	67.74	80.45	94.90	100.00	38.70	95.14	-	100.00
United Kingdom	7	99.87	93.56	66.97	76.25	85.02	76.75	86.72	78.00	27.56	93.71	64.70	100.00
Finland	8	100.00	99.16	59.60	54.36	81.73	67.04	76.58	100.00	14.80	98.33	23.50	97.30
Belarus	9	91.31	98.28	67.83	71.51	78.41	32.96	59.75	100.00	37.05	95.12	-	69.59
France	10	98.10	96.44	60.89	85.07	86.31	66.40	82.32	100.00	32.29	73.74	64.50	100.00
Italy	11	91.77	96.82	64.39	77.51	82.65	83.32	78.54	100.00	26.54	82.66	83.85	100.00
Slovakia	12	88.69	96.18	69.97	74.55	80.63	85.62	87.84	100.00	40.52	92.09	-	100.00
Hungary	13	91.22	97.87	72.41	76.36	83.59	75.49	84.18	100.00	26.29	77.64	-	100.00
Slovenia	14	90.57	97.99	64.03	69.73	83.05	76.41	75.19	100.00	59.45	88.12	41.43	100.00
Netherlands	15	97.24	96.45	63.75	60.74	88.27	67.21	66.22	65.07	13.73	90.24	65.30	100.00
Portugal	16	100.00	92.87	63.39	81.34	76.21	78.98	73.59	100.00	10.45	77.72	97.12	100.00
Norway	17	100.00	96.19	44.57	80.32	78.02	70.57	61.21	100.00	15.82	91.31	64.85	40.49
Estonia	18	100.00	97.27	73.69	55.84	86.48	57.46	71.63	100.00	27.76	97.60	42.08	100.00
Lithuania	19	99.49	97.25	66.32	71.61	79.91	46.06	67.91	100.00	31.92	98.14	17.09	100.00
Spain	20	100.00	96.65	66.04	80.50	86.68	73.12	63.66	100.00	13.90	74.66	68.79	100.00
Poland	21	82.90	94.31	76.06	65.50	70.84	73.96	90.64	100.00	39.34	95.66	20.16	100.00
Luxembourg	22	99.91	98.01	43.50	39.07	91.17	68.07	41.06	100.00	42.73	97.50	-	100.00
Bosnia and Herzegovina	23	73.67	97.96	74.83	71.42	85.36	76.46	51.02	100.00	37.11	83.44	22.20	30.79
Belgium	24	96.39	94.39	70.40	62.92	88.28	74.93	70.95	100.00	40.79	97.30	26.26	100.00
Albania	25	88.32	96.59	72.84	93.23	87.49	67.95	63.57	100.00	-	73.98	62.56	100.00
Latvia	26	97.28	97.22	68.69	81.58	83.32	55.65	73.02	100.00	30.59	98.09	33.15	100.00
Romania	27	92.33	92.40	80.06	88.62	76.58	75.22	76.75	100.00	48.92	77.64	23.06	100.00
Croatia	28	88.55	97.16	68.26	86.44	81.03	78.95	84.40	100.00	41.19	82.74	100.00	100.00
Macedonia	29	72.59	98.89	78.56	84.02	79.09	80.15	47.39	100.00	17.54	94.92	-	75.12
Bulgaria	30	87.33	96.94	70.98	100.00	75.58	76.77	99.28	100.00	42.68	89.34	26.90	100.00
Serbia	31	79.23	95.92	75.91	66.78	58.89	74.62	30.62	100.00	37.25	91.98	-	56.73
Greece	32	94.25	91.96	62.60	75.91	73.41	77.38	87.22	100.00	8.91	72.81	100.00	81.87
Russia	33	97.84	96.57	70.12	62.56	1.00	78.03	29.01	100.00	18.86	92.05	11.37	56.85
Ukraine	34	93.87	97.53	75.86	82.02	66.87	78.98	63.60	98.45	33.33	89.40	8.80	30.54
Ireland	35	100.00	97.14	57.31	58.55	87.77	1.00	82.87	67.45	26.78	86.14	24.27	30.64
Moldova	36	94.93	96.23	19.94	83.42	72.84	79.63	86.31	69.44	22.56	91.06	-	31.44
Iceland	37	100.00	97.51	53.16	71.81	60.01	45.09	27.36	4.00	6.46	77.61	87.64	21.99
Malta	38	95.95	95.16	50.44	85.07	81.67	94.72	47.96	9.37	-	78.93	100.00	56.58
Montenegro	39	84.78	98.07	62.17	79.87	64.70	79.75	29.77	100.00	23.37	67.50	51.75	68.51

Table 20. Normalized values of green growth indicators for natural capital protection *(continued)*

Country	Regional Rank	Indicators											
		EQ1	EQ2	EQ3	GE1	GE2	GE3	BE1	BE2	BE3	CV1	CV2	CV3
Andorra	-	100.00	-	62.77	72.09	62.41	100.00	18.29	100.00	36.56	85.22	-	100.00
Liechtenstein	-	-	-	36.69	82.29	88.09	-	54.33	100.00	56.98	98.50	-	100.00
Faeroe Islands	-	-	-	10.73	-	-	-	9.03	1.34	-	78.34	40.27	1.17
Gibraltar	-	-	-	64.02	-	-	-	1.00	1.00	1.00	89.01	91.95	1.00
Monaco	-	97.74	-	12.98	-	-	-	-	1.00	1.00	58.81	71.19	100.00
Isle of Man	-	-	-	55.31	-	-	-	27.23	36.35	-	97.18	-	100.00
San Marino	-	100.00	-	63.09	-	-	-	-	98.06	22.01	97.51	-	-
Guernsey	-	-	-	-	-	-	-	11.91	-	-	42.12	42.05	-
Jersey	-	-	-	-	-	-	-	44.64	-	-	40.08	42.78	-
Svalbard and Jan Mayen Islands	-	-	-	-	-	-	-	77.25	-	1.00	75.64	-	-
Vatican	-	-	-	-	-	-	-	-	-	1.00	89.05	-	-
Aland Islands	-	-	-	-	-	-	-	-	-	-	97.87	-	-
Kosovo	-	-	-	87.43	-	-	-	-	-	-	-	-	-
Oceania													
New Zealand	1	100.00	97.76	48.18	77.90	66.90	1.00	38.49	100.00	69.05	37.65	100.00	100.00
Fiji	2	98.66	88.61	84.47	-	85.72	87.65	9.25	100.00	47.83	50.39	100.00	8.26
Australia	3	100.00	98.02	59.96	25.70	32.16	1.00	57.60	100.00	20.39	70.37	58.31	100.00
Papua New Guinea	4	91.57	73.77	90.87	80.32	72.57	84.43	5.10	100.00	41.64	72.61	4.18	6.25
Samoa	-	98.63	91.38	89.65	93.30	80.83	71.22	34.87	100.00	25.25	60.33	78.38	3.32
Solomon Islands	-	96.08	65.54	77.25	1.00	82.89	96.40	2.96	100.00	23.12	60.31	37.79	2.10
Tonga	-	99.21	92.51	88.35	94.88	84.27	76.68	12.20	73.39	45.90	54.42	74.43	1.53
Marshall Islands	-	100.00	-	88.42	87.25	70.24	100.00	5.45	100.00	31.51	73.97	60.37	2.98
Nauru	-	100.00	-	66.15	84.08	100.00	100.00	1.00	1.00	1.00	62.29	62.18	1.00
Palau	-	100.00	-	68.73	55.76	58.28	100.00	30.79	100.00	97.12	50.09	67.33	100.00
Kiribati	-	100.00	60.60	77.75	98.23	97.43	97.55	19.05	9.48	-	62.85	-	87.69
Micronesia, Fed. Sts.	-	99.48	85.20	82.34	97.48	96.93	80.76	1.40	100.00	100.00	42.31	-	1.12
Tuvalu	-	100.00	-	74.37	96.05	100.00	72.11	-	100.00	-	71.35	73.52	1.22
Vanuatu	-	96.10	73.62	81.52	98.68	82.98	52.15	3.46	100.00	-	46.18	99.89	1.67
American Samoa	-	100.00	-	75.66	-	-	-	58.23	100.00	35.82	76.89	74.86	64.94
Guam	-	100.00	-	36.81	-	-	-	2.46	100.00	26.86	1.00	-	1.24
Northern Mariana Islands	-	100.00	-	56.71	-	-	-	26.73	100.00	-	26.59	-	100.00
French Polynesia	-	-	-	61.64	-	-	-	1.00	100.00	35.39	52.98	82.25	1.04
New Caledonia	-	-	-	72.26	-	-	-	33.72	100.00	34.72	40.55	92.26	100.00
Niue	-	-	-	-	-	-	-	32.44	-	26.88	68.66	77.76	-
Tokelau	-	-	-	-	-	-	-	1.00	-	1.00	74.89	76.49	-
Wallis and Futuna Islands	-	-	-	-	-	-	-	1.00	-	45.48	76.11	78.12	-
Christmas Island	-	-	-	-	-	-	-	32.13	-	-	10.40	87.14	-
Cocos (Keeling) Islands	-	-	-	-	-	-	-	50.50	-	-	63.60	87.59	-
Cook Islands	-	-	-	-	-	-	-	21.03	-	-	62.18	82.24	-
Norfolk Island	-	-	-	-	-	-	-	28.17	-	-	51.02	86.84	-
Pitcairn	-	-	-	-	-	-	-	29.30	-	-	54.75	79.12	-

Table 20. Normalized values of green growth indicators for natural capital protection *(continued)*

Country	Regional Rank	Indicators											
		EQ1	EQ2	EQ3	GE1	GE2	GE3	BE1	BE2	BE3	CV1	CV2	CV3
United States Minor Outlying Islands	-	-	-	-	-	-	-	47.35	-	-	56.00	-	-
Heard and McDonald Islands	-	-	-	-	-	-	-	75.25	-	-	86.32	-	-

Definitions:
EQ1: PM2.5 air pollution, mean annual population-weighted exposure (Micrograms per m^3)
EQ2: DALY rate due to unsafe water sources (DALY lost per 100,000 persons)
EQ3: Municipal solid waste (MSW) generation per capita (Ton per year per capita)
GE1: Ratio of CO_2 emissions to population, including AFOLU (Metric tons per capita)
GE2: Ratio of non-CO_2 emissions to population, excluding AFOLU (Ton per capita)
GE3: Ratio of non-CO_2 emissions in agriculture to population (Gigagrams per 1000 persons)
BE1: Average proportion of Key Biodiversity Areas covered by protected areas (Percent)
BE2: Forest area (Percent)
BE3: Above-ground biomass in forest (tonnes per hectare)
CV1: Red List Index Reporting (Index)
CV2: Tourism and recreation in coastal and marine areas (Score)
CV3: Terrestrial and marine protected areas (Percent)

Table 21. Normalized values of green growth indicators for green economic opportunities

Country	Regional Rank	Indicators											
		GV1	GV2	GV3	GT1	GT2	GT3	GJ1	GJ2	GJ3	GN1	GN2	GN3
Africa													
Gabon	1	69.98	33.46	-	7.31	-	100.00	-	1.00	97.98	38.93	22.53	10.63
Cabo Verde	2	87.45	65.92	14.62	1.10	-	-	5.81	-	98.31	100.00	38.35	5.07
Seychelles	3	-	36.50	38.63	1.94	-	100.00	-	-	-	75.57	24.55	8.85
Botswana	4	63.15	63.89	9.23	1.74	79.23	100.00	8.91	1.00	89.04	56.50	39.74	1.15
Namibia	5	56.30	53.75	21.37	5.58	70.31	100.00	-	1.01	84.49	6.55	39.72	14.43
Mauritius	6	48.77	75.05	11.35	4.22	91.21	100.00	12.39	1.06	99.91	8.23	37.69	13.81
Togo	7	57.47	26.36	16.35	22.69	51.27	100.00	-	-	84.00	76.49	-	1.59
Senegal	8	68.60	38.53	11.71	3.95	95.24	100.00	21.08	1.00	89.95	41.90	46.80	2.69
Morocco	9	73.85	63.89	18.94	7.71	99.50	99.99	7.33	1.85	99.76	24.30	32.90	7.43
Burkina Faso	10	53.55	51.72	7.43	2.61	97.13	100.00	-	-	62.58	100.00	36.97	1.29
Cote d'Ivoire	11	67.51	34.47	-	3.42	92.20	-	-	-	89.38	23.67	40.06	3.20
Tanzania	12	87.29	43.60	-	29.04	90.08	-	28.43	1.02	38.90	10.09	45.42	1.73
Zambia	13	88.96	41.57	14.25	7.24	99.65	100.00	28.43	1.12	31.17	100.00	39.45	10.46
Guinea	14	58.02	28.39	10.12	4.24	93.93	100.00	-	-	71.89	-	83.79	3.08
Uganda	15	56.29	64.90	5.89	4.06	91.88	100.00	36.70	1.18	55.85	12.09	47.64	2.77
Ghana	16	55.93	53.75	8.48	3.98	96.21	100.00	7.52	1.25	88.09	18.58	44.57	4.51
Rwanda	17	32.37	54.76	17.16	2.57	93.13	100.00	2.02	1.01	44.51	-	46.01	1.79
Kenya	18	39.57	41.57	6.54	8.77	89.25	100.00	26.40	1.16	63.88	33.56	65.34	4.04
South Africa	19	34.90	58.82	16.40	45.49	100.00	99.88	27.07	4.25	91.04	8.88	67.32	12.63
Cameroon	20	36.24	36.50	6.54	4.66	97.62	99.99	20.42	-	75.66	20.06	39.17	3.06
Ethiopia	21	69.27	38.53	3.16	5.52	95.67	100.00	31.18	1.38	77.25	42.09	48.75	3.68
Zimbabwe	22	29.18	54.76	11.92	2.07	97.84	100.00	13.15	1.00	55.97	38.69	21.12	6.13
Benin	23	56.84	53.75	1.90	2.90	96.85	100.00	-	-	84.34	53.24	28.65	1.01
Gambia	24	61.41	24.33	-	2.63	-	100.00	3.24	-	89.94	-	14.27	1.08
Lesotho	25	44.27	24.33	15.11	6.86	-	100.00	1.03	-	74.10	100.00	35.72	3.23
Tunisia	26	60.63	61.86	46.22	39.79	100.00	100.00	52.90	1.08	99.89	3.98	31.96	3.24
Malawi	27	-	44.62	6.61	2.63	84.45	100.00	18.96	-	12.84	-	25.36	2.79
Mali	28	46.91	36.50	10.57	2.71	-	100.00	-	-	75.31	7.34	40.80	2.40
Burundi	29	2.20	34.47	11.04	4.47	-	100.00	44.19	-	1.00	100.00	33.51	1.30
Nigeria	30	51.09	43.60	6.82	1.28	99.54	100.00	21.63	1.36	57.39	4.13	20.57	1.68
Mauritania	31	84.82	45.63	9.48	1.00	-	100.00	-	-	96.67	100.00	24.79	2.79
Algeria	32	69.96	61.86	17.04	4.91	-	99.99	61.62	13.58	99.89	28.70	23.23	2.05
Sierra Leone	33	9.48	28.39	11.38	2.52	-	100.00	-	-	46.79	56.32	27.28	1.79
Mozambique	34	35.80	34.47	22.11	1.81	78.10	100.00	-	1.01	25.00	-	38.59	5.80
Angola	35	18.92	44.62	10.44	2.11	-	100.00	27.95	1.09	37.19	20.84	7.92	8.45
Niger	36	76.02	24.33	4.45	2.12	-	100.00	1.00	-	49.86	21.73	-	1.07
Eswatini	37	45.98	44.62	17.70	2.36	-	-	21.90	-	74.51	59.53	9.14	10.91
Madagascar	38	26.93	11.14	9.48	3.26	91.78	100.00	9.59	-	3.77	49.11	41.18	1.46
Sudan	39	67.30	24.33	10.39	1.03	-	99.99	-	-	79.47	49.11	-	3.69
Egypt	40	46.24	25.34	-	15.12	99.44	99.83	53.50	1.72	98.20	4.58	26.52	4.86
DR Congo	41	49.20	28.39	-	1.23	-	-	-	1.04	15.98	-	27.91	2.93
Central African Republic	42	-	24.33	3.87	2.86	-	100.00	-	-	23.68	20.95	-	1.23
Libya	43	100.00	61.86	3.98	1.59	-	100.00	-	1.09	-	49.11	1.00	1.05

Table 21. Normalized values of green growth indicators for green economic opportunities *(continued)*

Country	Regional Rank	Indicators											
		GV1	GV2	GV3	GT1	GT2	GT3	GJ1	GJ2	GJ3	GN1	GN2	GN3
Comoros	-	39.93	8.10	1.15	1.24	-	100.00	-	-	82.00	-	-	1.11
Eritrea	-	-	1.00	-	8.55	-	100.00	3.45	-	-	100.00	-	1.47
Guinea-Bissau	-	30.71	14.19	-	1.00	-	100.00	-	-	70.95	-	-	1.03
Liberia	-	-	13.17	-	-	-	100.00	-	-	37.94	32.15	34.43	2.23
Chad	-	-	21.29	-	-	-	100.00	-	-	57.29	-	21.46	1.01
Congo Republic	-	22.34	39.55	-	7.13	-	-	-	-	25.38	100.00	-	3.63
Somalia	-	-	18.24	-	-	-	100.00	-	-	27.68	100.00	-	1.06
Djibouti	-	93.30	1.00	-	2.40	-	-	-	-	-	32.15	-	1.02
Sao Tome and Principe	-	-	21.29	8.81	10.92	-	-	-	-	-	-	-	1.80
South Sudan	-	16.98	29.40	-	-	-	-	1.28	-	-	-	-	1.00
Equatorial Guinea	-	-	25.34	-	-	-	-	-	-	-	-	-	6.27
Mayotte	-	-	-	-	33.51	-	-	-	-	-	-	-	4.86
Reunion	-	-	-	-	-	-	-	-	-	-	20.06		32.88
The Americas													
United States	1	49.33	69.98	-	45.49	97.68	-	77.95	74.62	-	7.21	100.00	-
Paraguay	2	73.14	24.33	10.54	3.65	88.21	99.97	41.02	1.10	99.64	74.75	22.02	90.30
Brazil	3	52.46	54.76	7.44	15.61	100.00	98.77	27.09	19.28	97.29	9.15	43.21	51.58
Costa Rica	4	66.35	46.65	14.33	12.02	86.62	99.86	25.19	1.02	99.64	11.85	48.11	42.94
Mexico	5	49.28	29.40	44.72	43.51	97.64	99.65	57.23	6.72	97.91	7.66	48.18	17.06
Chile	6	53.60	31.43	13.04	3.38	99.54	99.95	43.96	1.79	99.81	21.04	45.94	43.62
Honduras	7	83.70	21.29	13.24	3.58	100.00	99.99	-	-	86.47	100.00	33.82	13.29
Uruguay	8	49.10	20.27	3.37	2.59	86.16	99.94	15.68	1.11	99.96	13.48	40.34	75.01
Panama	9	75.69	26.36	13.41	10.56	91.69	99.99	12.52	1.02	98.96	5.46	40.61	38.20
Jamaica	10	86.96	31.43	15.46	12.13	100.00	100.00	38.22	-	98.55	50.50	45.89	7.08
Bolivia	11	43.32	46.65	-	2.35	99.14	-	3.99	-	94.97	23.47	18.38	7.98
Dominican Republic	12	73.00	17.23	13.78	9.38	95.59	99.99	18.37	1.01	99.53	18.58	27.16	10.34
El Salvador	13	50.65	19.26	19.15	13.66	92.88	100.00	-	1.00	99.45	49.11	25.20	18.09
Ecuador	14	48.21	14.19	5.72	3.02	95.82	98.80	52.66	1.38	95.02	25.57	33.66	21.18
Colombia	15	42.99	43.60	5.78	5.38	93.82	99.88	38.81	7.26	97.08	9.62	47.59	17.51
Peru	16	58.03	31.43	7.90	5.23	95.15	99.99	27.40	1.29	96.66	6.59	30.75	13.92
Nicaragua	17	77.04	18.24	20.44	2.11	93.43	100.00	-	1.07	98.35	23.67	24.72	8.26
Guatemala	18	53.66	19.26	10.09	7.06	95.03	99.94	1.04	-	96.27	28.78	43.01	12.05
Canada	19	46.99	1.00	18.49	25.36	100.00	32.11	74.50	3.90	-	9.74	72.96	-
Suriname	20	85.12	16.22	21.66	2.36	-	100.00	-	-	78.60	-	29.12	22.13
Venezuela	21	-	1.00	-	1.77	100.00	-	-	1.42	64.50	16.94	33.04	40.89
Belize	22	47.24	8.10	14.24	11.49	-	100.00	-	-	85.17	41.90	19.01	18.43
Argentina	23	55.52	1.00	5.37	6.15	100.00	78.72	27.52	3.21	99.47	2.72	40.15	23.49
Guyana	24	43.11	21.29	22.18	7.56	-	100.00	-	-	97.83	6.60	51.77	5.47
Trinidad and Tobago	25	-	24.33	99.29	94.04	100.00	100.00	7.81	-	99.89	6.82	27.25	1.15
Barbados	26	35.43	24.33	16.90	13.34	-	100.00	-	-	-	7.77	40.55	13.05
Antigua and Barbuda	-	-	21.29	12.71	3.25	-	100.00	-	-	-	32.15	-	13.26
Bahamas	-	69.03	28.39	-	22.11	-	-	20.15	-	-	18.58	-	1.37

Table 21. Normalized values of green growth indicators for green economic opportunities *(continued)*

Country	Regional Rank	Indicators											
		GV1	GV2	GV3	GT1	GT2	GT3	GJ1	GJ2	GJ3	GN1	GN2	GN3
Cuba	-	-	78.09	-	5.27	-	100.00	3.15	-	-	11.14	-	8.71
Haiti	-	60.84	26.36	-	-	-	100.00	-	-	72.74	-	6.06	1.47
Grenada	-	-	41.57	13.93	23.11	-	-	-	-	-	32.15	-	3.00
Dominica	-	-	49.69	36.63	3.67	-	-	-	-	-	-	-	7.66
Puerto Rico	-	-	-	-	-	-	-	1.00	-	-	5.49	63.86	12.68
St. Kitts and Nevis	-	-	21.29	-	10.03	-	-	-	-	-	51.69	-	6.89
St. Lucia	-	-	33.46	-	9.05	-	-	-	-	-	100.00	-	2.51
St. Vincent and the Grenadines	-	-	9.11	-	14.11	-	-	-	-	-	100.00	-	5.87
Aruba	-	-	-	12.98	17.56	-	-	-	-	-	-	-	25.24
Bermuda	-	-	-	2.42	32.47	-	-	18.65	-	-	-	-	-
Greenland	-	-	-	6.86	1.34	-	-	-	-	-	100.00	-	-
Turks and Caicos Islands	-	-	-	7.59	17.07	-	-	-	-	-	-	-	2.41
Anguilla	-	-	-	-	3.50	-	-	-	-	-	-	-	7.50
British Virgin Islands	-	-	-	-	-	-	-	-	-	-	12.10	-	2.51
French Guiana	-	-	-	-	-	-	-	-	-	-	100.00	-	41.83
Guadeloupe	-	-	-	-	-	-	-	-	-	-	100.00	-	35.11
Montserrat	-	-	-	-	1.74	-	-	-	-	-	-	-	4.76
United States Virgin Islands	-	-	-	-	-	-	-	-	-	-	32.15	-	7.83
Bonaire, Saint Eustatius and Saba	-	-	-	-	-	-	-	-	-	-	-	-	45.90
Cayman Islands	-	-	-	-	-	-	-	-	-	-	-	-	14.63
Curacao	-	-	-	-	-	-	-	-	-	-	-	-	22.26
Falkland Islands	-	-	-	-	-	-	-	-	-	-	-	-	44.04
Martinique	-	-	-	-	-	-	-	-	-	-	-	-	25.20
Saint-Martin	-	-	-	-	-	-	-	-	-	-	-	-	2.06
St. Barths	-	-	-	-	-	-	-	-	-	-	-	-	1.14
Asia													
Japan	1	48.14	92.29	12.93	57.02	96.84	100.00	48.33	16.14	-	8.27	76.43	-
China	2	70.85	84.18	17.91	36.38	100.00	95.41	51.13	100.00	99.88	7.11	67.69	49.50
Laos	3	34.47	59.83	-	3.00	98.04	-	10.37	-	87.54	70.06	47.47	78.49
Thailand	4	61.60	51.72	43.25	29.52	100.00	100.00	46.40	6.45	99.88	5.89	55.80	12.25
Bhutan	5	60.31	33.46	35.06	11.86	-	100.00	-	-	98.58	16.73	37.70	100.00
Georgia	6	28.60	37.52	24.49	24.43	94.93	100.00	26.55	-	95.91	16.62	26.67	50.39
Nepal	7	89.23	33.46	13.06	2.66	82.09	100.00	28.82	-	93.08	21.33	26.95	4.04
Malaysia	8	36.26	53.75	70.86	28.62	100.00	100.00	26.20	16.58	99.89	6.24	87.46	18.96
Philippines	9	64.05	39.55	18.13	18.39	94.45	98.99	25.10	2.27	97.24	11.13	45.90	5.18
Cyprus	10	39.64	92.29	10.75	11.50	100.00	100.00	31.97	1.10	-	15.11	42.84	-
Indonesia	11	63.76	69.98	8.95	10.36	99.46	99.99	23.76	15.12	95.76	-	65.84	3.76
Azerbaijan	12	51.89	49.69	15.89	2.12	99.01	99.99	79.56	3.42	99.88	92.46	64.17	9.57
Armenia	13	40.95	55.77	20.20	9.51	97.07	100.00	36.72	-	99.57	3.95	38.52	35.02
Maldives	14	51.28	41.57	21.28	1.07	-	-	6.42	-	99.88	100.00	-	5.21
Cambodia	15	71.56	53.75	36.18	3.23	75.87	99.99	6.26	1.27	82.31	12.76	36.43	8.35

Table 21. Normalized values of green growth indicators for green economic opportunities *(continued)*

Country	Regional Rank	Indicators											
		GV1	GV2	GV3	GT1	GT2	GT3	GJ1	GJ2	GJ3	GN1	GN2	GN3
Vietnam	16	56.37	58.82	-	9.63	100.00	99.98	32.42	9.69	98.46	6.58	45.32	30.71
Kyrgyz Republic	17	59.03	24.33	-	5.20	78.21	100.00	9.74	1.01	99.64	79.16	20.87	39.25
Kazakhstan	18	51.62	44.62	24.54	3.01	100.00	89.21	18.28	8.75	99.89	21.43	41.48	17.53
Israel	19	74.60	95.33	14.51	40.85	92.26	100.00	24.50	2.07	-	3.83	100.00	-
Tajikistan	20	57.86	43.60	10.28	-	91.58	100.00	6.04	1.11	97.99	32.15	65.71	38.86
Brunei Darussalam	21	96.52	61.86	36.19	6.25	100.00	100.00	36.44	-	-	16.73	39.12	1.20
South Korea	22	74.15	64.90	-	48.67	97.65	-	76.90	9.83	100.00	10.40	68.46	32.86
Timor-Leste	23	37.19	11.14	11.12	4.31	-	100.00	-	-	82.40	-	22.33	1.07
United Arab Emirates	24	-	95.33	48.41	12.08	100.00	-	69.70	7.01	100.00	5.80	69.76	19.66
Singapore	25	93.54	100.00	100.00	30.30	13.81	100.00	53.10	4.16	-	4.82	90.07	8.42
Palestine	26	-	-	-	8.32	-	100.00	15.30	-	99.68	74.56	-	3.35
India	27	72.10	38.53	6.93	23.18	100.00	86.29	54.94	22.86	88.65	7.14	68.82	8.08
Myanmar	28	78.16	24.33	11.38	5.06	-	99.97	20.14	1.28	98.40	2.26	13.86	5.33
Mongolia	29	33.42	38.53	14.66	1.67	100.00	100.00	4.64	1.05	99.89	15.18	21.84	6.66
Bangladesh	30	100.00	51.72	8.15	2.39	88.91	100.00	8.09	5.46	92.40	4.35	21.20	1.22
Sri Lanka	31	72.22	33.46	9.29	12.41	84.20	100.00	11.35	1.02	99.52	2.54	47.54	8.92
Qatar	32	76.47	87.22	7.50	1.00	100.00	100.00	53.34	-	-	19.53	86.63	1.60
Jordan	33	37.23	58.82	14.98	12.75	96.16	100.00	31.37	4.08	99.85	3.51	44.64	14.20
Lebanon	34	1.00	14.19	6.97	13.90	-	100.00	37.43	1.16	99.88	5.23	48.42	5.49
Uzbekistan	35	65.46	38.53	26.97	2.06	-	99.98	31.04	2.99	91.85	-	-	5.03
Oman	36	17.71	61.86	30.53	12.88	100.00	100.00	48.59	-	-	21.11	47.99	3.81
Saudi Arabia	37	64.89	47.66	10.83	6.32	100.00	99.96	52.71	-	-	14.04	49.79	1.21
Pakistan	38	54.32	54.76	6.86	3.96	98.05	99.92	20.47	2.57	96.45	8.86	45.00	4.77
Afghanistan	39	-	3.03	25.74	5.75	-	100.00	19.02	-	-	32.83	-	1.62
Bahrain	40	56.17	41.57	18.98	6.95	100.00	100.00	46.92	-	-	59.29	51.00	1.55
Kuwait	41	62.49	100.00	11.00	2.68	100.00	100.00	11.52	-	-	47.94	29.02	2.68
Iran	42	-	37.52	-	6.66	100.00	-	82.52	37.31	99.83	7.28	37.15	10.19
Iraq	43	67.93	21.29	1.96	-	-	99.99	43.34	-	99.36	14.72	-	3.48
Yemen	44	-	13.17	-	4.73	-	100.00	24.09	-	29.48	100.00	15.88	1.51
Syria	45	57.20	38.53	1.00	12.13	-	-	2.52	-	60.18	66.07	17.70	5.76
Turkmenistan	-	-	82.15	-	-	-	99.99	4.22	-	99.28	100.00	-	1.01
Hong Kong	-	-	-	-	16.32	64.42	-	28.91	-	-	11.29	81.05	-
Turkey	-	64.25	-	-	25.47	100.00	-	32.38	-	-	-	44.54	-
North Korea	-	-	41.57	-	-	-	-	-	-	-	5.46	-	13.83
Macau	-	-	-	-	1.44	-	-	11.80	-	-	-	-	-
Taiwan	-	-	-	-	-	98.87	-	-	-	-	3.74	-	-
Europe													
Switzerland	1	63.59	94.32	27.95	33.02	51.84	100.00	100.00	1.39	-	6.22	100.00	-
Austria	2	62.51	86.20	43.45	55.45	92.96	99.93	66.23	1.65	-	12.43	78.31	-
Germany	3	61.99	87.22	44.25	74.12	95.37	87.87	91.27	15.47	-	11.79	92.44	-
Denmark	4	78.38	94.32	38.47	47.41	88.50	99.71	86.92	1.71	-	20.57	76.74	-
Sweden	5	75.55	92.29	29.39	40.66	84.40	99.89	51.49	1.77	-	10.65	89.10	-
Czech Republic	6	56.87	68.96	88.40	60.04	98.01	-	90.62	2.27	-	10.02	54.32	-
United Kingdom	7	45.52	69.98	-	45.85	90.35	-	63.53	6.01	-	9.75	92.72	-

Table 21. Normalized values of green growth indicators for green economic opportunities *(continued)*

Country	Regional Rank	Indicators											
		GV1	GV2	GV3	GT1	GT2	GT3	GJ1	GJ2	GJ3	GN1	GN2	GN3
Finland	8	59.11	69.98	28.47	43.98	93.70	99.97	76.34	1.44	-	11.44	99.23	-
Belarus	9	64.74	43.60	36.09	17.24	100.00	99.94	62.43	1.15	99.88	-	-	-
France	10	50.19	100.00	16.77	34.82	92.26	69.12	51.09	6.91	-	10.99	63.44	-
Italy	11	49.12	64.90	-	54.22	93.49	99.62	65.46	3.37	-	8.02	52.53	-
Slovakia	12	44.54	49.69	-	46.02	95.36	99.83	69.96	1.57	-	10.19	40.82	-
Hungary	13	60.67	64.90	100.00	50.01	93.50	98.85	62.83	2.60	-	5.30	43.61	-
Slovenia	14	60.66	92.29	70.77	38.59	89.43	100.00	67.76	1.19	-	7.57	51.94	-
Netherlands	15	68.52	95.33	-	29.96	97.68	-	55.60	4.20	-	7.92	97.29	-
Portugal	16	42.00	68.96	24.58	43.97	96.66	99.99	48.05	1.87	-	5.06	62.77	-
Norway	17	63.70	68.96	17.83	24.52	96.74	100.00	56.07	1.23	-	12.37	77.92	-
Estonia	18	69.66	75.05	60.98	41.29	92.37	99.98	52.17	1.33	-	1.58	55.11	-
Lithuania	19	60.00	72.00	54.96	37.22	88.93	99.60	40.19	1.53	-	5.25	59.21	-
Spain	20	53.30	67.95	17.92	23.73	95.73	99.15	59.48	5.20	-	9.36	44.37	-
Poland	21	59.66	63.89	49.10	36.57	100.00	95.00	63.02	7.84	-	7.41	38.37	-
Luxembourg	22	70.79	90.26	19.26	40.74	100.00	100.00	14.54	1.09	-	8.62	78.35	-
Bosnia and Herzegovina	23	-	44.62	37.97	34.93	-	100.00	32.63	-	99.88	48.10	27.78	-
Belgium	24	58.16	64.90	38.03	28.71	77.95	99.93	47.25	1.95	-	6.81	89.73	-
Albania	25	28.11	34.47	9.73	1.69	94.96	100.00	14.36	1.21	99.88	27.36	43.50	-
Latvia	26	49.75	48.67	28.53	21.91	77.41	99.86	46.63	1.26	-	10.43	34.43	-
Romania	27	49.64	53.75	39.66	69.43	97.86	95.28	52.32	2.35	-	5.57	36.31	-
Croatia	28	60.41	82.15	33.93	22.90	92.28	99.95	54.03	1.35	-	1.00	25.84	-
Macedonia	29	64.64	29.40	98.16	100.00	-	-	40.09	1.06	98.76	17.55	43.78	-
Bulgaria	30	54.92	59.83	37.20	26.51	100.00	97.59	51.19	2.03	-	10.86	41.74	-
Serbia	31	48.74	24.33	44.07	28.80	-	99.74	24.19	1.02	99.88	6.24	36.86	-
Greece	32	25.50	74.03	14.87	18.98	100.00	99.90	36.60	1.80	-	5.45	21.39	-
Russia	33	57.31	75.05	11.52	8.85	100.00	-	83.58	15.23	99.99	4.89	54.23	-
Ukraine	34	35.84	33.46	19.27	11.03	100.00	53.22	59.05	5.54	99.89	12.24	42.55	-
Ireland	35	71.01	80.12	9.04	11.13	94.53	100.00	12.81	1.32	-	4.63	84.12	-
Moldova	36	48.39	28.39	-	12.22	-	-	34.92	1.00	99.89	3.52	25.13	-
Iceland	37	54.75	68.96	10.42	6.00	-	100.00	34.22	1.01	-	5.82	76.64	-
Malta	38	-	89.25	12.43	23.23	1.00	100.00	9.32	1.11	-	5.93	57.88	-
Montenegro	39	-	24.33	19.02	8.69	-	100.00	16.12	1.00	99.91	7.77	37.94	-
Andorra	-	-	36.50	7.85	9.18	-	-	-	-	-	3.14	-	-
Liechtenstein	-	-	77.08	-	-	-	-	1.00	-	-	1.71	-	-
Monaco	-	-	97.36	-	-	-	-	-	-	-	5.84	-	-
San Marino	-	-	72.00	-	-	-	-	-	-	-	4.21	-	-
Faeroe Islands	-	-	-	-	1.44	-	-	-	-	-	32.15	-	-
Gibraltar	-	-	-	-	-	-	-	-	-	-	40.28	-	-
Vatican	-	-	-	-	-	-	-	-	-	-	49.11	-	-
Oceania													
New Zealand	1	57.28	61.86	8.63	8.77	97.14	100.00	43.75	1.05	-	8.31	78.80	-
Fiji	2	55.58	64.90	33.03	4.29	-	100.00	2.62	-	97.18	59.53	-	16.62
Australia	3	53.96	90.26	8.14	8.81	100.00	1.00	50.37	5.24	-	8.66	65.27	-
Papua New Guinea	4	47.57	8.10	36.86	3.79	-	100.00	-	-	69.68	59.53	-	3.28

Table 21. Normalized values of green growth indicators for green economic opportunities *(continued)*

Country	Regional Rank	Indicators											
		GV1	GV2	GV3	GT1	GT2	GT3	GJ1	GJ2	GJ3	GN1	GN2	GN3
Solomon Islands	-	46.81	25.34	11.87	1.43	-	-	-	-	71.36	59.53	-	1.34
Tonga	-	52.16	11.14	22.25	5.47	-	-	1.00	-	-	-	-	5.97
Kiribati	-	-	1.00	19.84	4.47	-	-	-	-	-	32.15	-	2.50
Vanuatu	-	100.00	17.23	10.44	1.84	-	-	-	-	-	-	-	3.49
Marshall Islands	-	-	17.23	-	-	-	-	1.00	-	-	28.16	-	3.62
New Caledonia	-	-	-	8.64	2.64	-	-	-	-	-	28.69	-	47.93
Palau	-	-	1.00	21.08	1.65	-	-	-	-	-	-	-	7.56
Samoa	-	-	72.00	11.99	3.12	-	-	-	-	-	-	-	10.00
Tuvalu	-	-	25.34	-	5.01	-	-	-	-	-	10.45	-	14.98
French Polynesia	-	-	-	10.83	5.05	-	-	-	-	-	-	-	21.62
Micronesia, Fed. Sts.	-	-	43.60	-	1.58	-	-	-	-	-	-	-	3.06
Nauru	-	-	1.00	-	-	-	-	-	-	-	-	-	12.36
American Samoa	-	-	-	-	-	-	-	-	-	-	-	-	8.76
Cook Islands	-	-	-	-	-	-	-	-	-	-	-	-	20.02
Guam	-	-	-	-	-	-	-	-	-	-	-	-	15.04
Niue	-	-	-	-	-	-	-	-	-	-	-	-	33.93
Tokelau	-	-	-	-	-	-	-	-	-	-	-	-	39.71

Definitions:
GV1: Adjusted net savings, including particulate emission damage (Percent GNI)
GV2: Degree of integrated water resources management implementation, financing (Percent)
GV3: Total amount of funding to promote environmentally sound technologies per GDP
GT1: Share of export of environmental goods (OECD and APEC classifications) to total export (Percent)
GT2: CO_2 emissions embedded in trade (Percent)
GT3: Water virtual trade flows (tons per hectare)
GJ1: Share of green manufacturing employment in total manufacturing employment (Percent)
GJ2: Ratio of renewable energy employment to renewable energy production (Ratio)
GJ3: Employed population below international poverty line (Percent)
GN1: Development of environment-related technologies (Percent)
GN2: University-industry collaboration in Research & Development (Score)
GN3: Installed renewable energy-generating capacity in developing countries (watts per capita)

Table 22. Normalized values of Green growth indicators for social inclusion

Country	Regional Rank	Indicators											
		AB1	AB2	AB3	GB1	GB2	GB3	SE1	SE2	SE3	SP1	SP2	SP3
Africa													
Gabon	1	91.20	55.35	-	31.45	97.17	25.75	86.95	70.49	-	39.41	30.79	53.40
Cabo Verde	2	95.17	64.67	35.20	49.12	-	75.25	79.76	99.77	59.61	85.74	60.59	-
Seychelles	3	100.00	91.65	59.18	43.00	-	75.25	93.83	100.00	62.47	100.00	66.00	-
Botswana	4	71.79	50.69	15.87	21.09	96.57	75.25	52.37	70.04	46.43	100.00	38.92	58.38
Namibia	5	49.00	66.81	24.39	88.58	98.93	100.00	25.25	85.31	54.01	100.00	49.75	56.49
Mauritius	6	99.57	86.80	47.98	40.60	99.56	100.00	87.89	99.94	67.01	100.00	55.85	-
Togo	7	21.66	66.22	44.12	37.99	95.80	100.00	79.48	68.11	63.81	19.81	24.02	59.53
Senegal	8	31.34	88.94	16.17	85.51	95.93	25.75	85.80	87.20	51.10	30.60	32.15	66.78
Morocco	9	76.67	87.77	27.27	41.61	87.89	50.50	83.99	100.00	-	40.40	57.88	88.59
Burkina Faso	10	7.78	68.55	9.43	22.82	93.52	25.75	78.24	1.00	40.86	7.63	16.57	72.09
Cote d'Ivoire	11	40.02	85.05	10.91	23.60	87.92	50.50	87.55	87.90	68.36	8.62	22.67	44.07
Tanzania	12	20.76	56.81	22.81	73.98	95.07	100.00	82.89	74.51	79.27	6.16	22.67	57.03
Zambia	13	42.83	42.15	8.63	35.38	97.16	100.00	39.23	44.14	54.76	8.72	40.27	49.28
Guinea	14	42.94	74.96	13.98	45.29	90.85	50.50	96.23	64.62	50.52	2.98	18.61	48.49
Uganda	15	19.80	38.66	24.19	69.47	99.52	100.00	79.04	86.64	55.07	12.09	30.79	43.23
Ghana	16	44.64	90.49	22.91	26.92	96.84	50.50	77.29	96.85	66.80	19.81	29.44	64.80
Rwanda	17	44.98	38.66	30.64	100.00	95.92	100.00	77.27	85.04	58.09	4.07	30.79	59.69
Kenya	18	50.24	53.70	18.54	43.96	98.22	100.00	85.37	95.27	71.60	14.07	36.21	46.59
South Africa	19	78.12	87.38	25.98	93.51	99.67	100.00	1.00	99.01	55.85	81.69	60.59	74.56
Cameroon	20	62.89	88.64	21.12	62.60	98.31	25.75	70.23	69.00	75.44	19.12	23.01	65.66
Ethiopia	21	19.43	57.49	29.25	77.74	93.05	25.75	89.83	86.76	74.69	4.86	11.83	32.41
Zimbabwe	22	31.11	25.46	25.09	64.06	96.25	75.25	76.44	81.31	57.62	22.78	38.92	77.33
Benin	23	16.71	80.78	21.62	15.32	92.13	50.50	86.66	70.06	49.37	11.89	12.85	28.60
Gambia	24	42.61	61.95	29.94	21.47	94.55	75.25	85.35	81.88	57.52	17.83	26.73	59.12
Lesotho	25	37.84	10.71	18.64	47.19	99.29	75.25	74.32	87.48	49.29	94.06	36.21	73.14
Tunisia	26	84.03	94.18	47.39	53.01	90.29	25.75	92.96	99.97	54.55	85.55	55.17	91.96
Malawi	27	18.28	65.45	19.24	46.38	95.71	100.00	85.62	4.54	71.98	3.28	29.44	47.67
Mali	28	29.23	75.15	10.12	19.18	98.05	50.50	89.29	52.75	55.48	8.23	19.96	55.93
Burundi	29	3.68	-	34.50	72.99	98.05	75.25	85.62	1.00	83.85	4.96	19.96	61.32
Nigeria	30	33.43	69.14	19.14	8.15	90.02	50.50	90.49	75.30	47.13	11.89	15.90	48.52
Mauritania	31	43.90	85.93	3.58	41.11	88.13	25.75	93.32	1.00	36.42	10.21	18.61	41.14
Algeria	32	75.98	100.00	40.35	52.00	86.01	50.50	97.48	99.93	69.76	63.96	64.65	86.05
Sierra Leone	33	10.88	46.04	19.34	25.41	94.09	50.50	89.33	1.00	52.15	7.93	17.59	46.77
Mozambique	34	26.53	40.79	15.87	80.99	90.18	50.50	61.39	1.00	-	52.98	23.01	42.24
Angola	35	44.44	58.07	18.74	59.51	89.48	50.50	58.20	1.00	55.82	15.36	14.54	34.21
Niger	36	6.73	68.75	6.35	34.58	85.91	75.25	87.14	38.72	1.00	6.74	11.83	25.96
Eswatini	37	81.66	77.48	24.10	17.67	98.56	50.50	48.22	97.84	48.79	100.00	40.27	88.63
Madagascar	38	16.61	1.00	10.02	37.71	96.56	25.75	79.18	37.73	94.49	5.55	11.83	29.14
Sudan	39	59.03	76.90	3.08	55.75	82.54	1.00	90.99	92.25	52.26	11.89	25.04	22.54
Egypt	40	82.39	87.58	31.53	30.73	95.52	1.00	93.16	100.00	58.53	38.62	59.23	99.05
DR Congo	41	8.58	31.48	12.30	26.34	97.77	50.50	80.29	1.00	54.74	15.85	19.28	17.64
Central African Republic	42	5.32	10.32	17.45	17.97	85.35	25.75	78.71	1.00	-	5.65	7.77	27.57
Libya	43	43.17	83.69	13.19	32.60	96.84	75.25	-	1.00	-	42.58	48.40	-

Table 22. Normalized values of Green growth indicators for social inclusion *(continued)*

Country	Regional Rank	Indicators											
		AB1	AB2	AB3	GB1	GB2	GB3	SE1	SE2	SE3	SP1	SP2	SP3
Chad	-	2.88	39.05	2.69	30.96	83.74	50.50	87.22	1.00	46.56	1.99	3.71	13.82
Liberia	-	24.70	25.46	21.22	22.70	94.17	100.00	90.27	43.78	41.18	4.37	25.38	32.86
Comoros	-	87.02	77.09	23.01	13.00	92.57	100.00	73.67	97.73	67.21	-	27.41	27.90
Congo Republic	-	44.11	38.76	-	23.29	97.35	25.75	64.40	48.54	67.86	22.88	19.96	53.56
Djibouti	-	49.05	67.39	13.69	52.78	84.72	50.50	80.61	88.91	67.06	15.06	25.04	-
Guinea-Bissau	-	19.60	26.43	6.25	28.19	-	1.00	90.57	68.88	64.93	1.79	14.54	36.09
Sao Tome and Principe	-	45.94	74.57	18.94	37.00	-	75.25	81.99	99.06	-	65.85	44.34	44.72
South Sudan	-	1.00	59.62	-	57.35	85.71	100.00	70.82	80.89	-	1.00	7.43	1.00
Somalia	-	36.64	5.46	1.00	49.23	94.99	50.50	-	85.62	36.93	-	1.00	-
Equatorial Guinea	-	64.39	-	14.58	44.56	-	100.00	-	1.00	-	-	24.70	-
Eritrea	-	49.05	-	7.84	44.56	-	75.25	-	87.68	-	-	26.39	-
Reunion	-	85.14	-	-	-	-	-	-	-	58.75	-	-	-
Mayotte	-	92.79	-	-	-	-	-	-	-	-	-	-	-
St. Helena	-	88.45	-	-	-	-	-	-	-	-	-	-	-
The Americas													
United States	1	97.92	100.00	70.88	55.87	99.32	75.25	83.23	100.00	83.75	100.00	80.90	-
Paraguay	2	70.70	91.85	16.07	30.70	99.41	100.00	74.25	99.99	73.16	87.23	61.94	84.12
Brazil	3	76.70	96.41	42.73	30.32	98.70	75.25	51.81	99.84	66.26	79.51	72.77	84.34
Costa Rica	4	66.19	93.98	32.22	91.31	95.75	38.13	66.97	99.94	72.58	56.64	74.13	96.27
Mexico	5	64.01	100.00	43.92	96.44	96.01	75.25	73.59	99.87	73.51	100.00	64.99	81.50
Chile	6	97.86	95.15	34.01	45.71	99.81	75.25	75.13	100.00	76.50	76.18	75.48	92.32
Honduras	7	67.89	70.20	20.63	42.76	91.90	50.50	65.58	98.16	61.33	11.40	51.11	66.89
Uruguay	8	100.00	100.00	41.34	44.00	99.21	75.25	83.62	100.00	74.62	100.00	75.48	94.69
Panama	9	94.96	89.71	31.93	45.63	98.48	50.50	60.50	98.18	72.14	29.90	70.07	82.86
Jamaica	10	100.00	83.89	22.11	35.57	99.15	50.50	73.81	100.00	57.21	40.90	64.65	-
Bolivia	11	98.50	70.49	19.73	100.00	97.11	100.00	82.45	99.43	84.13	100.00	52.46	50.99
Dominican Republic	12	60.05	87.77	29.94	56.22	98.35	75.25	85.07	99.44	60.56	12.14	66.68	88.17
El Salvador	13	97.75	85.05	32.22	64.64	90.94	75.25	85.92	99.40	62.22	20.81	70.07	82.65
Ecuador	14	67.15	73.02	47.59	77.61	96.29	100.00	73.55	99.75	74.25	59.93	68.71	39.25
Colombia	15	61.19	87.19	16.36	37.75	97.79	50.50	57.36	100.00	60.67	51.23	72.77	89.80
Peru	16	63.63	87.58	32.32	58.11	97.02	100.00	79.37	97.99	67.24	36.34	64.65	63.77
Nicaragua	17	68.80	65.45	10.02	92.97	92.60	75.25	71.69	94.41	64.66	29.31	62.28	29.37
Guatemala	18	75.08	74.18	32.62	39.37	98.27	50.50	66.77	99.94	59.32	16.44	44.34	60.48
Canada	19	93.91	100.00	42.23	56.43	99.96	100.00	94.20	100.00	81.63	100.00	87.67	-
Suriname	20	57.01	82.53	28.16	59.23	-	75.25	-	99.77	73.74	100.00	58.89	83.39
Venezuela	21	60.56	57.00	16.26	44.88	97.99	75.25	74.82	99.91	67.02	59.81	66.00	72.98
Belize	22	97.53	90.49	28.75	19.57	96.83	50.50	51.05	99.85	56.36	50.40	56.52	83.47
Argentina	23	71.14	93.79	34.01	79.97	98.97	50.50	80.47	100.00	72.39	89.59	71.42	83.24
Guyana	24	66.49	93.89	25.58	66.99	-	100.00	74.00	99.24	33.10	100.00	68.37	87.23
Trinidad and Tobago	25	100.00	76.32	24.99	62.28	96.62	75.25	83.05	100.00	77.67	91.19	66.00	92.11
Barbados	26	100.00	100.00	54.13	40.60	-	50.50	-	100.00	58.17	63.87	68.71	-
Haiti	-	43.37	12.65	16.96	6.03	96.99	100.00	81.73	1.00	69.56	1.40	36.55	48.60

Table 22. Normalized values of Green growth indicators for social inclusion *(continued)*

Country	Regional Rank	Indicators											
		AB1	AB2	AB3	GB1	GB2	GB3	SE1	SE2	SE3	SP1	SP2	SP3
St. Lucia	-	100.00	-	25.78	34.01	-	100.00	57.15	100.00	43.70	33.18	68.71	-
Cuba	-	68.41	100.00	43.72	100.00	-	-	-	100.00	-	3.67	76.84	88.91
Dominica	-	100.00	86.99	25.19	69.07	-	50.50	-	100.00	-	60.70	52.80	-
St. Vincent and the Grenadines	-	100.00	93.98	38.47	26.82	-	50.50	-	99.98	-	42.58	64.99	-
Bahamas	-	100.00	-	20.33	26.38	-	75.25	-	100.00	-	89.70	70.74	-
Antigua and Barbuda	-	100.00	-	-	23.00	-	75.25	-	100.00	-	76.04	67.36	-
Grenada	-	91.21	-	31.33	93.41	-	100.00	-	-	-	48.32	62.62	-
St. Kitts and Nevis	-	100.00	-	-	34.00	-	50.50	-	100.00	-	62.68	71.42	-
Puerto Rico	-	75.82	-	-	-	98.04	75.25	-	100.00	-	100.00	-	-
Aruba	-	100.00	-	-	-	-	-	-	100.00	76.09	100.00	-	-
Bermuda	-	100.00	-	-	-	-	-	-	100.00	90.17	100.00	-	-
Curacao	-	100.00	-	-	-	-	-	-	100.00	74.79	100.00	-	-
Saint-Martin	-	98.19	-	-	-	-	-	-	100.00	-	61.19	-	-
Turks and Caicos Islands	-	57.51	-	-	-	-	-	-	100.00	-	68.72	-	-
United States Virgin Islands	-	98.89	-	-	-	-	-	-	100.00	-	100.00	-	-
Anguilla	-	100.00	-	-	-	-	-	-	-	-	66.44	-	-
British Virgin Islands	-	100.00	-	-	-	-	-	-	100.00	-	-	-	-
Cayman Islands	-	100.00	-	-	-	-	-	-	100.00	-	-	-	-
French Guiana	-	82.04	-	-	-	-	-	-	-	-	47.23	-	-
Greenland	-	46.37	-	-	-	-	-	-	100.00	-	-	-	-
Guadeloupe	-	96.20	-	-	-	-	-	-	-	-	72.97	-	-
Martinique	-	98.78	-	-	-	-	-	-	-	-	64.46	-	-
Sint Maarten	-	100.00	-	-	-	-	-	-	100.00	-	-	-	-
St. Pierre and Miquelon	-	81.90	-	-	-	-	-	-	-	-	100.00	-	-
Bonaire, Saint Eustatius and Saba	-	100.00	-	-	-	-	-	-	-	-	-	-	-
St. Barths	-	100.00	-	-	-	-	-	-	-	-	-	-	-
Falkland Islands	-	-	-	-	-	-	-	-	-	95.27	-	-	-
Asia													
Japan	1	99.17	93.79	69.49	20.17	99.87	25.75	92.73	100.00	95.43	100.00	76.84	-
China	2	82.42	100.00	34.30	50.38	99.50	25.75	87.49	100.00	-	100.00	74.13	-
Laos	3	56.74	89.81	-	55.49	99.49	75.25	85.28	100.00	62.77	7.24	33.84	77.08
Thailand	4	60.48	89.91	48.38	32.19	98.92	75.25	90.47	99.98	78.69	89.21	75.48	92.85
Bhutan	5	72.77	-	22.11	30.48	93.04	100.00	93.00	100.00	86.17	19.61	45.69	-
Georgia	6	62.12	94.08	57.80	32.68	99.89	75.25	91.39	100.00	64.05	90.99	56.52	92.55
Nepal	7	48.73	89.52	23.80	65.81	97.03	100.00	92.63	99.92	49.86	80.40	37.56	57.66
Malaysia	8	92.11	94.76	50.76	30.70	99.67	50.50	81.53	100.00	80.31	19.41	67.36	-
Philippines	9	66.05	89.91	33.02	55.83	97.07	100.00	82.56	99.76	74.77	21.30	45.01	61.51
Cyprus	10	91.63	100.00	41.14	36.36	99.83	75.25	93.58	100.00	80.11	97.82	74.13	-
Indonesia	11	61.80	88.55	31.93	40.77	99.63	75.25	86.59	99.81	-	15.65	38.92	79.59
Azerbaijan	12	78.35	100.00	40.55	34.28	98.95	1.00	97.67	100.00	-	73.07	53.82	71.70

Table 22. Normalized values of Green growth indicators for social inclusion *(continued)*

Country	Regional Rank	Indicators											
		AB1	AB2	AB3	GB1	GB2	GB3	SE1	SE2	SE3	SP1	SP2	SP3
Armenia	13	61.92	100.00	58.29	46.75	97.65	75.25	97.07	99.99	62.37	65.55	56.52	91.17
Maldives	14	100.00	-	29.55	10.11	97.41	75.25	96.48	100.00	62.09	100.00	47.04	63.37
Cambodia	15	43.85	90.68	18.25	42.18	99.01	75.25	-	96.89	83.55	7.53	42.98	58.27
Vietnam	16	63.89	90.29	39.26	53.91	99.56	50.50	88.14	100.00	78.44	41.49	56.52	93.93
Kyrgyz Republic	17	88.92	90.68	21.02	38.96	98.92	25.75	96.28	99.99	74.29	100.00	59.91	97.43
Kazakhstan	18	94.29	100.00	34.30	54.66	98.84	25.75	97.28	100.00	86.28	99.60	72.77	99.16
Israel	19	97.81	100.00	58.49	55.45	99.62	50.50	85.90	100.00	75.80	100.00	79.55	-
Tajikistan	20	75.81	81.95	21.12	38.72	99.93	50.50	91.56	99.90	39.13	93.76	57.54	82.06
Brunei Darussalam	21	100.00	-	58.89	19.00	-	75.25	-	100.00	73.03	100.00	70.07	-
South Korea	22	99.55	100.00	71.48	35.06	100.00	25.75	94.61	100.00	69.92	100.00	84.96	-
Timor-Leste	23	100.00	56.71	20.43	77.15	-	100.00	96.50	100.00	55.03	100.00	32.82	64.37
United Arab Emirates	24	99.18	94.08	40.35	100.00	99.74	38.13	99.43	100.00	84.50	23.37	68.37	-
Singapore	25	100.00	-	83.07	48.28	99.75	75.25	-	100.00	93.50	33.77	83.95	-
Palestine	26	80.61	-	-	-	89.82	1.00	92.34	100.00	52.62	66.34	-	79.50
India	27	69.45	67.78	28.16	30.58	99.99	25.75	91.10	99.37	55.71	43.08	49.75	48.49
Myanmar	28	60.90	93.69	15.77	23.21	98.76	50.50	94.71	94.74	78.31	15.75	34.86	38.75
Mongolia	29	65.28	87.87	29.05	34.88	99.81	75.25	92.98	100.00	73.33	100.00	54.49	81.20
Bangladesh	30	60.34	78.26	24.49	42.30	92.40	25.75	93.39	99.87	60.48	39.12	34.86	45.48
Sri Lanka	31	71.94	89.71	35.20	11.55	100.00	25.75	86.69	100.00	68.95	36.34	55.17	-
Qatar	32	98.01	-	39.66	20.32	98.06	50.50	-	100.00	-	20.21	67.36	-
Jordan	33	88.54	-	28.16	31.45	87.74	75.25	91.66	99.87	48.52	53.99	52.46	82.42
Lebanon	34	54.73	-	33.12	10.29	91.73	50.50	94.08	100.00	66.06	10.70	63.29	95.26
Uzbekistan	35	82.78	100.00	28.85	66.99	94.99	25.75	-	99.99	-	100.00	66.00	-
Oman	36	95.09	94.56	16.96	5.61	94.58	25.75	-	100.00	-	47.43	59.23	-
Saudi Arabia	37	89.19	91.46	11.31	40.34	95.12	25.75	-	100.00	72.25	33.87	64.65	-
Pakistan	38	69.40	64.09	20.33	41.53	81.44	25.75	95.37	99.04	54.49	6.57	25.38	41.17
Afghanistan	39	60.12	41.57	20.23	54.50	63.44	1.00	-	99.73	25.10	25.45	19.96	22.96
Bahrain	40	96.55	-	49.77	30.70	97.54	1.00	-	100.00	-	73.47	67.36	-
Kuwait	41	100.00	100.00	33.31	4.19	97.72	1.00	-	100.00	-	27.14	70.07	-
Iran	42	96.72	88.16	27.76	12.64	98.05	50.50	82.21	100.00	57.58	22.09	64.65	-
Iraq	43	68.72	68.36	17.65	52.22	91.63	50.50	96.03	100.00	46.73	18.62	44.34	48.14
Yemen	44	43.19	33.03	11.90	1.00	1.00	25.75	88.31	94.85	35.43	7.93	21.31	53.54
Syria	45	87.99	46.04	28.56	26.34	93.76	1.00	87.19	96.23	-	17.53	49.08	-
Turkmenistan	-	97.22	88.94	7.15	52.20	95.11	-	82.59	100.00	-	77.43	66.00	91.05
Hong Kong	-	98.75	100.00	-	-	99.85	75.25	-	100.00	89.27	73.47	-	-
Macau	-	87.70	84.47	-	-	-	-	-	100.00	92.80	44.96	-	-
North Korea	-	56.63	15.36	-	35.87	-	-	-	-	-	-	60.59	-
Turkey	-	-	-	47.98	-	-	75.25	80.70	-	-	-	-	-
Taiwan	-	-	-	-	-	-	100.00	-	-	-	-	-	-
Europe													
Switzerland	1	98.75	100.00	92.89	85.15	99.83	100.00	92.60	100.00	87.88	100.00	80.90	-
Austria	2	99.49	100.00	91.30	83.23	99.98	100.00	96.07	100.00	82.28	100.00	78.53	95.37
Germany	3	98.85	100.00	92.39	62.99	99.99	100.00	94.05	100.00	89.11	100.00	83.61	-

Table 22. Normalized values of Green growth indicators for social inclusion *(continued)*

Country	Regional Rank	Indicators											
		AB1	AB2	AB3	GB1	GB2	GB3	SE1	SE2	SE3	SP1	SP2	SP3
Denmark	4	99.54	100.00	66.22	79.53	100.00	100.00	97.69	100.00	89.13	100.00	75.48	-
Sweden	5	98.32	100.00	87.33	92.34	99.90	100.00	97.05	100.00	92.65	100.00	79.55	-
Czech Republic	6	95.26	100.00	61.66	45.55	99.45	100.00	98.47	100.00	90.43	91.39	78.19	-
United Kingdom	7	99.26	100.00	78.91	66.19	99.95	100.00	93.34	100.00	84.79	100.00	83.61	-
Finland	8	96.16	100.00	63.25	91.09	99.84	100.00	97.96	100.00	88.93	100.00	79.88	-
Belarus	9	88.53	100.00	75.44	80.20	99.92	50.50	99.99	100.00	-	100.00	71.42	97.60
France	10	96.13	100.00	92.39	79.23	99.73	100.00	94.85	100.00	81.71	100.00	79.55	-
Italy	11	89.89	100.00	65.53	71.71	99.93	100.00	90.64	100.00	71.47	94.46	78.19	-
Slovakia	12	93.42	94.56	60.18	41.26	99.39	75.25	100.00	100.00	83.98	90.69	75.48	-
Hungary	13	95.63	100.00	74.25	25.37	99.44	75.25	96.00	100.00	84.66	90.60	71.42	92.43
Slovenia	14	93.68	100.00	54.53	58.20	99.68	75.25	100.00	100.00	90.44	100.00	78.19	-
Netherlands	15	99.09	100.00	91.10	69.64	99.91	100.00	98.83	100.00	93.63	100.00	79.55	-
Portugal	16	95.18	100.00	79.21	80.20	99.02	100.00	91.04	100.00	88.98	90.50	83.61	-
Norway	17	91.72	100.00	80.10	83.01	99.82	100.00	97.69	100.00	92.93	100.00	81.24	-
Estonia	18	95.51	100.00	57.90	54.91	99.92	100.00	95.52	100.00	84.21	100.00	71.42	-
Lithuania	19	96.04	100.00	58.09	45.94	98.75	100.00	89.33	100.00	83.64	97.13	66.00	-
Spain	20	96.26	100.00	82.38	86.10	99.72	100.00	91.24	100.00	84.14	98.22	79.55	-
Poland	21	95.62	100.00	85.25	56.95	99.99	100.00	96.77	100.00	86.88	83.76	75.48	-
Luxembourg	22	98.04	100.00	52.84	58.75	99.80	100.00	92.72	100.00	90.97	100.00	79.21	-
Bosnia and Herzegovina	23	79.62	100.00	27.27	43.43	95.56	50.50	93.06	100.00	67.95	69.81	53.82	95.79
Belgium	24	98.07	100.00	63.35	78.88	99.88	100.00	99.02	100.00	86.72	100.00	81.92	-
Albania	25	72.19	92.04	29.35	59.21	98.76	100.00	96.46	100.00	62.74	100.00	51.11	97.05
Latvia	26	93.44	100.00	56.11	54.46	99.64	100.00	89.68	100.00	87.51	92.08	66.00	-
Romania	27	89.11	100.00	72.17	41.93	98.20	100.00	91.71	100.00	78.41	93.57	70.07	-
Croatia	28	86.91	100.00	52.44	41.00	99.25	100.00	96.59	100.00	81.66	89.90	72.77	-
Macedonia	29	61.60	93.89	37.77	77.73	97.72	50.50	93.10	100.00	73.49	68.91	64.65	-
Bulgaria	30	88.13	94.95	67.31	45.55	99.85	100.00	82.64	99.96	79.75	94.06	63.29	-
Serbia	31	64.59	100.00	44.81	80.20	99.84	100.00	90.52	100.00	76.82	59.56	61.94	-
Greece	32	96.80	100.00	66.72	42.58	99.47	100.00	92.34	100.00	82.59	95.84	70.74	-
Russia	33	77.55	100.00	59.78	32.24	99.84	50.50	89.04	99.91	82.07	100.00	71.42	-
Ukraine	34	85.70	90.68	68.20	41.25	98.65	1.00	98.99	100.00	76.22	96.24	67.36	98.84
Ireland	35	91.34	100.00	80.20	44.86	99.96	100.00	96.27	100.00	85.42	100.00	75.82	91.06
Moldova	36	86.23	100.00	57.60	48.04	99.25	100.00	98.75	100.00	76.53	75.45	60.59	93.16
Iceland	37	100.00	100.00	57.00	78.00	100.00	100.00	98.55	100.00	92.92	71.69	84.96	-
Malta	38	95.71	91.07	56.21	27.59	99.60	75.25	94.22	100.00	87.06	100.00	79.55	-
Montenegro	39	77.71	100.00	42.23	48.67	99.59	1.00	88.57	99.93	69.56	90.69	61.94	90.74
San Marino	-	96.49	-	-	66.99	-	75.25	-	100.00	-	-	68.71	-
Andorra	-	96.65	-	-	92.93	-	-	-	100.00	-	-	71.42	-
Liechtenstein	-	98.65	-	-	24.76	-	-	-	100.00	-	100.00	-	-
Monaco	-	100.00	-	-	66.99	-	-	-	100.00	-	-	80.90	-
Kosovo	-	-	-	-	-	92.27	100.00	96.08	-	-	-	-	-
Faeroe Islands	-	100.00	-	-	-	-	-	-	100.00	-	-	-	-
Gibraltar	-	100.00	-	-	-	-	-	-	100.00	-	-	-	-

Table 22. Normalized values of Green growth indicators for social inclusion *(continued)*

Country	Regional Rank	Indicators											
		AB1	AB2	AB3	GB1	GB2	GB3	SE1	SE2	SE3	SP1	SP2	SP3
Isle of Man	-	94.17	-	-	-	-	-	-	100.00	-	-	-	-
Oceania													
New Zealand	1	95.97	100.00	60.57	81.02	99.82	75.25	-	100.00	82.83	100.00	79.55	-
Fiji	2	59.20	87.19	28.16	39.83	-	50.50	95.16	99.64	71.00	92.18	44.00	90.11
Australia	3	97.62	100.00	58.39	62.64	99.89	100.00	91.51	100.00	87.07	100.00	82.25	-
Papua New Guinea	4	15.16	54.58	2.09	1.00	-	25.75	80.48	59.77	48.79	23.08	5.06	-
Kiribati	-	39.54	76.51	25.28	13.91	-	100.00	97.41	99.25	31.38	93.86	29.44	-
Samoa	-	65.91	91.07	30.74	20.80	-	75.25	85.35	99.76	58.53	91.49	38.92	-
Solomon Islands	-	74.58	61.86	9.33	9.08	-	25.75	87.94	99.45	89.81	21.30	28.08	-
Vanuatu	-	67.82	81.56	24.59	1.00	-	50.50	93.48	93.42	50.23	9.42	28.08	-
Micronesia, Fed. Sts.	-	82.41	-	31.13	1.00	-	75.25	83.99	97.48	58.63	100.00	29.44	-
Tonga	-	50.49	-	29.15	15.67	-	75.25	91.90	100.00	73.03	90.10	41.63	-
Marshall Islands	-	99.79	-	-	13.00	-	75.25	90.06	99.54	38.07	63.07	46.37	-
Nauru	-	100.00	-	-	21.85	-	-	93.52	100.00	47.49	95.74	45.69	-
Palau	-	93.21	-	-	25.75	-	75.25	-	100.00	73.95	100.00	52.46	-
Tuvalu	-	45.20	-	-	13.38	-	-	85.01	99.90	50.58	15.85	34.86	-
Cook Islands	-	100.00	-	-	-	-	-	-	-	81.95	100.00	44.00	-
New Caledonia	-	98.32	90.68	-	-	-	-	-	100.00	52.36	-	-	-
French Polynesia	-	91.39	90.10	-	-	-	-	-	100.00	-	-	-	-
Guam	-	99.50	-	-	-	-	-	-	100.00	-	-	-	-
Niue	-	96.27	-	-	-	-	-	-	-	-	-	41.97	-
Northern Mariana Islands	-	94.98	-	-	-	-	-	-	100.00	-	-	-	-
American Samoa	-	60.77	-	-	-	-	-	-	-	-	-	-	-
Wallis and Futuna Islands	-	66.62	-	-	-	-	-	-	-	-	-	-	-

Definitions:
AB1: Population with access to basic services i.e. Water, sanitation, electricity. and clean fuels
AB2: Prevalence of undernourishment
AB3: Universal access to sustainable transport
GB1: Proportion of seats held by women in national parliaments
GB2: Share of adults (15 years and older) with an account at financial institution or mobile- money-service provider
GB3: Getting paid, laws and regulations for equal gender pay
SE1: Inequality in income-based Palma ratio
SE2: Population with access to basic services by urban/ rural, i.e. electricity
SE3: Share of youth (aged 15-24 years) not in education, employment or training
SP1: Proportion population above statutory pensionable age receiving a pension
SP2: Universal health coverage (UHC) service coverage index
SP3: Proportion of urban population living in slums

8.4 Data gaps in indicators by dimension and region

Table 23. .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
Africa							
Gabon	1	3	0	3	2	8	17%
Cabo Verde	2	2	0	3	2	7	15%
Seychelles	3	4	0	5	2	11	23%
Botswana	4	2	1	0	0	3	6%
Namibia	5	1	0	1	0	2	4%
Mauritius	6	2	0	0	1	3	6%
Togo	7	1	0	3	0	4	8%
Senegal	8	1	0	0	0	1	2%
Morocco	9	1	0	0	1	2	4%
Burkina Faso	10	1	1	2	0	4	8%
Cote d'Ivoire	11	2	0	4	0	6	13%
Tanzania	12	2	0	2	0	4	8%
Zambia	13	2	1	0	0	3	6%
Guinea	14	1	0	3	0	4	8%
Uganda	15	2	1	0	0	3	6%
Ghana	16	1	0	0	0	1	2%
Rwanda	17	2	1	1	0	4	8%
Kenya	18	1	0	0	0	1	2%
South Africa	19	1	0	0	0	1	2%
Cameroon	20	0	0	1	0	1	2%
Ethiopia	21	2	1	0	0	3	6%
Zimbabwe	22	2	1	0	0	3	6%
Benin	23	0	0	2	0	2	4%
Gambia	24	2	0	4	0	6	13%
Lesotho	25	2	1	2	0	5	10%
Tunisia	26	2	0	0	0	2	4%
Malawi	27	2	1	3	0	6	13%
Mali	28	2	1	3	0	6	13%
Burundi	29	1	1	2	1	5	10%
Nigeria	30	1	0	0	0	1	2%
Mauritania	31	3	0	3	0	6	13%
Algeria	32	1	0	1	0	2	4%
Sierra Leone	33	1	0	3	0	4	8%
Mozambique	34	1	0	2	1	4	8%
Angola	35	0	0	1	0	1	2%
Niger	36	2	1	3	0	6	13%
Eswatini	37	4	1	3	0	8	17%
Madagascar	38	1	0	1	0	2	4%
Sudan	39	2	0	4	0	6	13%

Table 23. Data gaps in indicators by dimension and across all indicators *(continued)*

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
Egypt	40	3	0	1	0	4	8%
DR Congo	41	3	0	5	0	8	17%
Central African Republic	42	3	1	5	1	10	21%
Libya	43	3	0	3	3	9	19%
British Indian Ocean Territory	-	12	9	12	12	45	94%
Chad	-	3	1	7	0	11	23%
Comoros	-	1	0	5	1	7	15%
Congo Republic	-	3	0	6	1	10	21%
Djibouti	-	3	0	7	1	11	23%
Equatorial Guinea	-	3	0	10	6	19	40%
Eritrea	-	4	0	6	6	16	33%
French Southern Territories	-	12	10	12	12	46	96%
Guinea-Bissau	-	1	0	6	1	8	17%
Liberia	-	2	0	6	0	8	17%
Mayotte	-	10	9	10	11	40	83%
Reunion	-	8	9	10	10	37	77%
Sao Tome and Principe	-	1	0	8	2	11	23%
Somalia	-	2	0	7	3	12	25%
South Sudan	-	5	2	8	2	17	35%
St. Helena	-	11	9	12	11	43	90%
Western Sahara	-	12	9	12	12	45	94%
The Americas							
United States	1	3	0	4	1	8	17%
Paraguay	2	2	1	0	0	3	6%
Brazil	3	1	0	0	0	1	2%
Costa Rica	4	1	0	0	0	1	2%
Mexico	5	1	0	0	0	1	2%
Chile	6	1	0	0	0	1	2%
Honduras	7	1	0	2	0	3	6%
Uruguay	8	1	0	0	0	1	2%
Panama	9	1	0	0	0	1	2%
Jamaica	10	1	0	1	1	3	6%
Bolivia	11	2	1	3	0	6	13%
Dominican Republic	12	2	0	0	0	2	4%
El Salvador	13	1	0	1	0	2	4%
Ecuador	14	1	0	0	0	1	2%
Colombia	15	1	0	0	0	1	2%
Peru	16	1	0	0	0	1	2%
Nicaragua	17	1	0	1	0	2	4%
Guatemala	18	1	0	1	0	2	4%
Canada	19	0	0	2	1	3	6%

Table 23. Data gaps in indicators by dimension and across all indicators *(continued)*

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
Suriname	20	2	0	4	2	8	17%
Venezuela	21	3	0	4	0	7	15%
Belize	22	1	0	3	0	4	8%
Argentina	23	0	0	0	0	0	0%
Guyana	24	1	0	3	1	5	10%
Trinidad and Tobago	25	2	0	2	0	4	8%
Barbados	26	2	1	4	3	10	21%
Anguilla	-	9	8	10	10	37	77%
Antigua and Barbuda	-	1	0	6	6	13	27%
Aruba	-	8	6	9	8	31	65%
Bahamas	-	3	0	6	5	14	29%
Bermuda	-	6	5	9	8	28	58%
Bonaire, Saint Eustatius and Saba	-	11	10	11	11	43	90%
Bouvet Island	-	12	11	12	12	47	98%
British Virgin Islands	-	8	5	10	10	33	69%
Cayman Islands	-	7	6	11	10	34	71%
Cuba	-	2	0	6	4	12	25%
Curacao	-	9	5	11	8	33	69%
Dominica	-	3	2	8	4	17	35%
Falkland Islands	-	10	8	11	11	40	83%
French Guiana	-	10	8	10	10	38	79%
Greenland	-	8	5	9	10	32	67%
Grenada	-	2	0	7	6	15	31%
Guadeloupe	-	9	9	10	10	38	79%
Haiti	-	1	0	6	0	7	15%
Martinique	-	9	9	11	10	39	81%
Montserrat	-	9	9	10	12	40	83%
Puerto Rico	-	3	5	8	7	23	48%
Saint-Martin	-	12	5	11	9	37	77%
Sint Maarten	-	9	7	12	10	38	79%
South Georgia and South Sandwich Is.	-	12	10	12	12	46	96%
St. Barths	-	12	9	11	11	43	90%
St. Kitts and Nevis	-	5	1	8	6	20	42%
St. Lucia	-	5	0	8	3	16	33%
St. Pierre and Miquelon	-	11	8	12	10	41	85%
St. Vincent and the Grenadines	-	5	0	8	4	17	35%
Turks and Caicos Islands	-	7	6	9	9	31	65%
United States Virgin Islands	-	10	5	10	9	34	71%

Table 23. Data gaps in indicators by dimension and across all indicators *(continued)*

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
Asia							
Japan	1	2	0	2	1	5	10%
China	2	2	0	0	2	4	8%
Laos	3	3	1	3	1	8	17%
Thailand	4	1	0	0	0	1	2%
Bhutan	5	1	1	3	2	7	15%
Georgia	6	1	0	1	0	2	4%
Nepal	7	2	1	1	0	4	8%
Malaysia	8	1	0	0	1	2	4%
Philippines	9	1	0	0	0	1	2%
Cyprus	10	1	0	2	1	4	8%
Indonesia	11	1	0	1	1	3	6%
Azerbaijan	12	1	2	0	1	4	8%
Armenia	13	1	1	1	0	3	6%
Maldives	14	4	0	4	1	9	19%
Cambodia	15	0	0	0	1	1	2%
Vietnam	16	2	0	1	0	3	6%
Kyrgyz Republic	17	3	1	1	0	5	10%
Kazakhstan	18	2	1	0	0	3	6%
Israel	19	2	0	2	1	5	10%
Tajikistan	20	2	2	1	0	5	10%
Brunei Darussalam	21	3	0	2	4	9	19%
South Korea	22	3	0	2	1	6	13%
Timor-Leste	23	3	0	4	1	8	17%
United Arab Emirates	24	2	0	2	1	5	10%
Singapore	25	3	0	1	3	7	15%
Palestine	26	5	6	6	4	21	44%
India	27	1	0	0	0	1	2%
Myanmar	28	1	0	1	0	2	4%
Mongolia	29	2	1	0	0	3	6%
Bangladesh	30	0	0	0	0	0	0%
Sri Lanka	31	1	0	0	1	2	4%
Qatar	32	3	0	2	4	9	19%
Jordan	33	2	0	0	1	3	6%
Lebanon	34	2	0	1	1	4	8%
Uzbekistan	35	2	1	3	3	9	19%
Oman	36	1	0	2	3	6	13%
Saudi Arabia	37	2	0	2	2	6	13%
Pakistan	38	1	0	0	0	1	2%
Afghanistan	39	1	2	5	1	9	19%
Bahrain	40	1	1	2	4	8	17%
Kuwait	41	1	1	2	3	7	15%

Table 23. Data gaps in indicators by dimension and across all indicators *(continued)*

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
Iran	42	2	0	3	1	6	13%
Iraq	43	1	0	4	0	5	10%
Yemen	44	3	0	4	0	7	15%
Syria	-	3	0	3	2	8	17%
Hong Kong	-	6	8	7	5	26	54%
Macau	-	9	9	10	7	35	73%
North Korea	-	5	1	9	8	23	48%
Turkey	-	11	4	7	9	31	65%
Turkmenistan	-	3	1	6	2	12	25%
Taiwan	-	11	10	10	11	42	88%
Europe							
Switzerland	1	2	1	2	1	6	13%
Austria	2	1	1	2	0	4	8%
Germany	3	1	0	2	1	4	8%
Denmark	4	1	0	2	1	4	8%
Sweden	5	1	0	2	1	4	8%
Czech Republic	6	3	1	3	1	8	17%
United Kingdom	7	1	0	4	1	6	13%
Finland	8	1	0	2	1	4	8%
Belarus	9	3	1	3	1	8	17%
France	10	1	0	2	1	4	8%
Italy	11	1	0	3	1	5	10%
Slovakia	12	3	1	3	1	8	17%
Hungary	13	2	1	2	0	5	10%
Slovenia	14	1	0	2	1	4	8%
Netherlands	15	1	0	4	1	6	13%
Portugal	16	1	0	2	1	4	8%
Norway	17	1	0	2	1	4	8%
Estonia	18	1	0	2	1	4	8%
Lithuania	19	1	0	2	1	4	8%
Spain	20	1	0	2	1	4	8%
Poland	21	1	0	2	1	4	8%
Luxembourg	22	2	1	2	1	6	13%
Bosnia and Herzegovina	23	2	0	4	0	6	13%
Belgium	24	0	0	2	1	3	6%
Albania	25	1	1	1	0	3	6%
Latvia	26	1	0	2	1	4	8%
Romania	27	1	0	2	1	4	8%
Croatia	28	1	0	2	1	4	8%
Macedonia	29	2	1	3	1	7	15%
Bulgaria	30	0	0	2	1	3	6%
Serbia	31	2	1	2	1	6	13%

Table 23. Data gaps in indicators by dimension and across all indicators *(continued)*

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
Greece	32	1	0	2	1	4	8%
Russia	33	2	0	2	1	5	10%
Ukraine	34	2	0	1	0	3	6%
Ireland	35	1	0	2	0	3	6%
Moldova	36	2	1	4	0	7	15%
Iceland	37	1	0	3	1	5	10%
Malta	38	1	1	3	1	6	13%
Montenegro	39	2	0	3	0	5	10%
Aland Islands	-	12	11	12	12	47	98%
Andorra	-	8	2	8	8	26	54%
Faeroe Islands	-	7	6	10	10	33	69%
Gibraltar	-	11	5	11	10	37	77%
Guernsey	-	11	9	12	12	44	92%
Isle of Man	-	11	7	12	10	40	83%
Jersey	-	11	9	12	12	44	92%
Liechtenstein	-	8	4	9	8	29	60%
Monaco	-	10	5	10	8	33	69%
San Marino	-	10	7	10	7	34	71%
Svalbard and Jan Mayen Islands	-	12	9	12	12	45	94%
Vatican	-	12	10	11	12	45	94%
Oceania							
New Zealand	1	1	0	2	2	5	10%
Fiji	2	2	1	3	1	7	15%
Australia	3	1	0	2	1	4	8%
Papua New Guinea	4	3	0	4	2	9	19%
American Samoa	-	11	4	11	11	37	77%
Christmas Island	-	12	9	12	12	45	94%
Cocos (Keeling) Islands	-	12	9	12	12	45	94%
Cook Islands	-	6	9	11	8	34	71%
French Polynesia	-	4	5	9	9	27	56%
Guam	-	11	5	11	10	37	77%
Heard and McDonald Islands	-	12	10	12	12	46	96%
Kiribati	-	5	2	7	2	16	33%
Marshall Islands	-	7	1	8	4	20	42%
Micronesia, Fed. Sts.	-	6	1	9	3	19	40%
Nauru	-	6	1	10	5	22	46%
New Caledonia	-	5	5	8	8	26	54%
Niue	-	8	8	11	10	37	77%
Norfolk Island	-	12	9	12	12	45	94%
Northern Mariana Islands	-	11	6	12	10	39	81%
Palau	-	7	1	8	5	21	44%

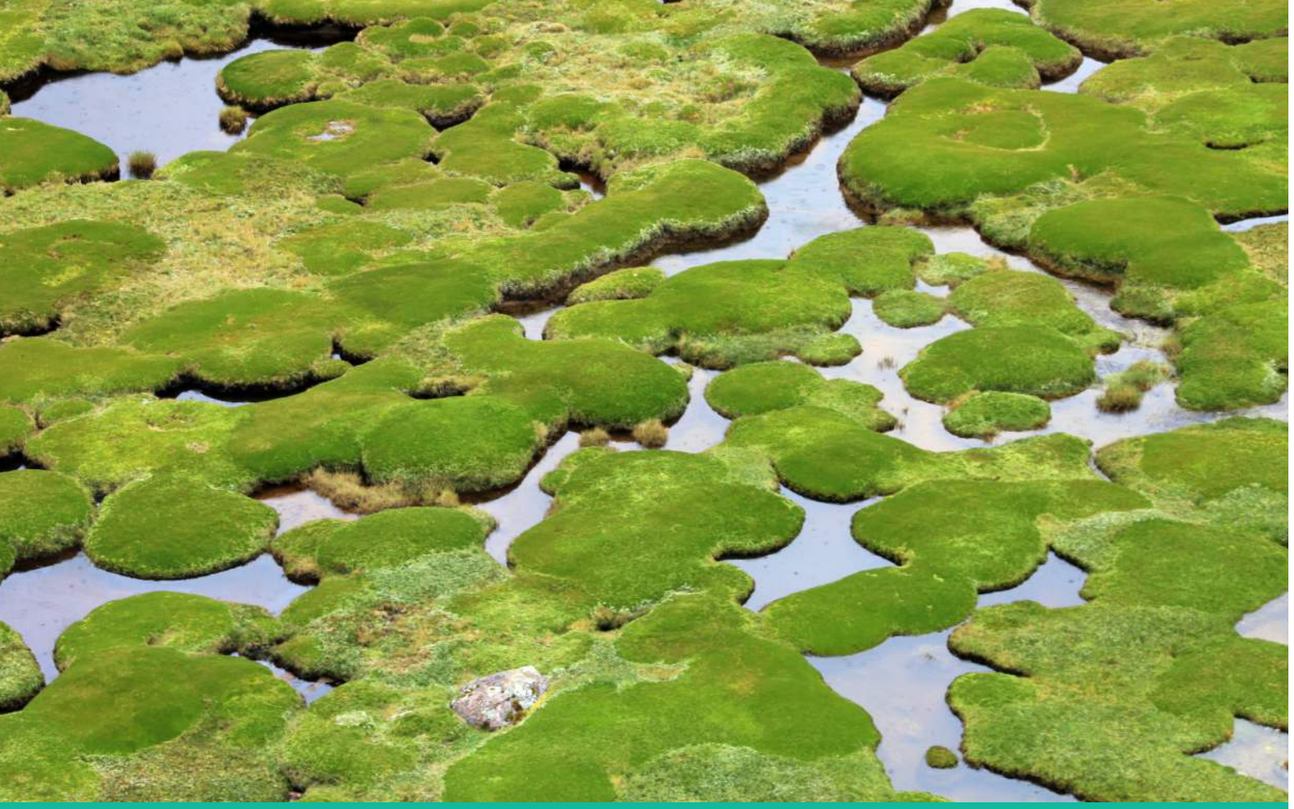
Table 23. Data gaps in indicators by dimension and across all indicators *(continued)*

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
Pitcairn	-	12	9	12	12	45	94%
Samoa	-	4	0	8	2	14	29%
Solomon Islands	-	4	0	5	2	11	23%
Tokelau	-	11	8	11	12	42	88%
Tonga	-	4	0	6	3	13	27%
Tuvalu	-	6	3	8	5	22	46%
United States Minor Outlying Islands	-	12	10	12	12	46	96%
Vanuatu	-	4	1	7	2	14	29%
Wallis and Futuna Islands	-	11	8	12	11	42	88%

Notes and References

1. Acosta, L. A., Maharjan, P., Peyriere, H., Galotto, L., Mamiit, R. J., Ho, C., Flores, B. H., & Anastasia, O. (2019). Green Growth Index: Concept, Methods and Applications. In GGGI Technical Report (No. 5). Green Growth Performance Measurement (GGPM) Program, Global Green Growth Institute (GGGI). https://greengrowthindex.gggi.org/wp-content/uploads/2019/12/Green-Growth-Index-Technical-Report_20191213.pdf
2. https://greengrowthindex.gggi.org/wp-content/uploads/2023/02/2022-Green-Growth-Index-1.pdf
3. GGGI. (2021). Green and Blue Economy Synergy – Concepts and Methods for the OECS Green-Blue Growth Index. Technical Report No. 23. Seoul, South Korea. https://gggi.org/report/green-and-blue-economy-synergy-concepts-and-methods-for-the-oecs-green-blue-growth-index/
4. https://greengrowthindex.gggi.org/wp-content/uploads/2023/12/Acosta-and-Hampel-2023-Azerbaijan-and-Central-Asia-green-growth.pdf
5. GGGI. (2017). GGGI Refreshed Strategic Plan 2015-2020. Report. https://gggi.org/report/gggi-refreshed-strategic-plan-2015-2020/
6. https://ourworldindata.org/grapher/share-co2-embedded-in-trade
7. https://www.waterfootprintassessmenttool.org/countries/~AFG/scope
8. https://www.fao.org/faostat/en/#data/TCL
9. https://waterfootprint.org/resources/Report50-NationalWaterFootprints-Vol1.pdf
10. IRENA and ILO (2022), Renewable energy and jobs: Annual review 2022, International Renewable Energy Agency, Abu Dhabi and International Labour Organization, Geneva and OECD. https://www.irena.org/publications/2022/Sep/Renewable-Energy-and-Jobs-Annual-Review-2022
11. https://govdata360.worldbank.org/indicators/haa832e63?country=BRA&indicator=604&viz=line_chart&years=2007,2017
12. https://unstats.un.org/sdgs/dataportal/SDMXMetadataPage?7.b.1-EG_EGY_RNEW
13. IISD. (2019). In Advance of HLPF 2019, Experts Review Progress on SDG 10. International Institute for Sustainable Development (IISD). https://sdg.iisd.org/news/in-advance-of-hlpf-2019-experts-review-progress-on-sdg-10/
14. https://unstats.un.org/sdgs/dataportal/SDMXMetadataPage?11.2.1-SP_TRN_PUBL
15. (OECD, 2019a, 2019b)
16. (Lafortune et al., 2018; Sachs et al., 2019; Sachs et al., 2018)
17. (Sachs et al., 2019; Sachs et al., 2018)
18. (PAGE, 2017b, 2017a)
19. https://greengrowthindex.gggi.org/wp-content/uploads/2019/12/Green-Growth-Index-Technical-Report_20191213.pdf
20. Does financial inclusion reduce poverty and income inequality in developing countries? A panel data analysis
21. The Changing Wealth of Nations 2021: Managing Assets for the Future (WB)
22. The Changing Wealth of Nations 2021: Managing Assets for the Future (WB)
23. Climate Change Mitigation: Policies and Lessons for Asia (ADB)
24. Global Gender Gap Report 2023
25. Africa's Dynamic Development Report
26. UNDP 2023 Africa Sustainable Development Report
27. Does resource efficiency matter for environmental quality in Canada?
28. ibid
29. Assessing global resource use (UNEP) Assessing Global Resource Use | Resource Panel
30. A sustainable, inclusive, and growing future for the United states (McKinsey & Company)
31. The Living Planet Report 2020 (WWF)
32. Developing countries' macroeconomic exposure to the low-carbon transition (AFD 2021)
33. ibid
34. Climate investment in Latin America (New Climate Institute 2021)
35. Technology and Innovation Report (TIR) (UNCTAD 2023)
36. Framework of Inclusive Growth Indicators 2012: Key Indicators for Asia and the Pacific Special Supplement (ADB)
37. Social Protection in South Asia: A Review
38. The Social Protection Indicator for Asia: Tracking Developments in Social Protection (ADB 2022)
39. green_growth_strategy.pdf (japan.go.jp), Green Growth Strategy Through Achieving Carbon Neutrality in 2050 (METI)
40. Asian Water Development Outlook 2020: Advancing Water Security across Asia and the Pacific (ADB 2020)
41. Sustainable Management Options for Healthy Rivers in South Asia: The Case of Brahmaputra
42. Gender Equality Strategy 2020-2025 (EU)
43. 2021 report on gender equality in the EU
44. How the European Union could achieve net-zero emissions at net-zero cost (McKinsey & Company)
45. ibid
46. Papua New Guinea National REDD+ Strategy 2017-2027 (2018)

47. Has Australia cut its greenhouse emissions faster than New Zealand?
48. Fiji Ministry of Economy. (2021). Internal Gender Equity and Social Inclusion Policy 2021-2024 and Action Plan 2021-2022 [GESI].
49. Fiji Country Gender Assessment (FCGA)
50. ibid
51. Green Energy Finance in Australia and New Zealand (ADB 2018)
52. https://renewableenergy.go.ke/a
53. https://www.climatelinks.org/sites/default/files/asset/document/2018_USAID-ATLAS-Project_Climate-Risk-Profile-Kenya.pdf
54. (Government of Ghana, 2017)
55. (MESTI, 2019b)
56. https://kenya-greengrowthindex.gggi.org/DashBoard/downloads_report; https://ghana-greengrowthindex-8af980b05521.herokuapp.com/DashBoard/downloads_report
57. Ibid.
58. https://ghana-greengrowthindex-8af980b05521.herokuapp.com/DashBoard/data
59. https://ghana-greengrowthindex-8af980b05521.herokuapp.com/DashBoard/data
60. http://kenya-greengrowthindex.gggi.org/DashBoard/data
61. https://ghana-greengrowthindex-8af980b05521.herokuapp.com/DashBoard/data
62. https://greengrowthindex.gggi.org/wp-content/uploads/2019/12/Green-Growth-Index-Technical-Report_20191213.pdf
63. OECD. (2019a). Measuring Distance to the SDG Targets: Metadata. OECD Publishing. https://www.oecd-ilibrary.org/sites/b79141ef-en/index.html?itemId=/content/component/b79141ef-en;
64. OECD. (2019b). Measuring Distance to the SDG Targets 2019: An Assessment of Where OECD Countries Stand. OECD Publishing. https://www.oecd.org/wise/measuring-distance-to-the-sdg-targets-2019-a8caf3fa-en.htm
65. Sachs, J., Schmidt-Traub, G., Kroll, C., Lafortune, G., & Fuller, G. (2019). Sustainable Development Report 2019. Bertelsmann Stiftung and Sustainable Development Solutions Network (SDSN). https://www.iau-hesd.net/sites/default/files/documents/2019_sustainable_development_report-compresse.pdf;
66. Sachs, Jeffrey, Schmidt-Traub, G., Kroll, C., Lafortune, G., & Fuller, G. (2018). SDG Index and Dashboards Report 2018. New York. Bertelsmann Stiftung and Sustainable Development Solutions Network (SDSN). https://s3.amazonaws.com/sustainabledevelopment.report/2018/2018_sdg_index_and_dashboards_report.pdf
67. OECD. (2019a). Measuring Distance to the SDG Targets: Metadata. OECD Publishing. AND. Sachs, J., Schmidt-Traub, G., Kroll, C., Lafortune, G., & Fuller, G. (2019) Sustainable Development Report 2019. Bertelsmann Stiftung and Sustainable Development Solutions Network (SDSN).
68. FAO. (2017). The future of food and agriculture: Trends and challenges. Food and Agriculture Organization of the United Nations, Rome. https://www.fao.org/3/i6583e/i6583e.pdf
69. Organization for Economic Co-operation and Development. (2006, December 1). Applying Strategic Environmental Assessment: Good Practice Guidance for Development Co-operation (2006).https://www.oecd.org/dac/environment-development/applying-sea-good-practice-guidance.htm
70. Partidário, M.R. (n.d.). Strategic Environmental Assessment (SEA) current practices, future demands and capacity-building needs. Course manual. International Association for Impact Assessment - IAIA Training Courses. https://iaia.org/pdf/UNEP/SEA/SEAManual.pdf; Organization for Economic Co-operation and Development. (2006, December 1). Applying Strategic Environmental Assessment: Good Practice Guidance for Development Co-operation (2006). https://www.oecd.org/dac/environment-development/applying-sea-good-practice-guidance.htm
71. Sheate, W. R., Dagg, S., Richardson, J., Aschemann, R., Palerm, J., & Steen, U. (2003). Integrating the Environment into Strategic Decision-Making: Conceptualizing Policy SEA. European Environment, 13(1), 1–18. doi:10.1002/eet.305. https://www.researchgate.net/publication/227788593_Integrating_the_environment_into_strategic_decision-making_Conceptualizing_policy_SEA
72. Ibid
73. Organization for Economic Co-operation and Development. (2006, December 1). Applying Strategic Environmental Assessment: Good Practice Guidance for Development Co-operation (2006). https://www.oecd.org/dac/environment-development/applying-sea-good-practice-guidance.htm
74. International Institute for Environment and Development (IIED). (n.d.). Profiles of Tools and Tactics for Environmental Mainstreaming. No. 9 Scenario Planning. Environmental Mainstreaming Initiative.https://www.environmental-mainstreaming.org/documents/EM%20Profile%20No%209%20-%20Scenario%20Planning%20(6%200ct%2009).pdf



Annex

Annex 1. **Summary of methods for the Green Growth Index**

A. Index Development Process

A.1 Iterative Approach

GGGI adopted a thorough process in designing the Green Growth Index through iterative activities, including expert consultations, assessment of expert feedback, and quality improvements. GGGI pursued two complementary strategies to enhance the relevance and practicality of the Index in policymaking:

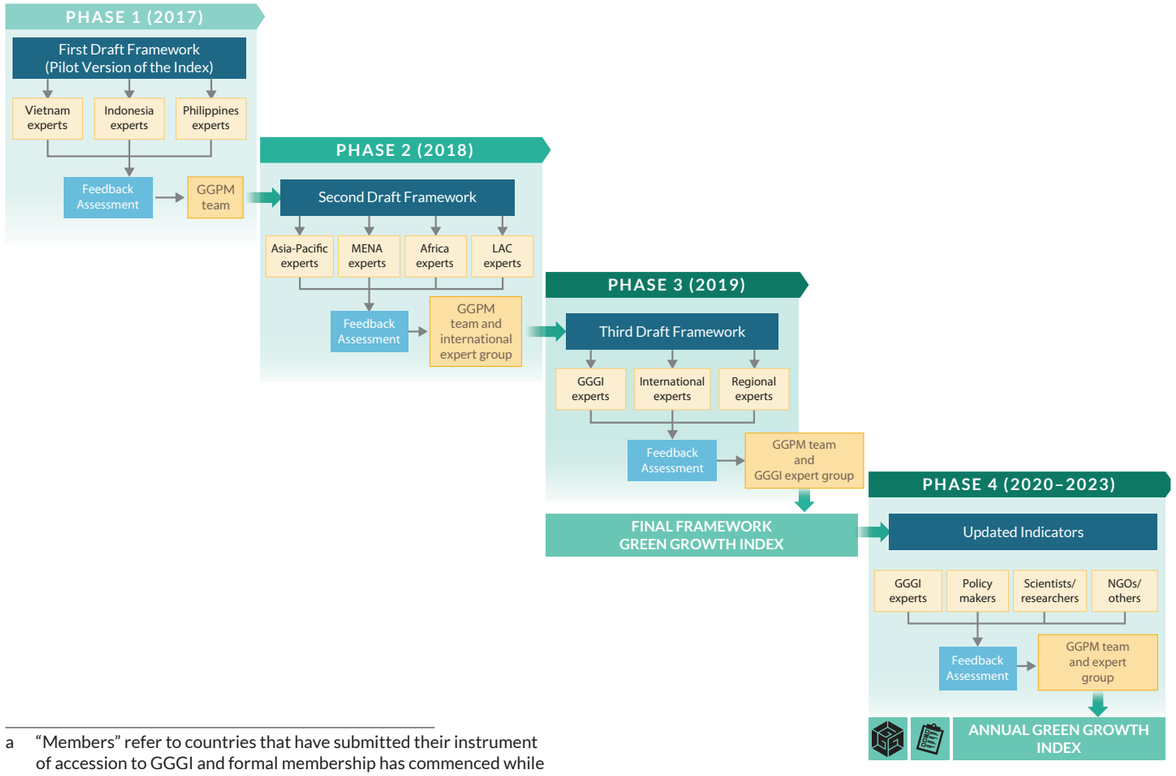
- A stepwise scientific approach through rigorous research to understand the complexity and multi-dimensionality of green growth and
- A consultative process involving experts and other stakeholders to determine the indicators' policy relevance in the national and regional contexts.

A.2 Participatory Approach

The stakeholder engagement process was initiated in 2016 and completed in early 2019. The four main phases included (Figure A.1):

1. **Phase 1 – Pilot:** GGGI developed a pilot version of the Index covering 34 GGGI member and partner countries.[1] The Index was presented in an international expert workshop at GGGI headquarters in Seoul, South Korea, three in-country stakeholder workshops (in Vietnam, Indonesia, and the Philippines), and international stakeholder consultation during Global Green Growth Week 2017 in Addis Ababa, Ethiopia. These consultative activities aimed to inform GGGI member countries about the ongoing process of developing the Index and collect initial feedback.

Figure A.1. Process for developing the framework of the Green Growth Index



a "Members" refer to countries that have submitted their instrument of accession to GGGI and formal membership has commenced while "partner countries" include countries where GGGI has operations and those that have formally communicated their intent to become a Member.

2. **Phase 2 – Regional Consultations:** GGGI presented the revised framework incorporating the preliminary feedback in 2018 in four regional consultation workshops for the Asia-Pacific Region (Bangkok), Middle East (Dubai), Africa (Addis Ababa), and Latin America and the Caribbean (Mexico City), as well as an international expert meeting in Geneva. These workshops served as a platform for dialogue and interaction among the stakeholders to ensure a transparent process for improving the Index. The outcomes of the workshops were presented during an international expert meeting in Rome, Italy.

3. **Phase 3 – Expert Consultations**: The last phase of the Index development process involved the circulation of the draft technical report on the concept, methods, and applications of the Index to the internal and external experts for their review and feedback. GGGI collected expert feedback through an online survey. GGGI also conducted two additional expert consultations—the first with GGGI thematic experts to align the Index to the priority areas of the Institute and the second with selected research institutions and international organizations[b] to validate the sustainability targets. These expert inputs from the online survey and consultations were used to finalize the Index.

4. **Phase 4 – Annual Expert Consultations:** The fourth phase of the Index development process is the expert consultations conducted yearly to continuously improve the indicators of the Green Growth Index. As discussed in Chapter 6 and as indicated in Table 6, missing green growth indicators will need to be included, and proxy variables will still need to be replaced with more relevant indicators when data becomes available in the coming years.

This year's annual expert consultation focused on selecting additional indicators for the green economic opportunities dimension. GGGI and GGKP collaborated in conducting a virtual workshop on the 12th of September 2023, which aimed to present the results of the online survey conducted before the workshop and validate the two top-rated green economic opportunities indicators. A detailed description of this year's consultations is discussed in Chapter 6.1 and Annex 5.

B. Analytical and Empirical Methods

B.1 Stepwise Analytical Approach

In building the Green Growth Index, GGGI applied a stepwise approach that conforms to "good practices" in developing composite indices[c] (Figure A.2. A composite index combines several indicators into a single score, which facilitates the comparison, ranking, benchmarking, and monitoring of progress for multifaceted, complex phenomena.

The development of the Green Growth Index followed four key steps:

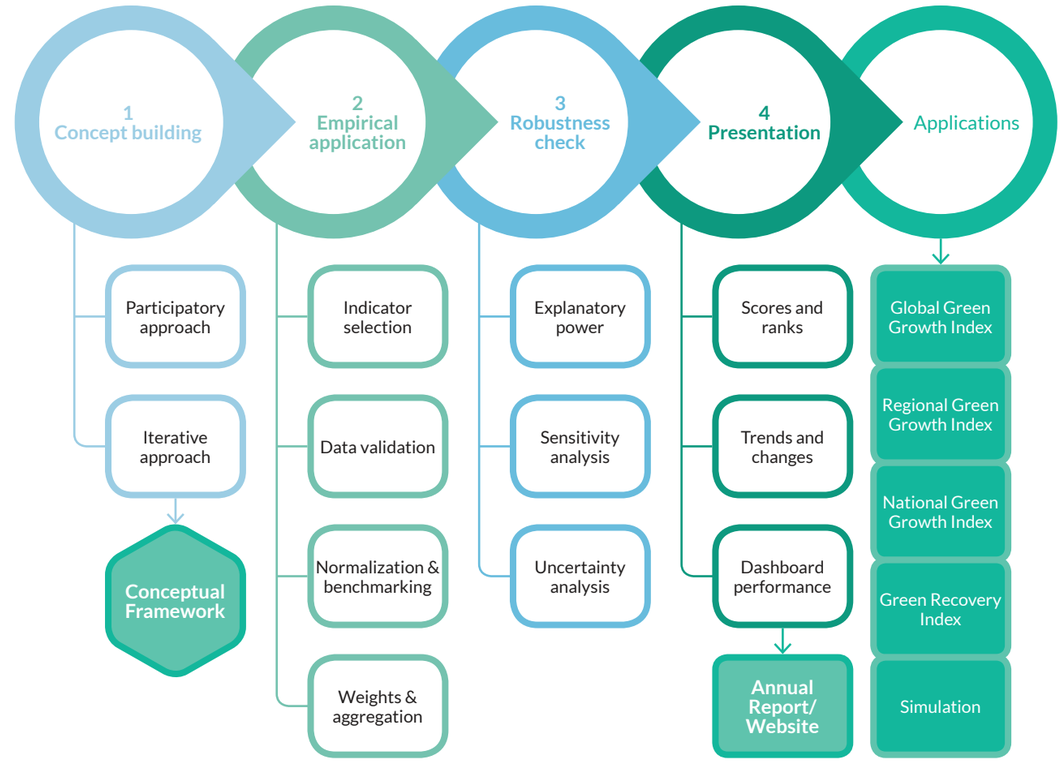
- **Concept building** entails defining the objectives of the Index, conceptualizing green growth, and identifying its dimensions and indicators;
- **Empirical application** requires addressing methodological issues such as indicator selection, data preparation (i.e., scaling, imputation, outliers, correlation), normalization, weights, and aggregation of indicators;
- **Robustness check** involves assessing the explanatory power of the Index through correlation analysis and changes in model inputs and its impacts on aggregation through sensitivity and uncertainty analyses; and
- **Presentation** focuses on communicating the results at the global, regional, and country scale using various diagrams and tables.

The Green Growth Index has various applications (Chapter 7), including the Global Green Growth Index (i.e., this report), Regional and National Green Growth Index, Green Recovery Index, and Green Growth Simulation Tool. The four key steps are applied in all applications of the Green Growth Index.

b IASS, PIK, FAO, SDSN and OECD.

c Nardo, M., Saisana, M., Saltelli, A., & Tarantola, S. (2005). Tools for Composite Indicators Building. Ispra, Italy: European Commission Joint Research Centre: Institute for the Protection and Security of the Citizen Econometrics and Statistical Support to Antifraud Unit; OECD & JRC 2008, op. cit.

Figure A.2. Stepwise approach for developing the Green Growth Index



B.2 Empirical Steps

The Green Growth Index was constructed through the aggregation of the normalized indicators (metrics), indicator categories (pillars), and dimensions (goals) (Figure C). Before the aggregation, several steps were necessary to select, prepare, and validate the indicators included in constructing the Index:

1. **Indicator selection:** Several criteria were applied in the selection of indicators, including the relevance of the data to the green growth dimensions based on conceptual and empirical evidence, coverage of more than 140 countries (including most GGGI member and partner countries); availability of time-series data to allow updates of the Index on a regular interval; accessibility of the data to ensure replication of methods and credibility of their sources; and acceptable level of association with other indicators in the same dimension. In a few cases, however, the criteria for country coverage and time-series data were waived due to a significant lack of data. All data were collected from online sources, mainly published in the UNSTATS SDG database and databases from other international organizations (e.g., FAO, World Bank, WIPO, UN COMTRADE, etc.).

2. **Data preparation:** Scaling and imputation are the most important methods to prepare the data and improve the comparability of the indicators. Scaling the data with an appropriate denominator (e.g., GDP, land area, etc.) allows an objective comparison across small and large countries. All indicators' available data were scaled except for the GHG emissions, export of environmental goods, and environmental technology patents. Imputing data based on the available time-series data helps improve the country coverage of the indicators. To minimize the effects of imputation on data uncertainty, the simple method of imputing data from the closest years was applied.

3. **Data validation:** The most important method to validate the statistical appropriateness of the indicator data is to check for outliers and correlation. Since outliers can distort the indicators' statistical properties and normalized values,[d] their values were capped using lower or upper fences based on the interquartile range from 75th and 25th percentiles. The correlation analysis aims to identify redundant indicators with a robust correlation to improve the explanatory power of the indicators and verify whether indicators have acceptable levels of association in their respective dimensions. Indicators with strong correlations were excluded from the framework and replaced with ones with acceptable association levels.

4. **Indicator weights:** With 12 green growth indicators added to the green economic opportunities in this year's Green Growth Index, assigning weights to the indicators was unnecessary. Each pillar across four dimensions has an equal number of indicators, i.e., three.

5. **Indicator normalization:** It is necessary to apply a normalization method to translate the indicators with different units into a standard scale. Normalization allows the indicator values measured in different units to be adjusted to a single scale to make the data comparable across the indicators. The re-scaling method (min-max transformation) for normalization was applied for the following reasons: it is the simplest and most widely used method that will facilitate ease of comprehensibility and replication; the use of upper and lower bounds will reduce issues related to outliers; and the integration of the targets will allow benchmarking against sustainability targets.

As presented, the normalized indicators were used as inputs to the aggregation model (i.e., level 1). The two most common and straightforward aggregation methods include linear aggregation using arithmetic mean and geometric aggregation using geometric mean. These two methods have different underlying assumptions. Linear aggregation allows full and constant compensability, i.e., low values in one indicator can be traded off (substituted) by high values

d Mishra, S. K. (2008). Construction of Composite Indices in Presence of Outliers. SSRN Electronic Journal, 1–5. https://doi.org/10.2139/ssrn.1137644; OECD & JRC 2008, op. cit.; Ibid.

in another. On the other hand, geometric aggregation allows only partial compensability, limiting the ability of the indicators with very low scores to be fully compensated by indicators with high scores. The two methods were applied in the different aggregation models so that, 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 compensability of the individual indicators in each indicator category. 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 compensability between indicators in each dimension. Like in Level 1, the 25 percent rule on missing values was applied to the dimensions with more than four indicator categories, i.e., resource efficiency and green economic opportunities.

3. **Level 3:** Geometric aggregation was applied to the dimensions, and 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.

Python software was used to conduct all the analyses described above, except for the correlation analysis, which was done in Prism (GraphPad Software). Detailed discussion on constructing the Green Growth Index is provided in Chapter 5 of GGGI Technical Report Number 5, *Green Growth Index: Concepts, Methods, Applications* (Acosta et al. 2019a).[e]

C. Validating and Improving the Index

Composite indices often face criticism because they can be misleading if poorly constructed and interpreted.[f] Thus, the final critical step in developing a composite index is evaluating the confidence in the model and its underlying assumptions (i.e., robustness check).

Two different types of analyses were conducted to validate the robustness of the Green Growth Index:

- **Sensitivity analysis:** Using Monte Carlo analysis, the sensitivity of the Green Growth Index to changes in the input variables of the aggregation model at the indicator level was analyzed.

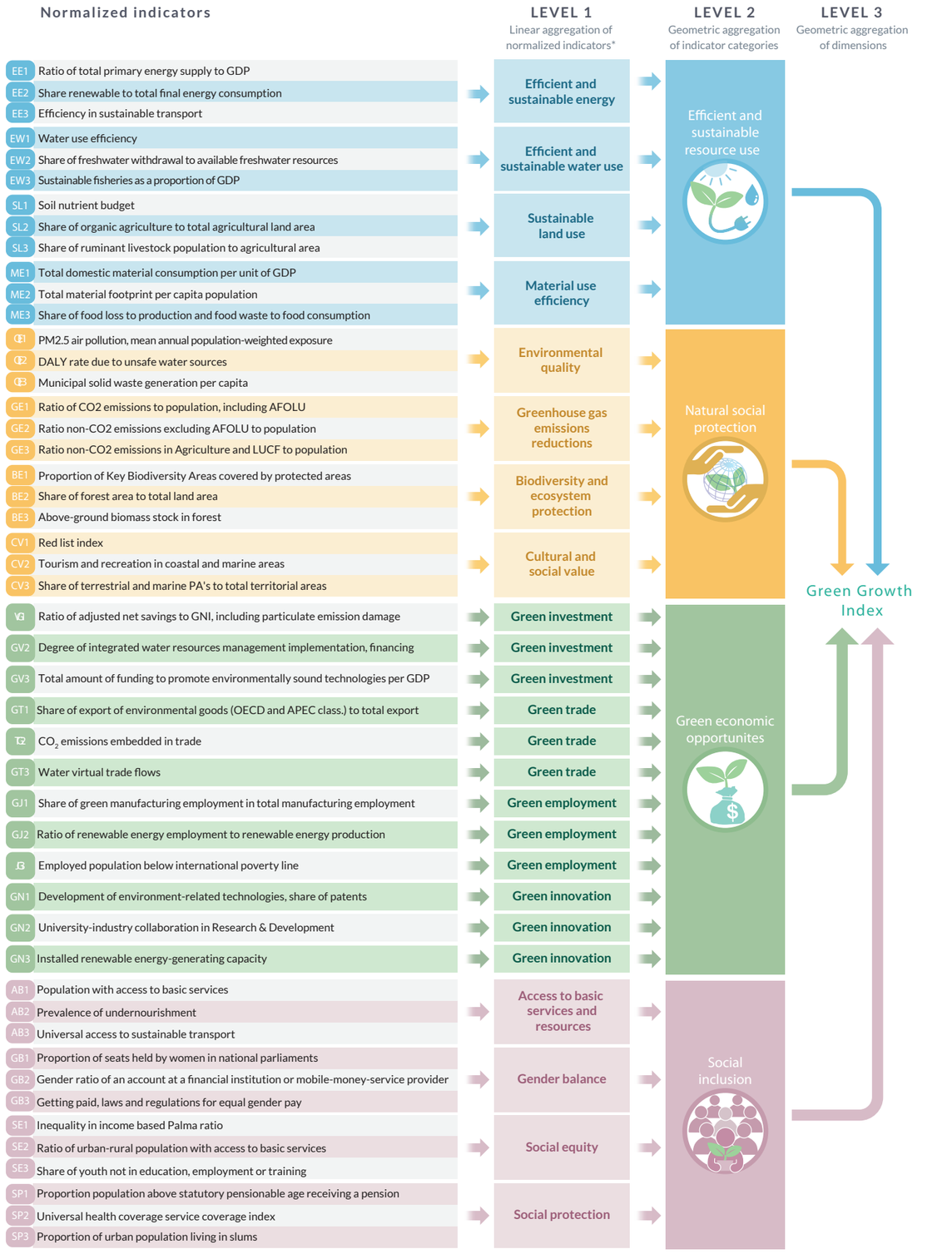
- **Explanatory power:** Using correlation and regressionanalyses, the ability of the indicators and their aggregated values (i.e., indicator categories, dimensions) to explain the structure of the Index at the pillar and dimension was analyzed.

The sensitivity analysis checks the impacts of changing the indicator values and missing indicator data on the Green Growth Index scores. This is critical to ensure the robustness of the scores because a few databases tend to change during annual updates by the publishers (Annex 2). The results from the regression models suggested that the dimensions, indicator categories, and indicators explain sufficient variation in the Green Growth Index. At the same time, the results from sensitivity analysis showed that the Green Growth Index is robust concerning changes in model inputs and assumptions. The results of the robustness check are discussed in Annex 3.

e https://greengrowthindex.gggi.org/wp-content/uploads/2019/12/Green-Growth-Index-Technical-Report_20191213.pdf

f Saisana, M., & Tarantola, S. (2002). State-of-the-art report on current methodologies and practices for composite indicator development. European Commission, pp. 1–72. https://doi.org/10.13140/RG.2.1.1505.1762

Figure A.3. Methods of aggregation at the indicator, indicator category, and dimension levels



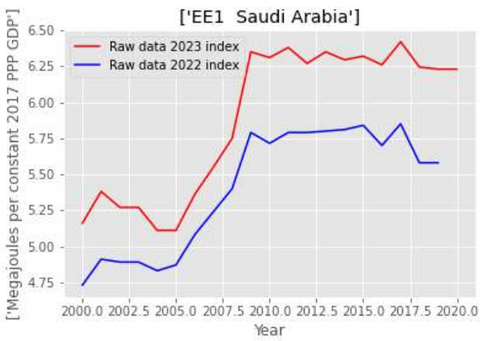
*No aggregation for indicators of green economic opportunities

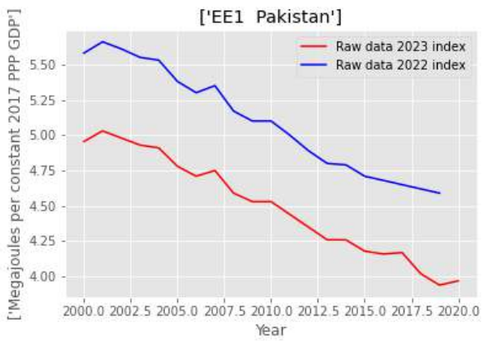
Annex 2. **Divergences in databases for selected green growth indicators in 2022 and 2023 Green Growth Index**

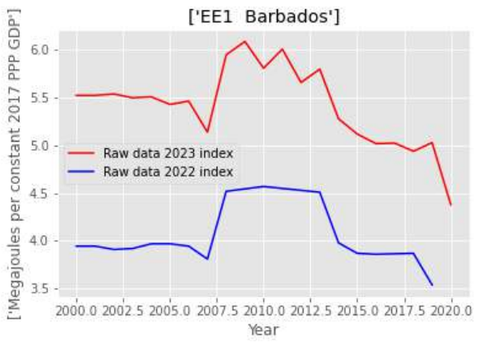
The raw data of all indicators for the 2022 and 2023 Green Growth Index were compared to identify any divergence that will affect the scores. Generally, there are divergences on the data reported in the online databases between 2022 and 2023. The diagrams below show indicators with significant divergences between databases for selected countries (Figure A.4). Overall, 15 indicators out of 48 represent data divergence for some countries. The data sources of indicators were the same for 2022 and 2023 Green Growth Index.

Figure A.4. Divergences in databases between 2021 and 2022 for selected indicators and countries

EE1: Energy intensity level of primary energy (MJ per $2011 PPP GDP)







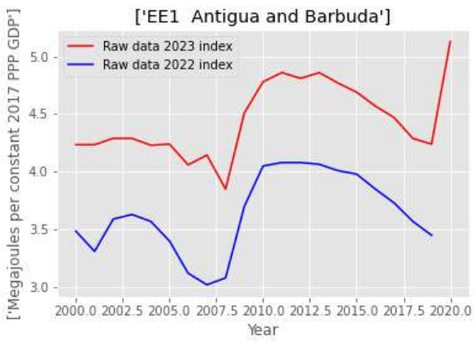
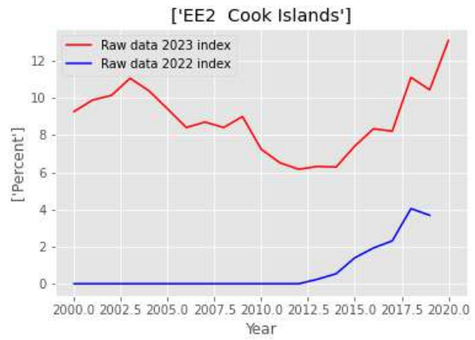
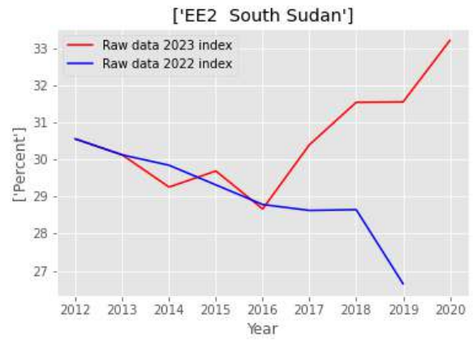
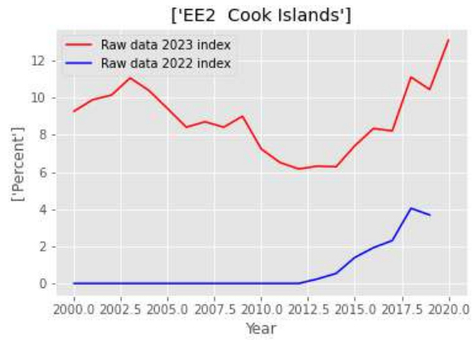


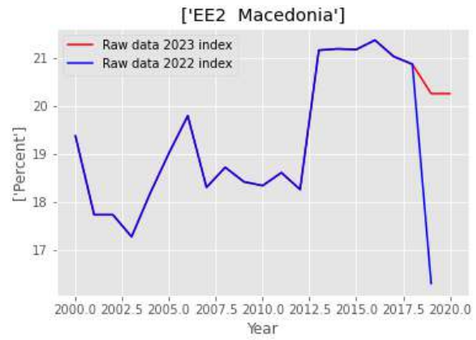
Figure A.4 Divergences in databases between 2021 and 2022 for selected indicators and countries *(continued)*

EE2: Share renewable to total final energy consumption (Percent)

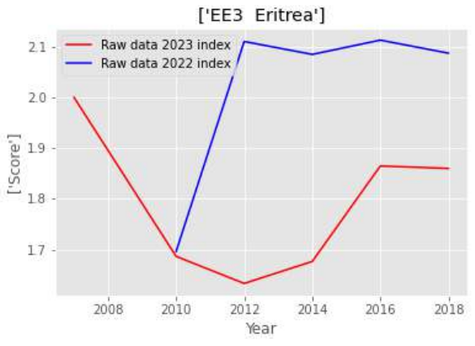


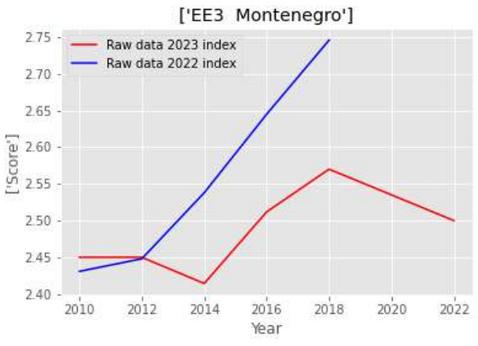


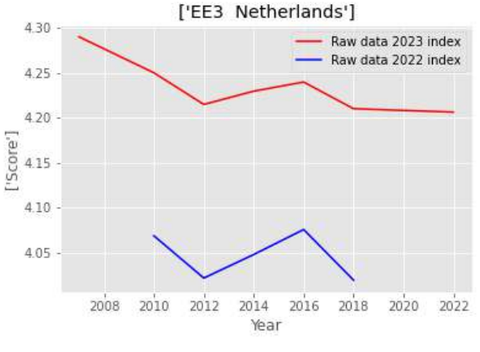




EE3: Efficiency in sustainable transport (Score)







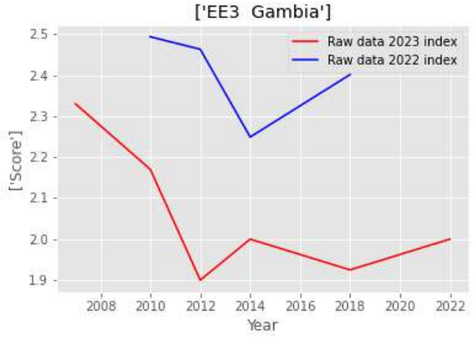
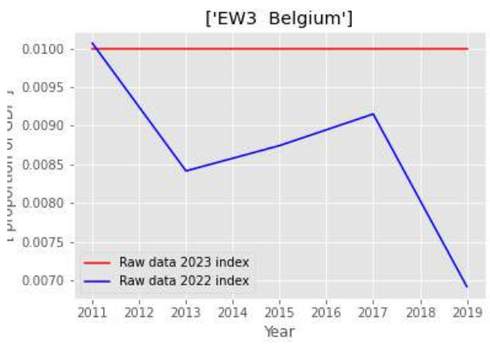
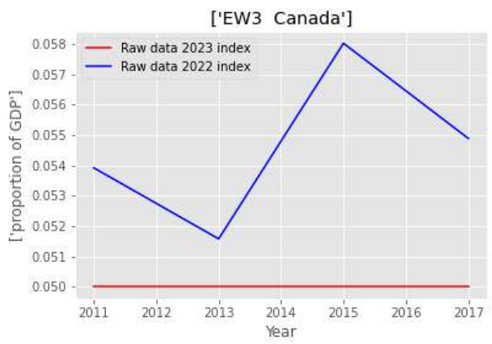


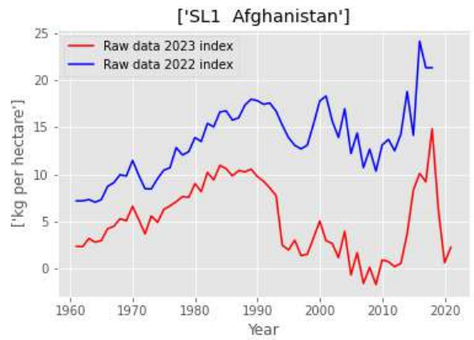
Figure A.4 Divergences in databases between 2021 and 2022 for selected indicators and countries *(continued)*

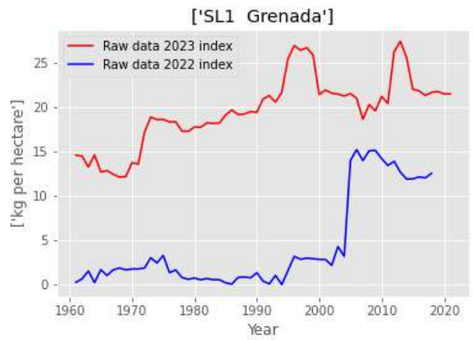
EW3: Sustainable fisheries as a proportion of GDP (Proportion of GDP)

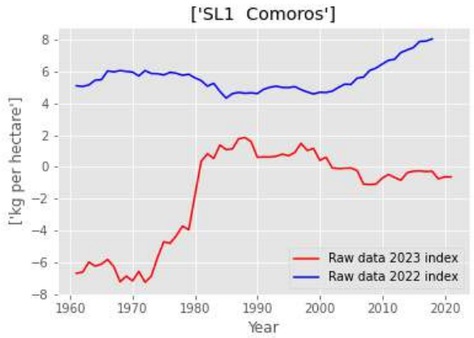




SL1: Nutrient balance per unit area (Kg per hectare)







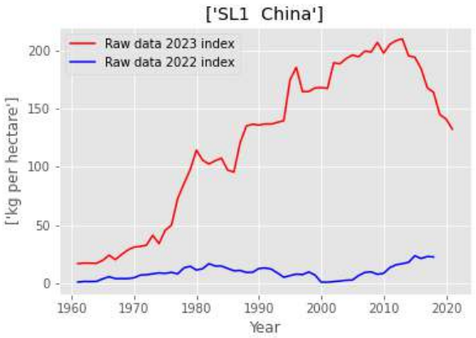
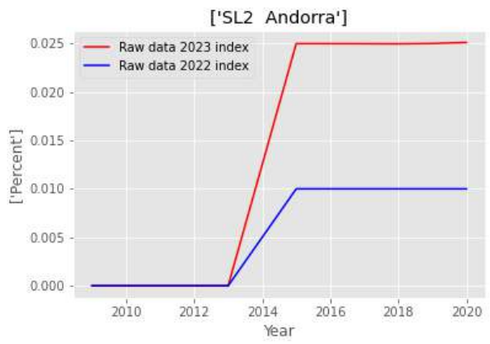
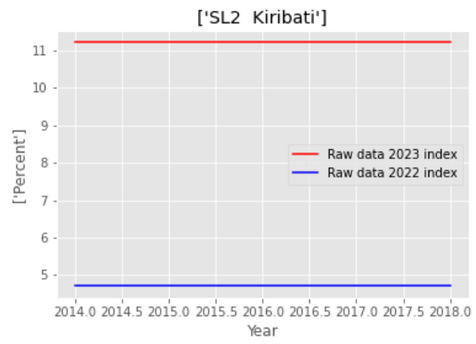
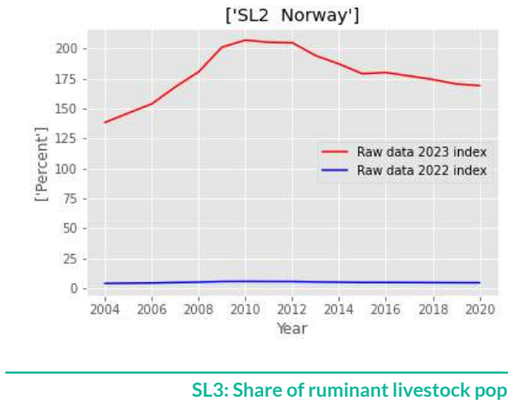


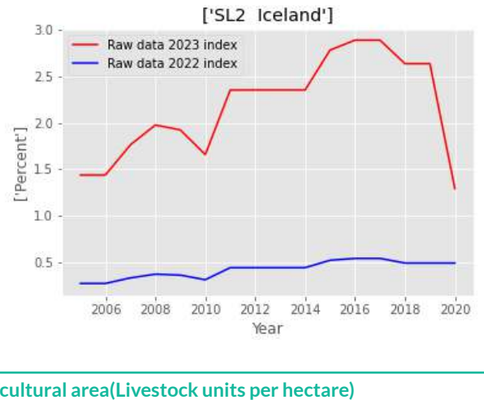
Figure A.4 Divergences in databases between 2021 and 2022 for selected indicators and countries *(continued)*

SL2: Share agriculture organic to total agriculture land area (Percent)

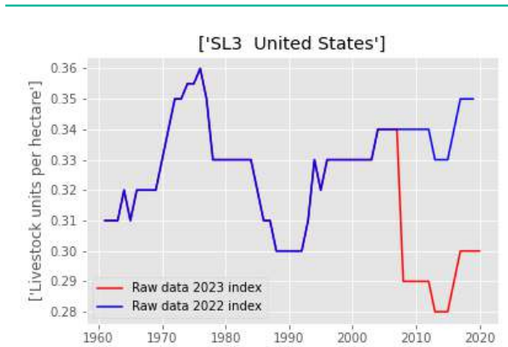


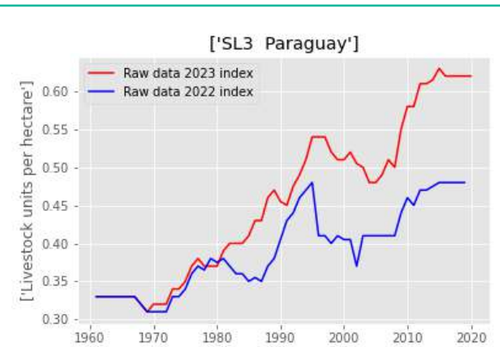






SL3: Share of ruminant livestock population to agricultural area(Livestock units per hectare)





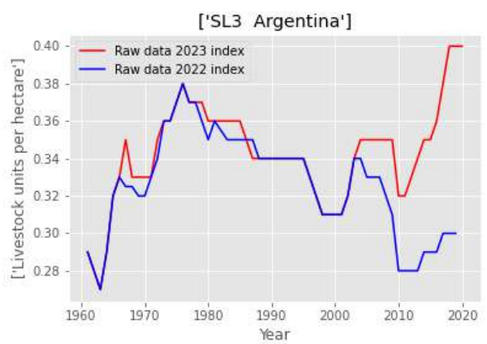
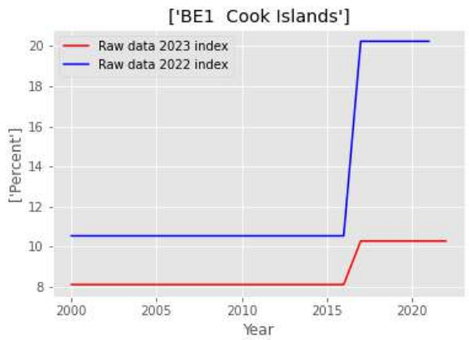
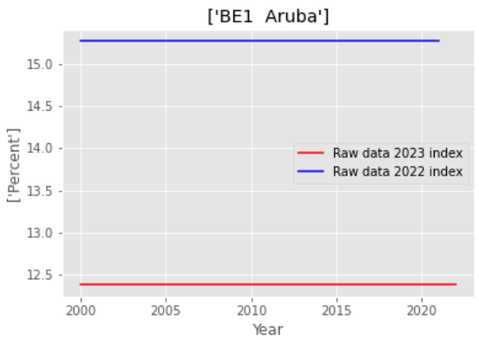
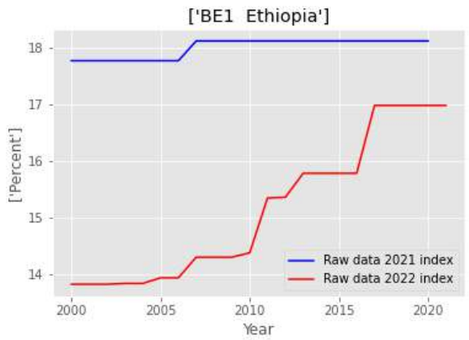


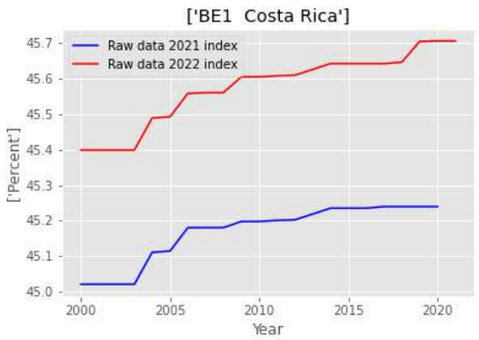
Figure A.4 Divergences in databases between 2021 and 2022 for selected indicators and countries *(continued)*

BE1: PM2.5 air pollution, mean annual population-weighted exposure (Percent)









BE2: Share Forest area to total land area (Percent)

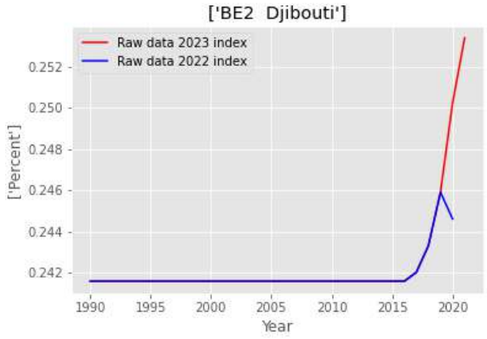
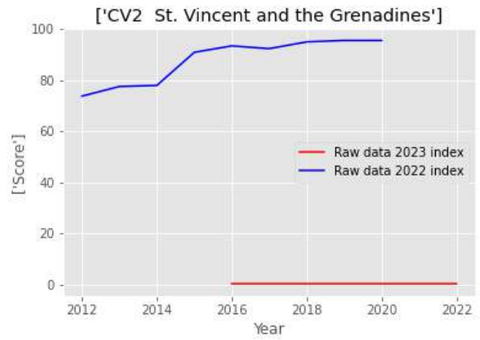
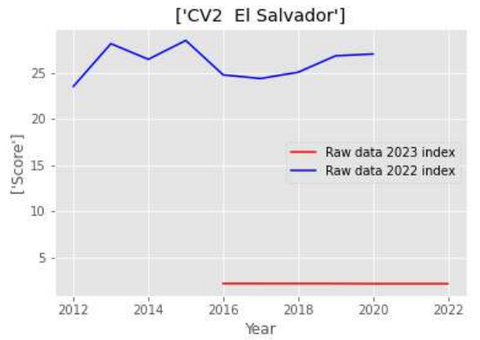
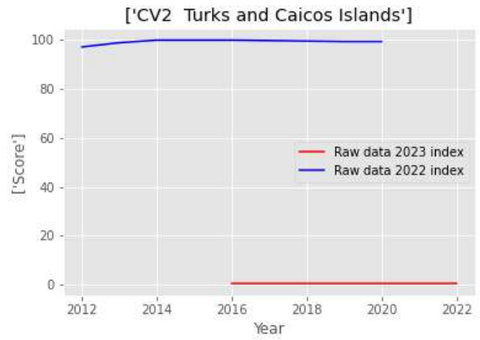


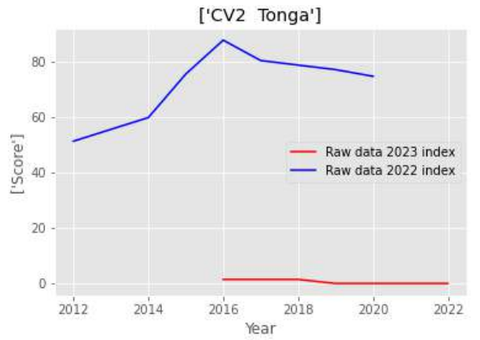
Figure A.4 Divergences in databases between 2021 and 2022 for selected indicators and countries *(continued)*

CV2: Tourism and recreation in coastal and marine areas (Score)

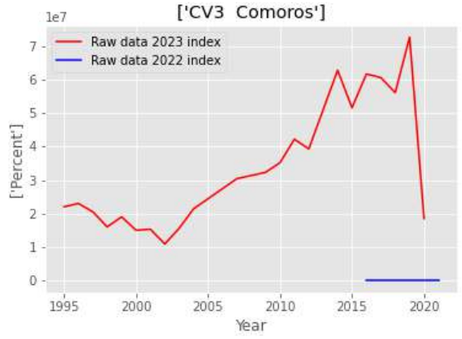


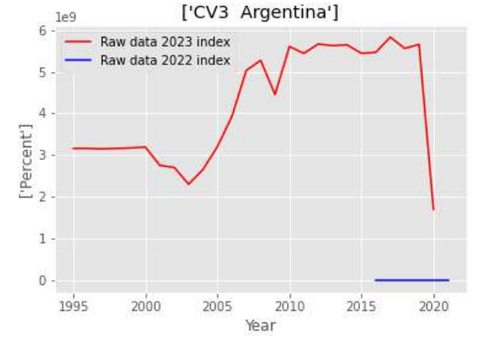


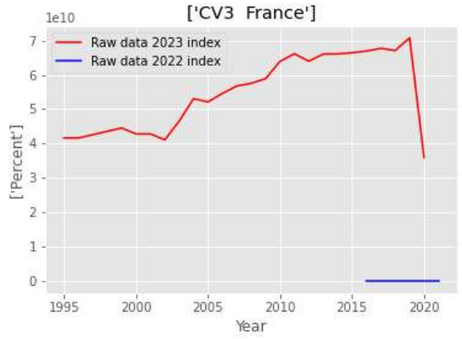




CV3: Share of terrestrial and marine protected areas to total territorial areas (Percent)







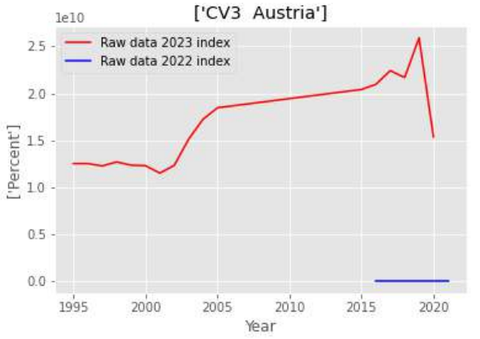
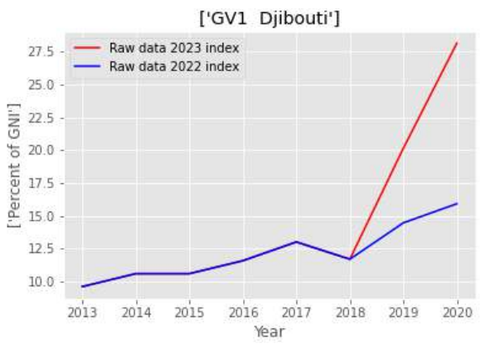
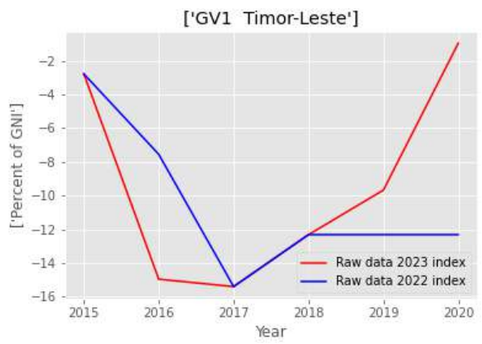


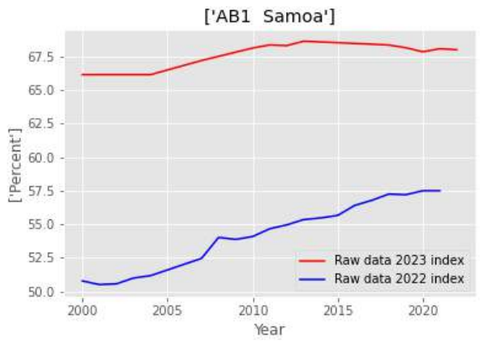
Figure A.4 Divergences in databases between 2021 and 2022 for selected indicators and countries *(continued)*

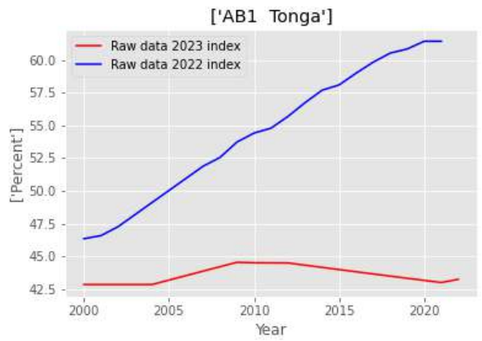
GV1: Adjusted net savings, including particulate emission damage (% of GNI))

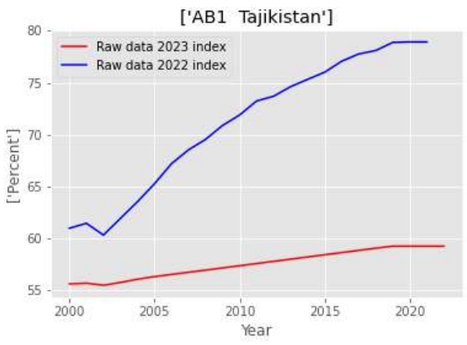




AB1: Population with access to basic services, i.e. Water, sanitation, electricity, and clean fuels (Percent)







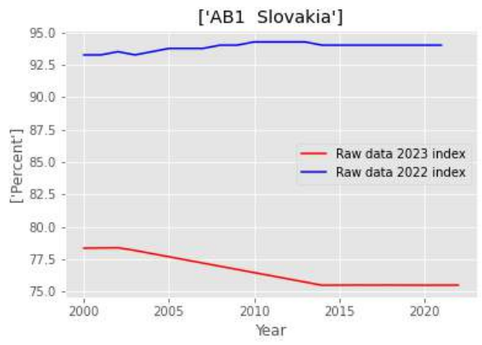
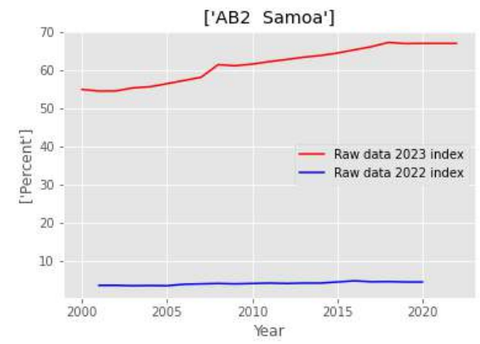
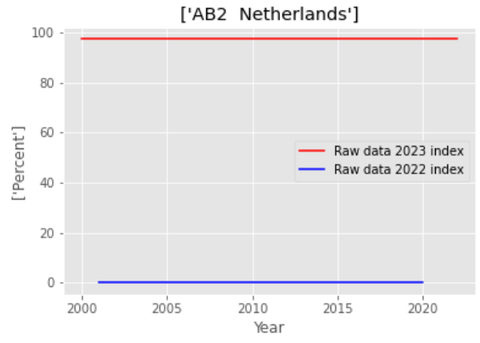
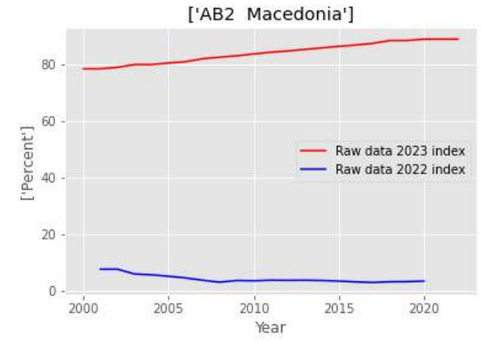


Figure A.4 Divergences in databases between 2021 and 2022 for selected indicators and countries *(continued)*

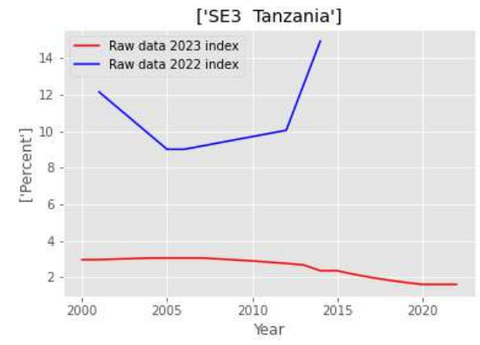
AB2: Prevalence of undernourishment (Percent)

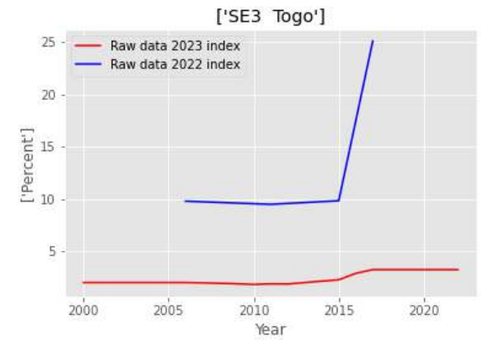


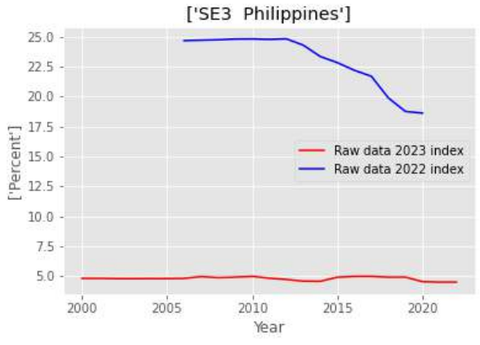


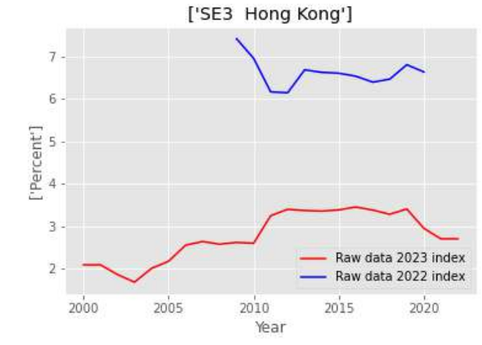


SE3: Share of youth (aged 15-24 years) not in education, employment, or training (Percent)









Annex 3. **Robustness check**

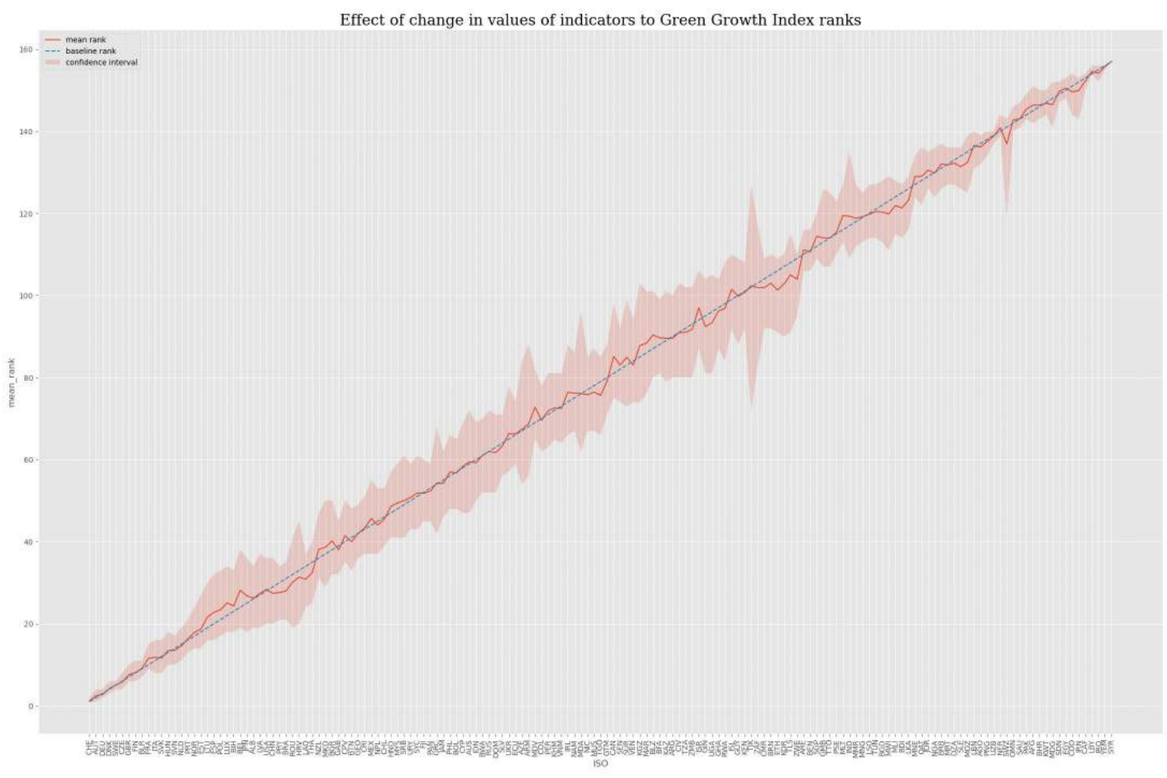
Composite indices often face criticism because they can be misleading if poorly constructed and interpreted.[g] Thus, the final critical step in developing a composite index is evaluating the confidence in the model and its underlying assumptions (i.e., robustness check). Two types of analyses were conducted to validate the robustness of the Green Growth Index:

- Using Monte Carlo analysis, check the sensitivity of the Green Growth Index to changes in the input variables of the aggregation model at the indicator level.
- Using correlation and regression analyses, check the scores' explanatory power to determine the indicators' ability and their aggregated values (i.e., indicator categories and dimensions) to explain the changes in the Green Growth Index.

A. Sensitivity analysis

Monte Carlo methods are an easy and efficient class of algorithms often used for sensitivity analysis because they can simulate many experiments to obtain quantities of the tested objects.[h] In this analysis, we simulate perturbations to the 2023 Green Growth Index to estimate its sensitivity to the changes in the values and missing values of the indicators. Each simulation is run 1000 times, and each run's number was determined empirically. For checking the sensitivity to the changes in the values of the indicators, the change was sampled from a Gaussian distribution. For checking sensitivity to missing data in indicators, random "nans" were added to the values of the indicators. This provided a stable estimate for each of the properties tested. The impact on the Index scores and ranks was analyzed in the simulation runs.

Figure A.5. Effect of changing values of indicators on the Green Growth Index ranks



g Saisana, M., & Tarantola, S. (2002). State-of-the-art report on current methodologies and practices for composite indicator development. European Commission, pp. 1–72. https://doi.org/10.13140/RG.2.1.1505.1762

h Burhene (2013) Monte Carlo Based Uncertainty and Sensitivity Analysis for Building Performance Simulation https://www.reiner-lemoine-stiftung.de/en/pdf/dissertationen/Dissertation-Sebastian_Burhenne.pdf

A.1 Changes in values of indicators

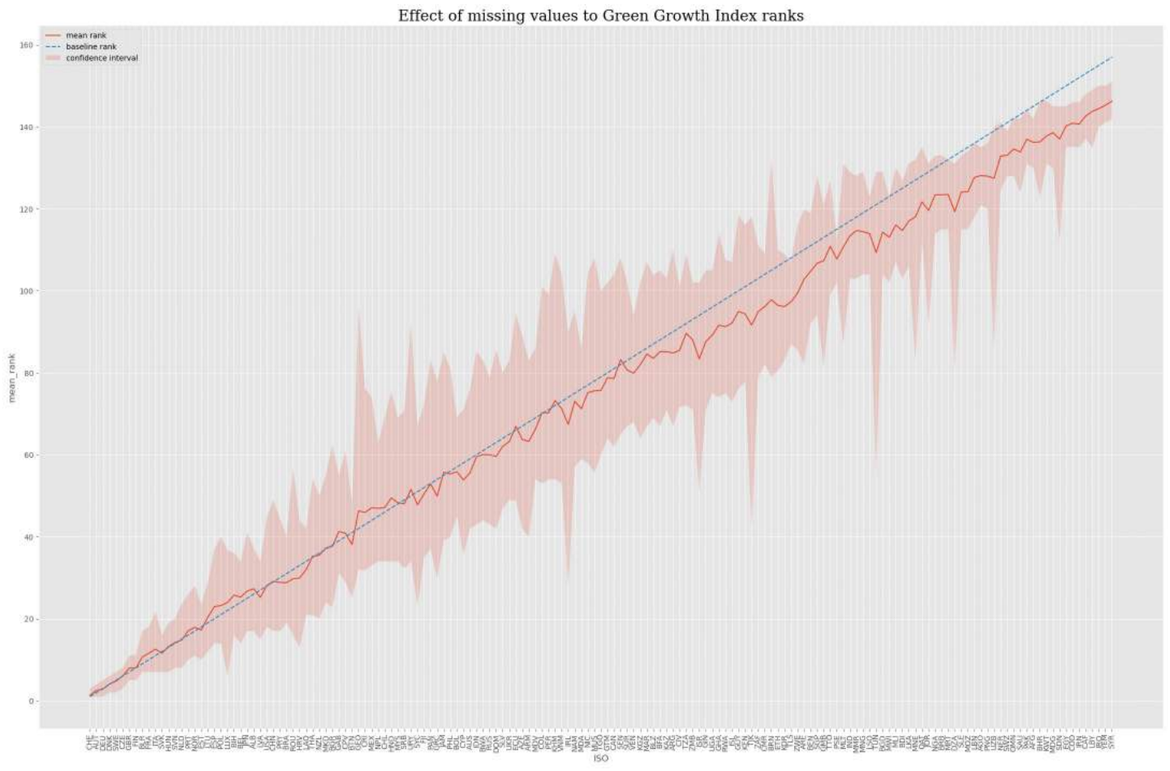
The sensitivity analysis checks for perturbations in the raw data of the indicators. This experiment aims to understand how the Index scores and the resulting ranks react to changes in the indicator values. In each simulation, modifications were made to the raw data of the indicators. As the first step, perturbations were sampled from a Gaussian distribution for each indicator. The distribution has a mean of zero; its standard deviation equals 10 percent of the measured value. As the second step, these perturbations were used in the values of the indicators. As the final step, a new Green Growth Index was computed using the perturbed data. These steps were repeated 1000 times to calculate many slightly different scores for the Green Growth Index. Figure A.5 presents the results from these steps, showing the average rank and 95 percent of the confidence interval for 1000 runs. The mean rank in red deviates slightly from the baseline rank dotted in blue. There is nearly no deviation for countries at the top and bottom of the ranking. For countries in the middle, the average deviation ranges from none to 3 ranks. The confidence interval for those countries is also wider, ranging from around +5 to −5 ranks. These results indicate that the Green Growth Index is relatively robust to the changes in the values of the indicators.

A.2 Missing values of indicators

The sensitivity analysis also checks for the impacts of missing values on the ranks. Recall from the aggregation methods that categories with three indicators can still be computed if a single indicator is missing (Annex 1). While this method may cause distortions, it also vastly improves the global coverage of the Green Growth Index. To measure the potential distortions caused by data gaps, values were removed randomly by 5 percent of the available data points. A distinct set of values was removed for each run before calculating a new Green Growth Index. The simulation run results are presented in Figure A.6, showing that uncertainty on the ranks grows as a country's rank increases. The confidence interval for the top 20 countries is centered around the baseline values. The scores range between +5 and −5 ranks at most. As the rank goes beyond 50, the average rank diverges from the baseline rank by around five ranks. Nonetheless, the relative ranks are mostly preserved. The average rank across simulations can vary by up to 10 ranks. The confidence interval for countries with a rank higher than 50 is wider. It can go as high as 15 ranks.

These results indicate that the impact on the ranks of missing data is more significant than the changes in the values of

Figure A.6. Effect of missing values of the indicators on the Green Growth Index ranks



the indicators. For this reason, improving data availability is a crucial step towards a more representative Green Growth Index. Simple imputation of missing data provides a temporary solution to this problem, as long as the confidence level based on the data availability is informed to guide the interpretation of the scores and ranks. Overall, the sensitivity analysis confirms that policymakers can confidently interpret the Green Growth Index.

B. Analysis of explanatory power

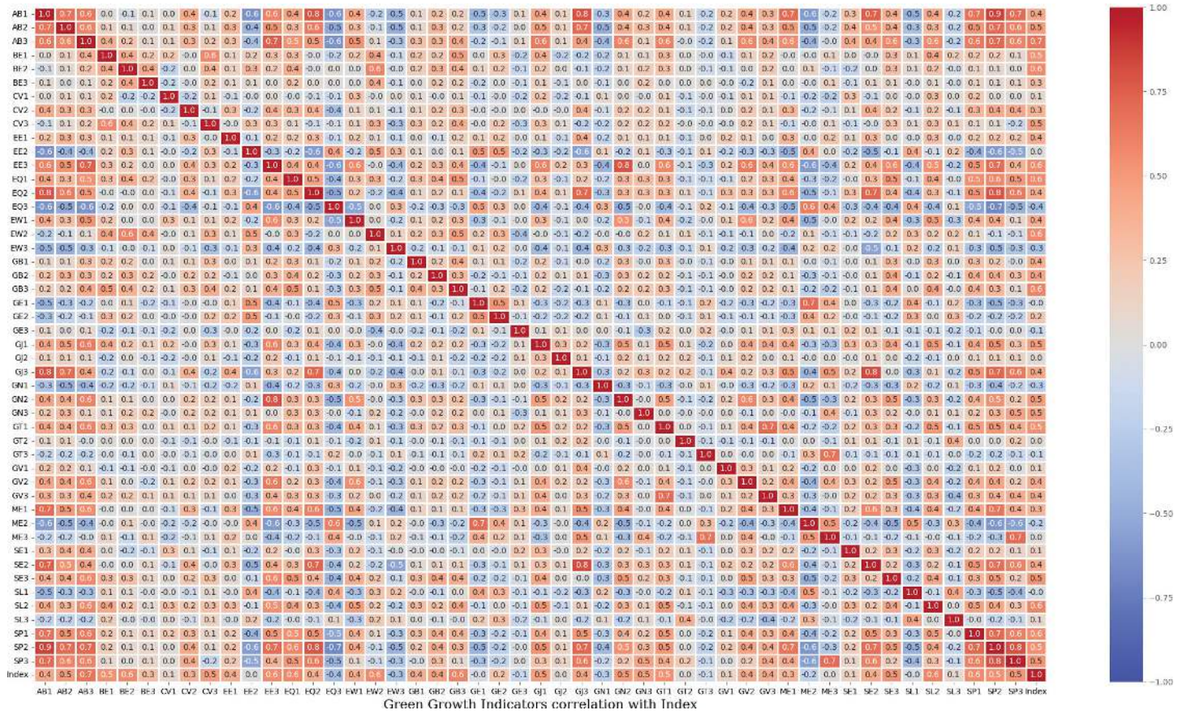
B.1 Correlation analysis

A correlation analysis was conducted to assess the relationships among various indicators and to determine the correlation between independent variables (green growth indicators) and dependent variables (Green Growth Index scores). The primary objective was to evaluate whether the indicators demonstrate meaningful associations within their respective dimensions. The analysis covered cross-sectional and longitudinal dimensions, examining 48 green growth indicators from 2010 to 2022 across 157 countries and corresponding Green Growth Index scores. Figure A.7 visually represents the correlation between normalized indicators and scores, providing a comprehensive overview of relationships across the indicators. The color intensity in red indicates a high positive correlation between the indicators and, in blue, a high negative correlation. Generally, neither extremely positive nor significantly negatively correlated green growth indicators are visible on the correlation heatmap. The absence of a strong correlation between indicators ensures that the changes in one indicator are not associated with shifts in another.

B.2 Regression analysis

The regression analysis was conducted to identify the extent to which the indicators' variance explains the Green Growth Index scores. Panel data analysis was performed on the indicators' cross-sectional and longitudinal global data from 2010 to 2022. A regression analysis is run over these two-dimensional data to identify the variance in the green growth index (Table A.1). The overall regression was statistically significant with an R-squared of 0.902, indicating the dataset's very good fitness. The adjusted R-squared is 0.900, with very minimal variation from the R-squared, meaning there is no overfitting, and the correlation is credible. The results show that 90 percent of the variance in the dependent variable (Green Growth Index) can be explained by the variance in the independent variables (green growth indicators). The P-value statistics from the regression analysis showing a P-value of less than 0.05 indicate the indicators' statistical significance. Most green growth indicators have P-values less than 0.05, implying a high statistical significance to the Green Growth Index scores. Only very few indicators show otherwise, including AB1 (0.083), BE1 (0.711), EQ2 (0.086), GE1 (0.926), GJ2 (0.078), and SP2 (0.308).

Figure A.7. Effect of changing values of indicators on the Green Growth Index ranks



Indicators:
AB1 - Population with access to basic services, i.e. Water, sanitation, electricity, and clean fuels; AB2 - Prevalence of undernourishment; AB3 - Universal access to sustainable transport; BE1 - Average proportion of Key Biodiversity Areas covered by protected areas; BE2 - Share of forest area to total land area; BE3 - Above-ground biomass stock in forest; CV1 - Red list index; CV2 - Tourism and recreation in coastal and marine areas; CV3 - Share of terrestrial and marine protected areas to total territorial areas; EE1 - Ratio of total primary energy supply to GDP; EE2 - Share renewable to total final energy consumption; EE3 - Efficiency in sustainable transport; EQ1 - $PM_{2.5}$ air pollution, mean annual population-weighted exposure; EQ2 - DALY rate due to unsafe water sources; EQ3 - Municipal solid waste (MSW) generation per capita; EW1 - Water use efficiency; EW2 - Share of freshwater withdrawal to available freshwater resources; EW3 - Sustainable fisheries as a proportion of GDP; GB1 - Proportion of seats held by women in national parliaments; GB2 - Gender ratio of an account at a financial institution or mobile-money-service provider; GB3 - Getting paid, laws and regulations for equal gender pay; GE1 - Ratio of CO_2 emissions to population, including AFOLU; GE2 - Ratio non-CO_2 emissions (CH_4, N_2O and F-gas) excluding AFOLU to population; GE3 - Ratio non-CO_2 emissions (CH_4 , N_2O and F-gas) in Agriculture and LUCF to population; GJ1 - Share of green employment in total manufacturing employment; GJ2 - Renewable Energy Employment by Country to total renewable energy; GJ3 - Employed population below international poverty line, by sex and age; GN1 - 7-Year rolling average, patents on environment technologies; GN2 - University-industry collaboration in Research & Development; GN3 - Installed renewable electricity-generating capacity; GT1 - Share export of environmental goods (OECD and APEC class.) to total export; GT2 - CO_2 emissions embedded in trade; GT3 - Water virtual trade flows; GV1 - Ratio of adjusted net savings to GNI, including particulate emission damage; GV2 - Degree of integrated water resources management implementation, financing GV3 - Total amount of funding to promote environmentally sound technologies per GDP; ME1 - Total domestic material consumption per unit of GDP; ME2 - Total material footprint per capita population; ME3 - Share of food loss to production and food waste to food consumption; SE1 - Inequality in income based on Palma ratio; SE2 - Population with access to basic services by urban/rural, i.e. electricity; SE3 - Share of youth (aged 15-24 years) not in education, employment or training; SL1 - Soil nutrient budget; SL2 - Share agriculture organic to total agriculture land area; SL3 - Share of ruminant livestock population to agricultural area; SP1 - Proportion population above statutory pensionable age receiving a pension; SP2 - Universal health coverage (UHC) service coverage index; SP3 - Proportion of urban population living in slums

Table A.1. Effect of green growth indicators on Green Growth Index scores, 2010-2021

Indicator code	Indicator names	Coefficient	Standard error	P-value
Constant		-12.383	1.587	0.000
AB1	Population with access to basic services i.e. Water, sanitation, electricity. and clean fuels	0.006	0.004	0.083
AB2	Prevalence of undernourishment	-0.027	0.004	0.000
AB3	Universal access to sustainable transport	0.048	0.005	0.000
BE1	Average proportion of Key Biodiversity Areas covered by protected areas	0.001	0.002	0.711
BE2	Share forest area to total land area	0.027	0.002	0.000
BE3	Above-ground biomass stock in forest	-0.009	0.003	0.002
CV1	Red list index	0.012	0.003	0.000
CV2	Tourism and recreation in coastal and marine areas	0.025	0.002	0.000
CV3	Share of terrestrial and marine protected areas to total territorial areas	0.031	0.002	0.000
EE1	Energy intensity level of primary energy	0.039	0.003	0.000
EE2	Share renewable to total final energy consumption	0.008	0.002	0.000
EE3	Efficiency in sustainable transport	0.023	0.006	0.000
EQ1	$PM_{2.5}$ air pollution, mean annual population- weighted exposure	0.010	0.003	0.005
EQ2	DALY rate due to unsafe water sources	-0.008	0.005	0.086
EQ3	Municipal solid waste (MSW) generation per capita	0.015	0.004	0.000
EW1	Water use efficiency	0.034	0.004	0.000
EW2	Share freshwater withdrawal to available freshwater resources	0.092	0.002	0.000
EW3	Sustainable fisheries as a proportion of GDP	0.019	0.003	0.000
GB1	Proportion of seats held by women in national parliaments	0.007	0.003	0.008
GB2	Share of adults (15 years and older) with an account at 8 financial institution or mobile- money-service provider	0.039	0.006	0.000
GB3	Getting paid, laws and regulations for equal gender pay	0.027	0.002	0.000
GE1	Ratio of CO_2 emissions to population. including AFOLU	0.000	0.003	0.926
GE2	Ratio non-CO_2 emissions (CH_4 N_2O and F-gas) excluding AFOLU to population	0.022	0.002	0.000
GE3	Ratio non-CO_2 emissions (CH_4 N_2O and F-gas) in Agriculture and LUCF to population	0.021	0.003	0.000

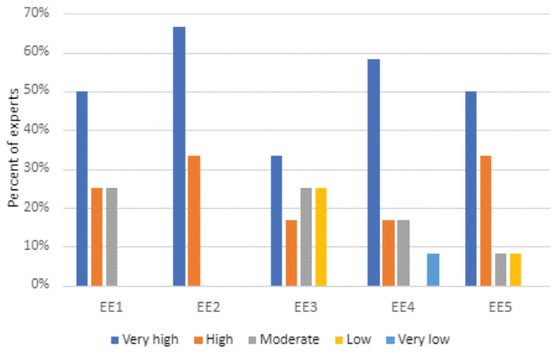
Table A.1 Effect of green growth indicators on Green Growth Index scores, 2010-2021 *(continued)*

Indicator code	Indicator names	Coefficient	Standard error	P-value
GJ1	Share of green employment in total manufacturing employment	0.063	0.003	0.000
GJ2	Renewable Energy Employment by Country to total renewable energy	-0.010	0.006	0.078
GJ3	Employed population below international poverty line	0.094	0.005	0.000
GN1	7 Years rolling average Patents on environment technologies	0.027	0.002	0.000
GN2	University-industry collaboration in Research & Development	0.062	0.004	0.000
GN3	Installed renewable electricity-generating capacity	0.043	0.004	0.000
GT1	Share export of environmental goods (OECD and APEC class.) to total export	0.024	0.005	0.000
GT2	CO_2 emissions embedded in trade	0.017	0.005	0.001
GT3	Water virtual trade flows	0.022	0.006	0.000
GV1	Ratio of adjusted net savings to GNI, including particulate emission damage	0.034	0.003	0.000
GV2	Degree of integrated water resources management implementation, financing	0.021	0.003	0.000
GV3	Total amount of funding to promote environmentally sound technologies per GDP	0.035	0.004	0.000
ME1	Domestic material consumption per unit of GDP	-0.052	0.008	0.000
ME2	Total material footprint (MF) per capital population	0.027	0.004	0.000
ME3	Share of food loss to production and food waste to food consumption	0.042	0.009	0.000
SE1	Inequality in income based Palma ratio	0.012	0.005	0.013
SE2	Population with access to basic services by urban/ rural, i.e. electricity	0.019	0.003	0.000
SE3	Share of youth (aged 15-24 years) not in education, employment or training	0.021	0.004	0.000
SL1	Soil nutrient budget	0.013	0.003	0.000
SL2	Share agriculture organic to total agriculture land area	0.010	0.002	0.000
SL3	Share of ruminant livestock population to agricultural area	0.085	0.009	0.000
SP1	Proportion population above statutory pensionable age receiving a pension	0.019	0.002	0.000
SP2	Universal health coverage (UHC) service coverage index	-0.006	0.006	0.308
SP3	Proportion of urban population living in slums	0.027	0.004	0.000

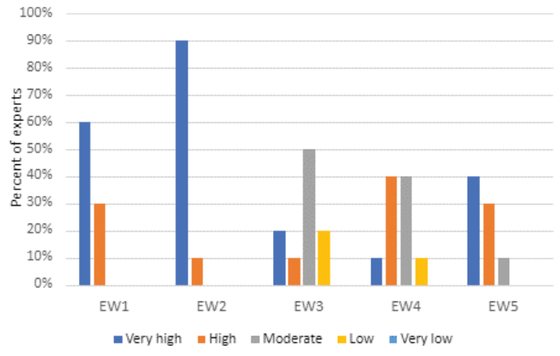
Annex 4. **Results of the second online survey with international experts**

Figure A.8. Ratings given by international experts on the 80 indicators for the Kenya Green growth Index

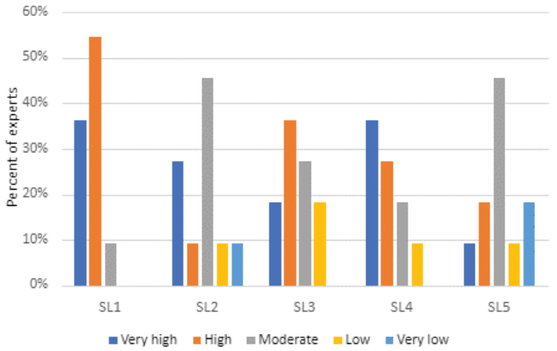
Efficient and sustainable resource use



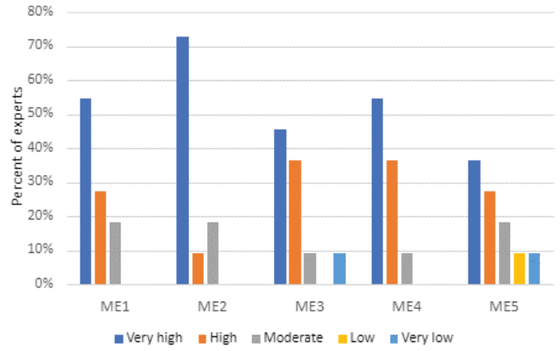
Efficient and sustainable energy (EE)



Efficient and sustainable water use (EW)



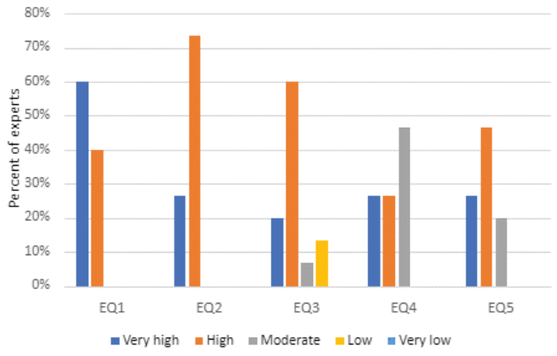
Sustainable land use (SL)



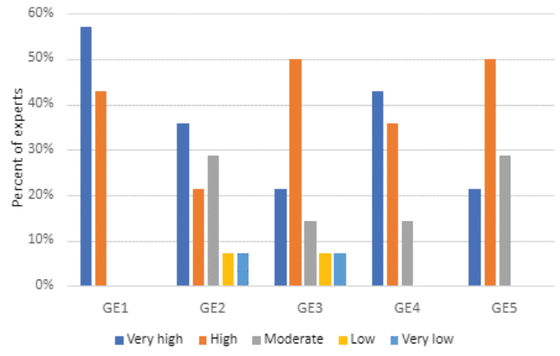
Waste and material use efficiency (ME)

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 - Sustainable fisheries, EW4 - Share of surface irrigation, EW5 - Renewable water resources per capita
SL1 - Soil nutrient balance, SL2 - Organic agriculture area, SL3 - Share ruminant livestock, SL4 - Agricultural productivity, SL5 - Farm machinery per unit land
ME1 - Material consumption per GDP, ME2 - Material footprint, ME3 - Food loss and food waste, ME4 - Municipal solid waste recycled, ME5 - Waste water treatment facilities

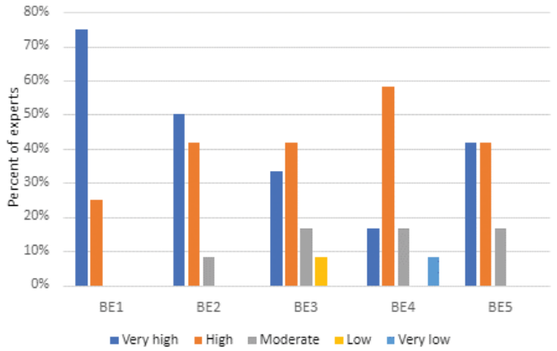
Natural capital protection



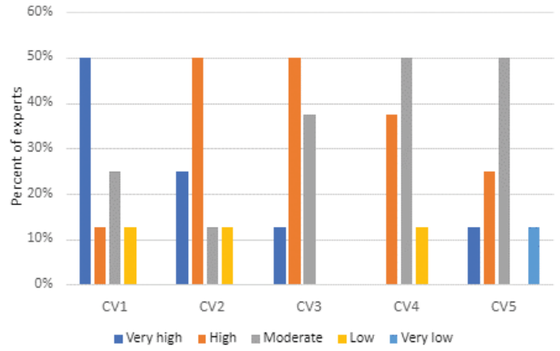
Environmental quality (EQ)



Greenhouse gas emissions reductions (GE)



Biodiversity and ecosystem protection (BE)

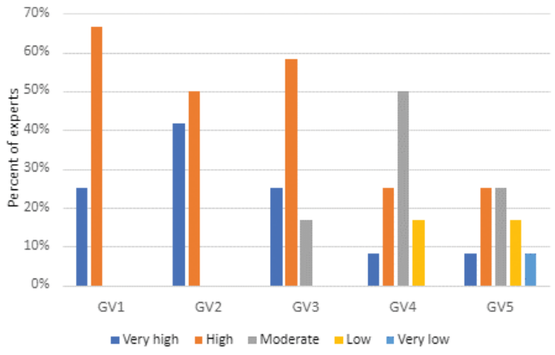


Cultural and social value (CV)

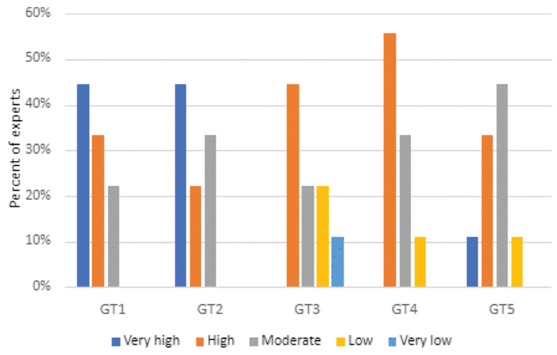
EQ1 - PM2.5 air pollution, EQ2 - DALY rate from unsafe water, EQ3 - Solid waste generation, EQ4 - Chlorophyll-a deviations, EQ5 - Water with good ambient quality
GE1 - CO_2 emissions per capita, GE2 - Non-CO_2 per capita excl. AFOLU, GE3 - Non-CO_2 emissions in AFOLU, GE4 - Carbon intensity of energy production, GE5 - CO_2 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 - Local breeds risk of extinction, CV2 - Terrestrial protected areas, CV3 - Tourism contribution to GDP, CV4 - Plant genetic resources accessions, CV5 - Share of exports of cultural goods

Figure A8. Ratings given by international experts on the 80 indicators for the Kenya Green growth Index *(continued)*

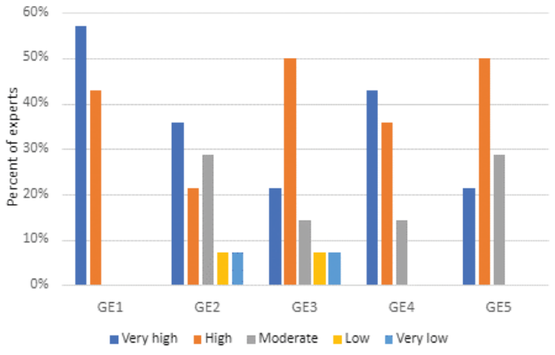
Green economic opportunities



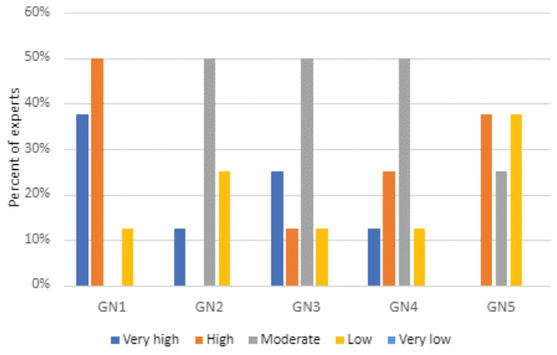
Green investment (GV)



Green trade (GT)



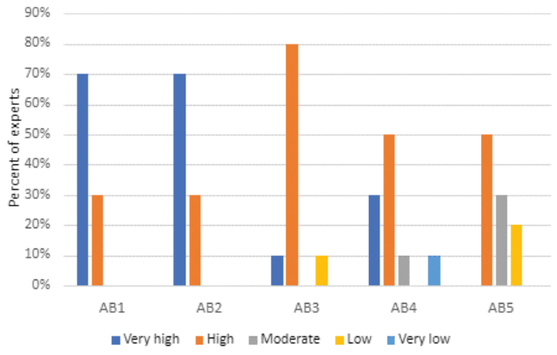
Green employment (GJ)



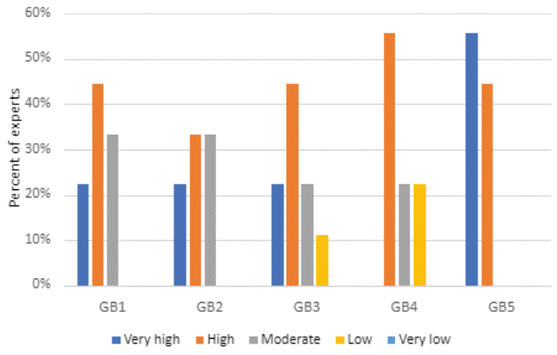
Green innovation (GN)

GV1 - Adjusted net savings, GV2 - Renewable electricity capacity, GV3 - Financial flows for clean energy R&D, GV4 - Agriculture orientation index, GV5 - Road quality
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 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

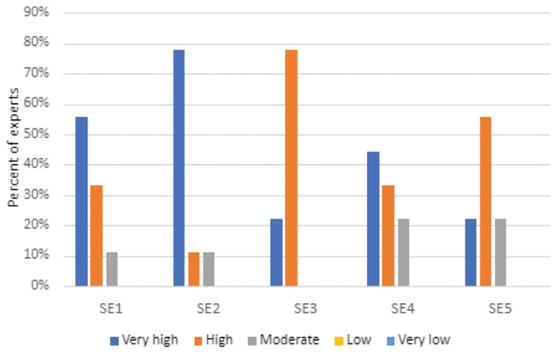
Social inclusion



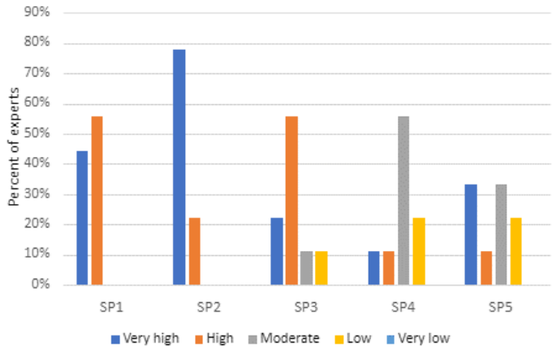
Access to basic services and resources (AB)



Gender balance (GB)



Social equality (SE)



Social protection (SP)

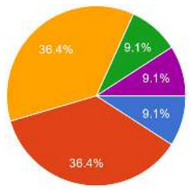
AB1 - Access to safe water and sanitation, AB2 - Access to electricity and clean fuels, AB3 - Prevalence of undernourishment, AB4 - Convenient access to public transport, AB5 - Property rights
GB1 - Women in national parliaments, GB2 - Gender account in financial institution, GB3 - Equal gender pay, 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

Annex 5. Ratings of the international experts on the green economic opportunities indicators from the online surveys

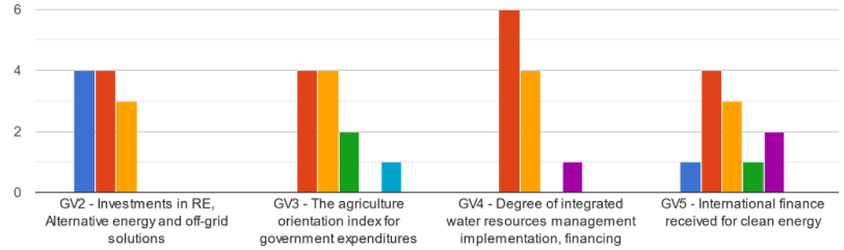
Figure A.9. Results of the online survey for the green economic opportunities indicator conducted before (individual survey) and during (group survey) the international expert consultation

Green Investment (GV)

Ratings before the expert consultation (Individual survey)



GV1 - Ratio of adjusted net savings to GNI, including particulate emission damage

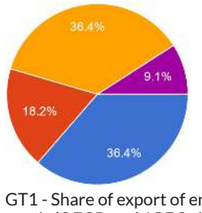


Ratings during the expert consultation (Group survey)

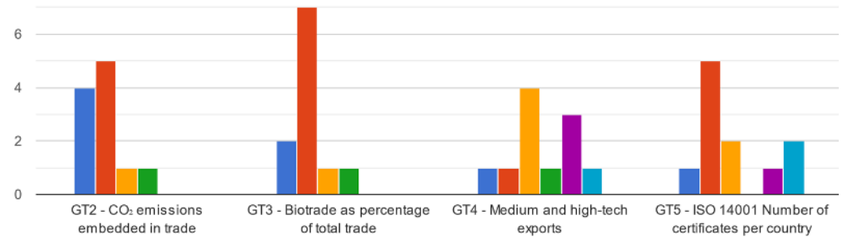
Note: (a) Ratio of adjusted net savings to GNI, including particulate emissions damage; (b) Investments in RE, Alternative energy and off-grid solutions, public outflows; (c) The agriculture orientation index for government expenditures; (d) Degree of integrated water resources management implementation, financing; and (e) International finance received for clean energy

Green Trade (GT)

Ratings before the expert consultation (Individual survey)



GT1 - Share of export of environmental goods (OECD and APEC classifications) to total export



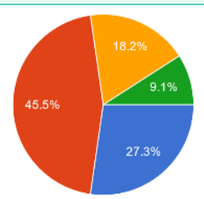
Ratings during the expert consultation (Group survey)

Note: (a) Share of export of environmental goods (OECD and APEC classifications) to total export; (b) CO_2 emissions embedded in trade; (c) Biotrade as percentage of total trade; (d) Medium and high-tech exports; and (e) ISO 14001 Number of certificates per country

Figure A.9. Results of the online survey for the green economic opportunities indicator conducted before (individual survey) and during (group survey) the international expert consultation *(continued)*

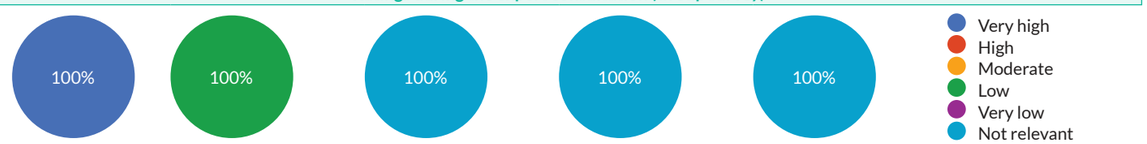
Green Employment (GJ)

Ratings before the expert consultation (Individual survey)



GJ1 - Share of green employment in total manufacturing employment

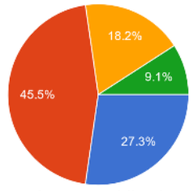
Ratings during the expert consultation (Group survey)



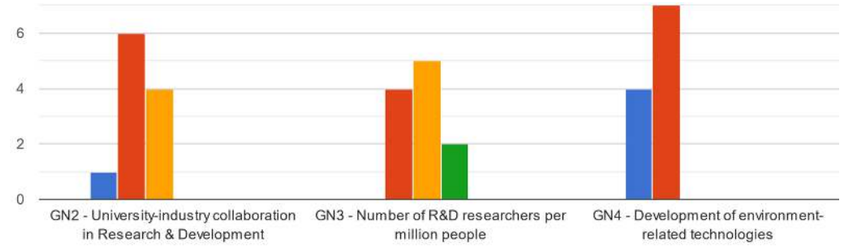
Note: (a) Share of green employment in total manufacturing employment; (b) Renewable Energy Employment by Country; (c) Firms offering formal training; (d) Level of national compliance with labor rights; (e) Employed population below international poverty line; and (e) ??????????????????

Green Innovation (GN)

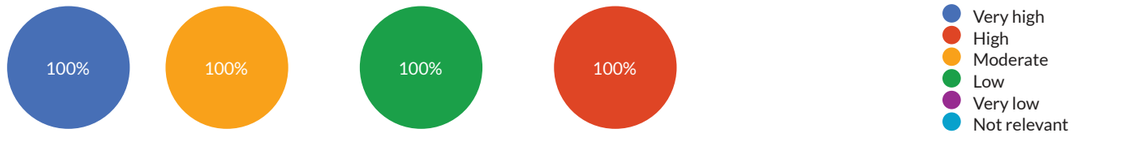
Ratings before the expert consultation (Individual survey)



GN1 - Share of patent publications in environmental technology to total patents



Ratings during the expert consultation (Group survey)



Note: (a) Share of patent publications in environmental technology to total patents; (b) University-industry collaboration in Research & Development; (c) Number of R&D researchers per million people; (d) Development of environment-related technologies, % all technologies

Figure A.10. Results of the Mentimeter votes for the green economic opportunities indicator during the international expert consultation

Green Investment (GV)

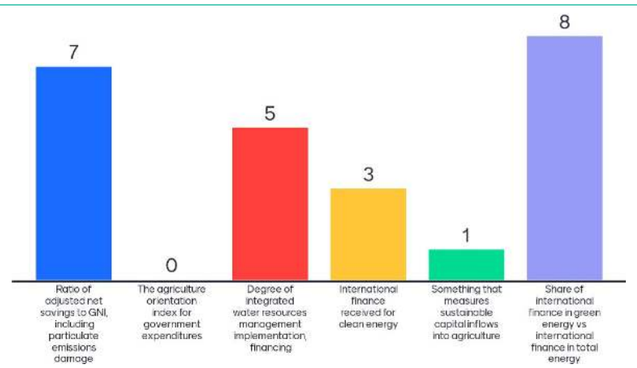
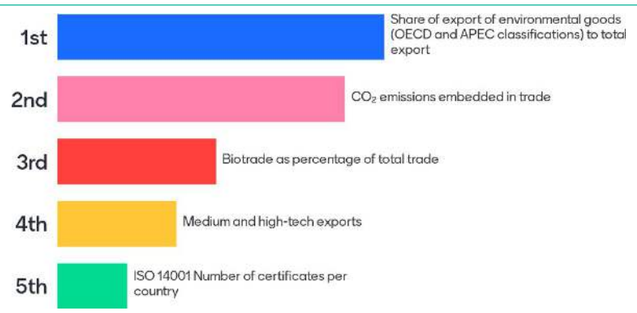
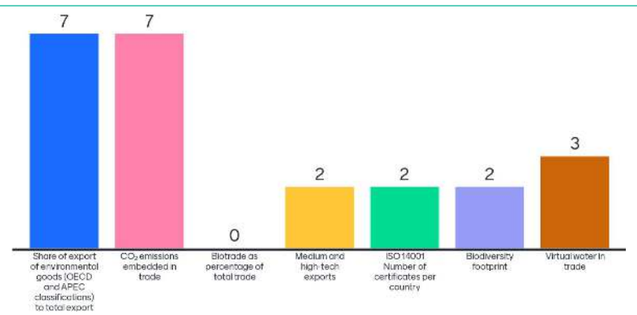
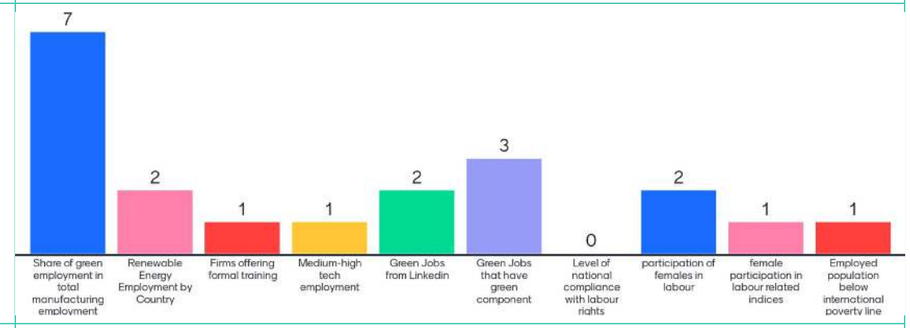
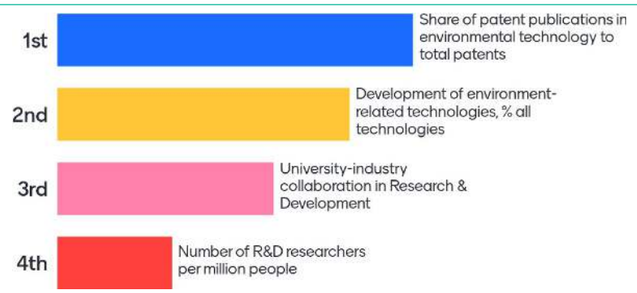
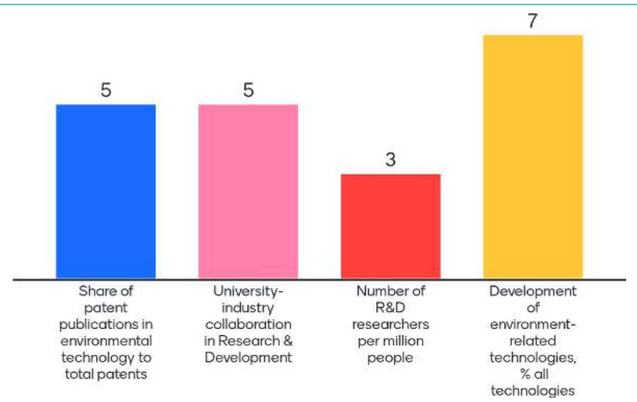
Pillar	Type	Mentimeter votes
Green investment	Initial	
	Final	
Green Trade	Initial	
	Final	

Figure A.10. Results of the online survey for the green economic opportunities indicator conducted before (individual survey) and during (group survey) the international expert consultation *(continued)*

Pillar	Type	Mentimeter votes
Green employment	Initial	
	Final	
Green innovation	Initial	
	Final	

Note: The initial Mentimeter votes were conducted before the breakout sessions and the final Mentimeter votes after the breakout sessions.

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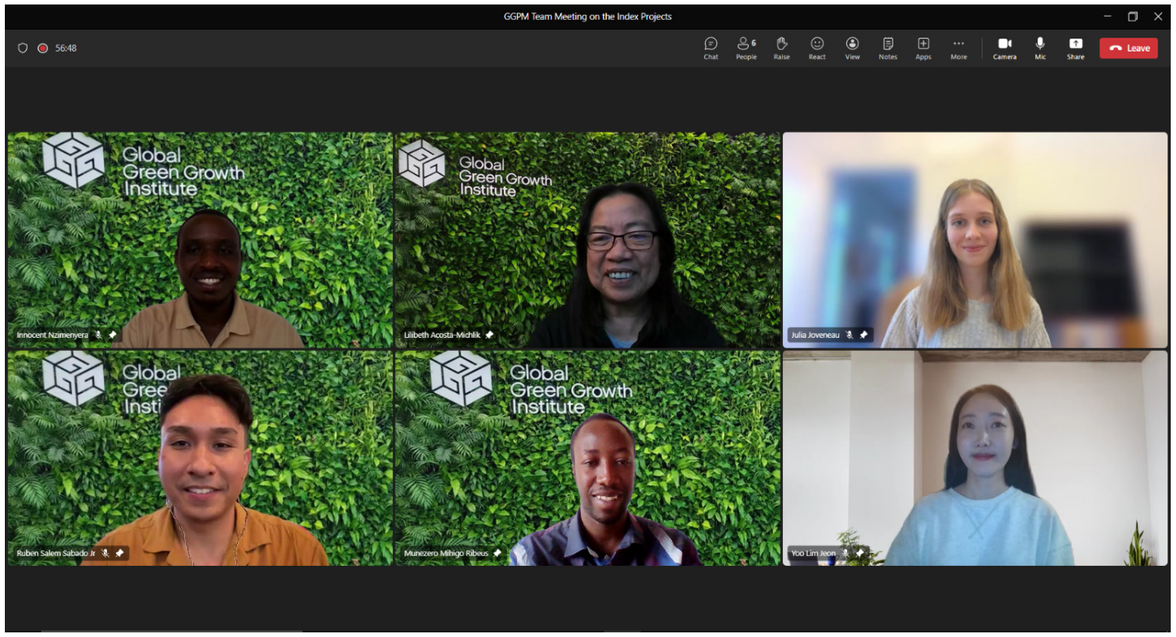
Annex 9. **The GGPM Team**



Lilibeth Acosta, based in Hungary, is a Principal Specialist in GGGI's Climate Action and Inclusive Development Division and Program Manager for the Green Growth Performance Measurement. She joined GGGI in 2018. Lilibeth has over 20 years of experience in indicator development, integrated assessment and scenario modeling of climate change vulnerability and adaptation, and sustainable development in the fields of ecosystem and biodiversity, agriculture and land use, and renewable energy. She worked as a development specialist at the National Economic Development Authority in the Philippines, senior scientist at the Potsdam Institute for Climate Impact Research in Germany, and researcher in Environmental Science departments in universities in Japan, Belgium, the United Kingdom, and the Philippines Before joining GGGI, she worked as a consultant in the ADB, UNCCD, and UNCTAD. She holds a Ph.D. in Agricultural Policy from the University of Bonn (Germany), an MPhil in Economics and Politics of Development from the University of Cambridge (England), and a BSc in Agricultural Economics from the University of the Philippines.

Innocent Nzimenyera, based in Rwanda, is a GGPM consultant supporting applications of green growth index projects and simulation tools. He has been part of the team since 2021. His main tasks are to support the team in data analysis and programming part. Before joining GGPM he worked as digital ambassador at Rwanda Ministry of ICT and Innovation. He worked as a research assistant at ARED group. He is currently doing a Master of Science in information technology specializing in applied machine learning at Carnegie Mellon University. He has a bachelor's degree in computer science from University of Rwanda, College of Science and Technology and He also certified in Artificial Intelligence with deep learning by FAST Foundation from Armenia. He enjoys being challenged and engaging with projects that require him to work outside his comfort and knowledge set, as he continues to learn new skills and development techniques that are important to him and the success of the organization. He is proactive, innovative, self-motivated, and capable of working under minimum supervision.

Ruben Sabado, Jr., based in the Philippines, is a GGPM consultant supporting applications of green growth index projects. He has supported the GGPM team since 2020 with projects such as the national green growth index application for GGGI member countries and the Green Recovery Index. His main tasks involve developing the training modules, conducting online and face-to-face stakeholder workshops with GGGI country teams, and identifying green growth-related indicators. He is also a part of the GGPM publication team, supporting the collection and literature review and preparing graphics and analysis for the Green Growth Index reports. He earned his Bachelor of Science in Agricultural Economics with a major in marketing and prices from the University of the Philippines. He values turning data into policy-relevant information to help countries monitor their progress toward sustainable development.

Ribeus Mihigo Munezero, based in Rwanda, is a Green Growth Performance Measurement consultant involved in the work of the Green Growth Simulation Tool and Green Growth Index. He joined GGGI in May 2022 as a Python programmer and modeler. His main tasks include supporting the work on national and global Green Growth Index computation and development of simulation tool for models and policy scenarios. Ribeus is passionate about using facts, metrics, and data to guide strategic decision making. Before joining GGGI, he worked as a researcher and data analyst apprentice at One Acre Fund where he worked with the deputy country director of the Rwanda program and multiple stakeholders to progress country program's strategic plan and carry out research for new products and services that delivers more impact to farmers and increase country program's sustainability. Ribeus holds a master's degree in Electrical and Computer Engineering from Carnegie Mellon University. Before that he completed his BSc in Electronics and Telecommunications Engineering at University of Rwanda.

Julia Joveneau, based in Hungary, is an analyst for the GGPM team. She joined GGGI in October 2023 to support the application of the Green Growth Simulation Tool. She holds a Master's degree in Mathematical Engineering from the Louvain School of Engineering in Belgium, and a bachelor's degree in Engineering from the same School. She followed specialization tracks in applied chemistry and physics and applied mathematics. She particularly enjoys interdisciplinarity and has a strong interest in modeling and optimization.

Yoo Lim Jeon, based in Seoul, is a Senior Associate in the Climate Action and Inclusive Development Unit of the Investment and Policy Solutions Division at GGGI. She joined GGGI in 2017. YooLim has over 10 years of experience in international development and NDC implementation. She provides technical support for project management and analysis of the MRV system and NDC enhancement for GGGI member countries. Before joining GGGI, she worked as a Specialist at KOICA and as a Research Assistant at the Bank of Korea. She holds an MA in Politics from New York University (USA) and a BA in International Studies from Waseda University (Japan). She has completed a doctorate in Energy and Environmental Policy at Korea University (South Korea).

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