

GGGI TECHNICAL REPORT NO. 16

# GREEN GROWTH INDEX 2020

Measuring performance in  
achieving SDG targets

December 2020



## PART OF GGGI'S TECHNICAL REPORTS SERIES

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# Green Growth Index

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# Preface

The year 2020 is a year unlike any other, as the COVID-19 pandemic continues to severely hit countries, resulting in globally over 70 million infected people, over a million deaths, millions of unemployed people, and trillions of dollars pulled-out for emergency stimulus packages to rescue the economies. The full impact of the pandemic is still expanding and governments are under immense pressure not only to invest in COVID-19 recovery packages while facing budget shortfalls, rising debt, and declining tax revenues, but also to “green” these investments. In its report on “*Achieving Green Growth and Climate Action Post-COVID-19*”, the Global Green Growth Institute (GGGI) joined many other international organizations in urging governments to implement green deal packages to stimulate growth in more sustainable ways such as investing in programs and projects that also address other global challenges facing the humanity – climate change, biodiversity loss, and social inequality, among others.

In other words, long-term COVID-19 recovery plans will need to build on existing efforts to achieve the Sustainable Development Goals (SDGs), which overarching goal is to share benefits equitably for improved quality of life – a much needed goal as the pandemic proves to disproportionately impact the poor and vulnerable members of the society. The recovery plans must be aligned with the SDGs to build social and economic resilience to not only future pandemics but also persistent global environmental challenges.


In this context, a policy assessment tool such as the Green Growth Index becomes even more relevant for important reasons - it is framed on a green growth economic development model, which aims to deliver equal opportunities from economic prosperity while protecting the environment; it integrates SDG indicators and targets related to green growth dimensions that support the quality of life (i.e. efficient and sustainable resource use, natural capital protection, green economic opportunities, and social inclusion); and it benchmarks indicators against sustainability targets including the SDGs, the Paris Climate Agreement, and the Aichi Biodiversity Targets to measure national-level green growth performance. The multidimensionality of the Green Growth Index allows its application to assess impacts of policy decisions and actions related to COVID-19 recovery plans on various environmental, economic, and social sustainability indicators.

Significant improvements were made in this year’s edition of the Green Growth Index to make it even more relevant to not only track changes on green growth performance but also assess the impacts of green recovery packages. First, more SDG indicators with sufficient data are included in the Green Growth Index. Second, the trend from 2005 to 2019 is calculated so that, over time, the Index can show the impacts of the green policies and investments on a country’s green growth performance. Third, the Simulation Tool for the Green Growth Index has been completed and is ready to be rolled out for country application next year. GGGI continues to ensure that the Green Growth Index and its Simulation Tool will be relevant to and supportive of the Member Countries and Partners’ goals of transitioning to a low carbon economy, protecting ecosystem health, building resilient society, and promoting inclusive growth.

This year, in addition to the ongoing collaboration with the African Development Bank (AfDB), GGGI has established a partnership with the Organisation of Eastern Caribbean States (OECS) Commission to develop a Green Growth Index for the region. Moreover, GGGI is supporting Uganda’s Government to develop a National Green Growth Index for its National Development Plan III. Next year, more collaborations have been planned, including the application of the Green Growth Index to assess COVID Recovery Packages in selected OECS countries as well as the implementation of the Simulation Tool to explore green growth performance scenarios in Uganda and analyze co-benefits of Green COVID Recovery in Hungary.

The success of the Green Growth Index will not be possible without the support of the policymakers from GGGI Member Countries and Partners as well as the members of the international expert group. The expert group consists of professionals and specialists from relevant international organizations, non-government organizations, and academia, who continue to participate in the annual review of the green growth indicators for the Index. GGGI is also very happy to welcome the support of many experts from the Task Forces on Scenarios and models, Policy support tools and methodologies, and Knowledge and data of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) and authors of the Working Group II for the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) who, on their own interest and capacity, participated in the review this year. Through GGGI’s internship program, the Green Growth Performance Measurement (GGPM) team, under the leadership of Dr. Lilibeth Acosta, has trained several young talented students and graduates to contribute to the development of the Green Growth Index and Simulation Tool and, more importantly, raised their awareness on the value of the green growth economic development model.



  
**Dr. Frank Rijsberman**  
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This report was prepared by the GGPM team, including the consultants, researchers, and interns, and in close collaboration with the international expert group, which consists of experts and practitioners on metrics and indicators from international organizations, research institutions, and knowledge networks. The authors express their appreciation of the support given by a large number of expert reviewers mentioned in this report, particularly those who participated in the online survey conducted in November 2020 to review the new green growth indicators for this year’s edition of the Green Growth Index. There were 110 respondents to the online survey who represent experts from 54 countries with the following regional distribution - 11 countries in Africa, 16 in Asia, 10 in the Americas, 13 in Europe, and 4 in Oceania. The experts are from GGGI headquarters and Country Offices, international organizations, policymakers from GGGI Member Countries and Partners, scientists from reputable universities and research institutions all over the world, and relevant non-government organizations. It has benefitted from the comments of the experts and authors who currently support relevant scientific work in the IPBES and the Sixth Assessment Report of the IPCC.

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## Acronyms and Abbreviations

<b>AB</b>	Access to Basic Services and Resources	<b>GDP</b>	Gross Domestic Product	<b>ME</b>	Material Use Efficiency	<b>SI</b>	Social Inclusion
<b>ADB</b>	Asian Development Bank	<b>GE</b>	GHG Emissions Reduction	<b>MENA</b>	Middle East and North Africa	<b>SL</b>	Sustainable Land Use
<b>AfDB</b>	African Development Bank	<b>GEM</b>	Green Economy Model	<b>MF</b>	Material Footprint	<b>SP</b>	Social Protection
<b>AFOLU</b>	Agriculture, Forestry, and Other Land Use	<b>GEO</b>	Green Economic Opportunities	<b>MJ</b>	Megajoule	<b>SSRN</b>	Social Science Research Network
<b>BE</b>	Biodiversity and Ecosystem Protection	<b>GEP</b>	Green Economy Progress	<b>MSW</b>	Municipal solid waste	<b>UHC</b>	Universal Health Coverage
<b>CO<sub>2</sub></b>	Carbon Dioxide	<b>GG</b>	Green Growth	<b>MtCO<sub>2e</sub></b>	Metric tons of carbon dioxide equivalent	<b>UN</b>	United Nations International Trade Statistics Database
<b>COVID-19</b>	Coronavirus disease	<b>GGGI</b>	Global Green Growth Institute	<b>N<sub>2</sub>O</b>	Nitrous Oxide	<b>COMTRADE</b>	United Nations Development Programme
<b>CPF</b>	Country Planning Framework	<b>GGKP</b>	Green Growth Knowledge Partnership	<b>NCP</b>	Natural Capital Protection	<b>UNDP</b>	United Nations Industrial Development Organization
<b>CV</b>	Cultural and Social Value	<b>GGPM</b>	Green Growth Performance Measurement	<b>NDC</b>	National Determined Contributions	<b>UNIDO</b>	United Nations Statistics Division
<b>DALY</b>	Disability-Adjusted Life Year	<b>GHG</b>	Greenhouse Gas	<b>NDP</b>	National Development Plan	<b>UNSTATS</b>	United States Dollar
<b>DMC</b>	Domestic Material Consumption	<b>GJ</b>	Green Employment	<b>NDPIII</b>	Third National Development Plan	<b>USD</b>	United States Dollar
<b>EE</b>	Efficient and Sustainable Energy	<b>GN</b>	Green Innovation	<b>NGO</b>	Non-government organizations	<b>WHO</b>	World Health Organization
<b>EE</b>	Enabling Environment	<b>GNI</b>	Gross National Income	<b>NPA</b>	National Planning Authority		
<b>EU</b>	European Union	<b>GT</b>	Green Trade	<b>OECD</b>	Organisation for Economic Co-operation and Development		
<b>EGD</b>	European Green Deal	<b>GV</b>	Green Investment	<b>OECS</b>	Organisation of Eastern Caribbean States		
<b>EPI</b>	Environmental Performance Index	<b>HDI</b>	Human Development Index	<b>PA</b>	Protected Area		
<b>EQ</b>	Environmental Quality	<b>IEA</b>	International Energy Agency	<b>PCA</b>	Principal Component Analysis		
<b>ESRU</b>	Efficient and Sustainable Resource Use	<b>IISD</b>	International Institute for Sustainable Development	<b>PGG</b>	"Potential" Green Growth		
<b>EU</b>	European Union	<b>IPBES</b>	Intergovernmental Platform on Biodiversity and Ecosystem Services	<b>PM<sub>10</sub></b>	Particulate matter 10		
<b>EW</b>	Efficient and Sustainable Water Use	<b>IPCC</b>	Intergovernmental Panel on Climate Change	<b>PM<sub>2.5</sub></b>	Particulate matter with a diameter of less than 2.5 micrometers		
<b>FAO</b>	Food and Agriculture Organization of the United Nations	<b>IQR</b>	Interquartile range	<b>PPP</b>	Purchasing power parity		
<b>FAOSTAT</b>	Food and Agriculture Organization Corporate Statistical Database	<b>KBA</b>	Key Biodiversity Areas	<b>SDG</b>	Sustainable Development Goal		
<b>FOLU</b>	Forestry, and Other Land Use	<b>LAC</b>	Latin America and the Caribbean	<b>SDSN</b>	Sustainable Development Solutions Network		
<b>GB</b>	Gender Balance	<b>Lao PDR</b>	Lao People's Democratic Republic	<b>SE</b>	Social Equity		



# 1 Introduction

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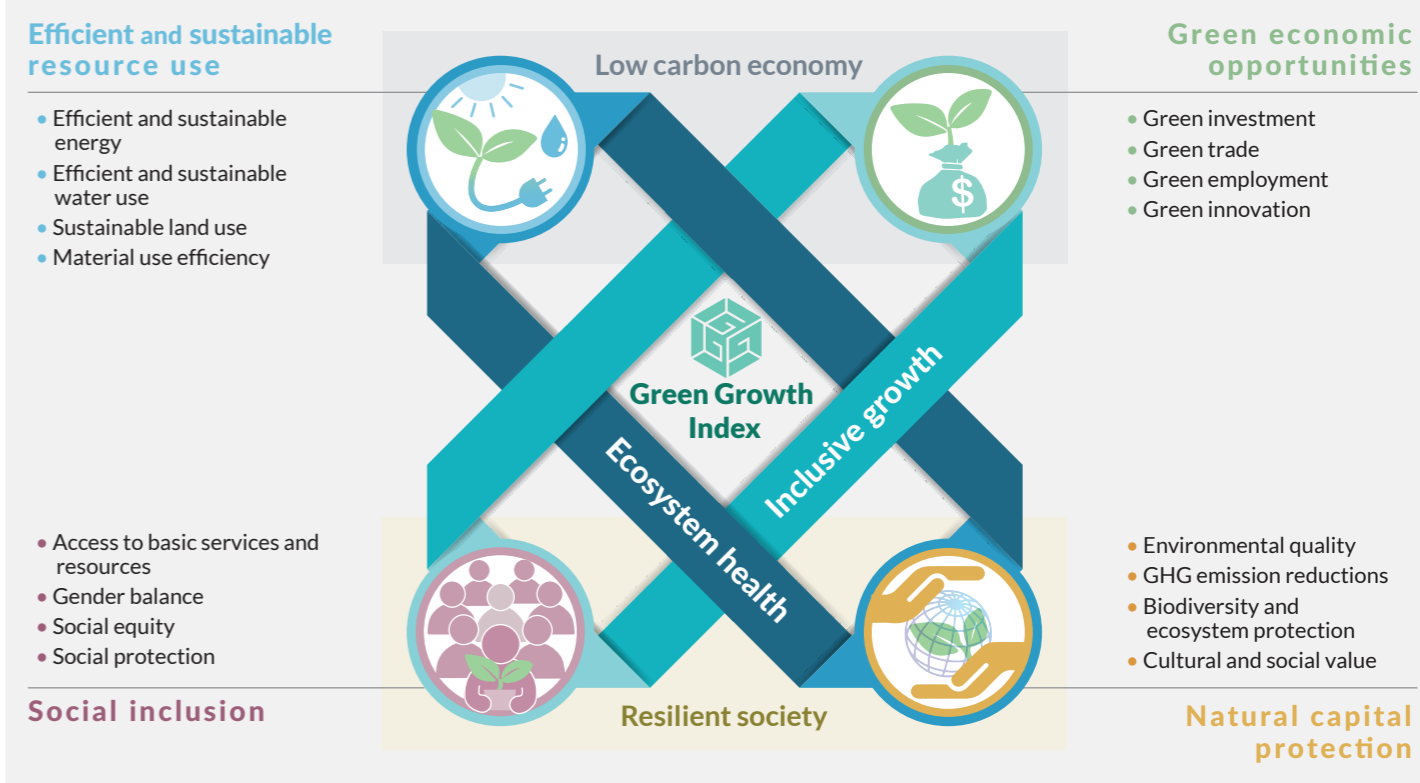
## 1.1 About the Green Growth Index

Green Growth Index is a composite index measuring a country's performance in achieving sustainability targets including Sustainable Development Goals (SDGs), Paris Climate Agreement, and Aichi Biodiversity Targets for four green growth dimensions – efficient and sustainable resource use, natural capital protection, green economic opportunities, and social inclusion (Acosta et al., 2019a). The Index is the first metric for green growth that explicitly links to sustainable development. In order to make the Index relevant at the national and international level, it has been imperative for GGGI to align the Index with global sustainability goals and targets. This complementary set of internationally accepted targets and related indicators serves as a reliable reference for the Green Growth Index and allows governments to align their pathway to green growth with achieving

the SDGs and national climate and biodiversity goals (Acosta et al., 2019b).

The four dimensions of green growth are closely interlinked (Figure 1). Using natural resources efficiently and sustainably will produce more goods and services with less resources. It will protect natural capital including water, energy, land, and materials as well as the ecosystem services they provide. A healthy ecosystem characterized by, for example, fertile soil, multifunctional forests, productive land and seas, good quality freshwater and clean air, and pollination increases economic productivity and creates new economic opportunities. Green Growth advocates the protection of natural capital because it provides sources of economic growth such as green jobs, trade, and investment. And it emphasizes not only people benefitting from growth but also people contributing to the efficient use and protection of natural resources. This makes social inclusion a key mechanism to both achievement and distribution of gains from green growth.

Figure 1 Conceptual Framework for the Green Growth Index



The interlinkages among the four green growth dimensions were drawn from the concepts of low carbon economy, resilient society, ecosystem health, and inclusive growth (details are available in Acosta et al., 2019a). These concepts guided the determination of four indicator categories that represent each dimension. They can

be interpreted as “pillars” of green growth, forming the basis for 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 the indicator categories.



**Box 1** Definitions of the indicator categories 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<sub>2</sub> and non-CO<sub>2</sub> 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, Almasy, & 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).

The scores for the Green Growth Index range from 1 to 100, with 1 having the lowest or very low performance and 100 having the highest or very high performance. Because the indicators are benchmarked against sustainability targets (see Chapter 1.2.3 Link to the SDGs), a score of 100 on the index, dimensions, and indicator categories means that a country has reached a given target. The scores are classified in a given range and can be interpreted as follows:

- 80–100 are very high scores, having reached or almost reached the target.
- 60–80 are high scores, taking a strategic position to completely reach the target.
- 40–60 are moderate scores, finding the right balance to move forward to and avoid moving away from 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.

relevant indicators or better data availability. The motivations for these are as follows:

1. **Motive 1:** The availability of other indicators with improved country coverage from the UNSTATS SDG database.
2. **Motive 2:** The inclusion of new indicators which are currently being suggested to be part of the UNSTATS SDG database.
3. **Motive 3:** The exclusion of indicators for which time-series data are not available and its availability is not expected to change in the near future.
4. **Motive 4:** The rescaling/redefining of indicators for which time-series data show erratic trend over time.
5. **Motive 5:** The creation of interlinkages between the Simulation Tool and Green Growth Index which requires adjustment in definition and unit of the indicators.

Table 1 presents the 10 indicators which have been updated in the 2020 Green Growth Index, including mainly indicators from natural capital protection and social inclusion. The motivations were almost equally important for the different indicators, except for Motive 2 which is relevant only for SE1: Inequality in income based on Atkinson (Index). This indicator, which was accessed from the United Nations Development Programme (UNDP) database last year, is no longer available for download this year. More importantly, there are ongoing debates on the inclusion of Palma Ratio as a measure of income inequality in the SDG 10 (IISD, 2019). The income inequality indicator based on Atkinson Index was thus replaced with Palma Ratio, which is the ratio of the top 10% to the bottom 40% share of gross national income and measures shifts at the ends of these distributions (Fukuda-Parr, 2019). Among the indicator categories, the GHG emissions reduction (GE) has the highest number of updated indicators, but motivations were mainly to align units of measurement for linking to the Simulation Tool (Acosta et al. 2020).

## 1.2 Updates in the 2020 Green Growth Index

### 1.2.1 Main improvements

First published in 2019, GGGI has envisaged to annually review the Green Growth Index to continuously improve its relevance to policy and decision making. There are two main improvements in the Index this year: first is the computation of trend from 2005 to 2019, and second is the replacement of several proxy variables with more

**Table 1** List of replaced indicators and motivations for updating in the 2020 Green Growth Index

Dimension	Indicator	Motivations for replacing
Efficient and sustainable resource use	SL1: Average soil organic carbon content (Ton per hectare)	Motive 3
Natural capital protection	GE1: Ratio of CO <sub>2</sub> emissions excl. AFOLU to population (Metric tons per capita)	Motive 5
	GE2: Ratio of non-CO <sub>2</sub> emissions excl. AFOLU to population (Ton per capita)	Motive 5
	GE3: Ratio of non-CO <sub>2</sub> emissions in Agriculture to population (Gigagrams per 1000 persons)	Motive 5
	BE3: Soil biodiversity, potential level of diversity living in soils (Index)	Motive 3
Green economic opportunities	GN1: Share of patent publications in environmental technology to total patents (Percent)	Motive 4
Social Inclusion	GB2: Share of female to male with account in financial institution (% age 15+) (Percent)	Motive 1
	SE1: Inequality in income based on Atkinson (Index)	Motive 2
	SE2: Ratio urban-rural access to basic services (water, sanitation and electricity) (Percent)	Motive 4
	SP2: Healthcare access and quality index (Index)	Motive 1

### 1.2.2 Updated indicator framework

The new indicators have been validated and confirmed by 110 experts from 54 countries (11 countries in Africa, 16 in Asia, 10 in the Americas, 13 in Europe, 4 in Oceania) with representations from GGGI, international expert group, scientific community, policymakers, and non-government organizations (NGOs) (Figure 2), through online expert consultations (see Chapter 5 Expert

consultations). While NGOs appear to be underrepresented, six (21%) of the members of the international expert group are also from NGOs, increasing the total number of experts to 12 out of 110 (Figure 2). In 2018, the Green Growth Performance Measurement (GGPM) team formed the international expert group to continuously support the development of the Green Growth Index. Many experts in this group are also members of the Green Growth Knowledge Partnership (GGKP) Metrics and Indicators Working Group.

**Figure 2 Characteristics of the experts who participated in the review of the new indicators**

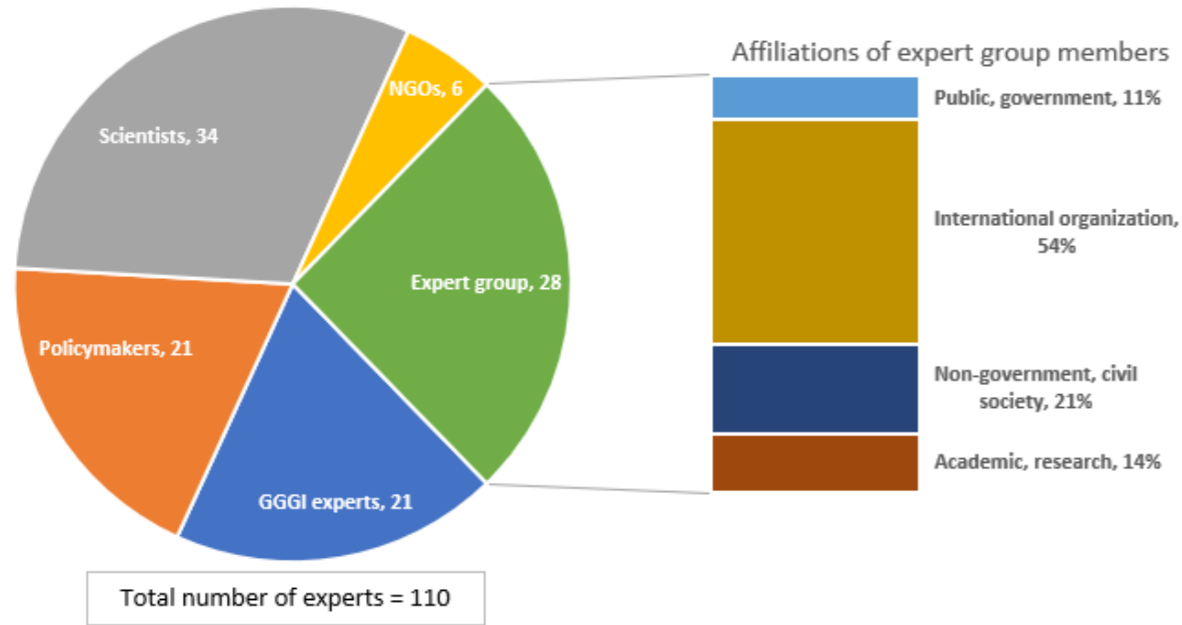


Figure 3 presents the updated indicator framework with the new green growth indicators for the 2020 Green Growth Index. The new indicator for SL1 is biological fixation, cropland nutrient flow per unit area, which has time-series data from 1961 to 2018. It was published by the FAO and, as of December 2020, available for download from the FAOSTAT database. It replaced the average soil organic carbon content which data was available only for 2019. This new indicator, also referred to as biological nitrogen fixation, is considered as an alternative sustainable practice for soil management to reduce the harmful impacts of overusing inorganic and manure fertilizers on ecosystems (Mohammadi, Sohrabi, Heidari, Khalesro, & Majidi, 2012; Soumare et al., 2020). These include, among others, pollution of groundwater, increased atmospheric nitrous oxide (N<sub>2</sub>O), and influence of global carbon cycles from direct use of nitrogen fertilizer as well as carbon dioxide (CO<sub>2</sub>) emissions from producing nitrogen fertilizer (He et al., 2016; Montañez, 2000). The new indicator for BE3 is above-ground biomass stock in forest in tons per hectare, which was developed by FAO and is one of the SDG indicators for sustainable forest management (SDG 15.2.1). Like the previous indicator for SL1, the previous indicator for BE3 has also limited time-series data, only for 2016 and 2019. The new indicator has data for 2000, 2010, and 2015-2020. An increase in above-ground biomass indicates gains in biomass due to forest growth, while a decrease indicates losses in biomass due to deforestation, forest fires, pest, and diseases, etc. (UNSTATS, 2020a). Maintaining species diversity

has a positive impact on above-ground biomass (Li, Su, Lang, Liu, & Ou, 2018; Pokhrel & Sherpa, 2020) and the same is the case for forest restoration (Dampthey, Birkhofer, Nsiah, & de la Riva, 2020).

The time-series data for the previous indicators for GN1 and SE2 showed an erratic trend, which had significant impacts on the stability of the Index trend. In the case of GN1, annual changes on the share of patent publications in environmental technology to total patents were erratic because countries were not able to publish patents every year, causing spikes in years when they were able to do so. Moreover, when no patent was published in a given year, although several were published in the past years, it directly implied that the country lacks innovation capacity. This may not make sense when considering innovation capacity over time because the patents which were published in previous years (and which continue contributing to greening the economy) are ignored. Several experts suggested using a moving average instead of a cumulative share of patent publications in environmental technology to total patents. With regards to SE2, the spikes in the trend in the ratio of urban-rural access to basic services were caused by the data paucity on urban and rural access to safely managed drinking water and sanitation. Consequently, these indicators were excluded from SE2 indicator for this year and until data availability improves in the next years. The SE2 only consists of urban-rural share in access to electricity in the 2020 Green Growth Index.

Finally, the indicators for GB2 and SP2 were replaced with similar indicators that were recently included in the UNSTATS SDG database, SDG Indicators 8.10.2 and 3.8.1, respectively. For the new indicator for GB2, mobile-money-service provider was added with account at a financial institution. Combining these two indicators enhanced the measurement of financial inclusion because mobile money provides account ownership and payment services to people in remote and underserved areas in developing

and emerging countries (Hamdan, 2019; Navis, 2019). The new indicator for SP2 is a composite index of 14 indicators covering four categories: reproductive, maternal, newborn, and child health; infectious diseases; non-communicable diseases; and service capacity and access (UNSTATS, 2020b). Currently, there are over 100 low- and middle-income countries that are working hard to achieve universal health coverage (UNDP, 2019b). Thus, this will improve inclusion in health services.

**Figure 3 Updated Indicator Framework for the 2020 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)
		Efficient and sustainable water use	EW1 Water use efficiency (USD per m <sup>3</sup> )
			EW2 Share of freshwater withdrawal to available freshwater resources (Percent)
		Sustainable land use	SL1 Soil nutrient budget (Nitrogen kilogram per hectare)
			SL2 Share of organic agriculture to total agricultural land area (Percent)
	Material use efficiency	ME1 Total domestic material consumption (DMC) per unit of GDP (Kilogram per GDP)	
		ME2 Total material footprint (MF) per capita (Tons per capita)	
	Natural capital protection	Environmental quality	EQ1 PM2.5 air pollution, mean annual population-weighted exposure (Micrograms per m <sup>3</sup> )
			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 <sub>2</sub> emissions to population, including AFOLU (Tons per capita)
			GE2 Ratio of non-CO <sub>2</sub> emissions to population, excluding AFOLU (CO <sub>2</sub> e per capita)
			GE3 Ratio of non-CO <sub>2</sub> emissions in agriculture to population (CO <sub>2</sub> eq 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 stock in forest (Tons per hectare)
	Cultural and social value	CV1 Red list index (Index)	
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 Adjusted net savings, including particulate emission damage (Percent GNI)	
	Green trade	GT1 Share of export of environmental goods (OECD and APEC class.) to total export (Percent)	
	Green employment	GJ1 Share of green employment in total manufacturing employment (Percent)	
	Green innovation	GN1 Share of patent publications in environmental technology to total patents (7 yrs moving ave.)	
Social inclusion	Access to basic services and resources	AB1 Population with access to safely managed water and sanitation (Percent)	
		AB2 Population with access to electricity and clean fuels/technology (Percent)	
		AB3 Fixed Internet broadband and mobile cellular subscriptions (Number per 100 people)	
	Gender balance	GB1 Proportion of seats held by women in national parliaments (Percent)	
		GB2 Gender ratio of 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 Ratio of urban-rural access to basic services, 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 index (Index)		
	SP3 Proportion of urban population living in slums (Percent)		

### 1.2.3 Link to the SDGs

The updated indicator framework for the 2020 Green Growth Index has two additional SDG indicators - BE3: Above-ground biomass stock in forest for Goal 15 on life on land and SP2: Universal health coverage (UHC) service coverage index for Goal 3 on good health and well-being. With these, the Green Growth Index now covers 27 SDG Targets, which are represented in 23 indicators (Figure 4A). Two of these 23 indicators are either included in different SDG Targets as in the case of ME1: Total domestic material consumption per gross domestic product (GDP) and ME2: Total material footprint per capita, which are both in Goal 8 on decent work and economic growth and Goal 12 on responsible consumption and production. The other three indicators are composite of different SDG indicators:

- BE1: Proportion of Key Biodiversity Areas (KBAs) covered by protected areas, which combines marine (SDG 14.5.1), freshwater and terrestrial (SDG 15.1.2), and mountain (SDG 15.4.1) biodiversity
- AB1: Access to safely managed water and sanitation, which covers both drinking water (SDG 6.1.1) and sanitation (SDG 6.2.1) services
- AB2: Access to electricity and clean fuels/technology, which combines access to electricity (SDG 7.1.1) and primary reliance on clean fuels and technology (SDG 7.1.2)

But still, 15 indicators are not SDG indicators and thus do not have SDG Targets (Figure 4B). Except for CV3: Share of terrestrial protected areas to total territorial areas, which has Aichi Biodiversity Target, other indicators do not have specific global targets at present. Even for the indicators on GHG emissions reduction, there are no globally agreed climate targets. National targets are determined by governments in their National Determined Contributions (NDCs). Global targets are necessary to benchmark countries' performance against the same measurement.

To come up with sustainability targets for all the green growth indicators, the following criteria were adopted:

1. For SDG indicators, the SDG targets, both explicit and implicit, which were suggested in the Organisation for Economic Co-operation and Development (OECD, 2019a, 2019b) and UN Sustainable Development Solutions Network (SDSN) (Lafortune et al., 2018; Sachs et al., 2019; Sachs et al., 2018) reports were used. If the interpretation of implicit targets is different, the SDSN values, which are applied on a global context, were adopted.
2. For non-SDG indicators, the targets suggested in scientific literature and reports from international organizations were used.
3. For SDG indicators not included in the OECD and SDSN reports, the mean of the top five performers was used.
4. For non-SDG indicators with no available information from the literature and reports, the mean of the top five performers was used.

Criteria 3 and 4 follow methods that were used in other global indices such as SDSN's SDG Index (Sachs et al., 2019; Sachs et al., 2018) and UNEP's Green Economy Progress (GEP) (PAGE, 2017b, 2017a). The details on the sustainability targets used to benchmark the indicators of the 2020 Green Growth Index are discussed in Chapter 5.3.3 Sustainability targets.

## 1.3 Purpose and structure of the report

Considering the significant updates on the 2020 Green Growth Index with the replacement of about 28% of the 36 indicators, the country performances from last year's report on the Index cannot be compared to those from this year. This is a common practice for global indices particularly when the development process evolved over years, as also is the case for the following global indices:

#### Human Development Index (HDI)

*"Because national and international agencies continually improve their data series, the data—including the HDI values and ranks—presented in this report are not comparable to those published in earlier editions." (UNDP, 2019: p. 295)*

*"It is misleading to compare values and rankings with those of previously published reports, because of revisions and updates of the underlying data and adjustments to goalposts." (UNDP, 2018: p. 1)*

#### SDG Index

*"Since the indicators, data, and methodology have been revised for the 2018 Index, the rankings and scores are not comparable with the 2017 and 2016 editions. Therefore, a change in a country's ranking does not necessarily signify a change in its SDG performance." (Sachs et al., 2018: p. 11)*

*"Due to changes in the indicators and some refinements in the methodology, SDG Index rankings and scores cannot be compared across the 2016, 2017 and 2018 editions of the report." (Sachs et al., 2018: p. 36)*

#### Environmental Performance Index (EPI)

*"Changes in methodology between versions of the EPI mean that historical EPI scores are not comparable. Differences in EPI scores across EPI iterations are largely due to additions and subtractions of indicators, new weighting schemes, and other aspects of the methodology—not necessarily to decreased or increased performance." (Wendling et al., 2018: p. 10)*



















Figure 4 Links of Green Growth Index to Sustainable Development Goals

Dimensions	Indicators	Sustainable Development Goals (SDGs)*			
		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
	ME1	Total 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	Decent work and economic growth	8.4	8.4.1
			Responsible consumption and production	12.2	12.2.1
Natural capital protection	EQ1	PM2.5 air pollution, mean annual population-weighted exposure	Sustainable cities and communities	11.6	11.6.2
	EQ2	DALY rate due to unsafe water sources	Good health and well-being	3.9	3.9.2
	BE1	Proportion of KBAs covered by protected areas	Life below water	14.5	14.5.1
			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 stock 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 PAs to total territorial areas	Life below water	14.5	14.5.1	
Social inclusion	AB1	Access to safely managed water and sanitation	Clean water and sanitation	6.1 6.2	6.1.1 6.2.1
	AB2	Access to electricity and clean fuels/technology	Affordable and clean energy	7.1	7.1.1 7.1.2
	AB3	Internet broadband and mobile cellular subscriptions	Partnerships to achieve the goal	17.6	17.6.2
	GB1	Seats held by women in national parliaments	Gender equality	5.5	5.5.1
	GB2	Gender ratio of account at a financial institution or mobile-money-service	Decent work and economic growth	8.10	8.10.2
	SE2	Ratio of urban-rural access to basic services, i.e. electricity	Affordable and clean energy	7.1	7.1.1
	SE3	Youth not in education, employment or training	Decent work and economic growth	8.6	8.6.1
	SP1	Proportion of population receiving pension	No poverty	1.3	1.3.1
	SP2	Universal health coverage service coverage index	Good health and well-being	3.8	3.8.1
	SP3	Proportion of urban population living in slums	Sustainable cities and communities	11.1	11.1.1

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

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

**B Link of green growth indicators to SDGs and other sustainability targets**

Dimensions	Indicators	Link to SDGs and other targets		
		Sustainable Development Goals (SDGs)*		Other targets
Efficient and sustainable resource use	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
Natural capital Protection	EQ3 Municipal solid waste generation per capita	 Responsible consumption and production	12	
	GE1 CO <sub>2</sub> emissions to population, including AFOLU	 Sustainable cities and communities	11.6.1	
	GE2 Non-CO <sub>2</sub> emissions to population, excluding AFOLU	 Industry, innovation and infrastructure	9.4	9.4.1
	GE3 Non-CO <sub>2</sub> emissions in agriculture to population	 Climate action	13	Climate
	CV2 Tourism and recreation in coastal and marine areas	 Climate action	13	Climate
	CV3 Share of terrestrial and marine PA's to territorial areas	 Climate action	13	Climate
Green economic opportunities	GV1 Adjusted net savings, including particulate emission damage	 Responsible consumption and production	12.B	
	GT1 Share of environmental goods to total export	 Life on land	15.1	Aichi
	GJ1 Share of green employment in manufacturing	 Responsible consumption and production	12	
	GN1 Share of environmental technology to total patents	 Responsible consumption and production	12	
Social inclusion	AB3 Fixed Internet broadband and mobile cellular subscriptions	 Industry, innovation and infrastructure	9.c	
	GB2 Gender ratio of account at a financial institution or mobile-money-service	 Gender equality	5.1	
	GB3 Laws and regulations for equal gender pay	 Gender equality	5.c	
	SE1 Inequality in income based on Palma ratio	 Reduced inequality	10.2	
		 No poverty	1.1.1 1.2.1	
		 Reduced inequality	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/>

To allow comparison of scores and ranks over time, this edition of the report includes trends in the Green Growth Index – comparing changes in their green growth performance in the last one and a half decades. The 2020 Green Growth Index presents the results for about 117 countries from 2005 to 2019, including key highlights on differences in green growth performance among countries and regions, and across dimensions and indicators. Details on the concept and methods for developing the Green Growth Index were already discussed in the previous report and will not be repeated here. Only the summary of the methods is presented to enable readers and users of this report to understand the context for developing the Index (Appendix 1). The structure of the report is as follows:

**Chapter 1** briefly describes the concept of the Green Growth Index and explains the improvements made on its indicator framework. This chapter also briefly mentions the experts who contributed to the review of the indicator framework.

**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 special focus on the performance of regions on the four green growth dimensions and the trend in performance from 2005 to 2019.

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

**Chapter 5** provides details of the expert consultations that were conducted to review the green growth indicators for the 2020 Green Growth Index. This chapter describes the online survey and feedback collected from experts from this survey as well as challenges that need attention in the next steps forward.

**Chapter 6** presents the projects at GGGI which will apply the Green Growth Index and its Simulation Tool to support GGGI Member Countries and its Regional Partners to support greening of National Development Plans and Framework and assess co-benefits from COVID Green Recovery Plans.

**Chapter 7** provides the detailed results of the Green Growth Index for each country, including those which cannot be ranked due to lack of data for some green growth indicators. This chapter presents tables of the Index, dimensions, indicator categories, and normalized indicators for all countries and classified by regions.

## 2

## Global Review

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## 2.1 Maps

Figure 5 presents the maps of scores for the four green growth dimensions in 2019. Among the four dimensions, the scores in the green economic opportunities dimension are lowest across all regions and have large variance across countries. No country has reached very high scores and only four countries have high scores, which are all in Europe (i.e. Sweden, Denmark, Czech Republic, and Germany). Out of the 124 countries with scores for this dimension, 44% and 29% have very low and low scores, respectively. These are a significant number of countries, which correspond to about 74.61 million m<sup>2</sup> of the global land area. Thirty countries have moderate scores of between 40 and 60. Social inclusion is the next dimension showing divergent scores, albeit between regions. Africa is the most disadvantaged region as far as social inclusion is concerned, with low and very low scores. In contrast, countries in other regions have scores that are high and very high. Almost the exact opposite of green economic opportunities because, out of the 171 countries with scores for the social inclusion dimension, 34% and 25% have high and very high scores, respectively. These countries account for 97.75 million m<sup>2</sup> of the global land area, including the most populated countries like China, the United States, Indonesia, and Brazil.

The maps of scores for efficient and sustainable resource use and natural capital protection have some similarities, with most countries having high scores (Figure 5). These dimensions have almost the same number of countries with moderate scores, 52 and 59 for efficient and sustainable resource use and natural capital protection, respectively, which both correspond to about 70.28 million m<sup>2</sup> of the global land area. The land area covered by the countries with not only moderate, but more importantly high and very high scores are very relevant because these dimensions deal with sustainable use and effective protection of natural resources. For efficient and sustainable resource use, out of the 148 countries with scores for this dimension, 49% and 5% have high and very high scores,

respectively. Natural capital protection, which is the dimension with the highest number of countries with scores, has slightly higher country scores than efficient and sustainable resource use. Out of the 194 countries with scores for this dimension, 58% has high scores and, like the other dimension, with an additional 5% having also very high scores. These countries cover a combined land area coverage of 57.33 million m<sup>2</sup>.

In 2019, there are 117 countries with scores for the Green Growth Index, with 24 countries in Africa, 20 countries in the Americas, 33 countries in Asia, 38 countries in Europe, and only two in Oceania (Figure 6). The scores of almost half of the countries are in the middle range, between 40 and 60, covering about 77 million m<sup>2</sup> of the global land area. There are 32 countries that reached a high score between 60 and 80, many of them are in Europe. Those 30 countries with low scores are mainly from Africa and Asia. While there are no countries with very low scores in 2019, none has also received a very high score. Sweden, located in Northern Europe, has the highest Green Growth Index with a score of 78.72, which is still further away from reaching the sustainability target of 100. The lowest score of 24.49 is attributed to Niger in Western Africa. Despite no score reaching a very high level, the Green Growth Index generally increased worldwide from 2005 to 2019. There is a very encouraging development for about 19 countries which experienced over a 20% increase in score for the Green Growth Index during this period. Many of these significant improvements in green growth performance can be found in the African region. While green growth performance moderately increased in 48 countries globally, a decline in scores can be observed in countries in different regions. The six countries, which experienced the most significant decline in green growth performance between -10% and -25%, account for 24.87% of the global land area. These countries include Cabo Verde in Western Africa (-19%), Mauritius in Eastern Africa (-11%), Algeria in Northern Africa (-13%), Panama in Central America (-19%), Jordan in Western Asia (-15%), and Bosnia and Herzegovina in Southern Europe (-25%).

Figure 5 Sub-indices of the green growth dimensions for different countries in 2019

Efficient and Sustainable Resource Use

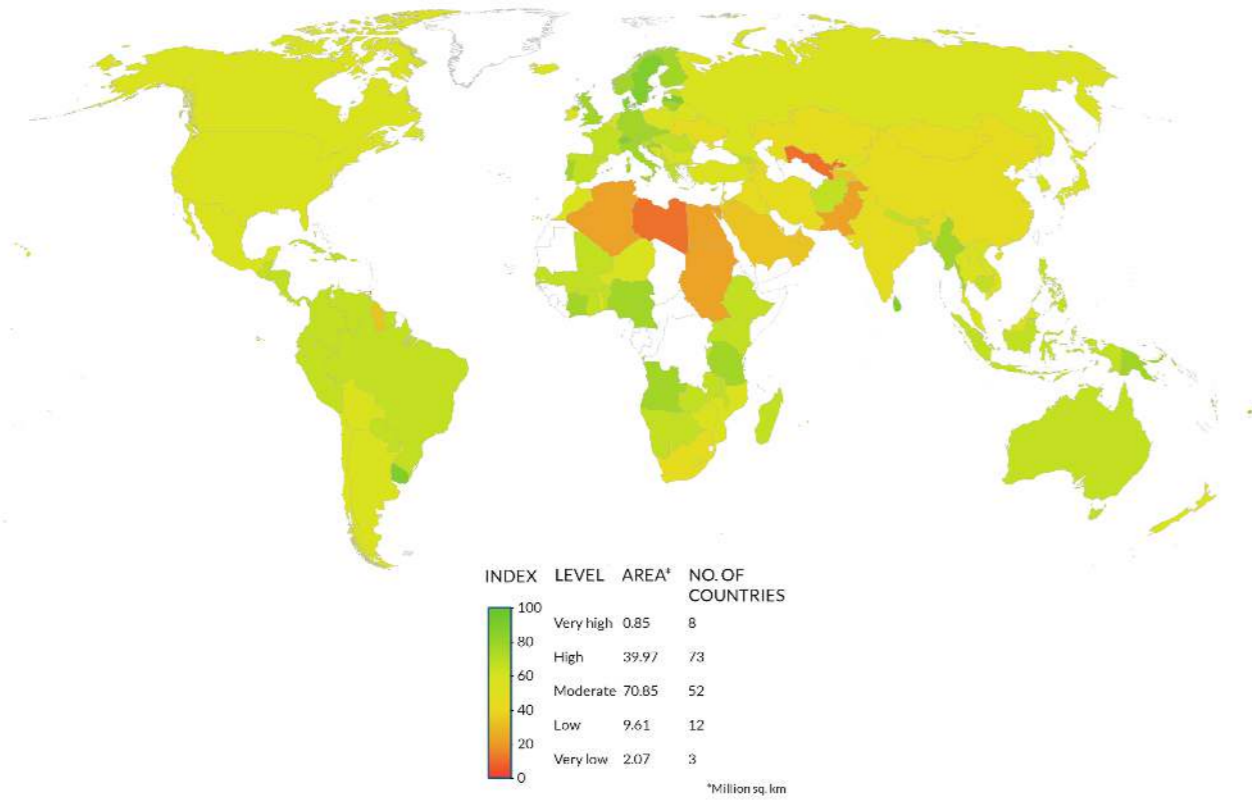
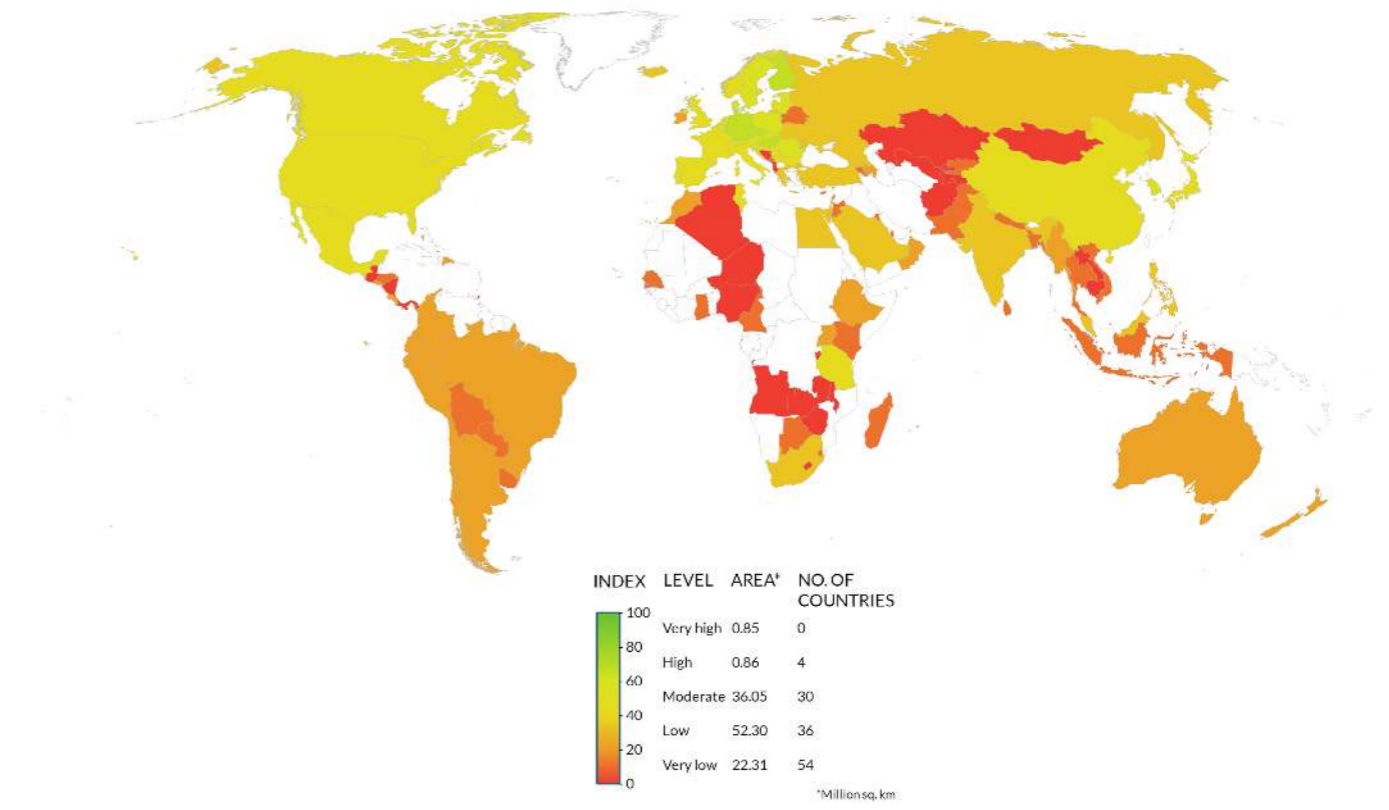
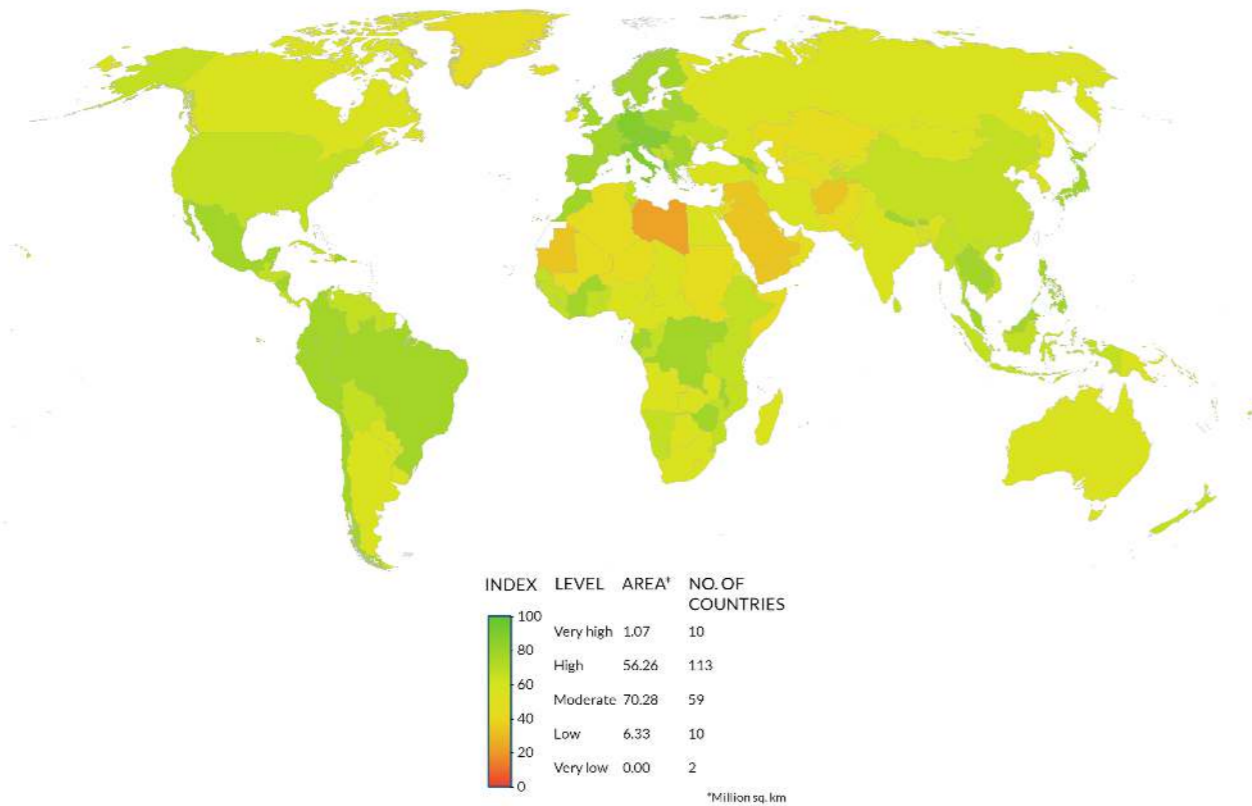


Figure 5 Sub-indices of the green growth dimensions for different countries in 2019 (continued)

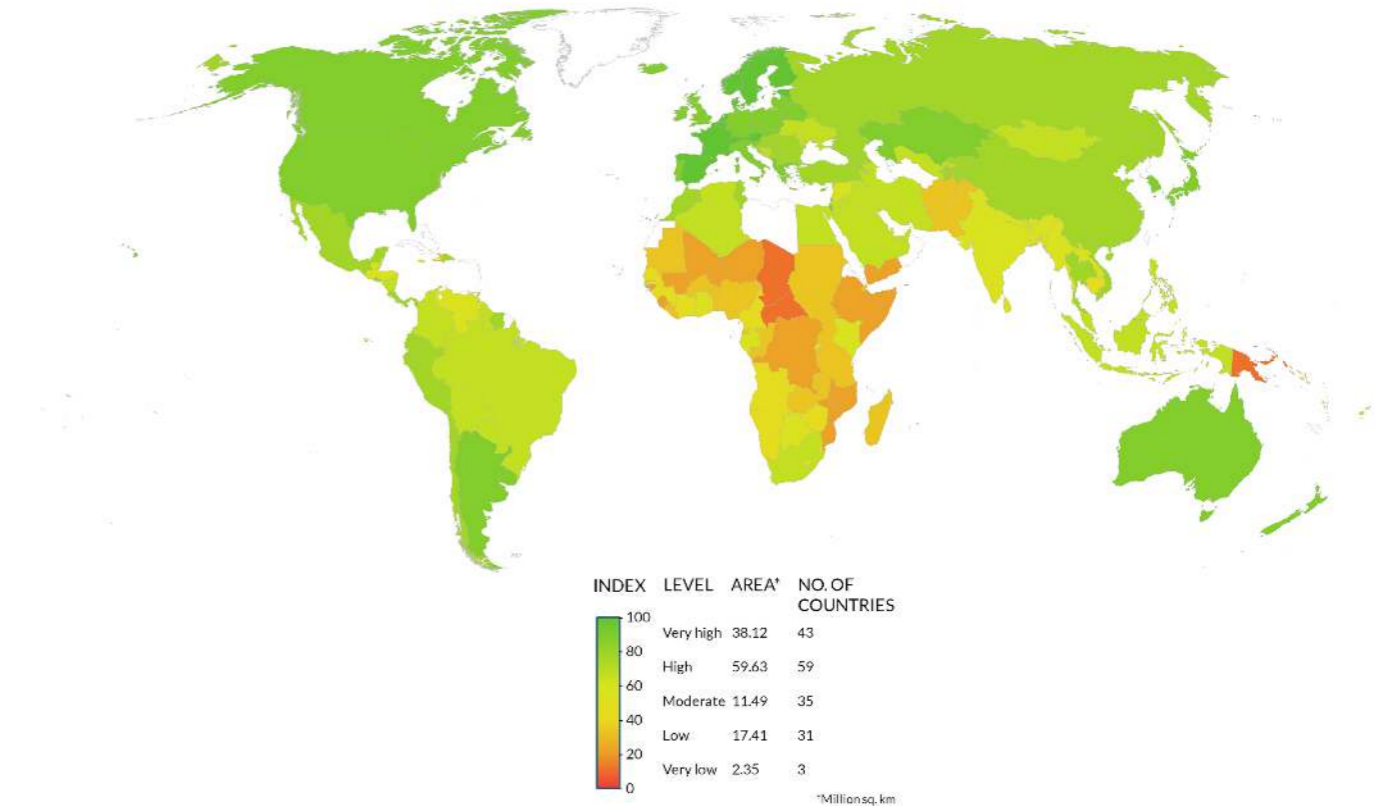
Green Economic Opportunities



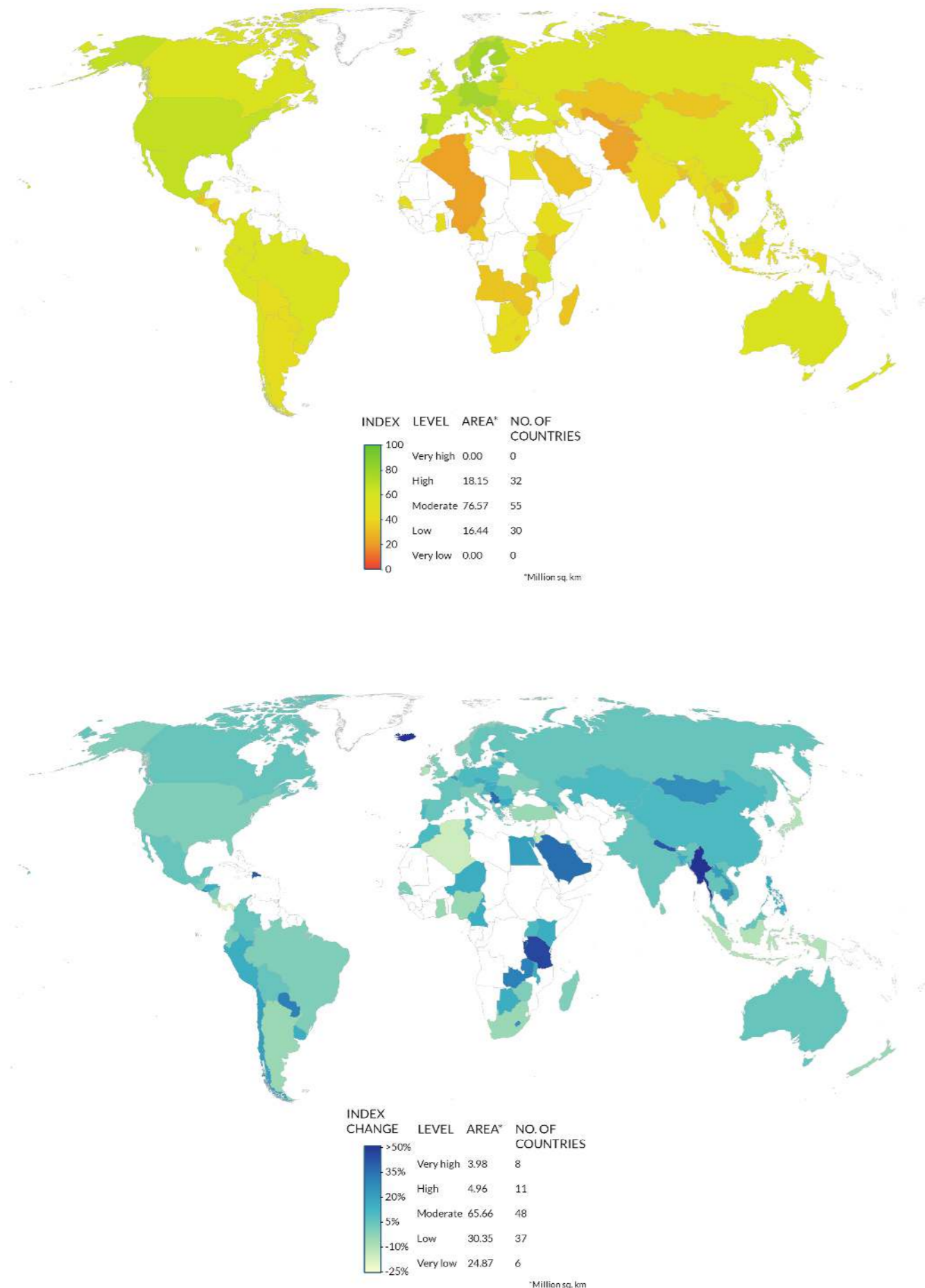
Natural Capital Protection



Social Inclusion



**Figure 6 Performance and change in scores of countries on the Green Growth Index in 2019**



## 2.2 Dashboards

Table 2 presents the country dashboard for the Green Growth Index by region and compares the changes in the scores of the Index from 2005 and 2019. In 2019, the top performing countries by region were Tanzania in Africa, Mexico in the Americas, Japan in Asia, Sweden in Europe, and New Zealand in Oceania, while the least performing countries were Niger in Africa, Trinidad and Tobago in the Americas, Uzbekistan in Asia, Malta in Europe, and Australia in Oceania. There were, however, only two countries with scores for the Index in Oceania due to lack of data for many countries in this region. Moreover, the score for Australia represents the scores in the upper range among the countries in the Americas and Asia. In Table 2, multi-directional arrows are used to show the performance of countries over time:

- ↑ pointing straight up represents increasing performance, above 10% increase in scores
- ↗ slightly slanting upward represents modest performance, between <10% and >=1% increase in scores
- → horizontal represents stable or almost no change in performance, between <1 and >=0% change in scores
- ↘ slightly slanting downward represents slight decline in performance, between <0% and >= -10% decline in scores
- ↓ pointing straight down represents worsening performance, below -10% decrease in scores

A 10% interval was used to measure the performance because the data points gather around this value. Although, Africa had the lowest scores among the regions, many countries showed increasing performance from 2005 to 2019. Tanzania, for example, experienced a 48% increase in scores for the Green Growth Index, one of the eight countries with the highest percentage change of above 35% globally (Figure 5). But Table 2 also shows that Africa has the greatest number of countries displaying a worsening performance with a decrease in scores of over -10%. Nonetheless, Africa has more countries showing an increasing performance than in the Americas and is par with other regions in terms of the number of countries with this good level of performance. Moreover, the other top performing countries in other regions have performed lower than Tanzania, which is the top performing country in Africa. On the one hand, Mexico and Sweden only experienced modest performance over this period, while Japan and New Zealand showed a slight decline in performance. The best performing country worldwide with 89% change in Index score from 2005 and 2019 is Iceland, but this level of change can be considered an outlier as the rest of the countries have percentage change of below 50%.

The better performance in Europe compared to other regions can be attributed to the relatively high scores for green economic opportunities in many European countries (Table 2). Only few European countries like Belarus, Albania, Montenegro, Bosnia and Herzegovina, and Malta showed very low scores for this green growth dimension. Among these countries, only Montenegro showed an increasing performance over time. In contrast, more than half of the countries in Africa, the Americas, and Asia have scores

below 20 for green economic opportunities. In Asia, more advanced countries like South Korea, China, and Japan are taking the lead in creating green economic opportunities. In Africa, these include developing countries like Tanzania, Tunisia, Egypt, and South Africa. If appropriate amounts of green investments and innovation would be made to enhance green employment and trade, many developing countries in the Asian and African regions would be expected to experience increasing performance in the future. In the Americas, performance of creating green economic opportunities in the United States and Canada are not on par with their peer developed countries in Europe.

The sub-regional performance for the different indicators is presented in Figure 7. It shows that the scores for the three among the four indicators for green economic opportunities are predominantly low and very low. On average, the scores for green trade (GT) are also low for all subregions in Europe. The scores for green investment (GV) are moderate for most sub-regions. After green economic opportunities, scores for efficient and sustainable resource use indicators are least impressive for most sub-regions, except for material use efficiency (ME). While efficient and sustainable use of energy (EE), water (EW), and land (SL) have low and moderate scores, the latter indicator shows scores from high to very high.

For the indicators of natural capital protection, the scores for environmental quality (EQ) and GHG emissions reduction (GE) also range from high to very high with few exceptions. For example, Northern America as well as Australia and New Zealand have scores of only around 40 for the reduction of emissions. In contrast, scores for indicators on biodiversity and ecosystem protection (BE) and cultural and social value (CV) are lower than the other two previous indicators in most subregions. In the case of the former indicator, subregions like Northern Africa, Central Asia, Western Asia, and Polynesia have very low scores for the protection of biodiversity and ecosystem. Scores are mostly low and moderate for cultural and social value (CV) with the exceptions of Europe as well as Australia and New Zealand wherein these sub-regions, scores are either high or very high.

For social inclusion, the scores are rather divergent for the different indicators and across the subregions. Social equity (SE) indicator has the highest number of subregions with high or very high scores, except for most subregions in Africa. Social equity in Northern Africa is on par with the rest of the subregions of the world. Except for gender balance (GB) with high scores in Eastern and Southern Africa, the scores for the rest of the indicators have mainly low cores. The Eastern, Middle, and Southern sub-regions in Africa have low scores for both access to basic services and resources (AB) and social protection (SP). Although a bit better than Africa, many sub-regions in Oceania have also low scores for social inclusion indicators, except for social equity.

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

Country	Subregion	Dimension scores (2019)				2005		2019		Performance
		ESRU	NCP	GEO	SI	Index	Rank	Index	Rank	
<b>AFRICA</b>										
Tanzania	Eastern Africa	71.77	66.89	47.53	41.77	37.63	9	55.56	1	↑
Morocco	Northern Africa	50.34	73.63	26.35	72.16	45.03	4	51.52	2	↑
Tunisia	Northern Africa	28.27	61.76	46.16	75.42	44.22	5	49.65	3	↑
South Africa	Southern Africa	40.14	59.22	35.45	67.24	49.96	2	48.79	4	↔
Cabo Verde	Western Africa	67.97	68.39	15.41	69.17	58.20	1	47.18	5	↓
Senegal	Western Africa	70	65.62	18.55	43.76	41.95	6	43.94	6	↔
Mauritius	Eastern Africa	59.21	53.2	12.98	84.43	48.19	3	43.10	7	↓
Uganda	Eastern Africa	65.41	69.92	23.7	31.63	39.01	8	43.03	8	↔
Egypt	Northern Africa	24.87	54.85	39.72	61.17	35.42	10	42.66	9	↑
Ethiopia	Eastern Africa	57.88	67.24	26.03	29.98	30.31	16	41.75	10	↑
Ghana	Western Africa	69.8	68.23	12.02	51.76	41.75	7	41.49	11	↔
Botswana	Southern Africa	66.41	58.75	12.25	53.92	33.48	12	40.07	12	↑
Cameroon	Middle Africa	67.58	59.76	12.88	43.61	32.40	14	38.81	13	↑
Kenya	Eastern Africa	62.67	62.48	10.3	53.68	32.53	13	38.36	14	↑
Madagascar	Eastern Africa	60.35	56.36	15.51	31.39	34.24	11	35.87	15	↔
Angola	Middle Africa	76.39	56.04	7.28	40.59	28.89	18	33.53	16	↑
Lesotho	Southern Africa	56.76	45.4	8.24	50.88	25.58	21	32.24	17	↑
Zambia	Eastern Africa	65.23	59.62	8.14	32.63	24.49	22	31.88	18	↑
Malawi	Eastern Africa	62.08	76.44	7.48	27.22	26.91	20	31.35	19	↑
Burundi	Eastern Africa	58.59	68.51	6.68	34.23	21.11	23	30.95	20	↑
Zimbabwe	Eastern Africa	57.58	78.42	4.2	41.71	29.73	17	29.83	21	↔
Algeria	Northern Africa	28.43	45.45	7.2	66.27	32.36	15	28.02	22	↓
Nigeria	Western Africa	67.97	57.23	4.18	36.18	28.07	19	27.69	23	↔
Niger	Western Africa	59.67	48.93	4.84	25.47	20.69	24	24.49	24	↑
<b>AMERICAS</b>										
Mexico	Central America	57.84	72.64	44.65	76.94	58.41	2	61.64	1	↔
United States	Northern America	56.3	63.95	43.13	85.21	58.60	1	60.31	2	↔
Canada	Northern America	59.17	56.24	41.73	87.91	54.25	5	59.11	3	↔
Brazil	South America	65.5	71.03	28.44	70.08	54.84	4	55.18	4	↔
Dominican Rep.	Caribbean	60.96	76.25	25.98	73.41	38.66	16	54.57	5	↑
Costa Rica	Central America	66.5	68.6	23.29	75.27	57.57	3	53.18	6	↔
Colombia	South America	65.1	71.7	25.05	67.98	48.77	9	53.10	7	↔
Peru	South America	64.94	72.08	23.26	71.17	45.10	10	52.76	8	↑
Chile	South America	59.01	73.63	21.98	79.87	42.41	11	52.55	9	↑
El Salvador	Central America	63.12	58.34	26.67	76.79	40.62	12	52.40	10	↑
Ecuador	South America	60.89	70.84	20.44	75.28	49.29	8	50.75	11	↔



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

Country	Subregion	Dimension scores (2019)				2005		2019		Performance
		ESRU	NCP	GEO	SI	Index	Rank	Index	Rank	
<b>ASIA</b>										
Argentina	South America	59.96	57.91	21.14	81.37	49.91	7	49.44	12	↔
Uruguay	South America	82.88	53.41	14.23	80.89	39.97	14	47.51	13	↑
Paraguay	South America	64.96	58.18	19.86	67.46	35.39	18	47.44	14	↑
Honduras	Central America	67.25	67.99	16.78	57.28	39.76	15	45.78	15	↑
Bolivia	South America	55.73	69.79	14.1	68.92	40.35	13	44.09	16	↔
Panama	Central America	67.14	67.48	9.39	73.22	51.75	6	42.01	17	↓
Guatemala	Central America	68.24	66.32	7.37	57.05	36.53	17	37.14	18	↔
Nicaragua	Central America	66.11	71.45	5.12	66.42	34.55	19	35.60	19	↔
Trinidad & Tobago	Caribbean	19.97	51.8	9.76	83.45	29.56	20	30.29	20	↔
Japan	Eastern Asia	55.74	71.1	44.88	82.16	66.00	1	61.83	1	↔
Georgia	Western Asia	61.25	72.13	36.7	72.99	53.05	2	58.65	2	↔
China	Eastern Asia	48.66	64.6	48.57	75.78	52.07	6	58.33	3	↑
Philippines	South-Eastern Asia	63.68	74.54	31.9	67.56	48.90	8	56.55	4	↑
Malaysia	South-Eastern Asia	55.8	71.07	36.84	64.67	52.22	4	55.44	5	↔
South Korea	Eastern Asia	34.62	57	52.93	81.8	51.17	7	54.07	6	↔
Turkey	Western Asia	54.28	50.94	31.87	74.43	52.34	3	50.60	7	↔
Myanmar	Eastern Asia	71.93	61.7	26.24	52.36	28.99	26	49.69	8	↑
Thailand	South-Eastern Asia	59.43	74.73	17.57	76.18	45.12	12	49.38	9	↔
Israel	Western Asia	47.05	49.33	30.77	82.32	52.11	5	49.24	10	↔
Nepal	Southern Asia	61.27	71.55	18.71	60.01	32.55	21	47.10	11	↑
Cyprus	Western Asia	62.73	69.33	11.6	82.94	46.33	9	45.23	12	↔
Azerbaijan	Western Asia	44.94	65.96	21.17	64.01	43.03	13	44.77	13	↔
India	Southern Asia	41.98	55.11	30.4	51.09	40.88	14	43.54	14	↔
Lebanon	Western Asia	44.09	56.1	24.49	51.56	45.76	10	42.04	15	↔
Vietnam	South-Eastern Asia	55.29	62.61	11.98	73.78	39.40	16	41.82	16	↔
Indonesia	South-Eastern Asia	62.88	64.3	11.52	64.6	45.46	11	41.65	17	↔
Bangladesh	Southern Asia	63.61	53.31	13.75	52.65	33.35	19	39.58	18	↑
Armenia	Western Asia	43.53	70.06	10.28	73.81	32.89	20	39.00	19	↑
Laos	South-Eastern Asia	59.24	72.46	9.36	55.75	31.90	23	38.69	20	↑
Saudi Arabia	Western Asia	31.1	35.75	30.75	65.27	28.19	27	38.65	21	↑
Sri Lanka	Southern Asia	32.5	65.4	18.04	55.53	38.13	17	38.20	22	↔
Kyrgyz Republic	Central Asia	43.93	59.7	10.73	73.06	33.84	18	37.87	23	↑
Cambodia	South-Eastern Asia	64.66	76.39	5.89	48.67	27.04	30	34.49	24	↑
Jordan	Western Asia	33.92	47.37	13.04	67.16	40.29	15	34.44	25	↓
Kazakhstan	Central Asia	45.95	43.21	8.58	81.4	30.10	25	34.32	26	↑
Kuwait	Western Asia	45.45	43.88	11.79	57.28	32.41	22	34.07	27	↔





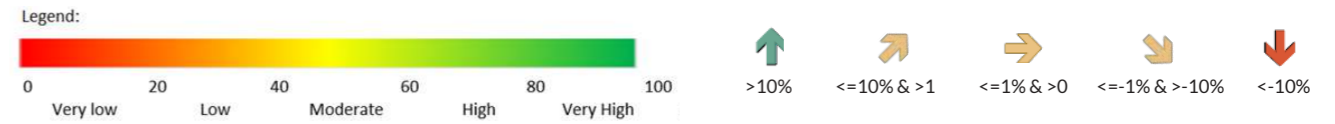
**Table 2 Country dashboard for dimensions and Green Growth Index performance, by region (continued)**

Country	Subregion	Dimension scores (2019)				2005		2019		Performance
		ESRU	NCP	GEO	SI	Index	Rank	Index	Rank	
Qatar	Western Asia	47.94	36	12.66	55.69	31.64	24	33.22	28	↗
Mongolia	Eastern Asia	44.71	55.65	7.32	63.26	25.74	31	32.76	29	↑
Pakistan	Southern Asia	24.71	49.99	16.3	37.8	27.69	29	29.54	30	↗
Tajikistan	Central Asia	38.45	60.85	4.17	72.86	28.10	28	29.04	31	↗
Afghanistan	Southern Asia	67.15	37.37	6.06	38.26	24.20	32	27.62	32	↑
Uzbekistan	Central Asia	13.24	53.7	9.74	64.26	19.87	33	25.83	33	↑
<b>EUROPE</b>										
Sweden	Northern Europe	87.78	78.14	59.53	94.06	73.17	2	78.72	1	↗
Denmark	Northern Europe	86.12	73.19	59.68	92.33	74.64	1	76.77	2	↗
Czech Republic	Eastern Europe	72.92	83.15	65.49	87.35	65.82	11	76.74	3	↑
Germany	Western Europe	70.37	82.37	63.73	89.49	68.08	7	75.83	4	↑
Austria	Western Europe	79.21	80.67	56.1	89.31	73.15	3	75.22	5	↗
Finland	Northern Europe	78.21	71.53	60.34	91.21	68.49	6	74.49	6	↗
Slovakia	Eastern Europe	71.88	85.53	58.58	84.37	63.09	17	74.25	7	↑
Switzerland	Western Europe	83.26	77.99	48.66	90.93	73.01	4	73.21	8	→
Lithuania	Northern Europe	76.42	75.62	52.2	87.1	64.54	13	71.60	9	↗
Hungary	Eastern Europe	63.63	81.47	62.24	80.54	61.79	18	71.40	10	↑
Slovenia	Southern Europe	68.36	81.85	51.34	88.53	70.21	5	71.01	11	↗
Portugal	Southern Europe	76.48	78.41	45.52	89.87	63.35	16	70.38	12	↗
Estonia	Northern Europe	68.97	76.15	50.48	88.66	60.38	22	69.63	13	↑
Latvia	Northern Europe	84.31	77.22	41.95	83.6	66.60	8	69.12	14	↗
Belgium	Western Europe	59.54	78.37	53.93	90.48	56.58	27	69.08	15	↑
Poland	Eastern Europe	59.69	76.83	55.05	89.29	60.76	20	68.90	16	↑
France	Western Europe	68.41	79.61	46.21	89.31	65.10	12	68.85	17	↗
Romania	Eastern Europe	64.96	78.68	54.01	79.36	59.83	23	68.41	18	↑
Italy	Southern Europe	72.57	80.82	41.91	87.3	66.28	9	68.06	19	↗
Norway	Northern Europe	76.54	72.32	41.92	92.2	65.99	10	68.01	20	↗
Croatia	Southern Europe	72.71	84.04	45.91	75.48	60.66	21	67.84	21	↑
Netherlands	Western Europe	59.54	74.53	49.27	92.51	64.22	14	67.06	22	↗
United Kingdom	Northern Europe	72.28	76.12	40.36	90.07	63.79	15	66.87	23	↗
Spain	Southern Europe	63.03	76.76	45.32	90.62	60.92	19	66.77	24	↗
Greece	Southern Europe	65.19	77.07	34.57	84.27	58.56	24	61.86	25	↗
Luxembourg	Western Europe	64.6	78.07	31.74	90.27	58.06	25	61.66	26	↗
Bulgaria	Eastern Europe	54.84	78.32	41.46	79.24	53.22	28	61.29	27	↑
Serbia	Southern Europe	57.31	69.51	40.91	76.7	43.89	35	59.46	28	↑
Russia	Eastern Europe	50.55	55.84	37.17	77.88	50.23	31	53.46	29	↗



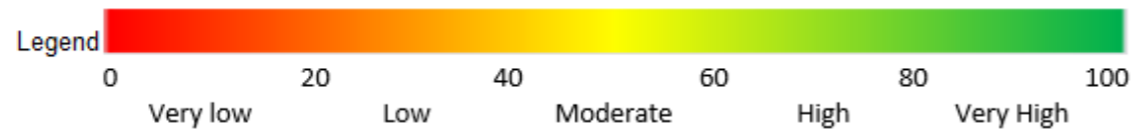
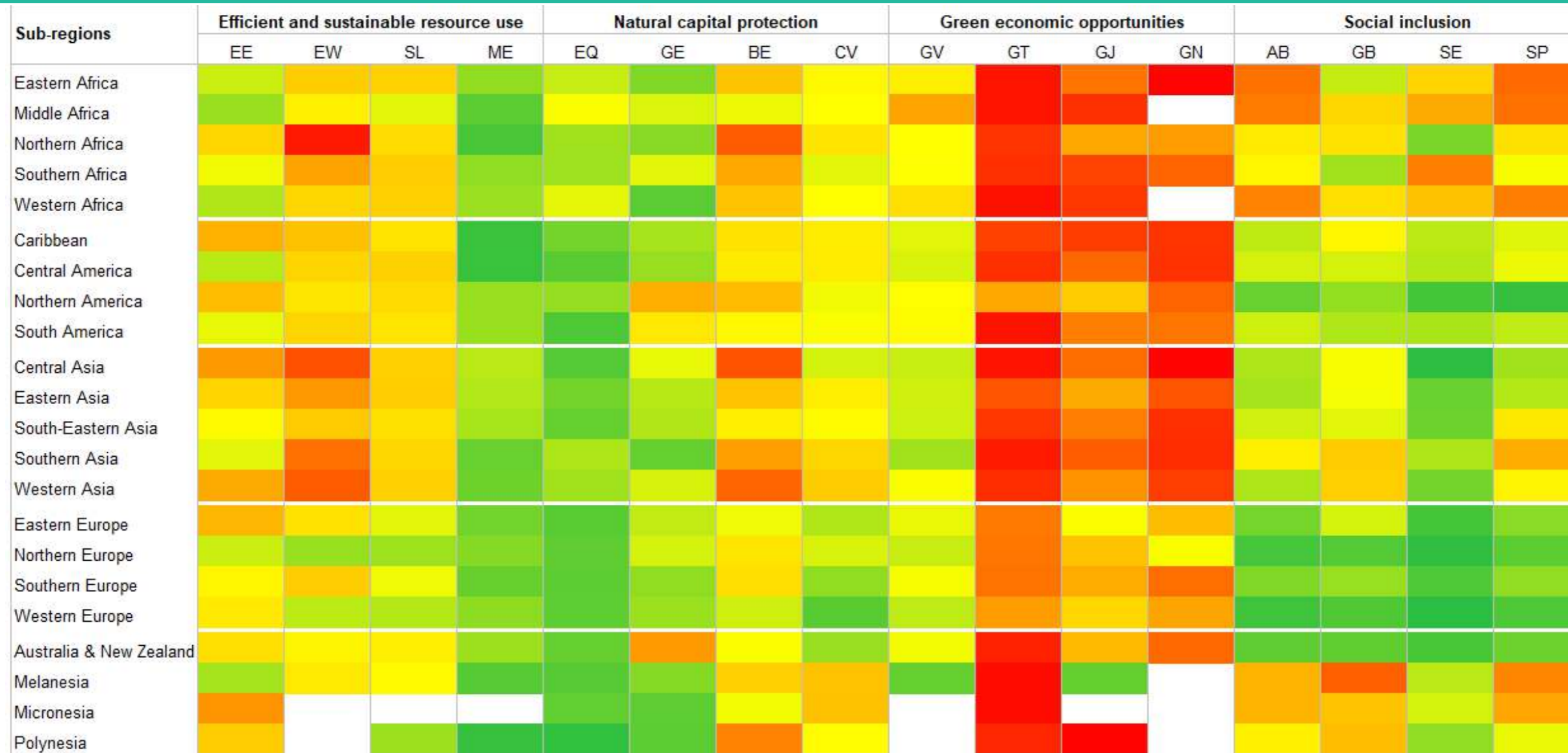
**Table 2 Country dashboard for dimensions and Green Growth Index performance, by region (continued)**

Country	Subregion	Dimension scores (2019)				2005		2019		Performance
		ESRU	NCP	GEO	SI	Index	Rank	Index	Rank	
Ireland	Northern Europe	54.83	59.16	27.65	85.01	57.32	26	52.55	30	↘
Iceland	Northern Europe	59.63	42.18	33.62	87.96	27.60	38	52.23	31	↑
Moldova	Eastern Europe	57.93	58.49	31.72	66.17	49.62	32	51.64	32	↗
Ukraine	Eastern Europe	45.02	62.57	35.34	69.62	50.87	30	51.31	33	→
Belarus	Eastern Europe	57.13	72.88	15.62	83.87	45.50	33	48.32	34	↗
Albania	Southern Europe	65.05	82.62	9.44	80.69	44.81	34	44.98	35	→
Montenegro	Southern Europe	66.06	60.91	12.75	71.65	33.64	37	43.78	36	↑
Bosnia & Herzegovina	Southern Europe	58.7	61.76	9.54	69.05	52.44	29	39.31	37	↓
Malta	Southern Europe	50.86	71.99	3.25	85.41	38.06	36	31.76	38	↓
<b>OCEANIA</b>										
New Zealand	Australia and New Zealand	58.11	69.64	27.98	88.92	58.08	1	56.33	1	↘
Australia	Australia and New Zealand	63.65	55.36	28.17	83.61	50.12	2	53.67	2	↗



Definitions: ESRU – Efficient and sustainable resource use, NCP – Natural capital protection, GEO – Green economic opportunities, SI – Social inclusion

Figure 7 Dashboard of indicator categories in each green growth dimension, by sub-regions in 2019



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

<b>3.1</b>	<b>Dimension Performance 2019</b>	<b>24</b>
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### 3.1 Dimension performance 2019

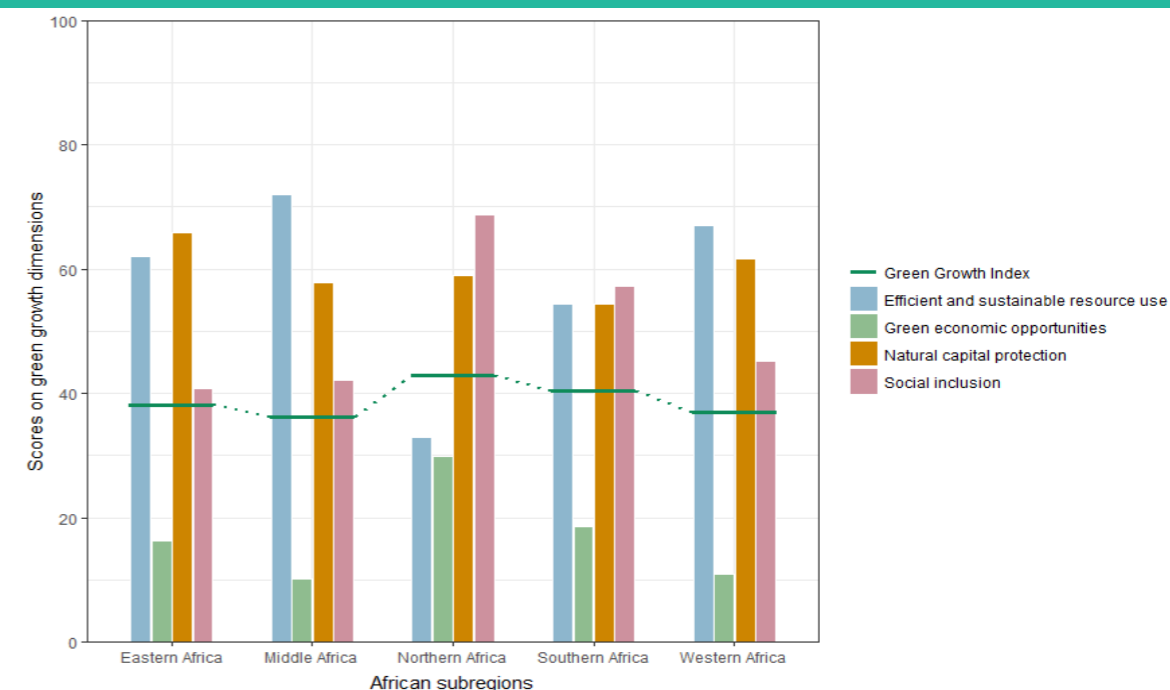
Green Growth Index rankings are provided for countries within five geographic regions – Africa, the Americas, Asia, Europe, and Oceania. To further understand the Green Growth Index results, an in-depth analysis of each region is provided discussing the scores of efficient and sustainable resource use, natural capital protection, green economic opportunities, and social inclusion at a subregional level.

#### 3.1.1 Africa

The Green Growth Index includes the results for five African subregions – Eastern, Middle, Northern, Southern, and Western Africa. The results show that the overall regional performance is moderate to low. Northern Africa has the highest green growth index, as a result of high social inclusion and the best performance

in green economic opportunities compared to the other subregions. The very high scores in social equality in Morocco, Algeria, and Tunisia as well as moderate to high country performance in green investment support this result. However, Northern Africa also has the lowest scores in efficient and sustainable resource use, linked to poorer performance in efficient and sustainable energy and water use. In comparison, the above 60 scores of Eastern, Middle, and Western Africa (Figure 8) in this dimension is mainly attributed to the high scores in efficient and sustainable energy use. Natural capital protection is the most consistent across subregions, with Eastern and Western Africa receiving high scores and having strong performances in GHG emission reductions followed by environmental quality. Whereas, the Northern Africa score is affected by low values in biodiversity and ecosystem protection (Figure 7). Among all subregions, green economic opportunities score the lowest, except Northern Africa. Green investment is observed to be the main contributor to the green economic opportunities dimension, with zero or very low scores provided to the other indicator categories.

Figure 8 Green Growth Index and dimension sub-indices in the African subregions



#### 3.1.2 Americas

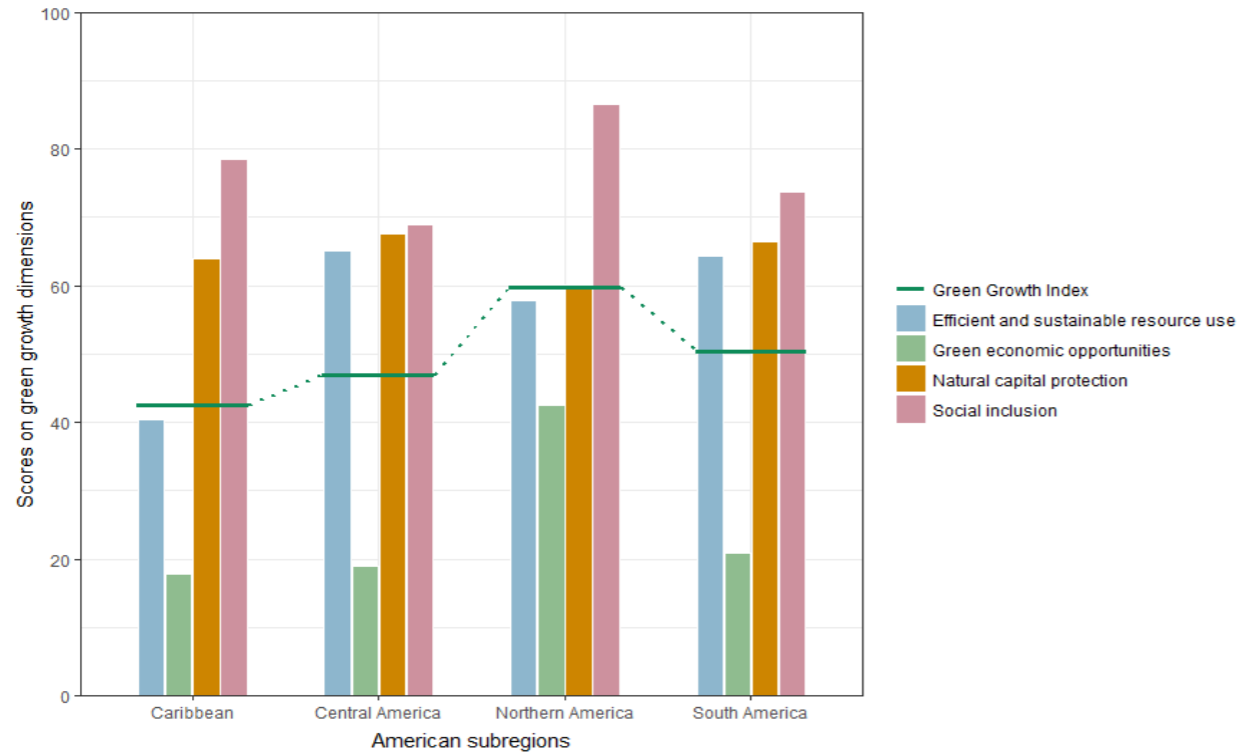
The Caribbean and Central, Northern, and South America are the four subregions of the Americas. Social inclusion is the strongest performing dimension with high scores in the Caribbean and Central and Southern America. The very high scores in Northern America can be attributed to countries such as the United States and Canada as a result of prioritizing social inclusion policies and spending on social programs. However, Northern America falls behind in the dimension of natural capital protection due to lower scores in GHG emissions and biodiversity and ecosystem protection (Figure 9). In comparison, Central America leads the performance in natural

capital protection. Consequently, being an area of the world with high biodiversity, many countries in this region such as Mexico and Costa Rica have higher scores for natural capital protection. Additionally, this region also has the highest efficient and sustainable resource use scores due to higher performance in efficient and sustainable energy use and material use efficiency. South America has comparable values to Central America in terms of natural capital protection and resource efficiency; however, it does have a higher green growth score due to slightly higher scores in gender balance and social equality for social inclusion. The Caribbean has the lowest green growth index score just above 40 (Figure 9), and while this sub-region scores higher in social inclusion, this is offset by the

lowest regional values in green economic opportunities and efficient and sustainable resource use. Green economic opportunities scores are also the lowest among all dimensions, with similar values observed in the Caribbean, Central America, and South America. This is primarily attributed to green investment. On the other hand,

the moderate scores in Northern America are the outcome of higher green trade and green employment scores compared to the other subregions (Figure 7).

Figure 9 Green Growth Index and dimension sub-indices in the Americas subregions

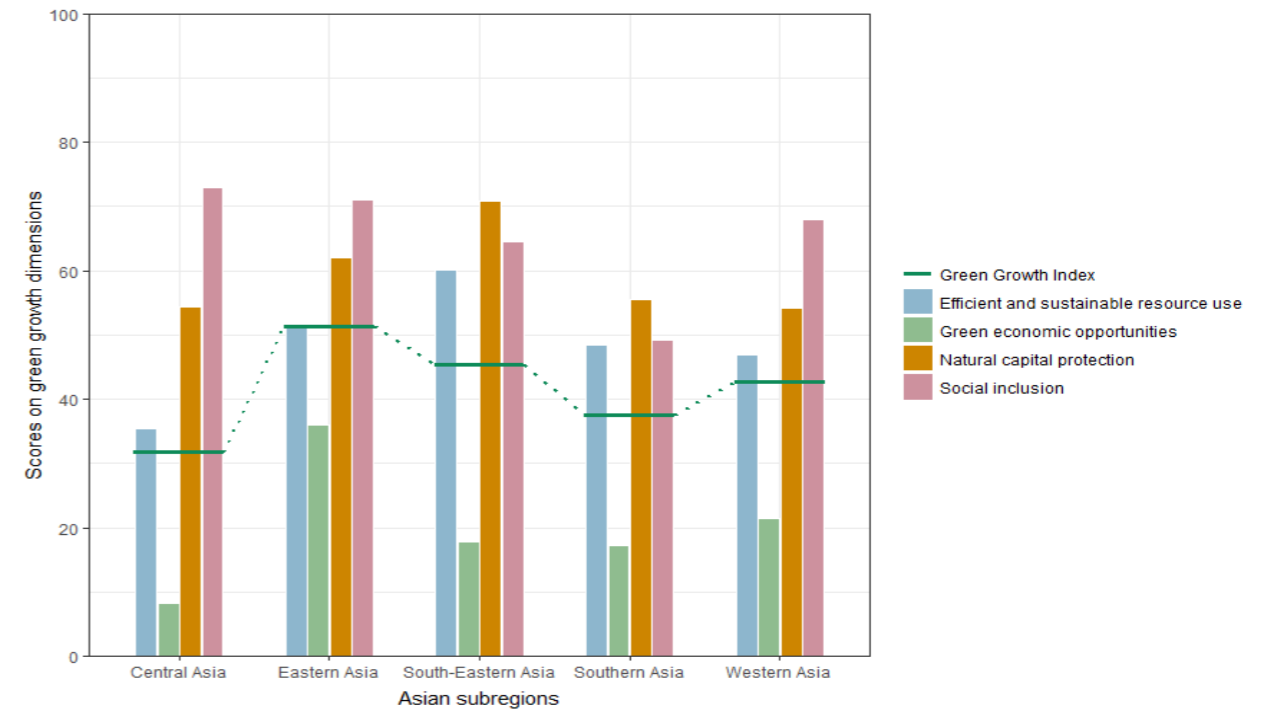


### 3.1.3 Asia

Asia has five subregions – Central, Eastern, South-Eastern, Southern, and Western Asia. Green growth performance is more varied in this region, with a large difference in index scores observed between Eastern and Central Asia. The high social inclusion scores among all the sub-regions are observed except for Southern Asia. The Central Asian countries slightly taking the lead in performance for social inclusion, with three out of the five countries scoring above 70. It is followed by East Asia with countries such as Japan and Korea having very high scores above 80 (Table 11). Both of these regions show high values for access to basic services and social equity among the individual indicators. However, Central Asia scores the lowest in overall green growth as a result of low scores for green economic opportunities and efficient and sustainable resource use. Comparably, Eastern Asia has the highest green growth performance, due to high scores in the green economic opportunities dimension as a result of green investment and green employment (Figure 10).

Natural capital protection performance is highest within South-Eastern Asia, with many countries having very high scores related to environmental quality and GHG emission reductions. Further, this sub-region is also another global biodiversity hotspot, thus it explains the average high score of 70 for this dimension (Figure 10). South-Eastern Asia also has the highest efficient and sustainable resource use score which can be attributed to having slightly higher values in terms of efficient and sustainable energy and water use compared with other sub-regions in Asia. The low scores for green economic opportunities are observed among South-Eastern Asia, followed by Southern Asia, Western Asia, then Central Asia. Similar to other regions, green investment seems to be the main contributing indicator towards a higher score in the green economic opportunities dimension (Figure 7). Additionally, another emerging trend is income-level, as it can be shown that the sub-regions with a higher proportion of upper-middle to high income classified countries have a better performance in green economic opportunities.

Figure 10 Green Growth Index and dimension sub-indices in the Asian subregions



### 3.1.4 Europe

In comparison to other regions, Europe is the strongest performer in green growth, with most of its subregions having a high green growth index score. This includes four regions – Eastern, Northern, Southern, and Western Europe. The bar plots of Eastern, Southern, and Western Europe show the same trend in dimension performance for social inclusion, natural capital protection, efficient and sustainable resource use, and green economic opportunities. Northern Europe varies by having a higher resource efficiency score than natural capital protection (Figure 11).

Social inclusion is classified as very high in each subregion, with the highest score in Western Europe and Northern Europe. Both subregions also have high scores across all indicator categories. Top countries include the Netherlands, Germany, and Norway. The variations between these two subregions are that Western Europe has higher scores for natural capital protection and green economic opportunities mainly due to higher biodiversity protection, green trade, and green employment (Figure 7). Thus, Western Europe has the highest green growth index. Though efficient and sustainable resource use scores are higher across the indicator categories in Northern Europe. Scores in Eastern and Southern Europe are also alike, however, the low score in green economic opportunities caused by a lack of green employment and green innovation results in Southern Europe having a lower Index score than Eastern Europe.

### 3.1.5 Oceania

Oceania is comprised of four subregions – Australia and New Zealand, Melanesia, Micronesia, and Polynesia. Due to data limitations with the region, a country-level analysis is presented for Australia and New Zealand. Moderate green growth scores are observed for both countries, with New Zealand being slightly higher than Australia (Figure 12). Global regional trends are further observed such as high social inclusion and low green economic opportunity scores. There are minor differences that appear between the efficient and sustainable resource use and natural capital protection dimensions. The higher scores in GHG emission reduction raise the score for the national capital protection dimension for New Zealand over Australia. While increasing organic agriculture in Australia has resulted in higher scores in sustainable land use for the resource efficiency dimension.

Figure 11 Green Growth Index and dimension sub-indices in the European subregions

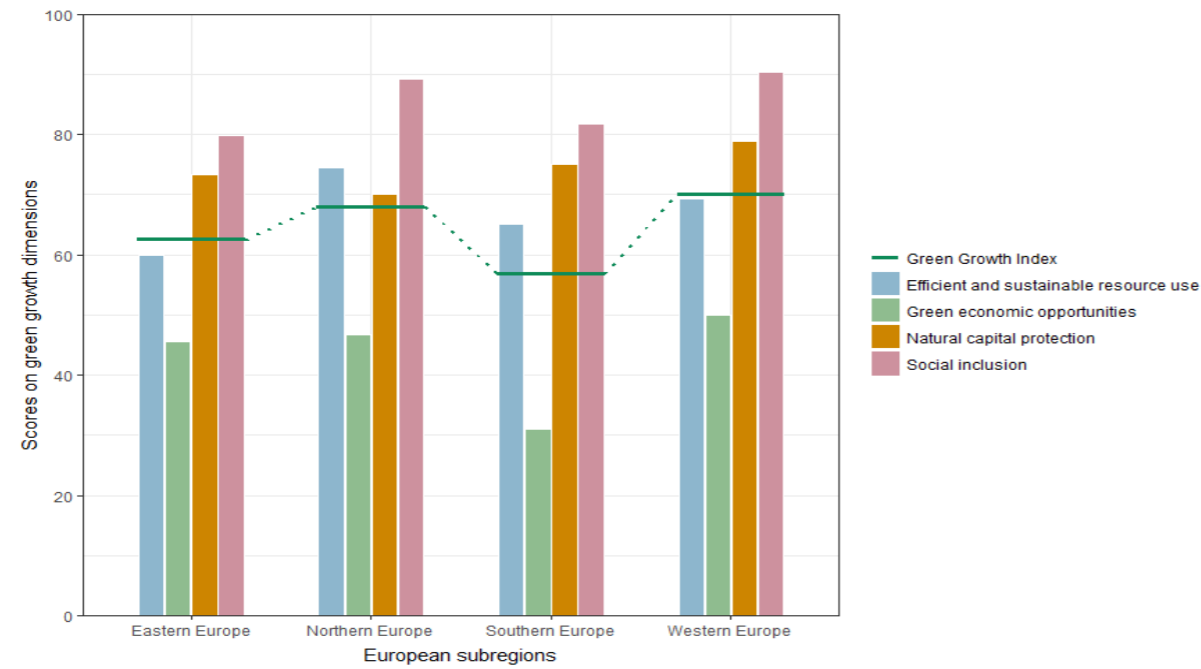
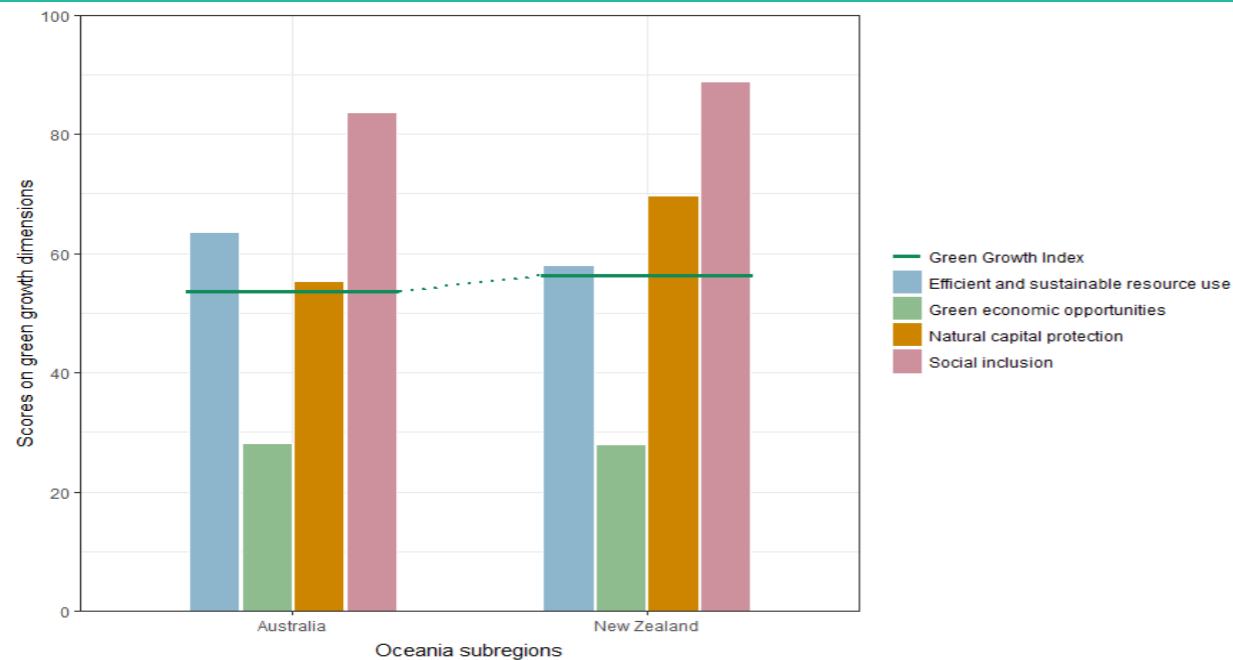


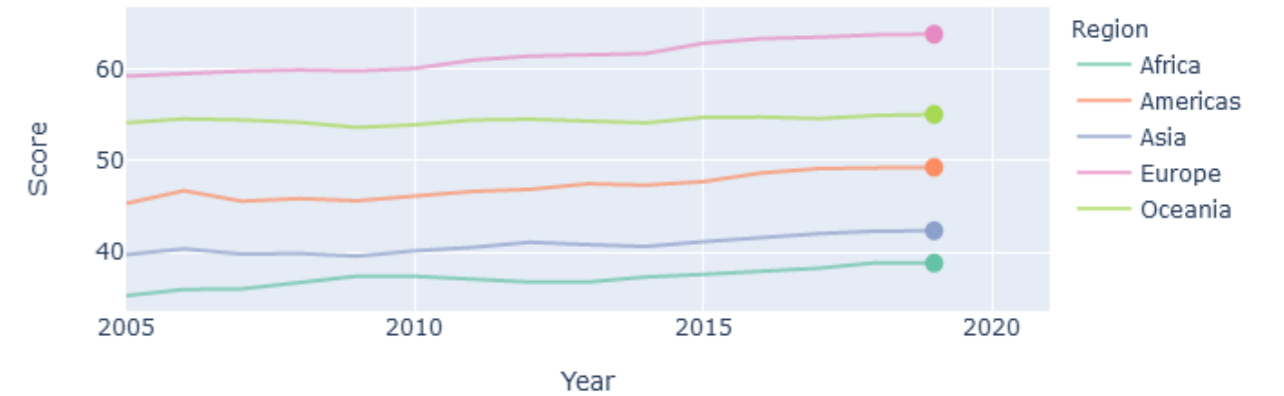
Figure 12 Green Growth Index and dimension sub-indices in the Oceania subregions



even though the disaggregation by dimensions shows a different picture. On the other hand, Africa and Asia remain the regions with the lowest scores over time. African nations have scores mostly in the low range (20-40), while Asian countries are on the lower end of moderate scores (40-60). But, there are still improvements in performance for these countries, particularly for the social inclusion dimension. For the Americas, the score range is between 40-60, but again. On the lower end of the moderate scores. This is primarily

once again due to the sustained efforts to reduce poverty and inequality in South and Central America. The score for the Americas does not adequately reflect the performance of the United States and Canada who individually score well above the average for the Americas as a whole, at 60 and 59, respectively. Finally, Oceania remains the continent that has seen the least change in score over the past 15 years, with a score between 40-60, but on the upper end of the average scores.

Figure 13 Trend in Green Growth Index by region



### 3.2.2 Trend in dimensions

From the disaggregated trends observed in Figure 14, some general conclusions can be drawn. Although the trends differ across continents for other dimensions, green economic opportunities is consistently below targets and largely stable across time, except in Europe where the trend is rising slightly and greater than other regions. Another positive trend to note is that across all continents, social inclusion scores have risen systematically over the past 15 years. This is especially true in areas with many developing countries like Asia and Africa. The increase in social inclusion scores can largely be attributed to the wide-ranging efforts at poverty reduction including the inflow of foreign aid, government welfare programs, and efforts by international organizations including the UN (Ravallion, 2020).

energy supply to GDP, where many African nations have a score of 100, indicating that they have reached or exceeded the sustainability target. The high scores for this indicator are due to the lower total consumption of energy in many African nations like Burkina Faso and Ethiopia as well as the increasing investments in renewable energy. Moreover, this trend may continue in the future as the continent has many renewable energy resources to exploit, including geothermal and solar energy (IEA, 2019). It can also be observed that Africa scores slightly better on the dimension of natural capital protection than its richer counterpart, Asia. This is because the Asian developing countries have usually prioritized industrialization over conservation, while Africa has only produced 2% of energy-related global carbon-dioxide. This can be expected to change in the coming years as African nations also emerge on a path of industrial development.

Certain interesting comparative trends can also be noted (Figure 14). For instance, African nations are on par with European countries in the efficient and sustainable resource use dimension. This seems to be at least partly due to the indicator on the ratio of total primary

The following parts of this chapter provide explanations for the above-mentioned trends in the green growth dimensions.

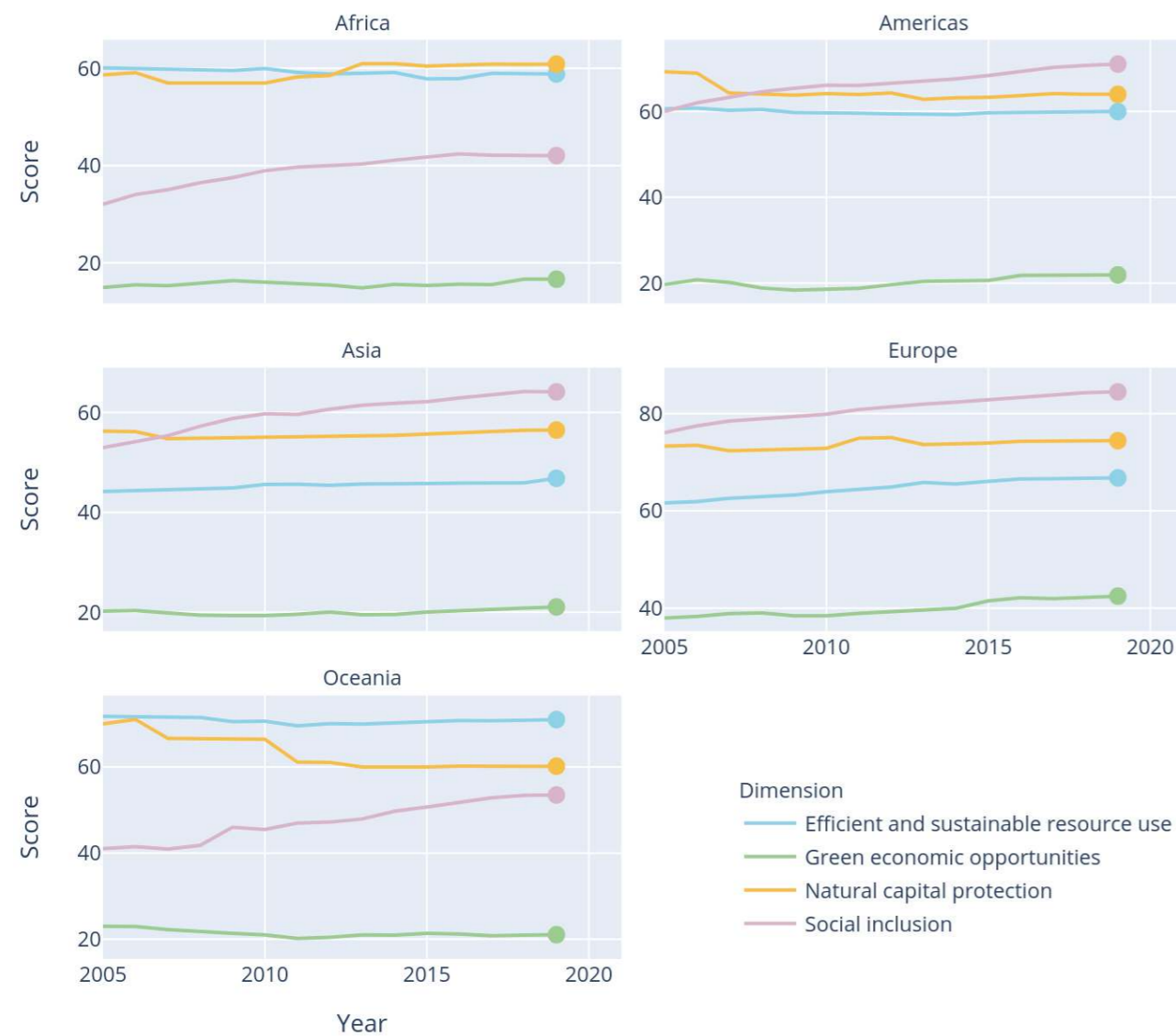
## 3.2 Trend 2005-2019

### 3.2.1 Overall trend

In order to analyze the performances of countries in the Green Growth Index, it is important to review the trends over the past years which are disaggregated by region and dimension. Understanding the reasons for the upward and downward trends in the Index and its dimensions allows policymakers to gain insight

into which areas of green growth require more attention. Figure 13 presents the trends in the Green Growth Index by region from 2005 to 2019. Europe takes the lead in the Green Growth Index performance across time, mostly raised over the years by the European Union's (EU) efforts to push for a more sustainable future. In the past decade, the EU has introduced stringent laws protecting reserved areas, attempting to reduce pollution in cities through the implementation of strict low emissions zones and pushing for greater use of renewable energy. Countries in Europe have scores indicating that they are approaching sustainability target levels as of 2019,

Figure 14 Trend in green growth dimensions by region



### Africa

Africa has a sustained increase in the social inclusion dimension score, which can be attributed to a variety of factors including the many initiatives to improve education and healthcare and reduce poverty. Some of these include conditional cash transfer schemes implemented in many countries, the popularity of mobile money, and malaria prevention initiatives like the distribution of insecticide-treated bednets. About 450 million malaria deaths were prevented in sub-Saharan Africa between 2000 and 2015 due to the distribution of such nets (WHO, 2015), which has contributed to the rise in the healthcare indicator. The effect of mobile money schemes can be seen most prominently in the case of Kenya, where the indicator on fixed internet broadband and mobile cellular subscriptions has increased rapidly over the past decade. Further, some studies found that mobile money initiatives in Kenya also empowered women which were observable in the gender balance indicators, especially on the account at a financial institution or mobile-money-service provider. Even low-income nations such as Somalia and Mali have recorded rapid increases in the score for fixed internet broadband and mobile cellular subscriptions. Botswana,

which is another country that has prioritized inclusive development in the past years, has also recorded an increase in the social inclusion indicators, particularly in access to basic services and resources.

The efficient and sustainable resource use dimension has remained largely consistent across time since efforts for introducing clean energy have been largely countered by a drive for industrialization. While many African countries have scores near 100 for the indicators on material footprint per capita, soil nutrient budget, and share of freshwater withdrawal, their scores on other indicators like share of organic agriculture are below 20 for most countries. In the natural capital protection dimension, a similar narrative emerges since efforts to conserve biodiversity and forest land have been resisted by politicians and interest groups who wish to exploit these resources. While most nations score highly in certain categories like in forest area to total land area and municipal solid waste generation, there are mixed results in other categories. For instance, in the indicator for Disability-Adjusted Life Year (DALY) rate due to unsafe water sources, countries such as Niger, Chad, and the Central African Republic have consistently scored very low (below 20). In the green economic opportunities dimension, trends

are difficult to ascertain in many cases because there were only a few data available. Generally, African countries perform uniformly low on most indicators, with some nations like Tunisia and Morocco outperforming others. The best performance is in the indicator on adjusted net savings, where many countries score above 70.

### Americas

In the Americas, the social inclusion dimension has seen a steady rise over time, although the developed countries like Canada and the United States outperform other nations substantially. The rise in social inclusion can be largely attributed to South and Central America's investment in social welfare, like the Bolsa Familia program in Brazil and Oportunidades in Mexico (Cecchini, 2020). These two countries have seen a rapid rise in access to basic services, social protection, and gender balance indicators and a moderate rise in social equality scores. On the other hand, there has been a slight decline in the natural capital protection dimension, primarily due to score decreases in cultural and social value indicators in many of the Caribbean countries like Antigua, Barbuda, Barbados, the Bahamas, and Aruba.

In efficient and sustainable resource use, trends in the Americas have remained largely stable, as the adoption of renewable energy has been slow, even in places like the United States and Canada. All countries perform poorly in indicator on water use efficiency, with scores below 20. In indicator on material use efficiency, the Americas perform relatively well, with most countries having high scores above 80. While the score for soil nutrient budget is near 100 for most countries, the indicator on share of organic agriculture is very low and remains persistent across time. The trends for green economic opportunities are more mixed differing from country to country and on average remaining unchanged over time. Canada has seen a rise in indicator values for green employment and share of patent publications in environmental technology. On the other hand, the indicator on adjusted net savings has a decreasing score for many countries, although it remains the highest scored category in this dimension (as also the case in Asia and Africa). The share of export of environmental goods to total export is the indicator in which most countries score consistently below 20.

### Asia

Asia has also recorded increasing trends in social inclusion and stable trends across other dimensions. The rise in social inclusion has been driven by an increase in access to basic services and social protection categories, as well as modest improvements in gender balance indicators across most countries. This is because large investments have been made since the beginning of the 21st century in welfare programs, with the aim of reducing absolute poverty. Some examples are sanitation and healthcare programs in Bangladesh and Sri Lanka, workfare programs in India, and the popularity of cash transfer programs throughout many developing countries (Berg, Bhattacharyya, Rajasekhar, & Manjula, 2018; UNICEF & WHO, 2019).

In the dimension of natural capital protection, Asian countries have not seen an increasing trend towards the sustainability target. This is primarily due to a large failure in curbing air pollution. India and China have cities that frequently appear in the top lists of the most polluted nations. Similarly, cities in Bangladesh, Pakistan, and Mongolia often have dangerous levels of particulate matter (PM) 2.5 levels (UNEP, 2019). In other natural capital indicators including

the biodiversity indicators, DALY rate due to unsafe water sources, and tourism in marine and coastal areas, there are mixed results with most countries recording stable trends across time. In the efficient and sustainable resource use dimension, Asia has failed to improve substantially over the past 15 years, despite large investments in renewable energy by both India and China. The region's score is uniformly poor in the category of water use efficiency, with many countries scoring between 1 and 10 points. Generally, as with Africa, Asian countries have not seen an improvement in performance along the dimension of green economic opportunities and the best performing category in this dimension is the indicator on adjusted net savings.

### Europe

Europe has recorded an increasing trend across the dimensions of efficient and sustainable resource use, green economic opportunities, and social inclusion, which is a positive sign for green growth transition. Countries such as Germany and the Scandinavian nations of Denmark, Norway, Sweden, and Finland have encouraged investments in renewable energy due to which the indicator on efficient and sustainable energy has seen a rise. Although many European nations have enacted strict air pollution laws by using low emissions zones and congestion charging policies (OECD, IEA, ITF, & NEA, 2015), the air pollution indicator (PM2.5) has seen a fall from target levels since 2005. Due to this and only stable trend in biodiversity indicators, the natural capital dimension in Europe has not substantially changed over time. In the case of social inclusion, the increased score can be attributed to improvements across all indicator categories in many of the Eastern European nations like Bulgaria, Slovakia, and the Czech Republic. Additionally, gender balance indicators across most countries have been very close to target levels since the enactment of policies for equality, such as mandating equal pay and treatment of women in the workplace (EIGE, 2020). The green economic opportunities dimension has also seen an upward trend due to consistent importance given to the creation of green employment and the focus on sustainable innovations (Pociovălișteanu, Novo-Corti, Acelanu, Șerban, & Grecu, 2015).

### Oceania

Oceania shows interesting trends across time, with a steep drop in natural capital protection and a rise in social inclusion. The drop in the natural capital protection score is due to a significant decrease in the environmental quality indicators in New Zealand and Australia. Cultural and social value indicators have also dropped for places like Fiji, the Marshall Islands, and Vanuatu. The rise in social inclusion can be attributed to an increase in access to basic services and resources across all countries, as well as a moderate increase in scores for the gender balance category. With respect to efficient and sustainable resource use, information for water-use efficiency remains limited, but performance in other categories has been consistent with a slight increase for most countries in efficient energy use.

Data remains sparse in the dimension of green economic opportunities but indicates that both Australia and New Zealand have had declining scores in share of export of environmental goods to total export and share of green employment in total manufacturing employment. Fiji has shown a steep increase in green employment with a score of 85.34 in 2020 (up from 51.6 in 2005), due to an increase in jobs at tourism resorts and jobs which are energy and water efficient and sustainable (GGGI, 2019).

## 4.1 Country distribution

The scatter diagram in Figure 15 provides a different perspective on the countries' green growth performance by region. While the distribution of scores across regions tends to be similar in range, their positions on the Y-plane reveals that many countries in Europe have high scores for the Green Growth Index, with values between 60 and 80. In contrast, countries in Africa, the Americas, and Asia gather around scores between 20 and 60, which correspond to low and moderate green growth performance. Oceania has only two countries with Green Growth Index, New Zealand, and Australia, that tend to follow the same distribution as the other three regions. Figure 16 presents the distribution of countries for the four green growth dimensions and reveals more information on the green growth performance for other countries in Oceania. The lack of data for green economic opportunities in Oceania prevented the

computation of the Green Growth Index for many countries in this region. While country performance in Oceania in social inclusion approaches those in other regions, it tends to follow the distribution of countries in Europe as far as efficient and sustainable resource use is concerned. It is noteworthy that while many countries in Europe have better scores on green economic opportunities, many European countries have also low and very low scores, similar to most countries in other regions. The countries in Europe excel in social inclusion where scores are all high and very high. This region is approaching the sustainability goal of leaving no one behind. On the other hand, this remains a big challenge in many countries in Africa where half of the countries remain to have low performance in social inclusion. The distribution of scores is promising for natural capital protection where countries across regions tend to gather at the upper end of the scatter diagram, which implies that they are all racing to reach targets for this dimension.

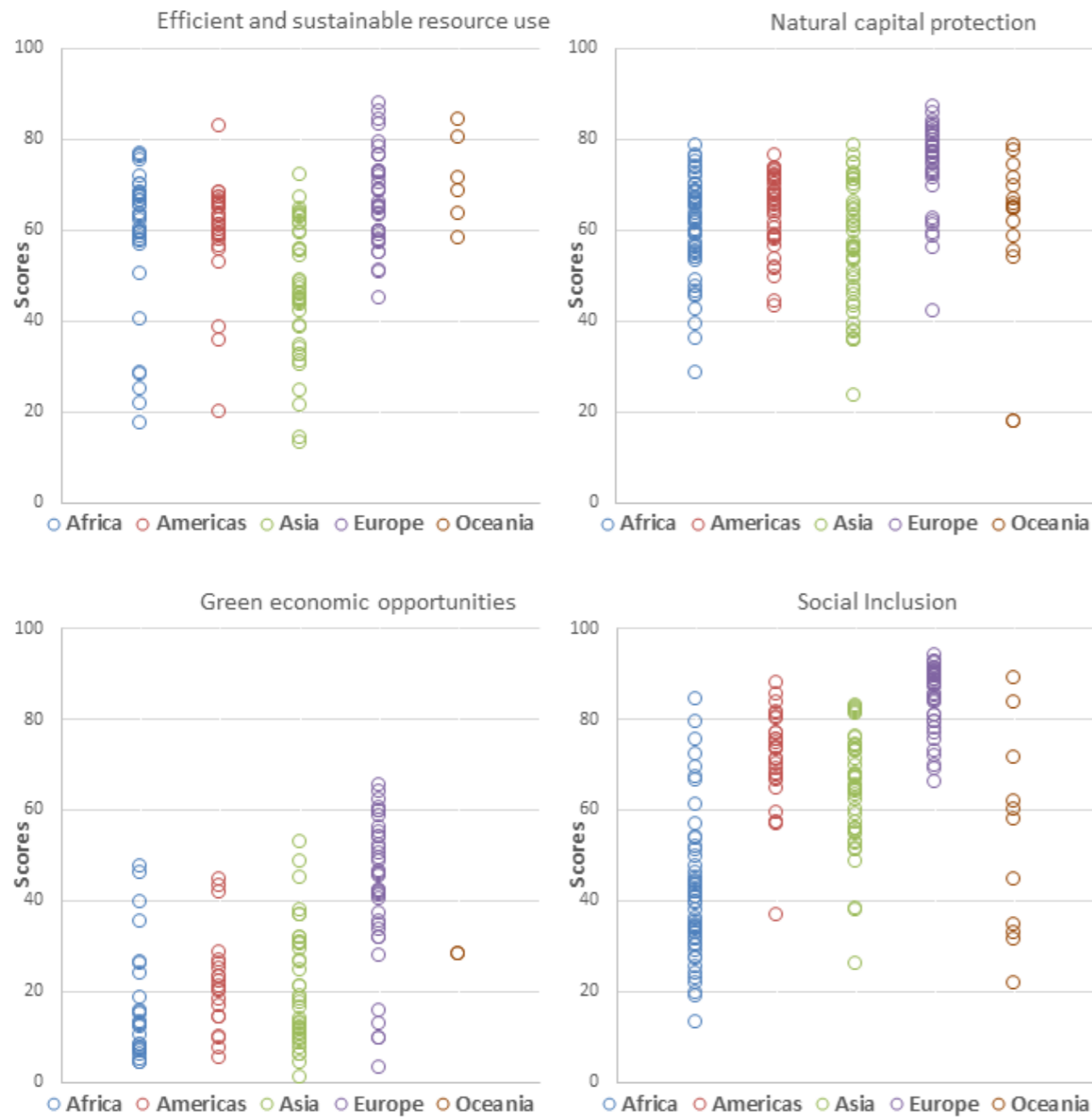
Figure 15 Distribution pattern of country scores for the Green Growth Index by region, 2019



# 4 Country Performance

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Figure 16 Distribution pattern of country scores for the green growth dimensions by region, 2019



## 4.2 Best performers by region

The top ranking countries by region are Sweden in Europe with an index score of 78.72, Japan in Asia with an index score of 61.83, Mexico in the Americas with an index score of 61.61, New Zealand in Oceania with an index score of 56.33, and Tanzania in Africa with an index score of 55.56. Figure 17 shows the scores of the indicator categories used to compute the Green Growth Index for these five countries. It further shows the benchmarking method used for measuring the distance of 100 indicators to their sustainability targets. Note that a score of 100 indicates that a target was reached.

**Sweden** has a good green growth performance as it progresses very close to achieving all of its targets in the social inclusion pillar, reflected by a dimension score of 94.06. This makes Sweden the global top performer for this dimension, followed by the Netherlands with 92.51, then Denmark with 92.33 (Table 17). Sweden has also made significant improvements in almost reaching its target in sustainable land use by decreasing trends in its fertilizer application to reduce nutrient surpluses, thus improving soil quality (OECD, 2019c).

**Japan** has almost reached its targets for social equity and access to basic services with scores of 95.72 and 93.84, respectively (Table

17). The progress in social inclusion indicators has been achieved as the country promotes social welfare, primarily due to its aging population (ADB, 2012). However, in comparison to other top countries, Japan scores the lowest in gender balance, requiring continued work in improving workplace culture and early education to promote equality for women (Estévez-Abe, 2013). Japan is also on track to meet environmental quality and GHG emission reduction targets.

**Mexico** has nearly reached its target for material use efficiency. Other notable progress is also observed in the social inclusion pillar and natural capital protection, but with slight lags in both access to basic services and biodiversity and ecosystem protection, respectively. Mexico has also scored moderately in terms of green investment, as it is crucial to the economy to develop climate-resilient infrastructure due to the natural vulnerability of the country to climate-related disasters (Holmes, Orozco, & Paniagua Borrego, 2017).

**New Zealand** continues to have good green growth performance in the region, previously being the top performing country in Oceania in 2019, as its current score increased in score from 52.17 to 56.33

(Acosta et al., 2019a). The social inclusion target is nearly achieved across all indicators, highlighting New Zealand's priority in equal opportunities within social policy. The progress in the natural capital protection shows that the country is on track to meet the targets on cultural and social value and environmental quality, although the scores for biodiversity and ecosystem protection and GHG emissions reductions are moderate. With nearly half of all New Zealand's emissions coming from agriculture, this reflects the low scores observed in sustainable land use as a signal of New Zealand's current agricultural practices (Carroll & Daigneault, 2019).

**Tanzania** has nearly reached its target for gender balance, as its strongest performing indicator in the social inclusion pillar. Tanzania has also performed well in efficient and sustainable energy and material use efficiency categories and has the second highest score for green investment among these top countries in other regions. As a result of embarking on large-scale, the public-private partnerships are established such as the Southern Agricultural Growth Corridor of Tanzania initiative which aims to mobilize 3.5 billion USD in investments by 2030 to help the African country transition to a green economy (Buseth, 2017).

Figure 17 Distance to targets of green growth indicators in top performing countries by region, 2019

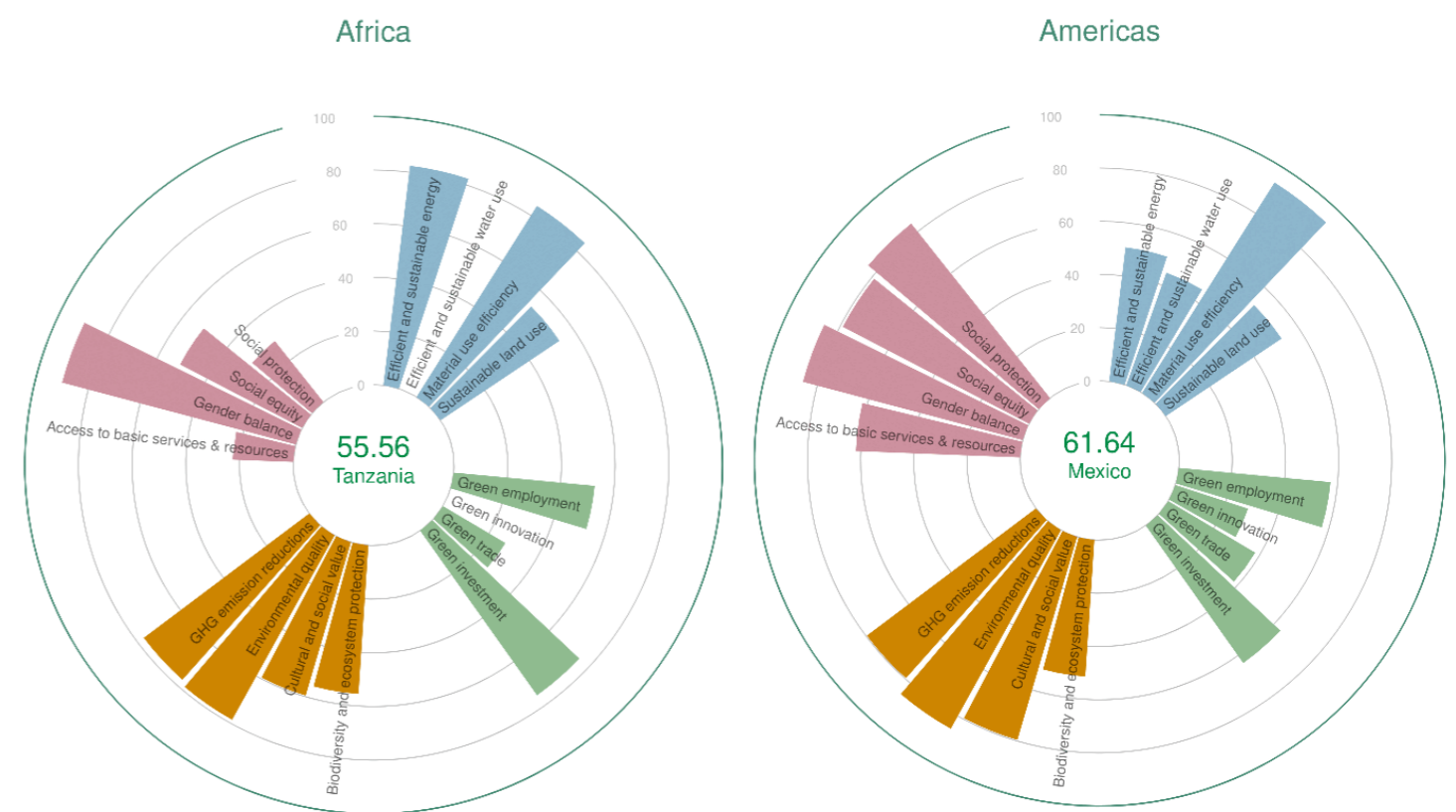
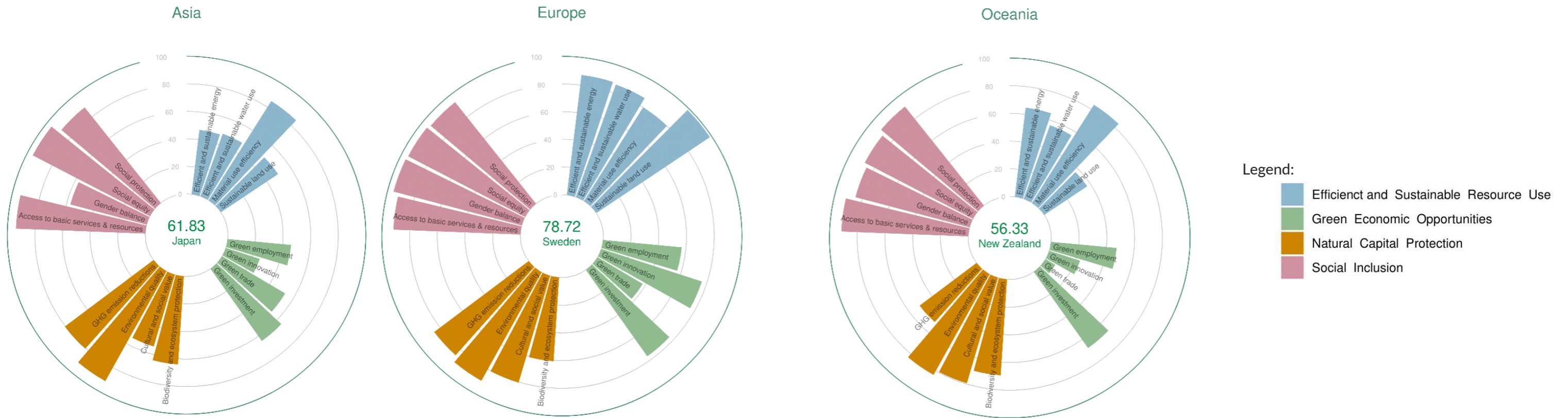




Figure 17 Distance to targets of green growth indicators in top performing countries by region, 2019 (continued)

Figure 17 Distance to targets of green growth indicators in top performing countries by region, 2019 (continued)





# 5 Expert Consultations

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From the beginning of developing the Green Growth Index in 2016, GGGI has placed significant value on consultations with experts from different fields and institutions from different parts of the world for several reasons such as to increase policy relevance of the green growth indicators, create awareness on the utility and enhance uptake of the Index, and encourage collaboration on its application. When the Index was first published in 2019, over 300 experts from about 40 countries have been consulted. Many of these experts remained involved in the annual review of the Index, but GGGI continues to invite more experts to make the review as comprehensive and global as possible. This section discusses the approach for and results of the expert review on the 2020 Green Growth Index.

## 5.1 Online survey

### 5.1.1 Questionnaire design

The expert consultation was conducted through an online survey from November 1 to December 30, 2020. The questionnaire was semi-structured consisting of five parts (Appendix 2):

- Involvement in the review – whether experts have participated in the previous reviews
- Personal information – name, gender, organization, and country
- Work qualification – field of expertise, relevance of work to indicators or composite index as well as to green growth
- Expert opinion on the new indicators – GE1, BE3, GB2, SE1, SP2, and GN1; SL1 was not included but mentioned in the questionnaire because the new indicator was not yet available during the survey; GE2 and GE3 were not included because the updates only refer to other units of measurement; and SE2 was not included because the

- changes dealt with the availability of the time-series data, which cannot be influenced by the experts
- Method for aggregating indicators – options for aggregation method to increase the number of countries with scores for green economic opportunities, which is the dimension with not only the least number of indicators but also with lowest country coverage due to data availability

### 5.1.2 Response rate

Table 3 presents a summary of the response rates to the online survey by a group of experts. The overall response rate is 54%, with the expert group and scientists accounting for the highest response rate within the types (80%) and over the total number (31%) of experts, respectively. The scientists who were invited to participate in the review are mainly those currently engaged in the Task Forces on scenarios and models, knowledge and data, and policy tools of the IPBES and authors in the Working Group II of the Sixth Assessment Report of the IPCC. The low response rate among scientists can be attributed to their very busy schedule in their respective tasks for these task forces and working groups. In the case of policymakers, the invitees are mainly those who participated in the four regional workshops in 2018. The reasons for the low response rate among them are either due to their busy schedules or retirement from their offices. With the expectation that many experts would be unable to participate, the number of invites for the online survey had been significantly increased this year, resulting to 110 completed questionnaires (as compared to 90 last year). However, there are only a few participants from the NGOs this year. Thus, the number of experts to be invited from NGOs and private sector will be increased in the next surveys to enhance participation from this group.

**Table 3** Number of experts who were invited and responded to the survey

Types of experts	Number of invited experts	Number of experts complete survey	Response rate	
			Within Types	Total
GGGI experts	40	21	53%	19%
Expert group	35	28	80%	25%
Policymakers	70	21	30%	19%
Scientists	50	34	68%	31%
NGOs	10	6	60%	5%
<b>Total</b>	<b>205</b>	<b>110</b>	<b>54%</b>	

### 5.1.3 Respondents' characteristics

Table 4 describes the characteristics of the experts from the different organizations who participated in the review. The majority of the experts come from international organizations and academic/research organizations with a combined share to a total number of experts of about 66%. While gender balance was taken into account when sending invites for the online survey, the response rate was higher among male experts, particularly from international organizations and NGOs. The gender ratio was highest

among the experts from academic/research organizations at 0.95, where relatively more female experts participated in the review as compared to other organizations. More than half of the experts also participated in the review of the 2019 Green Growth Index, with the highest percentage coming from the government organizations. The experts who participated for the first time in the review this year come from academic/research organizations. Although only 69% of the experts work on indicators and composite indices, a high percentage of them (85%) are working on issues related to green growth. Surprisingly, only 62% percent of the academic/research

experts indicated that their work is related to green growth even though all of them are supporting IPBES and IPCC initiatives, which are both relevant to the green growth dimensions on efficient and sustainable resource use and natural capital protection. This

implies that, while most experts from international organizations, governments, and NGOs are very knowledgeable about the green model of growth, those from the academe are not.

**Table 4** Characteristics of experts who participated in the review, by type of organizations

Characteristics of experts	Types of organizations				Total
	International organization	Government	Academic, research	Non-government	
Number of experts	36	25	37	12	110
Gender (female-male) ratio	0.57	0.79	0.95	0.09	0.64
Participated in 2019 review	53%	68%	19%	58%	45%
Work related to indicators	72%	72%	62%	75%	69%
Work related to green growth	97%	96%	62%	92%	85%

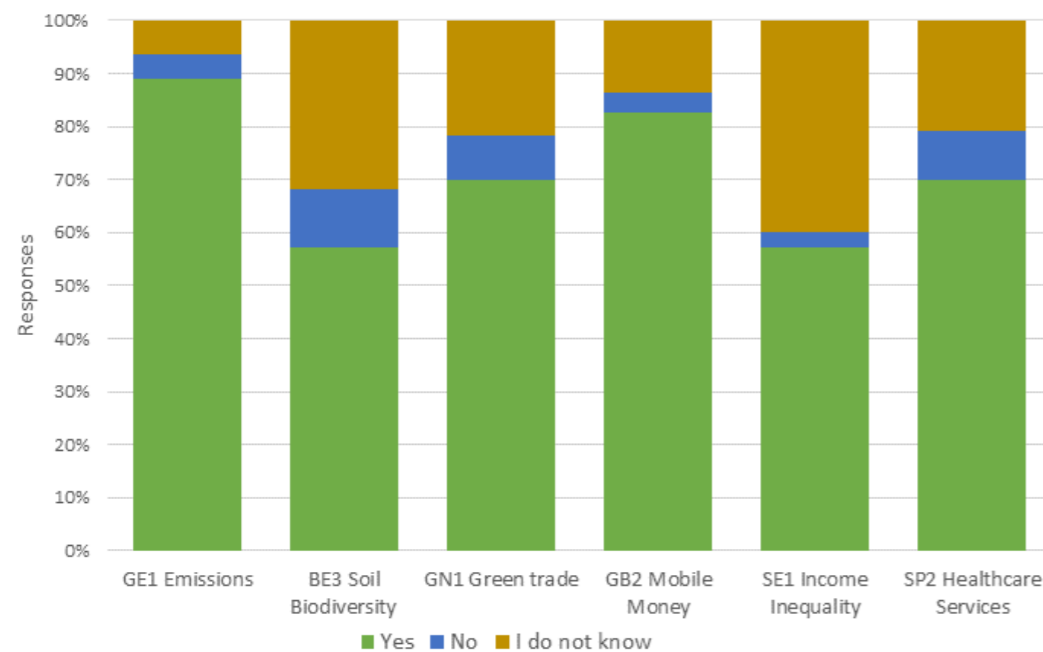
## 5.2 Expert feedback

### 5.2.1 New green growth indicators

Figure 18 presents the responses of the experts to the questions related to the new green growth indicators. Over 80% of the experts agreed to include the new indicators for GE1: Ratio of CO2 emissions including Agriculture, Forestry and Other Land Use (AFOLU) to population and GB2: Share of adults (15 years and older) with an account at a financial institution or mobile-money-service provider. Experts' responses to the inclusion of GN1: Share of patent publications in environmental technology to total patents

(cumulative) and SP2: Universal health coverage (UHC) service coverage index as new green growth indicators were also mainly positive, with about 70% of them responding "Yes" to the question. The positive responses for the inclusion of BE3: Above-ground biomass stock in forest and SE1: Inequality in income based on Palma ratio were the lowest, albeit still above 50%. But the main reason for disagreeing for their inclusion is the lack of expertise among over 30% of the experts, thus responding "I do not know to the question". Only about 17% and 37% of the experts indicate that they have expertise in social inclusion and social and gender equality, and biodiversity and ecosystem, respectively.

**Figure 18** Responses of the experts to the questions related to the new green growth indicators



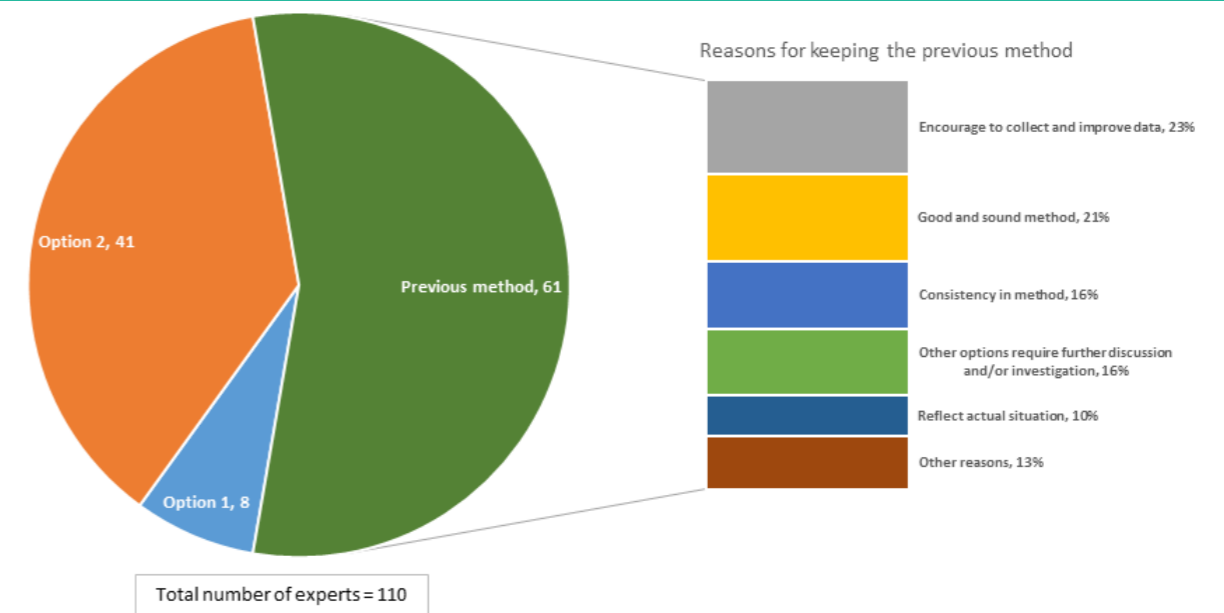
### 5.2.2 Aggregation method

The last question posted to the reviewers in the survey is their consensus to change the method to aggregate the four indicators for the green economic opportunities. In 2019, the overall scores for Green Growth Index were computed only for 116 countries because many countries (particularly in Africa and the Middle East) lack data for these indicators. As with the other green growth dimensions, the scores for the green economic opportunities dimension were only computed for countries with three or four indicators. But unlike other dimensions, many countries had only two green economic opportunities indicators and thus the country scores for this dimension were not computed. Because the green growth concept assumes that the four dimensions are equally important, no score on Green Growth Index was computed for countries which lack green economic opportunities scores. But several countries expressed their interest to have scores for Green Growth Index and know their ranks relative to their peer countries in 2020. In view of this, two options were proposed for the computation of green economic opportunities scores for countries with only two indicators for this dimension.

- Option 1 for new method: Identify two indicators with the highest scores and compute the geometric mean of these two indicators (i.e., Other indicators with the lowest scores are excluded)
- Option 2 for new method: Compute geometric mean if at least two indicators have scores (i.e., Only the countries with one indicator will be excluded)
- Previous method: Compute geometric mean only for countries having at least three indicators with scores (i.e., Countries with only one or two indicators were excluded)

Figure 19 presents the responses of the experts to the question on the aggregation method. More than half of the 110 experts did not agree on the two options and suggested to continue to use the previous method. The most important reason for this is the need to encourage the countries to collect and improve their data, with several experts suggesting that GGGI should play a key role in supporting the countries on this. Many experts also suggested keeping the previous method to keep the consistency, as this method is already good and sound.

**Figure 19** Responses of the experts to the question on modifying the aggregation method for the green economic opportunities dimension



## 5.3 Next steps forward

### 5.3.1 Indicators and proxy variables

Although a significant improvement has been made in the 2020 Green Growth Index by updating 10 green growth indicators, further improvements still lie ahead. As shown in Table 5, many of the challenges identified from the previous report still remain, including limited time-series data for indicators on the share of freshwater withdrawal to available freshwater resources (EW2), share of organic agriculture to total agricultural land area (SL2), municipal solid waste (MSW) generation per capita (EQ3), share of patent

publications in environmental technology to total patents (GN1), share of youth (aged 15–24 years) not in education, employment, or training (SE3), and proportion of population above statutory pensionable age receiving a pension (SP1). Moreover, the 2020 Green Growth Index continues to lack additional indicators for efficient and sustainable resource use as well as green economic opportunities, which have implications on the weights of the indicators across dimensions. For example, the dimension on green economic opportunities with only four indicators is receiving relatively higher weight as compared to natural capital protection and social inclusion, each with 12 indicators. GGGI will thus continue to review the indicators in the next years.

Table 5 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 \$2011 PPP GDP)	High	
EE2	Share of renewable to total final energy consumption (Percent)	High	
EE3	-	-	Additional indicator to measure energy productivity
EW1	Water use efficiency (USD per m <sup>3</sup> )	High	
EW2	Share of freshwater withdrawal to available freshwater resources (Percent)	Moderate	Improvement of time series data
EW3	-	-	Additional indicator to measure water treatment; data currently scanty
SL1	Soil nutrient budget (Kilogram nitrogen per hectare)	High	Included in Green Growth Index in 2020
SL2	Share of organic agriculture to total agricultural land area (Percent)	Moderate	Improvement of time series data
SL3	-	-	Additional indicator to measure sustainable land management; to be made available by FAO
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	-	-	Additional indicator to measure material and waste recycling
EQ1	PM2.5 air pollution, mean annual population-weighted exposure (Micrograms per m <sup>3</sup> )	Moderate	To be combined with PM10 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 <sub>2</sub> emissions to population, including AFOLU (Tons per capita)	High	
GE2	Ratio of non-CO <sub>2</sub> emissions to population, excluding AFOLU (CO <sub>2</sub> eq tons per capita)	High	
GE3	Ratio of non-CO <sub>2</sub> emissions in agriculture to population (CO <sub>2</sub> eq 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 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	Included in Green Growth Index in 2020
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
GV1	Adjusted net savings, including particulate emission damage (Percent GNI)	Proxy	Can be replaced by investment in renewable energy or green technology
GV2	-	-	Additional indicator to measure investment in Key Biodiversity Areas or protected areas; no identified sources yet

Table 5 Relevance of indicators for the Green Growth Index and desired improvements for proxy variables (continued)			
Codes	Baseline indicators	Relevance	Desired improvement and remarks
GV3	-	-	Additional indicator to measure investment in human skills in green jobs; no identified sources yet
GT1	Share of export of environmental goods (OECD and APEC class.) to total export (Percent)	Moderate	Improvement in the classification of environmental goods
GT2	-	-	Additional indicator to measure sustainable trade in certified products, to be made available by certification organization; data currently scanty
GT3	-	-	Additional indicator to measure trade in waste materials; no identified sources yet
GJ1	Share of green employment in total manufacturing employment (Percent)	Moderate	Improvement in the indicator to measure green employment in a different economic sector
GJ2	-	-	Additional indicator to measure skills generated in green employment; no identified sources yet
GJ3	-	-	Additional indicator to measure wage gap in green and standard employment; no identified sources yet
GN1	Share of patent publications in environmental technology to total patents (7 yrs moving ave.)	Moderate	Improvement in data availability for more countries
GN2	-	-	Additional indicator to measure green innovation in entrepreneurship; no identified sources yet.
GN3	-	-	Additional indicator to measure green innovation
AB1	Population with access to safely managed water and sanitation (Percent)	High	
AB2	Population with access to electricity and clean fuels/technology (Percent)	Moderate	Improvement of the indicator to measure renewable electricity
AB3	Fixed Internet broadband and mobile cellular subscriptions (Number per 100 people)	High	
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	Ratio of urban-rural access to basic services, 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	Included in Green Growth Index in 2020
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

The collaboration with other international organizations could provide a solution in developing additional indicators for green economic opportunities. The Working Group on Metrics and Indicators of the GGKP will soon publish a report on Measuring Economic Opportunities with Policy Linkages: Employment, Innovation, Trade and Investment, which will provide useful thematic guidance for collaborative work. Another important challenge, however, is identifying appropriate sustainability targets for not only the additional indicators, but also for the existing indicators which are not part of the SDGs or other international sustainability goals. These include, among others, the four indicators for the green economic opportunities. As mentioned in the previous report, sustainability targets are critical information for the Green Growth Index because they are used to benchmark green growth performance. For indicators without available targets, mean values of the top five performing countries are used in lieu of internationally agreed sustainability targets. A drawback of this method is that it allows countries to already reach the targets regardless of their performance on a given indicator. One step that GGGI has been taking on this was to request the producer or publisher of the data to recommend targets for the indicator. This has been done, for example, for the share of freshwater withdrawal to available freshwater resources, and soil nutrient budget, cropland nutrient flow per unit area, which were published by FAO.

### 5.3.2 Data availability and gaps

Although the GGPM team aimed to have a wide data coverage in terms of the number of countries and years, some of the more relevant indicators did not meet these criteria. For example, there were only data for less than 100 countries on one indicator for green economic opportunities, which is the share of patent publications in environmental technology to total patents and two indicators

for social inclusion, namely the share of youth (aged 15-24 years) not in education, employment, or training and the proportion of urban population living in slums. No alternative proxy variables are currently available for these indicators. The indicators for social inclusion, however, are expected to improve in the coming years because they are SDG indicators. There was data for only one year for the municipal solid waste (MSW) generation per capita (Table 6), but this is a proxy variable and expected to be replaced by more desired data in the next few years. Data for all the indicators included in the Green Growth Index are publicly available online, except for the share of green employment in manufacturing to total employment (GJ1). The data were mainly collected from international organizations; this offers important advantages for measuring performance across countries. For example, collecting data from national agencies for more than 100 countries will be cumbersome, whereas data from international organizations are collected from national agencies and have already undergone consistency checks. Nonetheless, during the regional consultation workshops, some regional experts expressed concerns over using data from international organizations (Acosta et al., 2019a). To address these concerns, data for the indicators are published on the Green Growth Index website to enable users to undertake a consistency check of the data. Moreover, GGGI will help to communicate any concerns on the correctness and validity of the data to the international organizations that are responsible for producing and publishing the data.

The most recent available data vary across indicators (Table 6). To enable computation of the Green Growth Index for 2019, the most recent data were used as baseline and values were assumed to hold until 2019. For the missing data between the time-series from 2005, the adjacent data were used to represent data for the missing years (i.e. imputed data). On the other hand, the indicators with missing data for several consecutive years were not imputed.

Table 6 Characteristics of the indicators in terms of data availability and required imputation					
Indicator codes*	Available data	Baseline data	Data download source <sup>a</sup>	Website	Year(s) imputed for 2020 Green Growth Index
EE1	1990-2017	2017	UNSTATS	<a href="https://unstats.un.org/sdgs/indicators/database/">https://unstats.un.org/sdgs/indicators/database/</a>	2018, 2019
EE2	1990-2017	2017	UNSTATS	-same-	2018, 2019
EW1	2000-2017	2017	UNSTATS	-same-	2018, 2019
EW2	2000-2017	2017	UNSTATS	-same-	2018, 2019
SL1	1961-2018	2018	FAOSTAT	<a href="http://www.fao.org/faostat/en/">http://www.fao.org/faostat/en/</a>	2019
SL2	2004-2017	2017	FAOSTAT	-same-	2018, 2019
ME1	1970-2017	2017	UNSTATS	<a href="https://unstats.un.org/sdgs/indicators/database/">https://unstats.un.org/sdgs/indicators/database/</a>	2018, 2019
ME2	1990-2015	2015	UNEP-IRP	<a href="https://www.resourcepanel.org/global-material-flows-database">https://www.resourcepanel.org/global-material-flows-database</a>	2015-2019
EQ1	1990-2017	2017	WB data	<a href="https://data.worldbank.org/indicator">https://data.worldbank.org/indicator</a>	2018, 2019
EQ2	2000-2019	2019	GHDx	<a href="http://ghdx.healthdata.org/about-ghdx/about-data-availability">http://ghdx.healthdata.org/about-ghdx/about-data-availability</a>	-
EQ3	2019	2019	WB Waste	<a href="https://datacatalog.worldbank.org/dataset/what-waste-global-database">https://datacatalog.worldbank.org/dataset/what-waste-global-database</a>	-
GE1	1960-2016	2016	ClimateWatch	<a href="https://www.climatewatchdata.org/ghg-emissions">https://www.climatewatchdata.org/ghg-emissions</a>	2017-2019

Table 6 Characteristics of the indicators in terms of data availability and required imputation (continued)					
Indicator codes*	Available data	Baseline data	Data download source <sup>a</sup>	Website	Year(s) imputed for 2020 Green Growth Index
GE2	1990-2016	2016	ClimateWatch	-same-	2017-2019
GE3	1990-2016	2016	ClimateWatch	-same-	2017-2019
BE1*	2000-2019	2019	UNSTATS	<a href="https://unstats.un.org/sdgs/indicators/database/">https://unstats.un.org/sdgs/indicators/database/</a>	-
BE2	1990-2020	2019	UNSTATS	-same-	-
BE3	2000, 2010, 2015-2020	2019	UNSTATS	-same-	-
CV1	1993-2020	2019	UNSTATS	-same-	-
CV2	2012-2019	2019	OHI	<a href="http://www.oceanhealthindex.org/region-scores/annual-scores-and-rankings">http://www.oceanhealthindex.org/region-scores/annual-scores-and-rankings</a>	-
CV3*	2016-2018	2018	WB data	<a href="https://data.worldbank.org/indicator">https://data.worldbank.org/indicator</a>	2019
GV1	1990-2018	2018	WB data	-same-	2019
GT1*	2000-2017	2017	UN COMTRADE	<a href="https://comtrade.un.org/">https://comtrade.un.org/</a>	2018, 2019
GJ1	2000-2017	2017	Moll de Alba and Todorov 2018, 2019	Not available online, data computed and shared by the authors	2018, 2019
GN1*	1980-2018	2018	WIPO	<a href="https://www3.wipo.int/ipstats/index.htm?tab=patent">https://www3.wipo.int/ipstats/index.htm?tab=patent</a>	2019
AB1*	2000-2017	2017	UNSTATS	<a href="https://unstats.un.org/sdgs/indicators/database/">https://unstats.un.org/sdgs/indicators/database/</a>	2018, 2019
AB2*	2000-2017	2017	UNSTATS	-same-	2018, 2019
AB3*	2000-2018	2018	WB data	<a href="https://data.worldbank.org/indicator">https://data.worldbank.org/indicator</a>	2019
GB1	1990, 1997-2020	2019	UNSTATS	<a href="https://unstats.un.org/sdgs/indicators/database/">https://unstats.un.org/sdgs/indicators/database/</a>	-
GB2	2011, 2014, 2017	2017	UNSTATS	-same-	2018-2019
GB3	2009-2019	2019	WB WBL	<a href="https://wbl.worldbank.org/en/wbl-data">https://wbl.worldbank.org/en/wbl-data</a>	-
SE1*	2000-2018	2018	WB data	<a href="https://data.worldbank.org/indicator">https://data.worldbank.org/indicator</a>	2019
SE2*	2000-2018	2018	WB data	-same-	2019
SE3	1990-2018	2018	UNSTATS	<a href="https://unstats.un.org/sdgs/indicators/database/">https://unstats.un.org/sdgs/indicators/database/</a>	2019
SP1	2000-2019	2019	UNSTATS	-same-	-
SP2	2000, 2005, 2010, 2015, 2017	2017	UNSTATS	-same-	2018, 2019
SP3	2000, 2005, 2010, 2014, 2016, 2018	2016	UNSTATS	-same-	2019

Notes:

\*Refer to Figure 3 for the definition of the indicator codes, those with asterisks refer to indicators computed by the GGPM team using data downloaded from the indicated sources in this table.

<sup>a</sup>This refers to the source where data were downloaded from. The original source of the data, which refers to the developers and/or publishers of the indicators, are mentioned in Table 8.

The availability of data is another important challenge that affects the relevance of the indicators. The GGPM team considered the indicators to be of high relevance for the framework if they are not only conceptually relevant but also publicly available. The completeness or lack of data 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 a value of zero, 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. The lack of data, thus, causes some level of uncertainty in the results of the Green Growth Index. Allowing missing values is, however, necessary for two reasons; first is to allow substitutability of indicators that represent the

same concept as represented by the indicator category and second is to maintain a larger number of countries until the last level of aggregation. Not allowing for substitutability at the first and second levels of aggregation will exclude countries with missing values. Table 7 provides information on data gaps for indicators in the Green Growth Index by region and their implications on the number of countries.

If there were no missing values, the index could be computed for about 243 countries globally. Due to data gaps, however, the current index has been computed only for 117 countries. The data gap is the largest for the indicators for green economic opportunities, with Oceania and the Americas having as high as 82% and 55% missing values, respectively. Data gaps for each country are presented in Chapter 7 Statistical tables.

**Table 7 Summary of data gaps for indicators in Green Growth Index and its dimensions by region, 2019**

Region	Number of countries	Green Growth Dimensions				Green Growth Index
		Resource efficiency	Natural capital protection	Green economic opportunities	Social inclusion	
Africa	59	22%	10%	48%	25%	26%
The Americas	55	35%	23%	55%	45%	40%
Asia	51	12%	9%	25%	18%	16%
Europe	51	22%	18%	25%	24%	22%
Oceania	27	59%	35%	82%	60%	59%
Global	243	27%	17%	44%	32%	30%

Note: The percentage refers to the proportion of countries without data for the indicators in their respective regions. Countries with no data for all dimensions were excluded from the count.

### 5.3.3 Sustainability targets

Because the sustainability targets are benchmarked against the Green Growth Index, the policy relevance of the scores to measure the distance to internationally agreed goals depend on the reliability of these targets. The targets were grouped into three types (Table 8): SDG targets, other targets, whose sources are not from the SDG indicators, and the mean of the top five performers. If the targets are not available 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 negative relationship to green growth). About 30% of the targets remained based on mean values of the top five performing countries, allowing countries to already reach the targets regardless of their performance on a given indicator. The mean values of top performers in the share of green employment in manufacturing to total employment, for example, is only 14%. This allows the countries to already have a score of 100 at this low level of green employment. An important step to improve the Green Growth Index is, thus, to have a valid and sufficient basis for the targets of the indicators which are currently not considered in any internationally agreed goals such as SDGs, Climate Paris Agreement, and Aichi Biodiversity Target. This holds particularly

for the available indicators for green economic opportunities. GGGI will continue to request the producer or publisher of data to recommend targets for the indicator. If this will not be possible, the experts of the international expert group will be sought to come up with agreed targets for the purpose of the Green Growth Index.

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. Because implicit SDG targets leave room for interpretation, different targets were given to the same SDG indicator (Table 8). 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 OECD (OECD, 2019a, 2019b) and by SDSN (Sachs et al., 2019; Sachs et al., 2018). Whenever the suggestions on the targets diverge, the team adopted the SDSN targets because, as with the Green Growth Index, the SDSN methodology was developed based on the global context. In the future, the alignment with the SDG targets will continue to be important to provide consistent policy recommendations to the countries.

**Table 8 Details on the sustainability targets used to benchmark the normalization functions**

Indicators	Link to Green Growth	Case	Min Max	Unstat SDG Indicator	Targets	Countries Reaching Targets	Type of Targets	Source of Data	Source of Targets
<b>RESOURCE EFFICIENCY</b>									
EE1: Ratio of total primary energy supply to GDP (MJ per \$2011 PPP GDP)	negative	4	0.43 18.96	Yes	0.928 MJ per GDP	2	Mean top 5 performers	SE4ALL	Method based on Sachs et al. (2019)
EE2: Share of renewable to total final energy consumption (Percent)	positive	3	0.00 97.12	Yes	51.4%	45	Other targets	SE4ALL	Sachs et al. (2019)
EW1: Water use efficiency (USD per m³)	positive	3	0.64 1179.77	Yes	265.7579346 USD per m³	4	Other targets	FAO	OECD (2019)
EW2: Share of freshwater withdrawal to available freshwater resources (Percent)	negative	5	0.10 1708.00	Yes	25% and 75%	101	Other targets	FAO	FAO 2017
SL1: Soil nutrient budget (Kilogram nitrogen per hectare)	negative	3	0.21 2743.73	No	0 and 5 kg N per hectare	16	Mean top 5 performers	FAO	Method based on Sachs et al. (2019)
SL2: Share of organic agriculture to total agricultural land area (percent)	positive	3	0.00 81.14	No	11.90%	11	Other targets	FAO	OECD 2017b
ME1: Total domestic material consumption (DMC) per unit of GDP (DMC kg per GDP)	negative	4	0.02 15.76	Yes	0.169685364 kg per USD	5	Other targets	IRP	OECD (2019)
ME2: Total material footprint (MF) per capita (MF tons per capita)	negative		0.40 116.73	Yes	5.0 MF tons per capita	60	Other targets	IRP**	Stefan Bringezu (2015)
<b>NATURAL CAPITAL PROTECTION</b>									
EQ1: PM2.5 air pollution. mean annual population-weighted exposure (Micrograms per m³)	negative	4	5.86 99.73	Yes	10 micrograms per m³	23	Other targets	Brauer et al. 2016	WHO 2005; OECD (2019)
EQ2: DALY rate due to unsafe water sources (DALY lost per 100,000 persons)	negative	2	0.82 7363.76	Yes	0 in every 100,000 population	0	SDG Target (explicit)	IHME	OECD (2019)
EQ3: Municipal solid waste (MSW) generation per capita (Tons per year per capita)	negative	4	0.04 1.59	No	0.001752675 ton per year per capita	1	Other targets	WB	Sachs et al. (2019)

**Table 8** Details on the sustainability targets used to benchmark the normalization functions (continued)

Indicators	Link to Green Growth	Case	Min Max	Unstat SDG Indicator	Targets	Countries Reaching Targets	Type of Targets	Source of Data	Source of Targets
EQ3: Municipal solid waste (MSW) generation per capita (Tons per year per capita)	negative	4	0.04 1.59	No	0.001752675 ton per year per capita	1	Other targets	WB	Sachs et al. (2019)
GE1: Ratio of CO <sub>2</sub> emissions to population, including AFOLU (Tons per capita)	negative	4	0.11 38.71	No	0,1018121 ton per capita	0	Mean top 5 performers	WRI	Method based on Sachs et al. (2019)
GE2: Ratio of non-CO <sub>2</sub> emissions to population, excluding AFOLU (CO <sub>2</sub> eq tons per capita)	negative	4	-4.77 22.23	No	0 ton per capita	4	Mean top 5 performers	WRI	Method based on Sachs et al. (2019)
GE3: Ratio of non-CO <sub>2</sub> emissions in agriculture to population (CO <sub>2</sub> eq tons per capita)	negative	4	0.00 8.67	No	0 ton per capita	7	Mean top 5 performers	FAO	Method based on Sachs et al. (2019)
BE1: Average proportion of Key Biodiversity Areas covered by protected areas (Percent)	positive	3	0.00 100.00	Yes	100%	1	SDG target (implicit)	IUCN, UNEP-WCMC	Sachs et al. (2019)
BE2: Share of forest area to total land area (Percent)	positive	3	0.00 98.26	Yes	17%	137	Other targets	FAO	OECD (2019)
BE3: Above-ground biomass stock in forest (Tons per hectare)	positive	3	0.00 500.39	Yes	428,688 tons per hectare	2	Mean top 5 performers	FAO	Method based on Sachs et al. (2019)
CV1: Red list index (Index)	positive	1	0.40 1.00	Yes	1 index	0	Other targets	BirdLife International and IUCN	OECD (2019); Sachs et al. (2019)
CV2: Tourism and recreation in coastal and marine areas (Score)	positive	3	0.00 100.00	No	100 score	19	Other targets	Ocean Health Index	Sachs et al. (2019)

**Table 8** Details on the sustainability targets used to benchmark the normalization functions (continued)

Indicators	Link to Green Growth	Case	Min Max	Unstat SDG Indicator	Targets	Countries Reaching Targets	Type of Targets	Source of Data	Source of Targets
CV3: Share of terrestrial and marine protected areas to total territorial areas (Percent)	positive	3	0.00 99.46	Yes	13.5 % for both terrestrial and marine	77	SDG Target (explicit) for marine; Other targets for terrestrial	UNEP-WCMC	(Leadly et. al., 2014)
<b>GREEN ECONOMIC OPPORTUNITIES</b>									
GV1: Adjusted net savings, including particulate emission damage (Percent GNI)	positive	3	-99.38 40.85	No	37.9440% GNI	1	Mean top 5 performers	WB	Method based on Sachs et al. (2019)
GT1: Share of export of environmental goods (OECD and APEC class.) to total export (Percent)	positive	3	0.00 34.55	No	18.28%	1	Mean top 5 performers	UN-COMTRADE	Method based on Sachs et al. (2019)
GJ1: Share of green employment in total manufacturing employment (Percent)	positive	3	0.00 0.21	No	14%	1	Mean top 5 performers	Moll de Alba and Todorov 2018, 2019	Method based on Sachs et al. (2019)
GN1: Share of patent publications in environmental technology to total patents (7 yrs moving ave.)	positive	3	0.00 0.08	No	0.05124%	2	Mean top 5 performers	WIPO	Method based on Sachs et al. (2019)
<b>SOCIAL INCLUSION</b>									
AB1: Population with access to safely managed water and sanitation (Percent)	positive	3	11.63 100.00	Yes	100% for both water and sanitation	3	SDG Target (explicit)	WHO/ UNICEF	OECD (2019); Sachs et al. (2019)
AB2: Population with access to electricity and clean fuels/technology (Percent)	positive	3	7.15 97.50	Yes	100% for both	0	SDG Target (explicit)	SE4ALL	Sachs et al. (2019)
AB3: Fixed Internet broadband and mobile cellular subscriptions (Number per 100 people)	positive	3	10.20 187.94	Yes	100 subscriptions per 100 people	9	SDG Target (explicit for mobile, implicit for internet)	ITU	Sachs et al. (2019)

**Table 8** Details on the sustainability targets used to benchmark the normalization functions (continued)

Indicators	Link to Green Growth	Case	Min Max	Unstat SDG Indicator	Targets	Countries Reaching Targets	Type of Targets	Source of Data	Source of Targets
GB1: Proportion of seats held by women in national parliaments (Percent)	positive	3	0.00 61.25	Yes	50% for parliament	2	SDG Target (explicit)	IPU	OECD (2019); Sachs et al. (2019)
GB2: Gender ratio of account at a financial institution or mobile-money-service provider (Ratio)	negative	4	1.00 6.82	Yes	1 equality ratio	0	Other targets	WB	Normative
GB3: Getting paid, covering laws and regulations for equal gender pay (Score)	positive	3	0.00 100.00	No	100%	51	Other targets	WB	Normative
SE1: Inequality in income based on Palma ratio (Ratio)	negative	4	0.82 7.01	No	0.86131 ratio	2	Mean top 5 performers	WB	Method based on Sachs et al. (2019)
SE2: Ratio of urban-rural access to basic services, i.e., electricity (Ratio)	negative	4	1.00 37.26	Yes	1 equality ratio	119	Other targets	SE4ALL	Normative
SE3: Share of youth (aged 15-24 years) not in education, employment or training (Percent)	negative	2	2.90 48.50	Yes	0%	0	SDG Target (explicit)	ILO	OECD (2019)
SP1: Proportion of population above statutory pensionable age receiving a pension (Percent)	positive	3	2.30 100.00	Yes	100%	55	SDG Target (explicit)	ILO	OECD (2019)

**Table 8** Details on the sustainability targets used to benchmark the normalization functions (continued)

Indicators	Link to Green Growth	Case	Min Max	Unstat SDG Indicator	Targets	Countries Reaching Targets	Type of Targets	Source of Data	Source of Targets
SP2: Universal health coverage (UHC) service coverage index (Index)	positive	1	25.00 89.00	Yes	100%	0	Other targets	WHO	Normative
SP3: Proportion of urban population living in slums (Percent)	negative	4	0.00 95.40	Yes	0%	3	Other targets	UN-Habitat	Normative

<sup>i</sup> Sustainable Energy for All (SE4ALL) database from the SE4ALL Global Tracking Framework led jointly by the World Bank, International Energy Agency, and the Energy Sector Management Assistance Program

<sup>ii</sup> Alternative target is 58.62368011 percent based on OECD report (2019)

<sup>iii</sup> Alternative targets are 10 percent and 12.5 percent based on OECD (2019) and Sachs et al. (2019), respectively

<sup>iv</sup> OECD (2017) metadata, based on Share of agricultural land area under certified organic farm management

<sup>v</sup> UN Environment: Secretariat of the International Resource Panel (IRP), website:resourcepanel@unep.org

<sup>vi</sup> Institute for Health Metrics and Evaluation (IHME)

<sup>vii</sup> WRI (2015) CAIT country greenhouse gas emissions: sources & methods. CAIT dataset of the World Resources Institute (WRI) is based on various sources including International Energy Agency (IEA), Carbon Dioxide Information Analysis Center (CDIAC) of the U.S. Dept. of Energy, Energy Information Administration (EIA) of the U.S. Dept. of Energy.

<sup>viii</sup> WRI (2015) CAIT country greenhouse gas emissions: sources & methods. CAIT dataset is based on United States Environmental Protection Agency (EPA).

<sup>ix</sup> Alternative targets are 92.69 and 37.73 percent for mountain and terrestrial/freshwater based on OECD (2019)

<sup>x</sup> Based on scores for other OHI indicators

<sup>xi</sup> World Database on Protected Areas (WDPA) where the compilation and management is carried out by United Nations Environment World Conservation Monitoring Centre (UNEP-WCMC) in collaboration with governments, non-governmental organizations, academia and industry. The data is available online through the Protected Planet website (protectedplanet.net).

<sup>xii</sup> Average value for 17 percent terrestrial and 10 percent marine

<sup>xiii</sup> World Intellectual Property Organization (WIPO)

<sup>xiv</sup> WHO/UNICEF Joint Monitoring Programme (JMP) for Water Supply, Sanitation and Hygiene (washdata.org).

<sup>xv</sup> Alternative targets are 100 percent for electricity and 95 percent for clean fuels based on OECD (2019)

<sup>xvi</sup> International Telecommunication Union (ITU), World Telecommunication/ICT Development Report and database

<sup>xvii</sup> Alternative targets are 40.37400055 percent for total fixed broadband subscriptions per 100 inhabitants and 100 percent for proportion of population covered by a mobile network, by technology, based on OECD (2019)

<sup>xviii</sup> Inter-Parliamentary Union (IPU)

<sup>xix</sup> Refers to the actual indicator and not to the ratio between female and male

<sup>xx</sup> Palma ratio was computed from the income data downloaded from the World Bank

<sup>xxi</sup> Refers to the actual indicator and not to the ratio between urban and rural

<sup>xxii</sup> Alternative target is 8.1 percent based on Sachs et al. (2019)

<sup>xxiii</sup> WHO (2019) The Global Health Observatory, <https://www.who.int/data/gho/data/major-themes/universal-health-coverage-major>



# 6

## Ongoing applications and collaboration

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## 6.1 Regional Green Growth Index

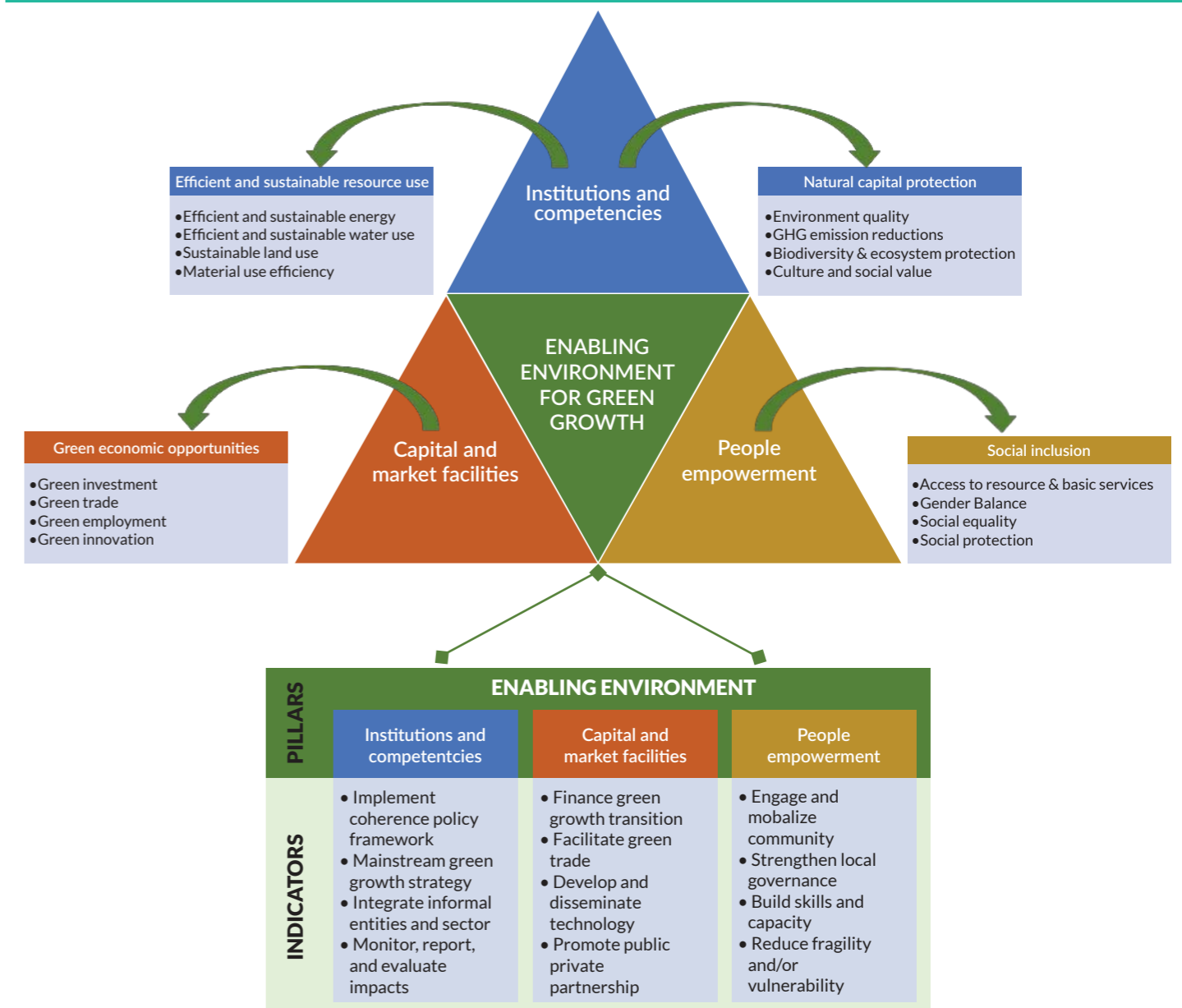
### 6.1.1 African Green Growth Index

**Collaborator: African Development Bank (AfDB)**

GGGI is collaborating with the AfDB to develop the second phase of the African Green Growth Index by applying GGGI's conceptual framework for green growth. The first phase or pilot version of the African Green Growth Index was developed in 2015 (AfDB, 2015). Through the collaborative project, two main improvements were identified – addition of indicators for green economic opportunities and dimension on enabling environment, considering the regional social, economic, and environmental contexts. The conceptual

and indicator frameworks for enabling environment have been developed (Figure 20), with the former identifying the links of the enabling environment pillars (or indicator categories) to the four dimensions of the Green Growth Index and the latter providing guidance for the selection of the indicators for these pillars. The next steps ahead will be to (1) identify quantifiable indicators for institutions and competencies, capital and market facilities, and people empowerment, (2) conduct stakeholder dialogues to validate the relevance of the indicators to policy, (3) inventory and collect data for the validated indicators, (4) identify proxy variables for indicators with insufficient data, (5) compute the Green Growth Index (to include additional indicators for green economic opportunities and enabling environment), (6) conduct expert consultation through online survey to collect feedback on the African Green Growth Index, (7) publish the report on the Index, and (8) conduct capacity building to transfer Index model and database to the AfDB.

Figure 20 Conceptual and indicator frameworks for the enabling environment



### 6.1.2 OECS Green Growth Index

**Collaborators: Organisation of Eastern Caribbean States (OECS) Commission and GGGI OECS Office**

The Eastern Caribbean countries have a very high ratio of sea to land space. The OECS Commission has established several regional frameworks related to the blue economy and ocean space planning to support these countries (e.g. OECS Blue/Green Economy Strategy, Eastern Caribbean Oceanscape Plan). Currently, there is no coherent measurement tool to track and monitor the goals and actions included in these frameworks and other related environmental sustainability frameworks (e.g. St Georges Declaration, Biodiversity Framework). As a result, OECS has expressed a desire to incorporate the indicators related to the blue economy into the Green Growth Index. The collaborative project, which activities were initiated this year, includes the review of relevant regional frameworks and assessment of how blue economy indicators can be incorporated into the Green Growth Index, conduct of a series of educational webinars/ stakeholder dialogues to inform OECS members and gauge interest from stakeholders on the use of the Index, assessment of data availability for the blue economy indicators agreed during the dialogues, and computation of the index for blue economy dimension to complement the Green Growth Index.

## 6.2 National Green Growth Index

### 6.2.1 Uganda Green Growth Index for the National Development Plan

**Collaborators: Uganda National Planning Authority (NPA), GGGI Country Office Uganda**

Uganda's NPA in partnership with the European Union and GGGI is undertaking a review of the Third National Development Plan (NDP III) draft Programme Implementation Action Plans to integrate Green Growth principles, interventions, and outputs. The main objective of the review is to mainstream green growth and climate change into the entire NDP III document and results framework. Further to mainstreaming, GGGI is supporting the NPA to develop a national Green Growth Index based on the indicators identified for each NDP III Programme, classifying them into green growth indicators, "potential" green growth (PGG) indicators, and enabling environment indicators. The green growth indicators are indicators that could be included in one of the four dimensions of the Green Growth Index. The PGG indicators are indicators that could be included if they are modified to emphasize "green" components or aspects, for example, identifying green exports from the total exports and considering eco-tourism or sustainable tourism from the tourism sector, etc. These indicators are included in the classification for possible consideration in the preparation of the next NDPs as data become available. The enabling environment indicators are useful indicators to enable green growth transition. The assessment of the indicators according to these three classifications has been

completed, which will guide the collection of data to be used to compute the Index.

### 6.2.2 Assessment of COVID Recovery Packages in OECS Countries

**Collaborators: OECS Commission and GGGI OECS Office**

OECS member countries have been hard-hit by the economic effects of the COVID-19 pandemic and thus are implementing policies to mitigate these effects. The countries are in various stages of developing response strategies. For instance, Saint Lucia published its Economic Recovery and Resilience Plan in July 2020, while Antigua and Grenada are in the process of drafting recovery plans. In order to encourage the development of recovery packages that also contribute to green growth and sustainability goals, OECS is interested in using the Green Growth Index to assess the effects of these strategies from a green growth perspective.

GGGI's Green Growth Index can be effectively used as a tool to assess the impacts of COVID-19 recovery plans because its framework is aligned to SDG indicators and targets, allowing for measurement of social, economic, and environmental co-benefits. Moreover, many of the green growth indicators are linked to the COVID-19 features and/or impacts. For example, zoonotic condition is impacted by habitat loss (due to unsustainable land use and biodiversity loss), increased mortality is caused by access to healthcare, job loss is affected by the degree of economic diversification, etc. The multidimensional framework of the Green Growth Index facilitates assessments of impacts of policy decisions and actions related to COVID-19 recovery on various environmental, economic, and social sustainability indicators. A two-step approach of green growth performance and green co-benefits assessments can be used to evaluate the co-benefits from building COVID-19 resilience through green new deals, national green growth plans, or climate action strategies. The assessment will involve an inventory of green growth indicators relevant to COVID-19 features and/or impacts, alignment of these indicators to the Green Growth Index framework, collection and validation of time-series data, and computation and assessment of Index scores.

### 6.2.3 Green Growth Performance in Country Planning Frameworks

**Collaborators: GGGI Green Growth Planning & Implementation and Country Offices**

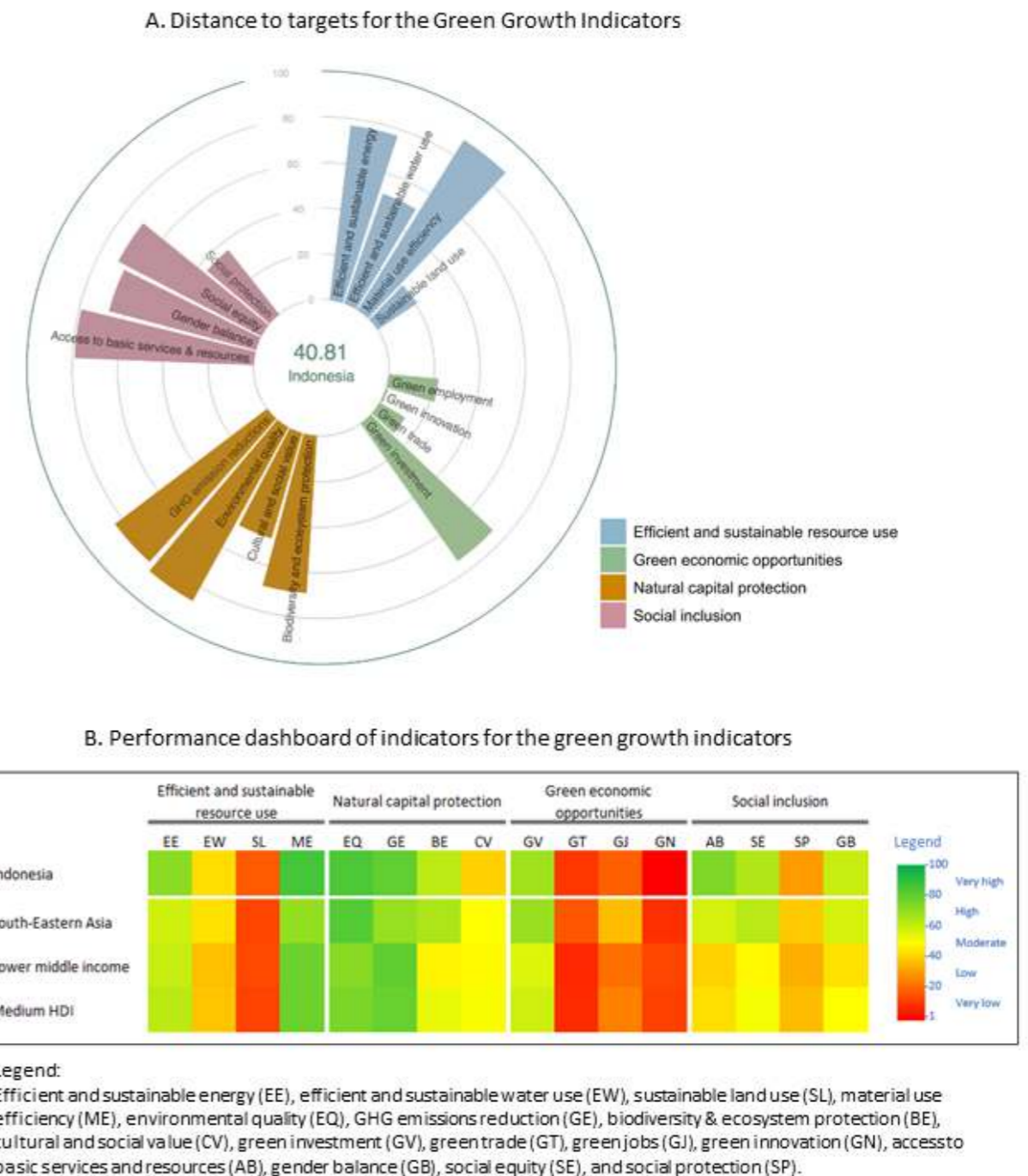
GGGI's Country Planning Framework (CPF) is a 5-year in-country delivery strategy that identifies GGGI's contribution to green growth in member and partner countries in alignment with GGGI's Strategy 2030. The CPF process entails an assessment of green growth challenges, opportunities, and enabling conditions, identification of GGGI's in-country comparative advantage, and elaboration of priority interventions and intended results. Figure 21 presents examples of the graphics of the GGGI Index that are included in the CPFs to highlight the current green growth trends and performance against other relevant countries, by region and economic development level. These results show where the policy should focus and the opportunities that can be created to improve

the performance on green growth indicators, as shown by the following excerpts from the Indonesia CPF:

"Indonesia has generally performed well with an overall score of 40.81 in 2019, ranking 16 among 35 Asian nations. Among the four green growth dimensions, performance in achieving targets in green economic opportunities is the poorest (Figure 21A). In comparison, Indonesia's score at 12.30 is below the score of most south-east Asian countries, representing an underperformance in green investment, green trade, green jobs, and green innovation (Figure 21B).

Herein, perhaps, lies Indonesia's biggest opportunity to achieve its national development targets: Green growth strategies to accelerate investments and innovation to create and target new economic opportunities, reinforcing the trajectory towards a sustainable, socially inclusive economy."

**Figure 21** Example of graphics on Green Growth Index in Country Planning Framework



## 6.3 Green Growth Simulation Tool

GGGI has developed both the Green Growth Index and Simulation 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 common set of metrics in four green growth dimensions. The Simulation Tool allows the users to enhance their knowledge on 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 Simulation Tool depends on the policy relevance of the indicators that frame the Green Growth Index. Moreover, this Simulation Tool not only enhances users' understanding of green growth but also 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.

The development of the Simulation Tool follows three phases:

1. Phase 1 consists of identifying and applying models which 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.

2. Phase 2 consists of 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.

3. 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 the Phase 1, which was 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. A comprehensive inventory of models was conducted to classify them for use in Phase 1 and Phase 2 development of the Simulation Tool. Figure 22 shows the interlinkages of different models, which are relevant for the 36 indicators of the Green Growth Index, built and validated through the following steps:

1. Collection of online data and running the model in Excel
2. Validation of results by comparing to actual data
3. Preparation of flow diagrams to represent the models
4. Translation of the equations run in Excel into Python codes
5. Validation of results consistency and flow diagrams

For Phase 1, the case study countries include Hungary, Mexico, and Uzbekistan. In this study, policy and investment scenarios were created for different sectors, which include:

- Energy – reducing coal production, increasing renewable supply (e.g., solar, wind)
- Transport – increasing electric vehicle, using efficient transport technology
- Water – implementing water pricing policies, improving irrigation technology efficiency
- Agriculture – reducing production losses, reducing fertilizer use
- Forestry – increasing reforestation or reducing deforestation, applying climate smart forestry policies
- Waste – increasing recycling rate, reducing food waste

The Phase 2 Simulation Tool will also include social (e.g. population, migration), economic (e.g. GDP growth, consumption), and climate (e.g. temperature, precipitation) scenarios. The Simulation Tool thus covers not only multiple sectors, but also multiple systems. It is based on system dynamics models that measure the impacts of policy and investment scenarios on important green growth indicators for efficient and sustainable resource use (i.e. energy, water, land, and materials), natural capital protection (i.e. environmental quality, GHG emissions reduction, biodiversity and ecosystem protection, and social and cultural value), green economic opportunities (i.e. green employment, investment, trade, and innovation), and social inclusion (i.e. access to basic services, gender balance, and social equity and protection). Moreover, it is an integrated assessment tool that can assess the impacts of policies and investments from green deals or stimulus packages on specific sectors they intend to support and the co-benefits on other parts of the society, particularly the poor and vulnerable (i.e. social inclusion). The Simulation Tool will have the following features:

1. It can simulate long-term progress relative to policy and investment scenarios from present (baseline) year to 2030 and 2050.
2. It is tailored to the social, economic, and environmental contexts of the country to improve long-term assessments of green growth performance.
3. It is developed through a participatory approach to enhance the relevance of the results for national policy and planning, including priorities and timeline for achieving the development goals.
4. It can be applied in close collaboration with the relevant government agencies to facilitate the transfer of knowledge and product.

### 6.3.1 COVID Green Recovery in Hungary

**Collaborators: Hungary GGGI Country Office and Ministry for Innovation and Technology**

In the context of the European Green Deal and Hungary's national climate neutrality commitment, GGGI has delivered various low-carbon scenarios using the Green Economy Model (GEM) over the past months. These scenarios are showing positive impacts on GDP and green employment. However, the critical question is how these low-carbon scenarios are aligned with the SDGs which governments are committed to achieve by 2030 and beyond. This question could further motivate the uptake of green deal packages that contribute to reducing not only GHG emissions, but also biodiversity loss and social inequality. By assessing the co-benefits using the Simulation Tool, it will be possible to determine the potential contribution of the green deal on reducing biodiversity loss and social inequality. These co-benefits are added social, economic, or environmental benefits above and beyond the direct benefits of reducing GHG emissions and the economic indicators already covered in the analysis performed with GEM. They can include, for example, improving gender balance, access to basic services, management of natural resources, etc. The project activities will include stakeholder dialogues for scenario building, data collection and model application, and capacity building on the use of the Tool.

### 6.3.2 Green Growth Performance in Uganda

**Collaborators: Uganda NPA, GGGI Country Office Uganda**

The third results framework, which is within a 30-year framework to achieve the Uganda Vision 2040, contains a set of objectives, key result areas, and targets, aligning to the stated theme of the NDPIII. The ongoing collaboration on developing the Green Growth Index will be complemented by the application of the Simulation Tool to assess the potentials for achieving the 2040 visions. The application of the Phase 1 Simulation Tool for Uganda is currently ongoing. The following activities will include: (1) collection of data and addition of the kept aside models in developing the Phase 2 Simulation Tool; (2) conduct of stakeholder dialogues with policymakers to identify most relevant policy/investment scenarios; (3) collection of data to implement the scenarios identified from the dialogues; (4) application, validation, and analysis of results from the application of Phase 2 Simulation Tool; and (5) conduct of capacity building on the use of the Tool to transfer knowledge to the policymakers.

Figure 22 Interlinkages of models of indicators across different green growth dimensions

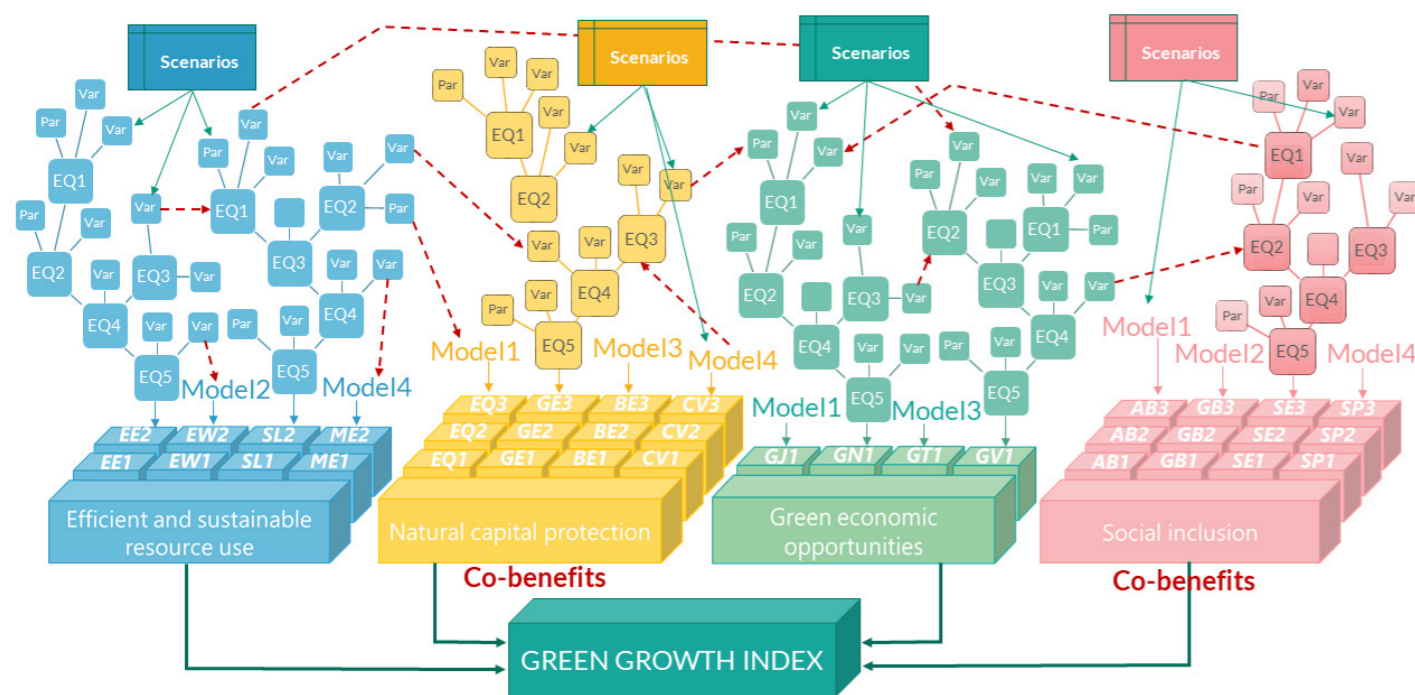


Table 9 Green growth dimension sub-indices and Green Growth Index and ranks for the African countries

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
Tanzania	Eastern	71.77	66.89	47.53	41.77	55.56	Moderate	1
Morocco	Northern	50.34	73.63	26.35	72.16	51.52	Moderate	2
Tunisia	Northern	28.27	61.76	46.16	75.42	49.65	Moderate	3
South Africa	Southern	40.14	59.22	35.45	67.24	48.79	Moderate	4
Cabo Verde	Western	67.97	68.39	15.41	69.17	47.18	Moderate	5
Senegal	Western	70.00	65.62	18.55	43.76	43.94	Moderate	6
Mauritius	Eastern	59.21	53.20	12.98	84.43	43.10	Moderate	7
Uganda	Eastern	65.41	69.92	23.70	31.63	43.03	Moderate	8
Egypt	Northern	24.87	54.85	39.72	61.17	42.66	Moderate	9
Ethiopia	Eastern	57.88	67.24	26.03	29.98	41.75	Moderate	10
Ghana	Western	69.80	68.23	12.02	51.76	41.49	Moderate	11
Botswana	Southern	66.41	58.75	12.25	53.92	40.07	Moderate	12
Cameroon	Middle	67.58	59.76	12.88	43.61	38.81	Low	13
Kenya	Eastern	62.67	62.48	10.30	53.68	38.36	Low	14
Madagascar	Eastern	60.35	56.36	15.51	31.39	35.87	Low	15
Angola	Middle	76.39	56.04	7.28	40.59	33.53	Low	16
Lesotho	Southern	56.76	45.40	8.24	50.88	32.24	Low	17
Zambia	Eastern	65.23	59.62	8.14	32.63	31.88	Low	18
Malawi	Eastern	62.08	76.44	7.48	27.22	31.35	Low	19
Burundi	Eastern	58.59	68.51	6.68	34.23	30.95	Low	20
Zimbabwe	Eastern	57.58	78.42	4.20	41.71	29.83	Low	21
Algeria	Northern	28.43	45.45	7.20	66.27	28.02	Low	22
Nigeria	Western	67.97	57.23	4.18	36.18	27.69	Low	23
Niger	Western	59.67	48.93	4.84	25.47	24.49	Low	24
Burkina Faso	Western	63.60	76.04	-	33.91	-	-	-
Gabon	Middle	-	74.81	-	56.68	-	-	-
Cote d'Ivoire	Western	75.38	74.01	-	43.09	-	-	-
Rwanda	Eastern	67.12	72.58	-	45.01	-	-	-
Sao Tome and Principe	Middle	76.71	71.89	-	30.28	-	-	-
DR Congo	Middle	-	70.01	-	22.81	-	-	-
Guinea	Western	-	69.98	-	40.76	-	-	-
Mozambique	Eastern	59.51	68.22	-	27.39	-	-	-
Namibia	Southern	67.79	66.65	-	47.53	-	-	-
Seychelles	Eastern	-	66.32	-	79.40	-	-	-
Benin	Western	63.30	66.15	-	32.75	-	-	-
Togo	Western	59.23	65.76	-	42.57	-	-	-
Gambia	Western	-	65.62	-	44.10	-	-	-
Guinea-Bissau	Western	-	65.47	-	21.75	-	-	-
Congo Republic	Middle	-	64.99	-	39.10	-	-	-
Liberia	Western	-	63.47	-	33.84	-	-	-
Eswatini	Southern	-	62.71	-	49.45	-	-	-

# 7 Statistical Tables

**Table 9** 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
Sierra Leone	Western	59.30	61.93	-	28.80	-	-	-
South Sudan	Eastern	67.36	61.24	-	18.73	-	-	-
Equatorial Guinea	Middle	-	58.84	-	39.56	-	-	-
Central African Republic	Middle	-	55.21	-	13.19	-	-	-
Comoros	Eastern	-	54.61	-	46.15	-	-	-
Chad	Middle	76.14	53.99	-	19.53	-	-	-
Eritrea	Eastern	-	53.93	-	-	-	-	-
Mali	Western	66.24	47.51	-	33.35	-	-	-
Somalia	Eastern	-	46.46	-	23.83	-	-	-
Sudan	Northern	21.59	42.56	-	35.31	-	-	-
Djibouti	Eastern	-	39.24	-	34.44	-	-	-
Mauritania	Western	-	35.88	-	37.97	-	-	-
Libya	Northern	17.40	28.32	-	-	-	-	-

**Table 10** 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
Mexico	Central	57.84	72.64	44.65	76.94	61.64	High	1
United States	Northern	56.30	63.95	43.13	85.21	60.31	High	2
Canada	Northern	59.17	56.24	41.73	87.91	59.11	Moderate	3
Brazil	Southern	65.50	71.03	28.44	70.08	55.18	Moderate	4
Dominican Republic	Caribbean	60.96	76.25	25.98	73.41	54.57	Moderate	5
Costa Rica	Central	66.50	68.60	23.29	75.27	53.18	Moderate	6
Colombia	Southern	65.10	71.70	25.05	67.98	53.10	Moderate	7
Peru	Southern	64.94	72.08	23.26	71.17	52.76	Moderate	8
Chile	Southern	59.01	73.63	21.98	79.87	52.55	Moderate	9
El Salvador	Central	63.12	58.34	26.67	76.79	52.40	Moderate	10
Ecuador	Southern	60.89	70.84	20.44	75.28	50.75	Moderate	11
Argentina	Southern	59.96	57.91	21.14	81.37	49.44	Moderate	12
Uruguay	Southern	82.88	53.41	14.23	80.89	47.51	Moderate	13
Paraguay	Southern	64.96	58.18	19.86	67.46	47.44	Moderate	14
Honduras	Central	67.25	67.99	16.78	57.28	45.78	Moderate	15
Bolivia	Southern	55.73	69.79	14.10	68.92	44.09	Moderate	16
Panama	Central	67.14	67.48	9.39	73.22	42.01	Moderate	17
Guatemala	Central	68.24	66.32	7.37	57.05	37.14	Low	18
Nicaragua	Central	66.11	71.45	5.12	66.42	35.60	Low	19
Trinidad and Tobago	Caribbean	19.97	51.80	9.76	83.45	30.29	Low	20
St. Vincent and the Grenadines	Caribbean	-	73.33	-	-	-	-	-
St. Lucia	Caribbean	-	73.29	-	73.40	-	-	-
Belize	Central	68.32	71.77	-	64.72	-	-	-
Suriname	Southern	62.07	68.61	-	74.66	-	-	-
Dominica	Caribbean	-	67.83	-	-	-	-	-
Jamaica	Caribbean	58.54	67.49	-	56.80	-	-	-
Cuba	Caribbean	63.24	66.81	-	-	-	-	-
Bahamas	Caribbean	58.77	65.81	18.29	-	-	-	-
Venezuela	Southern	61.13	65.15	-	59.18	-	-	-
St. Kitts and Nevis	Caribbean	-	64.68	-	-	-	-	-
Antigua and Barbuda	Caribbean	65.73	62.97	-	70.97	-	-	-
Grenada	Caribbean	-	61.50	-	80.30	-	-	-
Guyana	Southern	38.31	60.18	-	66.71	-	-	-
Barbados	Caribbean	35.78	58.91	-	-	-	-	-
Bermuda	Northern	-	58.50	-	-	-	-	-
United States Virgin Islands	Caribbean	-	51.33	-	-	-	-	-
Puerto Rico	Caribbean	52.60	49.45	-	-	-	-	-
Haiti	Caribbean	62.90	44.37	-	36.88	-	-	-
Greenland	Northern	-	43.18	-	-	-	-	-

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

Asian 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	55.74	71.10	44.88	82.16	61.83	High	1
Georgia	Western	61.25	72.13	36.70	72.99	58.65	Moderate	2
China	Eastern	48.66	64.60	48.57	75.78	58.33	Moderate	3
Philippines	South-Eastern	63.68	74.54	31.90	67.56	56.55	Moderate	4
Malaysia	South-Eastern	55.80	71.07	36.84	64.67	55.44	Moderate	5
South Korea	Eastern	34.62	57.00	52.93	81.80	54.07	Moderate	6
Turkey	Western	54.28	50.94	31.87	74.43	50.60	Moderate	7
Myanmar	Eastern	71.93	61.70	26.24	52.36	49.69	Moderate	8
Thailand	South-Eastern	59.43	74.73	17.57	76.18	49.38	Moderate	9
Israel	Western	47.05	49.33	30.77	82.32	49.24	Moderate	10
Nepal	Southern	61.27	71.55	18.71	60.01	47.10	Moderate	11
Cyprus	Western	62.73	69.33	11.60	82.94	45.23	Moderate	12
Azerbaijan	Western	44.94	65.96	21.17	64.01	44.77	Moderate	13
India	Southern	41.98	55.11	30.40	51.09	43.54	Moderate	14
Lebanon	Western	44.09	56.10	24.49	51.56	42.04	Moderate	15
Vietnam	South-Eastern	55.29	62.61	11.98	73.78	41.82	Moderate	16
Indonesia	South-Eastern	62.88	64.30	11.52	64.60	41.65	Moderate	17
Bangladesh	Southern	63.61	53.31	13.75	52.65	39.58	Low	18
Armenia	Western	43.53	70.06	10.28	73.81	39.00	Low	19
Laos	South-Eastern	59.24	72.46	9.36	55.75	38.69	Low	20
Saudi Arabia	Western	31.10	35.75	30.75	65.27	38.65	Low	21
Sri Lanka	Southern	32.50	65.40	18.04	55.53	38.20	Low	22
Kyrgyz Republic	Central	43.93	59.70	10.73	73.06	37.87	Low	23
Cambodia	South-Eastern	64.66	76.39	5.89	48.67	34.49	Low	24
Jordan	Western	33.92	47.37	13.04	67.16	34.44	Low	25
Kazakhstan	Central	45.95	43.21	8.58	81.40	34.32	Low	26
Kuwait	Western	45.45	43.88	11.79	57.28	34.07	Low	27
Qatar	Western	47.94	36.00	12.66	55.69	33.22	Low	28
Mongolia	Eastern	44.71	55.65	7.32	63.26	32.76	Low	29
Pakistan	Southern	24.71	49.99	16.30	37.80	29.54	Low	30
Tajikistan	Central	38.45	60.85	4.17	72.86	29.04	Low	31
Afghanistan	Southern	67.15	37.37	6.06	38.26	27.62	Low	32
Uzbekistan	Central	13.24	53.70	9.74	64.26	25.83	Low	33
Bhutan	Southern	62.98	78.42	-	58.77	-	-	-
Timor-Leste	South-Eastern	-	70.90	-	62.04	-	-	-
Brunei Darussalam	South-Eastern	-	60.80	26.68	71.12	-	-	-
Iran	Southern	48.96	56.19	-	67.88	-	-	-
Singapore	South-Eastern	-	55.90	37.92	81.10	-	-	-
North Korea	Eastern	-	55.84	-	-	-	-	-
Maldives	Southern	-	53.10	-	69.60	-	-	-

Table 11 Green growth dimension sub-indices and Green Growth Index and ranks for the Asian countries (continued)

Asian Countries/ Territories	Asia Subregion	Dimensions				Green Growth Index		
		Efficient and Sustainable Resource Use	Natural Capital Protection	Green Economic Opportunities	Social Inclusion	Scores	Level	Rank
United Arab Emirates	Western	38.89	46.62	-	66.78	-	-	-
Turkmenistan	Central	-	45.49	-	-	-	-	-
Oman	Western	32.37	41.63	29.10	-	-	-	-
Syria	Western	14.21	39.09	-	54.64	-	-	-
Yemen	Western	21.17	37.81	-	25.93	-	-	-
Iraq	Western	44.52	35.70	-	67.57	-	-	-
Bahrain	Western	30.24	23.41	-	-	-	-	-
Palestine	Western	-	-	-	54.87	-	-	-
Macao	Eastern	-	-	1.12	-	-	-	-
Hong Kong	Eastern	-	-	21.04	-	-	-	-

Table 12 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
Sweden	Northern	87.78	78.14	59.53	94.06	78.72	High	1
Denmark	Northern	86.12	73.19	59.68	92.33	76.77	High	2
Czech Republic	Eastern	72.92	83.15	65.49	87.35	76.74	High	3
Germany	Western	70.37	82.37	63.73	89.49	75.83	High	4
Austria	Western	79.21	80.67	56.10	89.31	75.22	High	5
Finland	Northern	78.21	71.53	60.34	91.21	74.49	High	6
Slovakia	Eastern	71.88	85.53	58.58	84.37	74.25	High	7
Switzerland	Western	83.26	77.99	48.66	90.93	73.21	High	8
Lithuania	Northern	76.42	75.62	52.20	87.10	71.60	High	9
Hungary	Eastern	63.63	81.47	62.24	80.54	71.40	High	10
Slovenia	Southern	68.36	81.85	51.34	88.53	71.01	High	11
Portugal	Southern	76.48	78.41	45.52	89.87	70.38	High	12
Estonia	Northern	68.97	76.15	50.48	88.66	69.63	High	13
Latvia	Northern	84.31	77.22	41.95	83.60	69.12	High	14
Belgium	Western	59.54	78.37	53.93	90.48	69.08	High	15
Poland	Eastern	59.69	76.83	55.05	89.29	68.90	High	16
France	Western	68.41	79.61	46.21	89.31	68.85	High	17
Romania	Eastern	64.96	78.68	54.01	79.36	68.41	High	18
Italy	Southern	72.57	80.82	41.91	87.30	68.06	High	19
Norway	Northern	76.54	72.32	41.92	92.20	68.01	High	20
Croatia	Southern	72.71	84.04	45.91	75.48	67.84	High	21
Netherlands	Western	59.54	74.53	49.27	92.51	67.06	High	22
United Kingdom	Northern	72.28	76.12	40.36	90.07	66.87	High	23
Spain	Southern	63.03	76.76	45.32	90.62	66.77	High	24
Greece	Southern	65.19	77.07	34.57	84.27	61.86	High	25
Luxembourg	Western	64.60	78.07	31.74	90.27	61.66	High	26
Bulgaria	Eastern	54.84	78.32	41.46	79.24	61.29	High	27
Serbia	Southern	57.31	69.51	40.91	76.70	59.46	Moderate	28
Russia	Eastern	50.55	55.84	37.17	77.88	53.46	Moderate	29
Ireland	Northern	54.83	59.16	27.65	85.01	52.55	Moderate	30
Iceland	Northern	59.63	42.18	33.62	87.96	52.23	Moderate	31
Moldova	Eastern	57.93	58.49	31.72	66.17	51.64	Moderate	32
Ukraine	Eastern	45.02	62.57	35.34	69.62	51.31	Moderate	33
Belarus	Eastern	57.13	72.88	15.62	83.87	48.32	Moderate	34
Albania	Southern	65.05	82.62	9.44	80.69	44.98	Moderate	35
Montenegro	Southern	66.06	60.91	12.75	71.65	43.78	Moderate	36
Bosnia and Herzegovina	Southern	58.70	61.76	9.54	69.05	39.31	Low	37
Malta	Southern	50.86	71.99	3.25	85.41	31.76	Low	38
Liechtenstein	Western	-	87.09	-	-	-	-	-
Andorra	Southern	-	77.13	-	-	-	-	-
Macedonia	Southern	59.70	74.72	-	72.71	-	-	-

Table 13 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	58.11	69.64	27.98	88.92	56.33	Moderate	1
Australia	Australia and New Zealand	63.65	55.36	28.17	83.61	53.67	Moderate	2
Kiribati	Micronesia	-	78.42	-	34.64	-	-	-
American Samoa	Polynesia	-	77.59	-	-	-	-	-
Palau	Micronesia	-	74.19	-	71.24	-	-	-
Northern Mariana Islands	Micronesia	-	71.42	-	-	-	-	-
Fiji	Melanesia	68.44	66.72	-	61.70	-	-	-
Marshall Islands	Micronesia	-	65.76	-	-	-	-	-
Tonga	Polynesia	-	64.82	-	60.04	-	-	-
Vanuatu	Melanesia	80.19	64.69	-	32.74	-	-	-
Samoa	Polynesia	84.18	64.42	-	57.66	-	-	-
Micronesia, Fed. Sts.	Micronesia	-	61.66	-	44.54	-	-	-
Solomon Islands	Melanesia	-	58.61	-	31.42	-	-	-
Papua New Guinea	Melanesia	71.40	53.80	-	21.85	-	-	-
Nauru	Polynesia	-	17.90	-	-	-	-	-
Guam	Micronesia	-	17.68	-	-	-	-	-

Table 14 Scores on indicator categories 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						
Sao Tome and Principe	-	76.71	74.24	51.76	99.94	90.17
Angola	16	76.39	90.92	78.71	50.48	94.23
Chad	-	76.14	91.51	52.06	-	92.68
Cote d'Ivoire	-	75.38	85.03	54.71	-	92.07
Tanzania	1	71.77	82.4	-	53.3	84.18
Senegal	6	70	76.85	-	50.51	88.35
Ghana	11	69.8	80.45	-	51.08	82.76
Cabo Verde	5	67.97	65.5	-	52.81	90.78
Nigeria	23	67.97	79.84	56.08	50.65	94.11
Namibia	-	67.79	68.19	-	50.34	90.73
Cameroon	13	67.58	85.95	54.35	50.5	88.41
South Sudan	-	67.36	75.23	54.07	52.23	96.9
Rwanda	-	67.12	87.37	56.27	50.99	80.97
Botswana	12	66.41	69.47	63.64	-	66.25
Mali	-	66.24	94.03	50.65	50.62	79.85
Uganda	8	65.41	68.57	55.75	58.04	82.52
Zambia	18	65.23	73.95	-	49.98	75.08
Burkina Faso	-	63.6	82.58	52.04	51.3	74.2
Benin	-	63.3	64.06	-	51.12	77.44
Kenya	14	62.67	75.56	44.36	52.8	87.14
Malawi	19	62.08	88.29	50.89	50.88	64.97
Madagascar	15	60.35	70.95	50.51	51.08	72.49
Niger	24	59.67	79.11	50.85	50.47	62.45
Mozambique	-	59.51	55.15	51.85	50.54	86.81
Sierra Leone	-	59.3	79.69	52.52	-	49.82
Togo	-	59.23	56.28	-	52.87	69.82
Mauritius	7	59.21	54.81	53.67	49.35	84.65
Burundi	20	58.59	71.42	51.47	50.42	63.57
Ethiopia	10	57.88	68.06	43.74	52.28	72.08
Zimbabwe	21	57.58	56.02	44.88	50.33	86.85
Lesotho	17	56.76	61.93	-	50.54	58.43
Morocco	2	50.34	52.33	26.41	50.58	91.85
South Africa	4	40.14	34.41	16.4	50.12	91.83
Algeria	22	28.43	39.21	3.56	50.5	92.58
Tunisia	3	28.27	51.54	2.32	57.9	92.06
Egypt	9	24.87	45.44	1.7	58.23	85.18
Sudan	-	21.59	87.56	1.35	-	85.41
Libya	-	17.4	37.68	1.59	-	88.01
Gabon	-	-	80.35	-	-	97.67
DR Congo	-	-	50.5	-	-	75.45

Table 14 Scores on indicator categories 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	-	-	82	-	-	74.28
Seychelles	-	-	42.73	-	-	88.23
Gambia	-	-	86.67	-	-	82.75
Guinea-Bissau	-	-	63.82	-	50.5	-
Congo Republic	-	-	85.95	-	-	94.62
Liberia	-	-	50.5	-	-	66.2
Eswatini	-	-	88.58	-	-	87.65
Equatorial Guinea	-	-	59	-	-	-
Central African Republic	-	-	79	-	-	59.48
Comoros	-	-	80.06	-	-	-
Eritrea	-	-	87.7	-	-	51.07
Somalia	-	-	-	-	-	59.87
Djibouti	-	-	58.56	-	-	93.83
Mauritania	-	-	59.44	-	-	73.03
AMERICAS						
Uruguay	13	82.88	92.35	-	96.42	63.93
Belize	-	68.32	70.96	-	50.56	88.87
Guatemala	18	68.24	86.68	53.72	50.68	91.9
Honduras	15	67.25	81.48	52.62	53.01	89.98
Panama	17	67.14	68.07	59.1	52.9	95.5
Costa Rica	6	66.5	78.72	53.43	49.49	93.97
Nicaragua	19	66.11	80.94	51.66	52.53	86.96
Antigua and Barbuda	-	65.73	42.62	71.34	-	93.41
Brazil	4	65.5	82.48	54.5	49.58	82.6
Colombia	7	65.1	72.94	53.96	49.52	92.17
Paraguay	14	64.96	90.04	52.07	50.38	75.4
Peru	8	64.94	70.98	52.45	55.52	86.09
Cuba	-	63.24	64.3	52.68	50.43	93.65
El Salvador	10	63.12	64.65	52.2	49.84	94.36
Haiti	-	62.9	65.53	51.3	51.78	89.91
Suriname	-	62.07	67.77	51.66	49.42	85.79
Venezuela	-	61.13	46.11	52.21	-	94.89
Dominican Republic	5	60.96	61.8	26.74	86.81	96.25
Ecuador	11	60.89	57.36	52.02	51.92	88.76
Argentina	12	59.96	49.06	52.93	57.95	85.89
Canada	3	59.17	48.57	58.2	56.78	76.36
Chile	9	59.01	62.26	51.58	47.97	78.71
Bahamas	-	58.77	45.72	-	50.2	88.42
Jamaica	-	58.54	48.35	52	50.46	92.59
Mexico	1	57.84	50.75	44.98	52.42	93.57



**Table 14** Scores on indicator categories 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
United States	2	56.3	44.82	55.1	51.35	79.22
Bolivia	16	55.73	48.87	52.83	51.3	72.86
Puerto Rico	-	52.6	52.65	56.05	49.32	-
Guyana	-	38.31	52.11	50.74	-	21.27
Barbados	-	35.78	45.46	10.55	-	95.49
Trinidad and Tobago	20	19.97	1.36	61.08	-	96.12
St. Vincent and the Grenadines	-	-	45.24	-	-	-
St. Lucia	-	-	47.98	-	-	-
Dominica	-	-	50.07	-	54.36	-
St. Kitts and Nevis	-	-	46.77	-	-	-
Grenada	-	-	55.34	-	55.08	-
Aruba	-	-	47.53	-	-	-
British Virgin Islands	-	-	-	-	-	77.91
Cayman Islands	-	-	46.62	-	-	-
Curacao	-	-	4.58	-	-	-
Sint Maarten	-	-	19.78	-	-	-
Turks and Caicos Islands	-	-	40.12	-	-	-
<b>ASIA</b>						
Myanmar	8	71.93	91.73	-	50.1	80.98
Afghanistan	32	67.15	70.57	-	50.21	85.46
Cambodia	24	64.66	82.21	51.48	51.05	80.9
Philippines	4	63.68	65.27	47.69	56.63	93.28
Bangladesh	18	63.61	74.01	51.45	48.85	87.99
Bhutan	-	62.98	67.88	51.5	55.23	81.49
Indonesia	17	62.88	74.94	46.37	50.76	88.61
Cyprus	12	62.73	51.98	56.97	69.46	75.29
Nepal	11	61.27	74.72	50.78	50.61	73.38
Georgia	2	61.25	61.12	51.57	49.09	90.96
Thailand	9	59.43	56.98	51.73	50.68	83.53
Laos	20	59.24	78.27	50.7	51.81	59.92
Malaysia	5	55.8	43.62	-	50.45	78.95
Japan	1	55.74	47.11	48.26	49.82	85.19
Vietnam	16	55.29	64.39	50.77	50.34	56.79
Turkey	7	54.28	53.8	33.51	55.67	86.47
Iran	-	48.96	28.83	-	50.23	81.05
China	3	48.66	44.03	36.25	49.02	71.71
Qatar	28	47.94	32.5	37.41	-	90.64
Israel	10	47.05	45.41	24.34	52.04	85.19
Kazakhstan	26	45.95	25.5	45.67	51.08	74.97

**Table 14** Scores on indicator categories 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
Kuwait	27	45.45	34.43	-	41.1	66.34
Azerbaijan	13	44.94	41.76	19.99	53.4	91.52
Mongolia	29	44.71	35.62	54.46	-	46.08
Iraq	-	44.52	38.47	22.47	50.14	90.65
Lebanon	15	44.09	39.62	21.71	50.17	87.54
Kyrgyz Republic	23	43.93	49.54	25.79	50.46	57.77
Armenia	19	43.53	46.95	18.52	47.73	86.55
India	14	41.98	69.43	9.81	52.2	87.31
United Arab Emirates	-	38.89	37.71	17.58	51.66	66.78
Tajikistan	31	38.45	74.91	7.24	51.22	78.71
South Korea	6	34.62	33.26	10.03	52.47	82.14
Jordan	25	33.92	41.28	7.41	50.06	86.43
Sri Lanka	22	32.5	93.14	1.97	65.08	93.65
Oman	-	32.37	30.67	8.27	48.96	88.39
Saudi Arabia	21	31.1	33.87	6.16	49.76	90.16
Bahrain	-	30.24	20.72	15.1	-	88.45
Pakistan	30	24.71	77.63	1.15	48.98	84.99
Yemen	-	21.17	51.1	2.15	-	86.38
Syria	-	14.21	38.58	1.07	-	69.77
Uzbekistan	-	13.24	29.75	1.08	-	71.94
Timor-Leste	-	-	68.73	-	81.33	-
Brunei Darussalam	-	-	35.94	-	-	87.05
Singapore	-	-	43.15	-	-	48.26
North Korea	-	-	59.18	-	-	78.04
Maldives	-	-	43.19	-	-	88.22
Turkmenistan	-	-	9.14	-	-	81.16
Palestine	-	-	52.13	40.26	-	-
Macao	-	-	56.13	-	-	-
Hong Kong	-	-	49.45	-	-	-
<b>EUROPE</b>						
Sweden	1	87.78	87.34	86.27	98.63	79.88
Denmark	2	86.12	79.52	100	81.02	85.39
Latvia	14	84.31	81.05	75.39	99.29	83.29
Switzerland	8	83.26	70.33	100	85	80.37
Austria	5	79.21	73.11	69.15	98.1	79.37
Finland	6	78.21	74.16	70.9	93.04	76.48
Norway	20	76.54	90.01	74.42	67.58	75.81
Portugal	12	76.48	65.36	-	77.02	88.88
Lithuania	9	76.42	72.42	78.06	80.76	74.7
Czech Republic	3	72.92	48.59	70.48	97.95	84.31

**Table 14** Scores on indicator categories 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
Croatia	21	72.71	68.37	61.34	73.93	90.13
Italy	19	72.57	58.74	54.55	98.59	87.8
United Kingdom	23	72.28	53.26	100	58.89	87.01
Slovakia	7	71.88	49.62	77.69	90.61	76.41
Germany	4	70.37	55.89	66.08	76.69	86.55
Estonia	13	68.97	57.71	52.5	99.13	75.36
France	17	68.41	53.36	65.98	70.93	87.7
Slovenia	11	68.36	57.22	58.34	76.97	85.01
Montenegro	36	66.06	75.4	-	49.09	77.88
Greece	25	65.19	55.91	53.21	73.1	83.07
Albania	35	65.05	79.07	51.55	49.63	88.49
Romania	18	64.96	65.29	54.74	57.42	86.76
Luxembourg	26	64.6	58.33	100	59.72	49.99
Hungary	10	63.63	52.19	54.78	64.14	89.39
Spain	24	63.03	56.87	39.72	81.5	85.72
Macedonia	-	59.7	57.01	52.26	50.87	83.79
Poland	16	59.69	49.28	48.7	64.17	82.41
Iceland	31	59.63	52.4	61.07	50.3	78.54
Belgium	15	59.54	45.79	46	69.52	85.81
Netherlands	22	59.54	46.55	58.66	55.03	83.66
Bosnia and Herzegovina	37	58.7	46.82	-	49.46	87.34
Moldova	32	57.93	52.33	51.54	55.47	75.28
Serbia	28	57.31	50.78	51.42	52.1	79.27
Belarus	34	57.13	36.96	56.35	-	89.54
Bulgaria	27	54.84	48.51	35.23	63	84
Ireland	30	54.83	57.15	-	32.75	88.07
Malta	38	50.86	54.98	30.98	47.78	82.16
Russia	29	50.55	26.55	53.85	51.02	89.5
Ukraine	33	45.02	19.3	51.83	54.19	75.79
Faeroe Islands	-	-	-	-	83.89	-
<b>OCEANIA</b>						
Samoa	-	84.18	64.71	-	100	92.19
Vanuatu	-	80.19	75.26	-	76.75	89.27
Papua New Guinea	-	71.4	83.03	-	55.63	78.81
Fiji	-	68.44	64.58	57.21	63.4	93.66
Australia	2	63.65	45.45	63.78	80.56	70.28
New Zealand	1	58.11	64.84	56.5	37.17	83.75
Kiribati	-	-	75.01	-	-	-
Palau	-	-	13.63	-	-	-
Marshall Islands	-	-	24.86	-	-	-

**Table 14** Scores on indicator categories 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	-	-	41.9	-	69.43	-
Micronesia, Fed. Sts.	-	-	33.14	-	-	-
Solomon Islands	-	-	80.79	-	-	-
Nauru	-	-	41.78	-	-	-
Cook Islands	-	-	-	-	51.75	-
French Polynesia	-	-	-	-	99.87	-
New Caledonia	-	-	-	-	49.66	-
Niue	-	-	-	-	63.81	-
Tuvalu	-	-	53.39	-	-	-

**Table 15 Scores on indicator categories 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
<b>AFRICA</b>						
Zimbabwe	21	78.42	80.18	83.27	68.26	82.97
Malawi	19	76.44	77.91	91.90	56.58	84.28
Burkina Faso	-	76.04	63.18	86.77	61.59	99.02
Gabon	-	74.81	75.43	82.44	75.64	66.58
Cote d'Ivoire	-	74.01	71.17	90.47	66.95	69.61
Morocco	2	73.63	84.91	90.95	46.74	81.41
Rwanda	-	72.58	67.33	95.78	57.79	74.44
Sao Tome and Principe	-	71.89	85.79	96.66	71.93	44.77
DR Congo	-	70.01	64.95	89.41	67.65	61.15
Guinea	-	69.98	76.05	70.72	69.21	64.42
Uganda	8	69.92	68.13	88.68	49.49	79.94
Burundi	20	68.51	62.93	96.28	52.35	69.46
Cabo Verde	5	68.39	82.37	94.58	45.42	61.82
Ghana	11	68.23	76.82	90.39	64.32	48.51
Mozambique	-	68.22	78.45	88.37	50.74	61.57
Ethiopia	10	67.24	66.48	86.43	40.68	87.46
Tanzania	1	66.89	78.59	77.14	55.46	59.54
Namibia	-	66.65	78.46	62.10	51.37	78.86
Seychelles	-	66.32	82.65	70.55	66.38	49.98
Benin	-	66.15	66.24	90.44	49.31	64.82
Togo	-	65.76	69.16	91.61	45.19	65.31
Senegal	6	65.62	68.01	87.05	43.94	71.28
Gambia	-	65.62	76.14	91.43	54.95	48.47
Guinea-Bissau	-	65.47	60.71	87.07	59.19	58.71
Congo Republic	-	64.99	65.98	60.20	64.78	69.33
Liberia	-	63.47	71.73	85.26	62.19	42.66
Eswatini	-	62.71	74.23	82.39	49.95	50.63
Kenya	14	62.48	72.68	83.44	44.63	56.31
Sierra Leone	-	61.93	69.92	90.52	55.43	41.94
Tunisia	3	61.76	83.26	88.30	32.06	61.75
South Sudan	-	61.24	48.25	50.50	-	94.25
Cameroon	13	59.76	54.55	64.11	65.58	55.62
Zambia	18	59.62	72.00	35.11	55.69	89.73
South Africa	4	59.22	78.83	77.69	34.06	58.95
Equatorial Guinea	-	58.84	72.93	56.63	83.51	34.75
Botswana	12	58.75	84.06	25.26	57.30	97.91
Nigeria	23	57.23	49.17	89.58	44.24	55.04
Madagascar	15	56.36	58.86	87.39	57.23	34.27
Angola	16	56.04	63.43	73.49	47.71	44.35

**Table 15 Scores on indicator categories 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	-	55.21	43.95	29.80	74.82	94.84
Egypt	9	54.85	63.43	89.36	22.66	70.46
Comoros	-	54.61	80.67	95.27	40.78	28.38
Chad	-	53.99	43.56	59.85	35.00	93.14
Eritrea	-	53.93	54.93	80.18	37.99	50.55
Mauritius	7	53.20	89.98	78.31	47.26	24.05
Niger	24	48.93	30.91	83.96	23.31	94.77
Mali	-	47.51	59.95	80.92	13.27	79.14
Somalia	-	46.46	64.64	82.48	28.34	30.85
Algeria	22	45.45	81.49	81.54	12.37	51.92
Lesotho	17	45.40	68.61	86.19	15.29	46.98
Sudan	-	42.56	72.56	78.75	15.60	36.80
Djibouti	-	39.24	74.47	88.94	8.52	42.00
Mauritania	-	35.88	69.20	77.66	8.48	36.40
Libya	-	28.32	74.29	51.88	5.03	33.15
Mayotte	-	-	-	-	-	65.21
Reunion	-	-	-	-	50.00	-
Western Sahara	-	-	-	-	-	59.43
<b>AMERICAS</b>						
Dominican Republic	5	76.25	87.09	86.30	69.35	64.87
Chile	9	73.63	86.61	84.17	62.14	64.87
St. Vincent and the Grenadines	-	73.33	87.15	90.37	66.36	55.34
St. Lucia	-	73.29	83.84	79.98	71.21	60.42
Mexico	1	72.64	85.42	79.64	51.43	79.56
Peru	8	72.08	86.72	82.31	65.14	58.04
Belize	-	71.77	86.64	51.97	64.40	91.50
Colombia	7	71.70	90.20	76.81	64.13	59.50
Nicaragua	19	71.45	88.67	76.97	63.12	60.49
Brazil	4	71.03	89.10	66.05	61.16	70.71
Ecuador	11	70.84	89.37	78.18	63.53	56.73
Bolivia	16	69.79	88.86	49.02	60.86	89.50
Suriname	-	68.61	88.08	54.29	79.24	58.48
Costa Rica	6	68.60	90.02	78.63	62.72	49.88
Honduras	15	67.99	86.07	81.20	61.56	49.66
Dominica	-	67.83	90.74	84.58	60.40	45.68
Jamaica	-	67.49	89.46	91.50	54.56	46.45
Panama	17	67.48	88.40	76.79	58.04	52.65
Cuba	-	66.81	90.09	84.50	66.92	39.10
Guatemala	18	66.32	83.56	87.40	53.90	49.15
Bahamas	-	65.81	80.43	74.97	43.43	71.64

**Table 15** Scores on indicator categories 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
Venezuela	-	65.15	87.43	53.36	67.05	57.59
St. Kitts and Nevis	-	64.68	-	74.87	68.07	53.10
United States	2	63.95	81.21	49.96	56.77	72.62
Antigua and Barbuda	-	62.97	88.33	52.90	54.67	61.56
Grenada	-	61.50	87.49	61.77	53.13	49.82
Guyana	-	60.18	86.95	30.22	100.00	49.92
Barbados	-	58.91	79.93	56.13	43.70	61.44
Bermuda	-	58.50	69.21	-	64.35	44.95
El Salvador	10	58.34	86.26	90.41	46.97	31.61
Paraguay	14	58.18	91.36	23.78	55.00	95.88
Argentina	12	57.91	88.49	50.65	46.96	53.45
Canada	3	56.24	83.62	36.38	50.81	64.74
Uruguay	13	53.41	91.12	38.69	39.39	58.58
Trinidad and Tobago	20	51.80	81.09	48.83	48.01	37.87
United States Virgin Islands	-	51.33	66.73	-	50.57	40.08
Puerto Rico	-	49.45	71.19	-	53.62	31.67
Haiti	-	44.37	78.56	94.25	25.64	20.43
Greenland	-	43.18	78.97	-	13.38	76.17
Anguilla	-	-	-	-	28.58	93.75
Aruba	-	-	-	-	22.91	65.04
British Virgin Islands	-	-	-	-	53.53	54.07
Cayman Islands	-	-	-	-	77.52	56.05
Curacao	-	-	-	-	32.30	59.62
Falkland Islands	-	-	-	-	6.28	54.73
French Guiana	-	-	-	-	82.26	60.12
Guadeloupe	-	-	-	-	85.33	-
Martinique	-	-	-	-	85.70	-
Montserrat	-	-	-	-	-	84.16
Saint-Martin	-	-	-	-	64.88	100.00
Sint Maarten	-	-	-	-	-	86.74
Turks and Caicos Islands	-	-	-	-	53.33	59.67
<b>ASIA</b>						
Bhutan	-	78.42	82.41	79.83	68.92	83.43
Cambodia	24	76.39	89.33	78.08	55.15	88.53
Thailand	9	74.73	83.53	75.39	65.38	75.75
Philippines	4	74.54	90.79	91.83	65.05	56.91
Laos	20	72.46	84.06	66.60	57.19	86.09
Georgia	2	72.13	90.09	77.61	55.90	69.24
Nepal	11	71.55	57.29	84.18	63.07	86.15
Japan	1	71.10	91.29	80.46	64.10	54.29
Malaysia	5	71.07	86.85	76.96	60.47	63.12

**Table 15** Scores on indicator categories 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
Timor-Leste	-	70.90	90.69	88.64	57.12	55.04
Armenia	19	70.06	87.47	83.79	37.64	87.33
Cyprus	12	69.33	86.49	81.42	58.26	56.33
Azerbaijan	13	65.96	88.25	56.72	59.65	63.39
Sri Lanka	22	65.40	95.87	93.14	53.95	37.98
China	3	64.60	80.23	76.77	42.17	67.05
Indonesia	17	64.30	85.18	76.96	57.74	45.17
Vietnam	16	62.61	89.30	85.56	50.78	39.60
Myanmar	8	61.70	82.93	78.70	53.10	41.83
Tajikistan	31	60.85	75.06	91.11	20.23	99.15
Brunei Darussalam	-	60.80	88.07	40.10	66.76	57.95
Kyrgyz Republic	23	59.70	90.01	87.86	21.76	73.82
South Korea	6	57.00	86.03	69.85	54.88	32.02
Iran	-	56.19	83.19	67.88	40.04	44.09
Lebanon	15	56.10	82.79	87.07	36.75	37.38
Singapore	-	55.90	64.71	60.71	48.47	51.27
North Korea	-	55.84	85.81	89.62	38.80	32.59
Mongolia	29	55.65	65.71	43.78	34.77	95.87
India	14	55.11	52.98	91.22	46.52	41.04
Uzbekistan	33	53.70	89.67	64.21	23.93	60.37
Bangladesh	18	53.31	73.59	92.83	32.84	36.00
Maldives	-	53.10	87.32	89.73	17.86	56.80
Turkey	7	50.94	77.30	85.12	35.43	28.87
Pakistan	30	49.99	66.83	89.57	20.34	51.30
Israel	10	49.33	80.84	66.14	24.39	45.44
Jordan	25	47.37	83.96	87.54	12.45	55.00
United Arab Emirates	-	46.62	74.13	35.57	22.86	78.36
Turkmenistan	-	45.49	92.72	33.26	22.99	60.41
Kuwait	27	43.88	67.07	42.50	22.74	57.19
Kazakhstan	26	43.21	91.79	52.84	13.97	51.45
Oman	-	41.63	77.38	65.52	13.41	44.18
Syria	-	39.09	81.86	87.92	10.04	32.33
Yemen	-	37.81	70.09	95.73	10.96	27.80
Afghanistan	32	37.37	71.19	79.24	9.21	37.57
Qatar	28	36.00	58.48	36.89	14.19	54.85
Saudi Arabia	21	35.75	58.53	49.06	10.82	52.56
Iraq	-	35.70	71.25	85.70	10.06	26.46
Bahrain	-	23.41	61.18	40.25	3.28	37.18
Palestine	-	-	82.40	-	13.26	-
Hong Kong	-	-	-	-	-	86.13
Taiwan	-	-	88.77	-	-	-

Table 15 Scores on indicator categories 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
<b>EUROPE</b>						
Liechtenstein	-	87.09	-	88.89	79.33	93.67
Slovakia	7	85.53	89.37	81.28	76.12	96.78
Croatia	21	84.04	87.74	82.35	73.20	94.33
Czech Republic	3	83.15	90.22	69.76	77.80	97.63
Albania	35	82.62	87.35	82.17	83.55	77.70
Germany	4	82.37	84.76	76.21	73.78	96.58
Slovenia	11	81.85	87.24	80.32	83.69	76.54
Hungary	10	81.47	88.74	79.36	69.69	89.79
Italy	19	80.82	86.23	81.25	68.69	88.65
Austria	5	80.67	86.10	77.46	69.53	91.34
France	17	79.61	87.71	79.12	71.36	81.11
Romania	18	78.68	92.08	78.32	75.25	70.61
Portugal	12	78.41	89.50	76.77	60.12	91.51
Belgium	15	78.37	89.25	75.54	74.51	75.07
Bulgaria	27	78.32	86.57	77.12	77.09	73.12
Sweden	1	78.14	89.65	85.30	60.63	80.40
Luxembourg	26	78.07	85.38	65.31	67.36	98.90
Switzerland	8	77.99	83.12	84.26	63.00	83.86
Latvia	14	77.22	88.43	68.91	75.82	76.95
Andorra	-	77.13	87.81	79.45	54.46	93.15
Greece	25	77.07	86.05	73.92	64.86	85.51
Poland	16	76.83	89.16	71.07	76.07	72.27
Spain	24	76.76	89.95	79.67	58.80	82.41
Estonia	13	76.15	91.46	61.52	74.32	80.40
United Kingdom	23	76.12	88.59	78.79	62.45	77.01
Lithuania	9	75.62	88.66	69.04	73.90	72.31
Macedonia	-	74.72	83.51	81.28	55.01	83.48
Netherlands	22	74.53	87.14	70.58	59.20	84.74
Denmark	2	73.19	81.69	70.38	67.35	74.10
Belarus	34	72.88	86.17	63.62	62.47	82.38
Norway	20	72.32	90.23	79.01	59.10	64.93
Malta	38	71.99	84.12	86.73	48.22	76.35
Finland	6	71.53	88.43	62.58	63.63	74.33
Serbia	28	69.51	88.31	67.17	55.26	71.19
Ukraine	33	62.57	88.13	75.55	53.07	43.39
Bosnia and Herzegovina	37	61.76	84.96	76.55	56.94	39.28
Montenegro	36	60.91	83.40	76.39	43.78	49.35
Ireland	30	59.16	86.40	50.93	58.52	47.58
Moldova	32	58.49	71.28	79.77	32.60	63.13
Russia	29	55.84	87.72	42.23	49.05	53.49

Table 15 Scores on indicator categories 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
Iceland	31	42.18	66.99	60.48	12.52	62.44
Faeroe Islands	-	-	-	-	9.20	40.86
Gibraltar	-	-	-	-	1.00	94.70
Monaco	-	-	-	-	-	77.49
San Marino	-	-	-	-	11.51	-
<b>OCEANIA</b>						
Kiribati	-	78.42	82.50	97.22	62.72	75.16
American Samoa	-	77.59	89.55	-	70.93	73.54
Palau	-	74.19	-	64.67	84.86	74.41
Northern Mariana Islands	-	71.42	84.54	-	67.65	63.71
New Zealand	1	69.64	83.14	51.32	69.40	79.41
Fiji	-	66.72	91.22	81.05	52.22	51.32
Marshall Islands	-	65.76	93.82	91.75	47.13	46.09
Tonga	-	64.82	94.15	84.87	45.21	48.86
Vanuatu	-	64.69	88.39	78.23	52.11	48.60
Samoa	-	64.42	94.55	80.20	45.86	49.51
Micronesia, Fed. Sts.	-	61.66	91.73	91.06	67.18	25.76
Solomon Islands	-	58.61	88.11	88.47	43.38	34.91
Australia	2	55.36	86.97	24.67	57.23	76.49
Papua New Guinea	-	53.80	81.34	73.61	49.23	28.41
Nauru	-	17.90	-	90.91	1.00	63.06
Guam	-	17.68	76.87	-	57.07	1.26
Cook Islands	-	-	-	-	-	74.25
French Polynesia	-	-	-	-	45.46	47.08
New Caledonia	-	-	-	-	57.67	78.43
Niue	-	-	-	-	13.94	73.13
Tokelau	-	-	-	-	1.00	78.59
Tuvalu	-	-	-	90.49	-	50.91

Table 16 Scores on indicator categories for green economic opportunities by region and rank

Country	Regional Rank	Green Economic Opportunities	Indicator categories			
			Green investment	Green Trade	Green employment	Green innovation
<b>AFRICA</b>						
Tanzania	1	47.53	75.22	27.06	52.75	-
Tunisia	3	46.16	46.04	37.04	50.09	53.17
Egypt	9	39.72	59.88	14.13	56.89	51.71
South Africa	4	35.45	55.08	42.34	27.53	24.60
Morocco	2	26.35	78.68	7.23	17.56	48.23
Ethiopia	10	26.03	65.49	5.21	51.74	-
Uganda	8	23.70	49.42	3.84	70.10	-
Senegal	6	18.55	70.33	3.74	24.27	-
Madagascar	15	15.51	61.49	3.10	19.54	-
Cabo Verde	5	15.41	78.12	1.00	46.80	-
Eswatini	-	14.82	61.58	2.27	23.28	-
Mauritius	7	12.98	59.28	3.99	9.24	-
Cameroon	13	12.88	55.37	4.40	8.75	-
Botswana	12	12.25	79.64	1.69	13.63	-
Ghana	11	12.02	45.92	4.99	7.58	-
Kenya	14	10.30	50.57	8.24	26.99	1.00
Lesotho	17	8.24	63.61	6.44	1.37	-
Zambia	18	8.14	79.37	6.80	-	1.00
Malawi	19	7.48	48.36	2.74	23.65	1.00
Angola	16	7.28	12.47	2.03	15.18	-
Algeria	22	7.20	80.50	4.63	-	1.00
Burundi	20	6.68	35.99	1.66	4.97	-
Gambia	-	5.89	46.58	2.52	1.74	-
Niger	24	4.84	64.19	1.76	1.00	-
Zimbabwe	21	4.20	37.26	1.99	-	1.00
Nigeria	23	4.18	55.79	1.31	1.00	-
Burkina Faso	-	-	56.40	1.86	-	-
Gabon	-	-	79.48	-	-	-
Cote d'Ivoire	-	-	80.58	3.25	-	-
Rwanda	-	-	52.43	2.46	-	-
Sao Tome and Principe	-	-	-	10.22	-	-
DR Congo	-	-	46.47	-	-	-
Guinea	-	-	43.86	3.18	-	-
Mozambique	-	-	61.64	1.75	-	-
Namibia	-	-	55.77	5.26	-	-
Seychelles	-	-	-	1.88	-	-
Benin	-	-	59.41	4.85	-	-
Togo	-	-	57.00	17.51	-	-
Guinea-Bissau	-	-	53.16	-	-	-
Congo Republic	-	-	9.23	6.70	-	-

Table 16 Scores on indicator categories 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
Liberia	-	-	1.00	-	-	-
Sierra Leone	-	-	32.02	5.42	-	-
South Sudan	-	-	44.97	-	-	-
Central African Republic	-	-	-	1.68	-	-
Comoros	-	-	60.65	1.23	-	-
Eritrea	-	-	-	-	1.00	-
Mali	-	-	58.62	2.59	-	-
Somalia	-	-	-	-	-	-
Sudan	-	-	48.52	1.03	-	-
Djibouti	-	-	100.00	-	-	-
Mauritania	-	-	72.96	1.03	-	-
<b>AMERICAS</b>						
Mexico	1	44.65	63.43	38.06	57.32	28.73
United States	2	43.13	62.31	42.33	71.98	18.23
Canada	3	41.73	62.77	22.54	68.54	31.28
Brazil	4	28.44	59.59	15.17	22.23	32.54
El Salvador	10	26.67	61.70	12.83	-	23.96
Dominican Republic	5	25.98	78.30	10.07	38.79	14.89
Colombia	7	25.05	53.34	5.07	36.08	40.31
Costa Rica	6	23.29	75.45	9.65	32.28	12.52
Peru	8	23.26	63.42	4.93	20.45	45.74
Chile	9	21.98	56.34	3.22	40.46	31.84
Argentina	12	21.14	61.58	5.79	27.88	20.09
Ecuador	11	20.44	59.98	3.03	50.94	18.86
Paraguay	14	19.86	64.14	2.60	47.03	-
Bahamas	-	18.29	51.61	13.13	9.02	-
Honduras	15	16.78	78.36	4.87	-	12.37
Uruguay	13	14.23	61.76	2.74	16.29	14.87
Bolivia	16	14.10	54.77	2.21	23.20	-
Trinidad and Tobago	20	9.76	-	87.45	10.62	1.00
Panama	17	9.39	85.82	8.35	10.84	1.00
Guatemala	18	7.37	57.85	6.64	1.01	7.59
Nicaragua	19	5.12	73.22	1.83	-	1.00
St. Vincent and the Grenadines	-	-	-	5.01	-	-
St. Lucia	-	-	-	7.59	-	-
Belize	-	-	51.23	10.75	-	-
Suriname	-	-	-	2.27	-	-
Jamaica	-	-	76.11	11.34	-	-
Cuba	-	-	-	-	1.00	23.79
Venezuela	-	-	64.41	-	-	-
St. Kitts and Nevis	-	-	-	9.39	-	-

Table 16 Scores on indicator categories 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
Antigua and Barbuda	-	-	-	9.17	-	-
Guyana	-	-	78.96	1.75	-	-
Barbados	-	-	55.00	13.00	-	-
Bermuda	-	-	-	99.38	9.81	-
Haiti	-	-	73.74	-	-	-
Greenland	-	-	-	1.32	-	-
Aruba	-	-	-	12.37	-	-
Montserrat	-	-	-	1.69	-	-
<b>ASIA</b>						
South Korea	6	52.93	78.09	37.48	75.44	35.54
China	3	48.57	80.38	31.26	48.44	45.73
Japan	1	44.88	64.25	53.05	46.15	25.78
Singapore	-	37.92	96.22	28.23	56.07	13.58
Malaysia	5	36.84	59.00	26.66	34.82	33.62
Georgia	2	36.70	66.88	22.77	29.17	40.83
Philippines	4	31.90	80.20	17.16	38.75	19.42
Turkey	7	31.87	69.90	23.74	53.17	11.69
Israel	10	30.77	73.98	38.03	17.30	18.43
Saudi Arabia	21	30.75	75.75	6.01	56.48	34.79
India	14	30.40	76.33	20.74	49.72	10.85
Oman	-	29.10	35.37	12.04	57.89	-
Brunei Darussalam	-	26.68	91.15	5.88	35.47	-
Myanmar	8	26.24	80.44	4.80	46.83	-
Lebanon	15	24.49	28.60	12.99	39.56	-
Azerbaijan	13	21.17	63.13	2.05	73.46	-
Hong Kong	-	21.04	-	15.23	35.67	17.13
Nepal	11	18.71	98.54	2.54	26.16	-
Sri Lanka	22	18.04	80.19	11.27	6.49	-
Thailand	9	17.57	73.27	27.50	47.34	1.00
Pakistan	30	16.30	60.36	3.76	19.10	-
Bangladesh	18	13.75	81.97	2.30	13.79	-
Jordan	25	13.04	59.57	11.92	40.74	1.00
Qatar	28	12.66	89.88	1.00	22.50	-
Vietnam	16	11.98	71.52	9.02	31.92	1.00
Kuwait	27	11.79	77.76	2.93	7.20	-
Cyprus	12	11.60	65.22	10.71	25.91	1.00
Indonesia	17	11.52	70.77	9.63	25.80	1.00
Kyrgyz Republic	23	10.73	64.04	9.53	21.76	1.00
Armenia	19	10.28	50.85	5.73	38.34	1.00
Uzbekistan	33	9.74	86.93	1.99	52.12	1.00
Laos	20	9.36	48.76	2.86	5.88	-

Table 16 Scores on indicator categories 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
Kazakhstan	26	8.58	59.21	2.87	32.01	1.00
Mongolia	29	7.32	46.99	1.57	38.98	1.00
Afghanistan	32	6.06	62.01	3.60	1.00	-
Cambodia	24	5.89	67.55	2.86	1.06	-
Tajikistan	31	4.17	72.49	-	1.00	1.00
Macao	-	1.12	-	1.41	1.00	1.00
Bhutan	-	-	75.28	-	-	-
Timor-Leste	-	-	42.29	4.08	-	-
Iran	-	-	-	5.98	65.88	-
Maldives	-	-	-	1.07	1.00	-
United Arab Emirates	-	-	-	9.96	56.17	-
Syria	-	-	-	-	34.89	-
Yemen	-	-	-	4.47	32.94	-
Iraq	-	-	52.43	-	1.00	-
Bahrain	-	-	78.96	6.53	-	-
Palestine	-	-	-	5.54	30.31	-
<b>EUROPE</b>						
Czech Republic	3	65.49	67.61	53.02	88.86	57.74
Germany	4	63.73	72.57	68.72	89.98	36.77
Hungary	10	62.24	72.68	53.37	69.53	55.64
Finland	6	60.34	68.32	36.82	70.12	75.14
Denmark	2	59.68	78.32	44.21	83.55	43.85
Sweden	1	59.53	76.53	37.80	56.93	76.25
Slovakia	7	58.58	60.73	36.77	77.74	67.85
Austria	5	56.10	72.38	51.59	65.67	40.39
Poland	16	55.05	68.00	34.05	60.35	65.74
Romania	18	54.01	56.06	56.33	49.58	54.35
Belgium	15	53.93	68.65	25.47	48.39	100.00
Lithuania	9	52.20	68.81	34.65	42.77	72.80
Slovenia	11	51.34	69.55	35.93	62.56	44.44
Estonia	13	50.48	75.17	34.85	25.25	98.15
Netherlands	22	49.27	78.11	27.94	52.44	51.50
Switzerland	8	48.66	75.48	30.75	100.00	24.14
France	17	46.21	66.16	31.45	52.14	42.02
Croatia	21	45.91	72.58	21.35	52.09	55.04
Portugal	12	45.52	61.10	34.21	48.88	42.03
Spain	24	45.32	67.58	22.12	57.70	48.92
Latvia	14	41.95	61.19	20.43	39.78	62.27
Norway	20	41.92	76.97	22.86	50.39	34.85
Italy	19	41.91	63.14	50.32	65.62	14.79
Bulgaria	27	41.46	73.39	22.02	45.75	39.98

Table 16 Scores on indicator categories 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
Serbia	28	40.91	59.32	26.83	68.31	25.75
United Kingdom	23	40.36	59.27	42.67	62.88	16.68
Russia	29	37.17	65.33	8.29	87.53	40.23
Ukraine	33	35.34	57.54	10.48	63.66	40.63
Greece	25	34.57	53.72	14.56	35.45	51.55
Iceland	31	33.62	68.52	5.65	33.03	100.00
Luxembourg	26	31.74	70.98	32.73	14.63	29.88
Moldova	32	31.72	61.08	11.43	33.79	42.90
Ireland	30	27.65	74.48	10.41	13.90	54.22
Belarus	34	15.62	74.07	14.62	54.90	1.00
Montenegro	36	12.75	-	6.36	24.96	13.04
Bosnia and Herzegovina	37	9.54	-	28.02	30.94	1.00
Albania	35	9.44	53.91	1.15	13.54	-
Malta	38	3.25	-	21.66	1.59	1.00
Liechtenstein	-	-	-	-	1.00	-
Andorra	-	-	-	8.61	-	-
Macedonia	-	-	72.82	100.00	-	-
Monaco	-	-	-	-	-	1.00
San Marino	-	-	-	-	-	1.00
<b>OCEANIA</b>						
Australia	2	28.17	60.89	8.26	44.17	28.35
New Zealand	1	27.98	67.54	8.22	47.42	23.28
Kiribati	-	-	-	4.23	-	-
Palau	-	-	-	1.60	-	-
Fiji	-	-	-	4.39	85.34	-
Tonga	-	-	-	5.16	1.00	-
Vanuatu	-	-	85.25	-	-	-
Samoa	-	-	-	18.60	-	-
Solomon Islands	-	-	-	1.40	-	-
French Polynesia	-	-	-	4.76	-	-
New Caledonia	-	-	-	2.53	-	-

Table 17 Scores on indicator categories for social inclusion by region and rank

Country	Regional Rank	Social Inclusion	Access to basic services and resources	Indicator categories		
				Gender balance	Social equity	Social protection
<b>AFRICA</b>						
Mauritius	7	84.43	90.69	74.28	89.34	-
Seychelles	-	79.40	98.65	59.12	85.81	-
Tunisia	3	75.42	82.29	59.46	96.68	68.39
Morocco	2	72.16	70.04	55.72	92.18	75.37
Cabo Verde	5	69.17	69.09	61.50	71.36	75.49
South Africa	4	67.24	82.94	95.08	34.52	75.11
Algeria	22	66.27	54.98	62.28	85.00	-
Egypt	9	61.17	67.37	41.40	79.69	62.98
Gabon	-	56.68	77.81	53.00	52.89	47.32
Botswana	12	53.92	66.54	63.89	26.80	74.22
Kenya	14	53.68	40.09	80.78	73.75	34.77
Ghana	11	51.76	49.04	58.29	64.76	38.79
Lesotho	17	50.88	42.40	73.91	37.82	56.53
Eswatini	-	49.45	-	54.08	37.97	58.88
Namibia	-	47.53	49.71	94.74	20.48	52.93
Comoros	-	46.15	31.25	68.52	64.56	32.80
Rwanda	-	45.01	23.09	90.39	56.32	34.91
Gambia	-	44.10	46.39	47.46	45.28	37.94
Senegal	6	43.76	34.26	69.19	36.91	41.90
Cameroon	13	43.61	36.94	61.04	45.60	35.18
Cote d'Ivoire	-	43.09	49.00	55.99	37.17	33.81
Togo	-	42.57	28.14	76.27	53.18	28.76
Tanzania	1	41.77	22.65	90.09	51.26	29.12
Zimbabwe	21	41.71	35.29	78.94	26.26	41.40
Guinea	-	40.76	29.04	62.79	46.70	32.41
Angola	16	40.59	28.47	66.80	-	35.17
Equatorial Guinea	-	39.56	28.35	72.78	-	30.00
Congo Republic	-	39.10	43.43	46.92	32.84	34.92
Mauritania	-	37.97	43.22	54.91	-	23.06
Nigeria	23	36.18	28.38	49.15	49.39	24.88
Sudan	-	35.31	39.78	46.43	57.25	14.71
Djibouti	-	34.44	25.14	53.81	40.98	25.37
Burundi	20	34.23	11.27	82.10	58.09	25.54
Burkina Faso	-	33.91	28.66	48.33	45.52	20.97
Liberia	-	33.84	14.27	72.02	54.89	23.25
Mali	-	33.35	28.88	43.73	41.62	23.52
Benin	-	32.75	28.61	51.30	33.80	23.19
Zambia	18	32.63	32.48	77.25	15.26	29.61
Uganda	8	31.63	10.34	88.57	37.28	29.31



Table 17 Scores on indicator categories 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
Madagascar	15	31.39	10.53	53.78	82.80	20.72
Sao Tome and Principe	-	30.28	33.68	19.00	38.08	34.49
Ethiopia	10	29.98	12.13	65.52	45.61	22.30
Sierra Leone	-	28.80	7.57	55.21	56.69	29.06
Mozambique	-	27.39	13.43	73.50	26.41	21.59
Malawi	19	27.22	9.47	76.47	36.61	20.71
Niger	24	25.47	7.79	57.00	47.07	20.11
Somalia	-	23.83	15.92	64.91	-	13.09
DR Congo	-	22.81	9.78	58.24	-	20.83
Guinea-Bissau	-	21.75	22.68	14.59	31.03	21.78
Chad	-	19.53	9.06	54.91	39.58	7.39
South Sudan	-	18.73	8.89	43.41	45.35	7.03
Central African Republic	-	13.19	8.50	43.03	-	6.27
Eritrea	-	-	12.49	59.90	-	-
Libya	-	-	32.38	68.23	-	-
<b>AMERICAS</b>						
Canada	3	87.91	83.31	84.77	88.94	95.11
United States	2	85.21	90.49	71.51	91.15	89.37
Trinidad and Tobago	20	83.45	93.09	78.05	-	79.98
Argentina	12	81.37	85.01	75.60	80.92	84.32
Uruguay	13	80.89	92.63	64.51	82.59	86.74
Grenada	-	80.30	79.16	83.50	-	78.35
Chile	9	79.87	85.76	69.80	81.23	83.72
Mexico	1	76.94	61.85	85.54	78.98	83.87
El Salvador	10	76.79	84.94	76.89	92.61	57.50
Ecuador	11	75.28	66.55	91.39	79.19	66.67
Costa Rica	6	75.27	93.13	64.05	76.21	70.62
Suriname	-	74.66	84.48	63.36	-	77.75
Dominican Republic	5	73.41	66.96	76.02	75.97	75.10
St. Lucia	-	73.40	76.11	67.00	77.93	73.02
Panama	17	73.22	81.73	61.44	76.73	74.61
Peru	8	71.17	65.89	84.08	75.54	61.30
Antigua and Barbuda	-	70.97	98.65	49.12	-	73.77
Brazil	4	70.08	65.48	65.38	66.22	85.08
Bolivia	16	68.92	51.14	83.38	76.55	69.11
Colombia	7	67.98	69.32	61.92	71.05	70.02
Paraguay	14	67.46	64.26	76.26	78.08	54.13
Guyana	-	66.71	61.21	82.06	60.36	65.33
Nicaragua	19	66.42	56.51	85.28	67.05	60.23
Belize	-	64.72	59.46	55.64	72.05	73.60

Table 17 Scores on indicator categories 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
Venezuela	-	59.18	47.82	72.79	-	59.55
Honduras	15	57.28	53.46	63.13	56.31	56.66
Guatemala	18	57.05	59.35	58.90	68.06	44.53
Jamaica	-	56.80	71.71	61.92	-	41.28
Haiti	-	36.88	20.49	67.68	41.54	32.12
St. Vincent and the Grenadines	-	-	74.51	38.66	-	-
Dominica	-	-	73.65	50.50	-	-
Cuba	-	-	30.32	-	-	85.29
Bahamas	-	-	79.47	50.82	-	-
St. Kitts and Nevis	-	-	98.65	38.95	-	-
Barbados	-	-	83.83	42.25	-	-
Puerto Rico	-	-	62.91	86.65	-	-
Greenland	-	-	80.08	-	-	-
Curacao	-	-	-	-	94.77	-
<b>ASIA</b>						
Cyprus	12	82.94	91.34	70.36	89.20	82.53
Israel	10	82.32	89.77	68.26	85.11	88.05
Japan	1	82.16	93.84	57.18	95.72	88.71
South Korea	6	81.80	94.59	53.52	97.50	90.69
Kazakhstan	26	81.40	86.55	68.05	99.02	75.29
Singapore	-	81.10	94.52	73.73	95.79	64.80
Thailand	9	76.18	94.39	53.80	86.27	76.88
China	3	75.78	74.89	57.51	93.17	82.21
Turkey	7	74.43	71.02	65.59	77.01	85.55
Armenia	19	73.81	74.94	66.19	72.00	83.11
Vietnam	16	73.78	74.95	67.99	91.02	63.89
Kyrgyz Republic	23	73.06	73.43	54.56	85.25	83.41
Georgia	2	72.99	72.98	68.00	78.11	73.21
Tajikistan	31	72.86	61.88	61.73	95.92	76.89
Brunei Darussalam	-	71.12	82.44	47.12	79.57	82.79
Maldives	-	69.60	89.20	43.95	82.20	72.84
Iran	-	67.88	81.25	54.08	91.39	52.88
Iraq	-	67.57	64.34	65.31	98.22	50.51
Philippines	4	67.56	57.44	84.77	76.67	55.81
Jordan	25	67.16	72.67	46.08	96.03	63.27
United Arab Emirates	-	66.78	97.79	47.64	90.61	47.12
Saudi Arabia	21	65.27	80.31	53.18	83.55	50.86
Malaysia	5	64.67	86.53	56.96	85.54	41.49
Indonesia	17	64.60	75.14	70.14	79.71	41.46
Uzbekistan	33	64.26	62.44	60.69	-	70.03

Table 17 Scores on indicator categories 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
Azerbaijan	13	64.01	76.25	44.74	-	76.85
Mongolia	29	63.26	51.96	69.78	63.09	70.00
Timor-Leste	-	62.04	48.02	-	73.88	67.31
Nepal	11	60.01	50.34	70.96	74.68	48.60
Bhutan	-	58.77	54.03	70.30	93.10	33.74
Kuwait	27	57.28	94.72	36.29	-	54.67
Laos	20	55.75	34.69	75.67	90.26	40.76
Qatar	28	55.69	88.16	56.30	-	34.80
Sri Lanka	22	55.53	67.14	46.03	75.35	40.82
Palestine	-	54.87	51.26	-	74.78	43.09
Syria	-	54.64	74.48	40.63	-	53.89
Bangladesh	18	52.65	51.48	51.36	72.94	39.83
Myanmar	8	52.36	49.08	57.20	74.07	36.15
Lebanon	15	51.56	29.75	48.47	97.24	50.42
India	14	51.09	52.93	41.43	72.71	42.74
Cambodia	24	48.67	45.40	72.08	-	35.23
Afghanistan	32	38.26	43.83	40.11	56.10	21.72
Pakistan	30	37.80	39.50	33.60	52.79	29.15
Yemen	-	25.93	43.83	9.47	54.04	20.16
North Korea	-	-	43.41	-	-	-
Turkmenistan	-	-	90.15	73.61	-	-
Oman	-	-	86.21	41.22	-	-
Bahrain	-	-	85.04	38.13	-	-
Macao	-	-	100.00	-	-	-
Hong Kong	-	-	97.83	87.51	-	-
<b>EUROPE</b>						
Sweden	1	94.06	91.70	95.71	95.06	93.79
Netherlands	22	92.51	92.59	91.18	96.21	90.18
Denmark	2	92.33	92.00	91.69	94.33	91.33
Norway	20	92.20	85.18	93.92	96.27	93.83
Finland	6	91.21	91.69	94.37	93.64	85.42
Switzerland	8	90.93	93.15	88.40	93.75	88.56
Spain	24	90.62	89.34	93.89	88.76	90.57
Belgium	15	90.48	87.40	92.06	93.21	89.37
Luxembourg	26	90.27	93.52	85.63	93.47	88.71
United Kingdom	23	90.07	90.98	88.08	89.89	91.35
Portugal	12	89.87	87.36	89.73	91.65	90.79
Germany	4	89.49	93.13	79.13	94.12	92.47
Austria	5	89.31	88.75	88.43	94.18	86.08
France	17	89.31	88.65	92.84	90.49	85.42

Table 17 Scores on indicator categories 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
Poland	16	89.29	90.15	85.34	92.87	88.96
Estonia	13	88.66	93.60	85.90	92.09	83.44
Slovenia	11	88.53	86.78	82.88	95.49	89.44
Iceland	31	87.96	89.04	88.22	96.17	79.24
Czech Republic	3	87.35	88.35	81.49	96.16	84.10
Italy	19	87.30	90.54	87.15	83.59	88.05
Lithuania	9	87.10	95.71	80.76	90.65	82.12
Malta	38	85.41	95.92	67.07	93.93	88.05
Ireland	30	85.01	83.65	81.61	90.95	84.10
Slovakia	7	84.37	89.49	71.80	93.04	84.76
Greece	25	84.27	88.73	79.19	87.66	81.89
Belarus	34	83.87	86.77	73.27	99.90	77.92
Latvia	14	83.60	83.88	78.79	91.45	80.81
Albania	35	80.69	63.37	85.75	96.70	-
Hungary	10	80.54	84.70	64.94	91.25	83.82
Romania	18	79.36	77.81	69.57	86.88	84.34
Bulgaria	27	79.24	74.32	81.33	84.15	77.51
Russia	29	77.88	83.54	60.85	87.40	82.78
Serbia	28	76.70	60.60	89.48	85.10	74.99
Croatia	21	75.48	76.41	80.06	89.44	59.33
Macedonia	-	72.71	61.03	75.22	81.08	75.11
Montenegro	36	71.65	89.92	57.60	84.24	60.40
Ukraine	33	69.62	81.71	41.70	88.46	77.96
Bosnia and Herzegovina	37	69.05	60.84	63.77	83.38	70.28
Moldova	32	66.17	72.27	57.07	80.86	57.47
Liechtenstein	-	-	92.31	-	-	-
Andorra	-	-	90.30	-	-	-
Gibraltar	-	-	93.93	-	-	-
Monaco	-	-	87.94	-	-	-
San Marino	-	-	85.38	62.88	-	-
<b>OCEANIA</b>						
New Zealand	1	88.92	91.53	85.13	87.83	91.35
Australia	2	83.61	80.45	86.76	91.16	76.81
Palau	-	71.24	82.49	50.50	86.81	-
Fiji	-	61.70	57.49	41.59	79.77	75.97
Tonga	-	60.04	52.20	45.46	93.28	58.71
Samoa	-	57.66	46.64	48.02	68.32	72.24
Micronesia, Fed. Sts.	-	44.54	21.87	38.12	72.63	64.99
Kiribati	-	34.64	32.01	56.95	46.84	16.86
Vanuatu	-	32.74	37.15	25.75	62.29	19.29

Table 17 Scores on indicator categories 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
Solomon Islands	-	31.42	30.44	15.36	84.31	24.72
Papua New Guinea	-	21.85	21.39	13.38	65.27	12.20
Marshall Islands	-	-	42.21	47.12	-	-
Nauru	-	-	69.65	-	-	-
New Caledonia	-	-	75.21	-	-	-
Niue	-	-	94.25	-	-	-
Tuvalu	-	-	33.77	-	75.42	-

Table 18 Normalized values of green growth indicators for efficient and sustainable resource use

Country	Regional Rank	Indicators							
		EE1	EE2	EW1	EW2	SL1	SL2	ME1	ME2
<b>AFRICA</b>									
Tanzania	1	64.80	100.00	-	-	99.94	6.66	68.37	100.00
Morocco	2	83.60	21.07	3.91	48.92	99.92	1.25	83.71	100.00
Tunisia	3	79.13	23.94	3.65	1.00	99.83	15.97	85.88	98.24
South Africa	4	48.63	20.18	6.25	26.54	99.16	1.08	88.96	94.69
Cabo Verde	5	85.94	45.07	-	-	99.38	6.24	86.67	94.90
Senegal	6	80.31	73.40	-	-	99.36	1.67	76.70	100.00
Mauritius	7	89.89	19.72	7.34	100.00	97.46	1.25	91.35	77.95
Uganda	8	37.14	100.00	11.50	100.00	99.94	16.14	65.03	100.00
Egypt	9	79.21	11.67	2.39	1.00	91.84	24.63	70.37	100.00
Ethiopia	10	36.12	100.00	1.94	85.55	99.32	5.24	44.17	100.00
Ghana	11	82.79	78.10	-	100.00	100.00	2.16	65.51	100.00
Botswana	12	82.94	56.01	27.27	100.00	96.81	-	74.17	58.33
Cameroon	13	71.89	100.00	8.70	100.00	100.00	1.00	76.82	100.00
Kenya	14	51.11	100.00	4.96	83.76	99.94	5.66	74.28	100.00
Madagascar	15	41.90	100.00	1.01	100.00	100.00	2.16	44.99	100.00
Angola	16	81.84	100.00	57.42	100.00	99.97	1.00	88.45	100.00
Lesotho	17	48.26	75.60	-	-	99.92	1.17	26.29	90.56
Zambia	18	47.90	100.00	-	-	98.71	1.25	50.17	100.00
Malawi	19	76.57	100.00	1.78	100.00	99.01	2.75	29.93	100.00
Burundi	20	42.85	100.00	2.95	100.00	99.85	1.00	27.14	100.00
Zimbabwe	21	12.05	100.00	2.24	87.53	99.50	1.17	73.69	100.00
Algeria	22	77.16	1.27	6.12	1.00	100.00	1.00	85.15	100.00
Nigeria	23	59.67	100.00	12.16	100.00	99.72	1.58	88.21	100.00
Niger	24	58.21	100.00	1.69	100.00	99.95	1.00	24.91	100.00
Burkina Faso	-	65.16	100.00	4.09	100.00	99.68	2.91	48.41	100.00
Gabon	-	60.70	100.00	-	100.00	99.45	-	95.44	99.90
Cote d'Ivoire	-	70.06	100.00	9.41	100.00	-	2.66	84.14	100.00
Rwanda	-	74.75	100.00	12.53	100.00	99.99	2.00	61.94	100.00
Sao Tome and Principe	-	73.57	74.90	3.52	100.00	99.89	100.00	81.86	98.48
DR Congo	-	1.00	100.00	-	100.00	-	3.99	50.89	100.00
Guinea	-	63.99	100.00	4.88	-	99.99	-	48.56	100.00
Mozambique	-	10.29	100.00	3.70	100.00	100.00	1.08	73.62	100.00
Namibia	-	81.26	55.12	-	-	99.02	1.67	86.07	95.39
Seychelles	-	83.23	2.23	-	-	97.34	-	100.00	76.47
Benin	-	39.26	88.85	-	-	100.00	2.25	54.89	100.00
Togo	-	12.56	100.00	-	-	99.99	5.74	39.64	100.00
Gambia	-	74.45	98.88	-	100.00	99.74	-	65.49	100.00
Guinea-Bissau	-	27.63	100.00	-	-	99.66	1.33	46.87	-
Congo Republic	-	71.89	100.00	48.01	-	100.00	-	89.24	100.00

Table 18 Normalized values of green growth indicators for efficient and sustainable resource use (continued)

Country	Regional Rank	Indicators							
		EE1	EE2	EW1	EW2	SL1	SL2	ME1	ME2
Liberia	-	1.00	100.00	-	100.00	99.97	-	32.41	100.00
Eswatini	-	77.16	100.00	-	1.00	-	-	82.48	92.82
Sierra Leone	-	59.38	100.00	5.04	100.00	-	15.64	1.00	98.64
South Sudan	-	95.67	54.80	8.14	100.00	99.62	4.83	93.81	100.00
Equatorial Guinea	-	93.99	24.02	-	100.00	100.00	-	88.41	-
Central African Republic	-	57.99	100.00	6.44	-	99.42	-	18.97	100.00
Comoros	-	84.33	75.79	-	-	-	17.22	69.54	-
Chad	-	83.01	100.00	4.11	100.00	99.71	-	85.35	100.00
Eritrea	-	75.40	100.00	-	-	99.51	-	2.14	100.00
Mali	-	88.06	100.00	1.30	100.00	100.00	1.25	59.71	100.00
Somalia	-	-	100.00	-	-	99.47	-	19.73	100.00
Sudan	-	75.11	100.00	1.69	1.00	99.50	-	70.81	100.00
Djibouti	-	88.13	28.99	-	-	89.76	-	87.66	100.00
Mauritania	-	72.92	45.95	-	100.00	99.61	-	46.06	100.00
Libya	-	70.94	4.41	2.18	1.00	99.80	-	76.02	100.00
Reunion	-	-	-	-	-	-	16.14	-	-
St. Helena	-	-	26.15	-	-	-	-	-	-
Western Sahara	-	-	-	7.11	-	-	-	-	-
AMERICAS									
Mexico	1	82.13	19.37	5.59	84.36	98.59	6.24	93.87	93.27
United States	2	69.55	20.09	16.54	93.66	97.54	5.16	98.22	60.22
Canada	3	51.55	45.59	16.40	100.00	98.00	15.56	96.28	56.43
Brazil	4	76.72	88.23	8.99	100.00	96.01	3.16	81.86	83.34
Dominican Republic	5	89.82	33.78	3.57	49.91	100.00	73.63	94.75	97.74
Costa Rica	6	86.67	70.76	6.86	100.00	94.23	4.74	92.44	95.51
Colombia	7	88.57	57.30	7.92	100.00	97.46	1.58	92.15	92.18
Peru	8	87.62	54.33	4.89	100.00	98.64	12.40	78.56	93.61
Chile	9	78.26	46.26	3.15	100.00	94.10	1.83	75.01	82.41
El Salvador	10	79.50	49.81	4.41	100.00	97.94	1.75	90.62	98.09
Ecuador	11	81.48	33.24	4.03	100.00	96.84	6.99	85.82	91.69
Argentina	12	75.48	22.65	5.86	100.00	99.02	16.89	85.32	86.46
Uruguay	13	84.69	100.00	-	-	96.42	96.42	72.73	55.13
Paraguay	14	80.09	100.00	4.14	100.00	97.35	3.41	64.85	85.94
Honduras	15	62.97	100.00	5.23	100.00	97.61	8.40	79.96	100.00
Bolivia	16	70.87	26.87	5.66	100.00	99.11	3.50	46.27	99.44
Panama	17	91.28	44.86	18.19	100.00	99.23	6.57	95.27	95.73
Guatemala	18	73.36	100.00	7.44	100.00	97.44	3.91	83.81	100.00
Nicaragua	19	70.06	91.81	3.32	100.00	98.57	6.49	73.91	100.00
Trinidad and Tobago	20	1.00	1.71	22.16	100.00	88.55	-	92.77	99.47
St. Vincent and the Grenadines	-	82.94	7.55	-	100.00	-	-	-	-

Table 18 Normalized values of green growth indicators for efficient and sustainable resource use (continued)

Country	Regional Rank	Indicators							
		EE1	EE2	EW1	EW2	SL1	SL2	ME1	ME2
St. Lucia	-	89.74	6.22	-	100.00	97.30	-	-	-
Belize	-	66.40	75.52	5.60	-	98.12	3.00	82.04	95.70
Suriname	-	92.89	42.64	3.33	100.00	97.35	1.50	85.23	86.34
Dominica	-	80.31	19.84	-	100.00	99.73	8.99	96.27	-
Jamaica	-	71.89	24.81	3.99	100.00	99.26	1.67	89.93	95.24
Cuba	-	93.47	35.13	5.37	100.00	99.68	1.17	91.81	95.50
Bahamas	-	87.69	3.75	-	-	96.41	3.99	100.00	76.83
Venezuela	-	62.75	29.47	4.42	100.00	96.29	-	93.30	96.47
St. Kitts and Nevis	-	89.16	4.39	-	48.92	99.02	-	-	-
Antigua and Barbuda	-	83.09	2.16	42.67	100.00	98.58	-	99.39	87.42
Grenada	-	85.43	25.25	-	100.00	99.75	10.40	100.00	-
Guyana	-	59.82	44.39	1.48	100.00	99.37	-	41.54	1.00
Barbados	-	83.01	7.91	20.11	1.00	93.66	-	99.87	91.11
Bermuda	-	-	1.92	-	100.00	-	-	-	-
United States Virgin Islands	-	-	7.72	-	-	-	7.24	-	-
Puerto Rico	-	100.00	5.30	12.10	100.00	97.57	1.08	-	-
Haiti	-	31.07	100.00	2.60	100.00	99.82	3.75	79.82	100.00
Greenland	-	-	22.78	-	-	-	-	-	-
Anguilla	-	-	1.35	-	-	-	-	-	-
Aruba	-	81.62	13.44	-	-	-	-	-	-
Bonaire, Saint Eustatius and Saba	-	-	6.35	-	-	-	-	-	-
British Virgin Islands	-	-	3.45	-	-	-	-	100.00	55.83
Cayman Islands	-	92.23	1.02	-	-	-	-	-	-
Curacao	-	1.00	8.16	-	-	-	-	-	-
Falkland Islands	-	-	10.44	-	-	-	100.00	-	-
French Guiana	-	-	-	-	-	-	72.30	-	-
Guadeloupe	-	-	-	-	-	-	3.75	-	-
Martinique	-	-	-	-	-	-	9.07	-	-
Montserrat	-	-	1.00	-	-	-	-	-	-
Sint Maarten	-	38.46	1.10	-	-	-	-	-	-
St. Pierre and Miquelon	-	-	2.43	-	-	-	-	-	-
Turks and Caicos Islands	-	77.31	2.93	-	-	-	-	-	-
ASIA									
Japan	1	79.94	14.29	20.87	75.65	96.82	2.83	99.58	70.81
Georgia	2	66.04	56.20	3.14	100.00	96.69	1.50	86.97	94.94
China	3	62.45	25.60	8.53	63.96	93.46	4.58	65.20	78.21
Philippines	4	84.48	46.07	2.02	93.35	99.04	14.23	86.56	100.00
Malaysia	5	76.21	11.03	-	100.00	99.81	1.08	85.35	72.55
South Korea	6	60.04	6.47	19.05	1.00	94.04	10.90	97.08	67.20

Table 18 Normalized values of green growth indicators for efficient and sustainable resource use (continued)

Country	Regional Rank	Indicators							
		EE1	EE2	EW1	EW2	SL1	SL2	ME1	ME2
Turkey	7	84.62	22.98	5.83	61.19	98.94	12.40	88.39	84.55
Myanmar	8	83.45	100.00	-	-	98.87	1.33	61.96	100.00
Thailand	9	69.26	44.70	3.45	100.00	98.19	3.16	80.81	86.26
Israel	10	82.43	8.40	47.69	1.00	96.18	7.91	97.83	72.54
Nepal	11	49.43	100.00	1.56	100.00	98.31	2.91	46.76	100.00
Cyprus	12	82.94	21.01	22.86	91.09	96.82	42.10	93.94	56.64
Azerbaijan	13	78.84	4.68	2.14	37.83	99.23	7.57	84.28	98.76
India	14	75.84	63.02	1.80	17.83	96.50	7.91	74.62	100.00
Lebanon	15	71.89	7.36	10.34	33.08	97.93	2.41	90.18	84.91
Vietnam	16	66.19	62.60	1.53	100.00	96.02	4.66	23.49	90.10
Indonesia	17	81.48	68.41	2.05	90.69	98.70	2.83	78.71	98.52
Bangladesh	18	85.43	62.60	2.89	100.00	96.13	1.58	75.98	100.00
Armenia	19	68.89	25.00	1.98	35.06	93.88	1.58	76.55	96.54
Laos	20	67.21	89.33	1.41	100.00	99.88	3.75	22.17	97.66
Saudi Arabia	21	66.70	1.04	11.31	1.00	98.43	1.08	90.99	89.34
Sri Lanka	22	92.08	94.20	2.93	1.00	99.97	30.20	87.31	100.00
Kyrgyz Republic	23	50.82	48.27	1.07	50.50	99.25	1.67	20.66	94.88
Cambodia	24	64.43	100.00	2.96	100.00	99.60	2.50	61.79	100.00
Jordan	25	71.82	10.75	13.82	1.00	97.95	2.16	77.49	95.36
Kazakhstan	26	46.87	4.12	3.42	87.92	100.00	2.16	68.58	81.37
Kuwait	27	67.87	1.00	43.17	-	81.11	1.08	93.99	38.68
Qatar	28	63.99	1.00	73.82	1.00	95.08	-	95.59	85.69
Mongolia	29	63.41	7.84	8.93	100.00	94.84	-	4.24	87.92
Pakistan	30	74.53	80.74	1.31	1.00	95.96	2.00	69.97	100.00
Tajikistan	31	68.53	81.30	1.00	13.47	99.20	3.25	57.42	100.00
Afghanistan	32	92.67	48.48	-	-	99.41	1.00	70.92	100.00
Uzbekistan	33	53.82	5.68	1.17	1.00	94.18	-	45.54	98.34
Bhutan	-	35.75	100.00	2.99	100.00	98.89	11.57	70.60	92.39
Timor-Leste	-	99.91	37.56	1.53	-	99.68	62.98	73.57	-
Brunei Darussalam	-	70.87	1.02	-	-	87.61	-	95.30	78.80
Iran	-	54.77	2.89	2.28	-	99.13	1.33	74.98	87.12
Singapore	-	83.96	2.33	-	1.00	45.53	-	95.53	1.00
North Korea	-	64.58	53.79	-	97.03	-	-	56.08	100.00
Maldives	-	83.01	3.37	-	100.00	98.56	-	93.04	83.40
United Arab Emirates	-	74.01	1.40	34.17	1.00	92.50	10.82	96.37	37.19
Turkmenistan	-	17.17	1.12	1.30	-	99.71	-	86.26	76.06
Oman	-	60.33	1.00	15.55	1.00	96.92	1.00	84.32	92.46
Syria	-	74.01	3.14	1.13	1.00	-	2.16	39.55	100.00
Yemen	-	91.86	10.34	3.30	1.00	100.00		72.76	100.00
Iraq	-	75.11	1.83	2.56	42.38	99.27	1.00	81.30	100.00

Table 18 Normalized values of green growth indicators for efficient and sustainable resource use (continued)

Country	Regional Rank	Indicators							
		EE1	EE2	EW1	EW2	SL1	SL2	ME1	ME2
Bahrain	-	40.43	1.00	29.19	1.00	75.31		91.01	85.90
Macao	-	100.00	12.27	-	-	-	-	-	-
Hong Kong	-	96.40	2.50	-	-	1.00	-	-	-
<b>EUROPE</b>									
Sweden	1	74.67	100.00	72.54	100.00	97.25	100.00	98.81	60.96
Denmark	2	87.69	71.34	100.00	100.00	96.66	65.39	98.96	71.81
Czech Republic	3	68.31	28.87	40.96	100.00	95.90	100.00	94.17	74.45
Germany	4	81.40	30.37	49.00	83.17	95.65	57.74	98.74	74.36
Austria	5	81.18	65.04	38.30	100.00	96.20	100.00	98.66	60.07
Finland	6	61.87	86.46	41.81	100.00	97.98	88.10	97.04	55.92
Slovakia	7	74.31	24.94	55.39	100.00	97.70	83.53	95.69	57.13
Switzerland	8	92.01	48.65	100.00	100.00	91.45	78.54	99.62	61.12
Lithuania	9	79.21	65.64	56.11	100.00	98.05	63.48	92.94	56.46
Hungary	10	75.77	28.60	9.57	100.00	97.92	30.37	92.39	86.39
Slovenia	11	74.16	40.27	16.68	100.00	94.20	59.73	96.61	73.41
Portugal	12	82.65	48.07	-	100.00	96.64	57.41	97.32	80.43
Estonia	13	62.45	52.97	5.00	100.00	98.25	100.00	84.23	66.48
Latvia	14	79.06	83.03	50.78	100.00	98.58	100.00	90.92	75.66
Belgium	15	72.04	19.55	39.71	52.28	89.71	49.34	98.46	73.16
Poland	16	76.14	22.42	17.00	80.40	96.31	32.03	91.42	73.41
France	17	77.74	28.97	31.95	100.00	96.35	45.51	98.99	76.41
Romania	18	84.55	46.03	9.49	100.00	99.95	14.89	90.14	83.37
Italy	19	84.84	32.65	19.00	90.10	97.18	100.00	98.74	76.86
Norway	20	80.01	100.00	48.84	100.00	93.89	41.27	99.08	52.53
Croatia	21	78.33	58.42	22.68	100.00	96.44	51.42	95.27	84.99
Netherlands	22	79.57	13.52	17.31	100.00	84.76	25.29	99.03	68.29
United Kingdom	23	86.30	20.22	100.00	100.00	93.24	24.54	99.84	74.18
Spain	24	82.65	31.09	14.28	65.15	98.03	64.98	98.17	73.27
Greece	25	79.87	31.95	6.42	100.00	98.78	47.42	97.01	69.13
Luxembourg	26	85.94	30.72	100.00	100.00	89.49	29.95	98.97	1.00
Bulgaria	27	63.19	33.84	3.72	66.74	98.37	27.62	78.38	89.63
Serbia	28	62.23	39.33	2.85	100.00	99.70	4.49	80.00	78.53
Russia	29	45.85	7.26	7.70	100.00	99.87	2.16	85.61	93.38
Ireland	30	93.62	20.68	-	100.00	50.10	15.39	99.68	76.46
Iceland	31	4.80	100.00	22.15	100.00	95.11	5.49	99.49	57.60
Moldova	32	53.46	51.21	3.09	100.00	99.70	11.23	50.57	100.00
Ukraine	33	25.14	13.46	3.66	100.00	99.73	8.65	60.83	90.75
Belarus	34	58.94	14.98	12.69	100.00	97.01	-	79.08	100.00
Albania	35	85.50	72.63	3.10	100.00	97.77	1.50	85.52	91.46
Montenegro	36	76.35	74.44	8.55	-	85.77	12.40	84.80	70.97

Table 18 Normalized values of green growth indicators for efficient and sustainable resource use (continued)

Country	Regional Rank	Indicators							
		EE1	EE2	EW1	EW2	SL1	SL2	ME1	ME2
Bosnia and Herzegovina	37	56.46	37.19	-	100.00	97.51	1.42	80.20	94.48
Malta	38	94.79	15.18	60.97	1.00	92.16	3.41	95.98	68.34
Andorra	-	-	37.86	-	-	-	1.17	-	-
Macedonia	-	76.28	37.73	4.53	100.00	98.57	3.16	79.65	87.93
Faeroe Islands	-	-	12.50	-	-	97.49	70.30	-	-
Gibraltar	-	-	1.00	-	-	-	-	-	-
Guernsey	-	-	1.00	-	-	-	-	-	-
Isle of Man	-	-	4.62	-	-	-	-	-	-
Jersey	-	-	33.45	-	-	-	-	-	-
OCEANIA									
New Zealand	1	70.06	59.61	13.00	100.00	67.52	6.82	96.01	71.50
Australia	2	71.53	19.37	27.57	100.00	99.21	61.90	95.20	45.35
Kiribati	-	60.77	89.25	-	-	-	40.18	68.39	-
American Samoa	-	-	4.37	-	-	-	-	-	-
Palau	-	26.17	1.10	-	-	-	-	100.00	-
Northern Mariana Islands	-	-	1.00	-	-	-	-	-	-
Fiji	-	76.21	52.95	14.42	100.00	99.59	27.21	90.53	96.78
Marshall Islands	-	26.09	23.63	-	-	-	-	97.20	-
Tonga	-	79.94	3.85	-	-	100.00	38.85	65.34	-
Vanuatu	-	80.09	70.43	-	-	100.00	53.49	82.13	96.41
Samoa	-	76.72	52.70	-	-	100.00	100.00	88.18	96.20
Micronesia, Fed. Sts.	-	62.23	4.04	-	-	99.95	-	94.93	-
Solomon Islands	-	66.77	94.80	-	-	-	44.93	65.01	-
Papua New Guinea	-	69.26	96.80	-	100.00	99.35	11.90	57.61	100.00
Nauru	-	81.04	2.52	-	-	99.48	-	-	-
Guam	-	-	6.70	-	-	-	-	-	-
Cook Islands	-	-	4.35	-	-	96.93	6.57	-	-
French Polynesia	-	-	21.99	-	-	99.73	100	-	-
New Caledonia	-	-	10.78	-	-	96.32	3	-	-
Niue	-	-	44.07	-	-	100.00	27.62	-	-
Tuvalu	-	79.87	26.91	-	-	98.15	-	98.46	-
Wallis and Futuna Islands	-	-	2.29	-	-	-	-	-	-

## Definitons:

EE1: Ratio of total primary energy supply to GDP (MJ per \$2011 PPP GDP)  
 EE2: Share of renewable to total final energy consumption (Percent)  
 EW1: Water use efficiency (USD per m3)  
 EW2: Share of freshwater withdrawal to available freshwater resources (Percent)  
 SL1: Average soil organic carbon content (Ton per hectare)  
 SL2: Share of organic agriculture to total agricultural land area (percent)  
 ME1: Total domestic material consumption (DMC) per unit of GDP (DMC kg per GDP)  
 ME2: Total material footprint (MF) per capita (MF tons per capita)

Table 19 Normalized values of green growth indicators for natural capital protection

Country	Re-gional Rank	Indicators											
		EQ1	EQ2	EQ3	GE1	GE2	GE3	BE1	BE2	BE3	CV1	CV2	CV3
AFRICA													
Tanzania	1	78.74	70.09	86.94	84.62	84.61	62.19	54.16	100	12.22	51.01	27.62	100.00
Morocco	2	74.82	93.72	86.20	93.08	91.49	88.28	55.63	74.38	10.2	81.75	62.49	100.00
Tunisia	3	69.17	97.37	83.23	89.69	86.22	89.00	41.15	40.4	14.61	95.75	50.30	39.19
South Africa	4	83.17	78.06	75.26	69.17	78.95	84.94	36.03	45.36	20.78	63.30	37.30	76.24
Cabo Verde	5	72.38	92.59	82.14	94.90	95.25	93.59	13.33	100	22.94	84.36	100.00	1.11
Senegal	6	65.79	49.22	89.01	96.60	86.36	78.21	20.59	100	11.22	90.28	23.55	100.00
Mauritius	7	95.03	98.95	75.97	86.70	51.71	96.52	12.11	100	29.68	3.85	67.21	1.08
Uganda	8	54.86	63.41	86.12	97.31	89.00	79.73	67.91	57.39	23.17	59.87	-	100.00
Egypt	9	14.18	92.65	83.45	90.54	86.84	90.70	37.85	1.43	28.71	85.97	39.72	85.71
Ethiopia	10	67.70	36.20	95.54	99.21	90.15	69.92	18.95	74.02	29.05	74.92	-	100.00
Ghana	11	72.45	69.36	88.66	97.28	85.22	88.66	69.67	100	23.29	75.04	12.33	58.16
Botswana	12	85.40	73.96	92.81	4.71	70.07	1.00	35.06	100	36.85	95.82	-	100.00
Cameroon	13	30.01	44.04	89.58	79.54	32.47	80.32	34.52	100	62.21	73.86	15.85	77.14
Kenya	14	79.29	48.07	90.68	-	92.54	74.34	40.07	46.53	47.28	67.01	23.88	78.04
Madagascar	15	86.02	1.00	89.56	96.04	95.88	70.24	32.99	100	38.69	60.91	23.70	18.20
Angola	16	75.05	26.85	88.41	85.77	83.46	51.24	35.14	100	8	88.87	6.49	37.70
Lesotho	17	79.91	28.44	97.49	99.40	77.14	82.03	17.27	10.59	18.02	91.05	-	2.91
Zambia	18	80.56	48.05	87.37	16.10	88.23	1.00	55.91	100	11.16	79.46	-	100.00
Malawi	19	84.88	54.21	94.65	99.20	87.51	88.98	50.57	100	19.17	68.55	-	100.00
Burundi	20	67.79	40.22	80.77	99.02	96.65	93.17	63.86	64.63	28.57	82.25	-	56.67
Zimbabwe	21	86.34	62.16	92.02	86.50	86.43	76.89	81.84	100	22.94	65.94	-	100.00
Algeria	22	67.81	97.80	78.88	85.91	67.24	91.48	23.53	5.8	7.78	84.88	17.79	53.11
Nigeria	23	31.12	28.75	87.65	94.00	86.96	87.77	57.51	43.09	32.12	76.52	2.47	86.14
Niger	24	6.31	1.00	85.41	99.81	87.00	65.07	53.88	6.19	9.84	89.54	-	100.00
Burkina Faso	-	63.29	36.05	90.20	97.80	95.77	66.74	72.57	100	12.19	98.04	-	100.00
Gabon	-	61.67	79.78	84.84	87.58	74.87	84.86	74.36	100	52.56	92.73	7.00	100.00
Cote d'Ivoire	-	82.29	46.26	84.94	97.57	82.98	90.87	78.05	100	22.81	84.44	24.39	100.00
Rwanda	-	62.98	64.53	74.48	99.72	96.75	90.86	38.66	100	34.72	81.03	-	67.84
Sao Tome and Principe	-	79.34	87.25	90.78	97.40	93.93	98.63	77.27	100	38.53	67.04	64.49	2.79
DR Congo	-	61.09	46.39	87.38	92.99	91.28	83.94	48.59	100	54.35	82.13	1.33	100.00
Guinea	-	82.10	51.06	94.99	94.16	66.83	51.17	76.34	100	31.3	82.89	10.36	100.00
Mozambique	-	87.41	54.25	93.70	93.95	91.60	79.55	27.8	100	24.41	70.11	14.97	99.62
Namibia	-	82.88	63.85	88.64	78.73	87.54	20.04	88.12	49.42	16.57	94.90	41.68	100.00
Seychelles	-	88.65	97.03	62.26	49.10	62.54	100.00	58.24	100	40.91	48.58	100.00	1.37
Benin	-	67.68	39.60	91.45	94.19	91.94	85.19	23	100	24.92	85.26	9.21	100.00
Togo	-	71.32	46.74	89.42	95.39	90.40	89.02	87.63	19.01	28.95	77.44	18.50	100.00
Gambia	-	73.27	65.31	89.83	99.98	90.32	83.98	54.2	100	10.65	94.59	39.81	11.02
Guinea-Bissau	-	77.96	15.44	88.71	96.20	93.61	71.40	57.19	100	20.4	84.97	4.94	86.21

Table 19 Normalized values of green growth indicators for natural capital protection (continued)

Country	Re-gional Rank	Indicators											
		EQ1	EQ2	EQ3	GE1	GE2	GE3	BE1	BE2	BE3	CV1	CV2	CV3
Congo Republic	-	59.16	50.54	88.24	74.23	87.62	18.76	47.42	100	46.91	94.42	13.55	100.00
Liberia	-	91.10	35.18	88.91	98.13	62.23	95.42	38.13	100	48.43	84.46	33.64	9.88
Eswatini	-	92.01	41.89	88.79	95.74	77.02	74.41	31.26	100	18.58	69.22	-	32.04
Sierra Leone	-	87.04	30.43	92.29	96.72	93.08	81.77	46.34	100	19.94	88.62	12.01	25.18
South Sudan	-	60.35	1.00	83.40	-	100.00	1.00	44.49	-	-	88.49	-	100.00
Equatorial Guinea	-	51.80	78.19	88.79	69.33	1.00	99.57	100	100	50.54	70.83	19.47	13.94
Central African Republic	-	47.80	1.00	83.05	87.39	1.00	1.00	73.33	100	51.13	89.68	-	100.00
Comoros	-	88.24	61.81	91.95	99.11	98.77	87.92	6.11	100	16.24	58.25	24.99	1.92
Chad	-	37.55	1.00	92.14	93.52	85.03	1.00	59.97	22.96	22.07	86.29	-	100.00
Eritrea	-	57.61	18.38	88.79	98.56	83.75	58.23	8.43	87.81	17.73	82.48	46.47	22.69
Mali	-	68.20	19.99	91.67	98.24	95.18	49.34	4.99	23.13	11.71	96.92	-	61.36
Somalia	-	75.44	29.69	88.79	96.48	93.34	57.64	1	59.35	24.67	84.48	1.00	7.06
Sudan	-	49.43	73.26	95.00	93.67	91.92	50.67	17.28	-	13.93	88.22	1.00	21.19
Djibouti	-	60.38	73.67	89.37	95.52	93.02	78.28	1.55	2.41	21.6	68.82	47.15	10.03
Mauritania	-	58.29	58.23	91.08	99.38	96.31	37.30	9.95	2.25	13.23	95.93	4.34	8.92
Libya	-	50.67	96.24	75.96	66.95	1.00	87.69	1	1.72	12.38	95.35	1.00	3.11
British Indian Ocean Territory	-	-	-	-	-	-	-	-	-	-	-	40.69	-
Mayotte	-	-	-	-	-	-	-	68.66	-	-	78.28	52.13	-
Reunion	-	-	-	-	-	-	-	70.14	-	29.87	29.99	-	-
St. Helena	-	-	-	-	-	-	-	-	-	-	-	38.57	-
Western Sahara	-	-	-	-	-	-	-	-	-	10.2	89.58	29.28	-
AMERICAS													
Mexico	1	87.83	97.71	70.74	84.03	77.88	77.00	41.18	100.00	13.11	47.16	91.53	100.00
United States	2	100.00	99.91	43.72	36.82	49.30	63.78	47.44	100.00	22.86	72.60	45.25	100.00
Canada	3	100.00	99.91	50.94	29.01	38.63	41.51	30.53	100.00	21.88	94.04	51.68	48.50
Brazil	4	96.98	97.22	73.10	85.10	86.78	26.26	42.81	100.00	40.67	83.68	28.46	100.00
Dominican Republic	5	95.85	92.20	73.23	94.14	89.13	75.63	87.95	100.00	20.10	56.25	38.35	100.00
Costa Rica	6	93.62	97.70	78.73	-	82.46	74.80	41.89	100.00	46.26	72.33	54.04	23.26
Colombia	7	92.72	95.99	81.87	89.51	78.99	61.92	48.87	100.00	43.52	58.85	19.64	100.00
Peru	8	83.52	95.32	81.32	83.46	87.62	75.86	39.51	100.00	55.91	55.59	21.17	97.37
Chile	9	87.70	98.98	73.14	85.29	83.75	83.48	34.74	100.00	51.67	61.13	33.49	100.00
El Salvador	10	83.87	93.44	81.48	95.09	87.60	88.53	39.44	74.24	27.24	72.54	5.52	16.78
Ecuador	11	94.55	96.29	77.26	82.26	73.98	78.29	48.70	100.00	41.88	44.39	25.79	100.00
Argentina	12	96.31	98.08	71.09	72.12	67.73	12.10	38.99	58.06	43.83	75.28	29.77	55.30
Uruguay	13	100.00	98.82	74.53	-	76.38	1.00	31.05	63.15	23.98	76.22	81.68	17.83
Paraguay	14	97.87	95.19	81.03	8.56	61.78	1.00	47.87	100.00	17.13	91.76	-	100.00

Table 19 Normalized values of green growth indicators for natural capital protection (continued)

Country	Re-gional Rank	Indicators											
		EQ1	EQ2	EQ3	GE1	GE2	GE3	BE1	BE2	BE3	CV1	CV2	CV3
Honduras	15	88.15	86.47	83.58	83.62	86.01	73.96	59.26	100.00	25.41	61.57	6.74	80.67
Bolivia	16	87.11	93.79	85.69	60.40	84.80	1.87	51.27	100.00	31.31	79.00	-	100.00
Panama	17	98.44	92.48	74.28	80.71	75.40	74.27	39.60	100.00	34.51	58.37	60.19	39.39
Guatemala	18	84.32	78.07	88.29	93.84	89.13	79.23	32.07	100.00	29.65	55.79	16.45	75.22
Nicaragua	19	91.51	92.95	81.55	96.65	89.63	44.62	67.33	100.00	22.02	75.53	5.93	100.00
Trinidad and Tobago	20	84.27	97.05	61.95	33.86	18.93	93.68	22.18	100.00	21.84	68.21	29.62	15.77
St. Vincent and the Grenadines	-	86.40	95.03	80.02	90.59	85.83	94.69	47.46	100.00	51.61	61.83	99.76	4.42
St. Lucia	-	86.18	95.74	69.61	89.24	57.13	93.57	45.49	100.00	68.13	73.42	100.00	7.82
Belize	-	85.50	93.97	80.45	62.71	69.22	23.99	43.47	100.00	49.73	74.57	99.92	100.00
Suriname	-	83.53	91.02	89.69	60.79	54.63	47.45	52.91	100.00	84.80	97.27	14.97	63.21
Dominica	-	89.42	95.38	87.43	81.02	89.09	83.64	20.80	100.00	-	46.73	84.36	5.94
Jamaica	-	96.21	97.49	74.69	88.47	92.12	93.92	25.86	100.00	37.83	45.31	82.73	11.31
Cuba	-	89.18	97.57	83.51	96.62	85.97	70.92	73.53	100.00	27.23	44.90	18.71	53.69
Bahamas	-	91.79	96.91	52.59	61.95	76.53	86.42	20.09	100.00	10.19	51.19	100.00	63.74
Venezuela	-	92.19	92.78	77.32	63.19	47.96	48.94	52.87	100.00	48.28	71.77	1.00	100.00
St. Kitts and Nevis	-	-	-	57.92	78.99	45.61	100.00	54.73	100.00	49.50	56.46	100.00	2.84
Antigua and Barbuda	-	90.39	96.51	78.10	66.79	1.00	90.93	14.51	100.00	49.50	81.94	99.84	2.89
Grenada	-	85.82	96.05	80.60	89.55	1.00	94.75	33.13	100.00	26.26	46.82	100.00	2.63
Guyana	-	86.21	91.25	83.38	1.00	88.66	1.00	-	100.00	100.00	80.35	29.50	39.91
Barbados	-	85.42	97.65	56.73	72.50	1.00	94.88	1.08	86.32	-	83.25	100.00	1.06
Bermuda	-	98.16	97.46	12.01	-	-	-	28.70	100.00	-	38.28	95.56	1.00
United States Virgin Islands	-	99.70	96.79	3.69	-	-	-	39.07	100.00	12.65	71.96	-	8.21
Puerto Rico	-	100.00	97.08	16.50	-	-	-	41.54	100.00	19.32	47.55	-	15.79
Haiti	-	94.40	56.00	85.27	99.07	95.27	88.42	32.75	21.33	22.83	54.01	3.68	3.59
Greenland	-	98.21	99.77	38.93	-	-	-	25.77	1.00	-	84.41	44.10	100.00
Anguilla	-	-	-	-	-	-	-	7.67	-	49.50	87.51	100.00	-
Aruba	-	-	-	40.64	-	-	-	31.23	14.59	-	93.08	100.00	2.03
Bonaire, Saint Eustatius and Saba	-	-	-	-	-	-	-	42.06	-	-	80.25	-	-
British Virgin Islands	-	-	-	28.96	-	-	-	11.08	100.00	49.50	61.05	100.00	1.17
Cayman Islands	-	-	-	29.51	-	-	-	55.05	100.00	-	70.61	95.78	1.76
Curacao	-	-	-	88.92	-	-	-	45.35	-	19.24	75.97	100.00	2.89
Falkland Islands	-	-	-	-	-	-	-	11.55	-	1.00	55.67	53.79	-
French Guiana	-	-	-	-	-	-	-	79.23	-	85.29	88.11	32.14	-
Guadeloupe	-	-	-	-	-	-	-	89.53	-	81.14	34.84	-	-





Table 19 Normalized values of green growth indicators for natural capital protection (continued)

Country	Re-gional Rank	Indicators											
		EQ1	EQ2	EQ3	GE1	GE2	GE3	BE1	BE2	BE3	CV1	CV2	CV3
Italy	19	92.48	99.96	66.26	79.38	80.21	84.16	79.52	100.00	26.54	83.51	83.44	99.01
Norway	20	100.00	99.94	70.76	89.21	76.22	71.60	61.65	100.00	15.66	90.05	66.62	38.11
Croatia	21	91.19	99.31	72.71	86.35	79.26	81.44	78.57	100.00	41.04	83.07	99.91	100.00
Netherlands	22	97.73	99.98	63.71	61.00	85.59	65.16	97.90	66.10	13.62	90.22	64.00	100.00
United Kingdom	23	99.47	99.95	66.36	76.65	82.16	77.57	82.94	77.09	27.33	64.09	66.94	100.00
Spain	24	100.00	99.96	69.90	80.39	84.03	74.60	62.48	100.00	13.90	76.17	71.05	100.00
Greece	25	93.07	99.98	65.09	73.56	69.80	78.40	85.67	100.00	8.91	74.64	100.00	81.87
Luxembourg	26	99.59	99.96	56.59	38.15	89.05	68.72	59.90	100.00	42.19	97.81	-	100.00
Bulgaria	27	89.80	99.01	70.90	80.74	72.85	77.77	89.47	100.00	41.80	90.32	29.04	100.00
Serbia	28	83.59	99.30	82.04	72.29	57.24	72.00	28.56	100.00	37.23	92.88	-	49.49
Russia	29	93.13	99.10	70.93	58.58	1.00	67.12	28.36	100.00	18.79	92.45	11.17	56.85
Ireland	30	100.00	99.98	59.24	66.58	85.20	1.00	84.71	65.22	25.64	86.12	25.99	30.64
Iceland	31	100.00	99.97	1.00	76.92	57.35	47.15	27.32	3.93	6.30	77.59	90.36	19.38
Moldova	32	93.03	98.68	22.12	88.91	71.40	79.00	1.00	74.23	22.56	94.83	-	31.44
Ukraine	33	88.51	99.36	76.52	81.35	65.09	80.20	27.81	98.30	33.10	89.17	11.52	29.46
Belarus	34	90.23	99.57	68.70	76.40	77.38	37.07	50.69	100.00	36.70	95.16	-	69.59
Albania	35	90.86	98.71	72.48	93.76	85.71	67.04	67.09	100.00	-	73.46	59.64	100.00
Montenegro	36	87.98	99.25	62.95	85.52	63.48	80.17	7.97	100.00	23.37	68.16	48.38	31.51
Bosnia and Herzegovina	37	80.22	99.16	75.51	70.90	83.23	75.53	33.71	100.00	37.11	83.76	22.85	11.23
Malta	38	95.64	99.98	56.74	88.30	77.14	94.74	89.07	7.37	-	81.04	100.00	48.00
Liechtenstein	-	-	-	38.42	95.86	86.26	84.55	81.01	100.00	56.98	98.81	-	88.52
Andorra	-	99.66	99.98	63.78	75.58	62.76	100.00	26.82	100.00	36.56	86.30	-	100.00
Macedonia	-	78.01	99.08	73.45	85.28	78.31	80.26	47.50	100.00	17.54	95.16	-	71.80
Faeroe Islands	-	-	-	13.16	-	-	-	17.07	1.33	-	78.00	43.40	1.17
Gibraltar	-	-	-	65.00	-	-	-	-	1.00	1.00	-	91.89	97.50
Guernsey	-	-	-	-	-	-	-	-	-	-	-	45.14	-
Isle of Man	-	-	-	56.52	-	-	-	-	36.35	-	-	-	32.01
Jersey	-	-	-	-	-	-	-	-	-	-	-	44.72	-
Kosovo	-	-	-	87.77	-	-	-	-	-	-	-	-	-
Monaco	-	-	-	15.35	-	-	-	-	-	1.00	60.37	72.09	100.00
San Marino	-	-	-	64.09	-	-	-	-	1.00	22.01	98.49	-	-
Svalbard and Jan Mayen Islands	-	-	-	-	-	-	-	-	-	1.00	-	-	-
Vatican	-	-	-	-	-	-	-	-	-	1.00	89.48	-	-
<b>OCEANIA</b>													
New Zealand	1	100.00	99.83	49.59	88.12	64.84	1.00	39.18	100.00	69.03	38.22	100.00	100.00
Australia	2	100.00	99.86	61.05	44.42	28.60	1.00	55.60	95.68	20.39	70.67	58.80	100.00
Kiribati	-	99.29	69.87	78.36	98.59	95.56	97.50	37.10	88.35	-	62.62	-	87.69
American Samoa	-	97.24	95.09	76.32	-	-	-	77.31	100.00	35.49	74.74	80.95	64.94

Table 19 Normalized values of green growth indicators for natural capital protection (continued)

Country	Re-gional Rank	Indicators											
		EQ1	EQ2	EQ3	GE1	GE2	GE3	BE1	BE2	BE3	CV1	CV2	CV3
Palau	-	-	-	69.58	37.52	56.49	100.00	57.45	100.00	97.12	55.38	67.86	100.00
Northern Mariana Islands	-	100.00	95.72	57.89	-	-	-	35.31	100.00	-	27.41	-	100.00
Fiji	-	99.06	89.72	84.89	91.41	84.74	66.99	8.82	100.00	47.85	45.70	100.00	8.26
Marshall Islands	-	99.73	92.98	88.74	93.03	82.23	100.00	9.89	100.00	31.51	73.54	61.74	2.98
Tonga	-	99.12	94.66	88.66	94.60	82.50	77.51	15.93	73.79	45.90	54.83	79.58	12.16
Vanuatu	-	98.16	84.99	82.02	98.26	83.45	52.98	4.22	100.00	-	44.50	99.65	1.66
Samoa	-	98.27	95.43	89.93	92.93	77.47	70.19	12.34	100.00	25.25	61.82	83.93	2.77
Micronesia, Fed. Sts.	-	98.57	93.80	82.82	95.85	95.41	81.93	1.54	100.00	100.00	50.40	-	1.11
Solomon Islands	-	97.91	88.55	77.86	86.06	82.84	96.49	3.27	100.00	26.86	61.01	41.59	2.14
Papua New Guinea	-	97.44	55.47	91.12	77.76	68.45	74.63	6.04	100.00	41.64	73.07	6.34	5.82
Nauru	-	-	-	67.07	72.73	100.00	100.00	1.00	1.00	1.00	62.14	63.97	-
Guam	-	98.18	93.91	38.53	-	-	-	44.34	100.00	26.86	1.00	-	1.52
Christmas Island	-	-	-	-	-	-	-	-	-	-	-	-	87.31
Cocos (Keeling) Islands	-	-	-	-	-	-	-	-	-	-	-	-	87.75
Cook Islands	-	-	-	-	-	-	-	12.57	-	-	62.20	86.29	-
French Polynesia	-	-	-	62.69	-	-	-	1.00	100.00	35.39	52.49	87.70	1.04
New Caledonia	-	-	-	73.01	-	-	-	38.28	100.00	34.72	41.78	93.51	100.00
Niue	-	-	-	-	-	-	-	1.00	-	26.88	62.72	83.54	-
Norfolk Island	-	-	-	-	-	-	-	-	-	-	-	-	87.02
Pitcairn	-	-	-	-	-	-	-	-	-	-	-	-	84.66
Tokelau	-	-	-	-	-	-	-	1.00	-	1.00	74.80	82.39	-
Tuvalu	-	-	-	75.07	96.70	100.00	74.78	-	100.00	-	72.73	78.93	1.06
Wallis and Futuna Islands	-	-	-	-	-	-	-	-	-	45.48	-	83.89	-

Definitions:

- EQ1: PM2.5 air pollution, mean annual population-weighted exposure (Micrograms per m3)
- 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 CO2 emissions to population, excluding AFOLU (Metric tons per capita)
- GE2: Ratio of non-CO2 emissions to population, excluding AFOLU (Ton per capita)
- GE3: Ratio of non-CO2 emissions in agriculture to population (Gigagrams per 1000 persons)
- BE1: Average proportion of Key Biodiversity Areas covered by protected areas (Percent)
- BE2: Share of forest area to total land area (Percent)
- BE3: Soil biodiversity, potential level of diversity living in soils (Index)
- CV1: Red list index (Index)
- CV2: Tourism and recreation in coastal and marine areas (Score)
- CV3: Share of terrestrial and marine protected areas to total territorial areas (Percent)

Table 20 Normalized values of green growth indicators for green economic opportunities

Country	Regional Rank	Indicators			
		GV1	GT1	GJ1	GN1
AFRICA					
Tanzania	1	75.22	27.06	52.75	-
Morocco	2	78.68	7.23	17.56	48.23
Tunisia	3	46.04	37.04	50.09	53.17
South Africa	4	55.08	42.34	27.53	24.60
Cabo Verde	5	78.12	1.00	46.80	-
Senegal	6	70.33	3.74	24.27	-
Mauritius	7	59.28	3.99	9.24	-
Uganda	8	49.42	3.84	70.10	-
Egypt	9	59.88	14.13	56.89	51.71
Ethiopia	10	65.49	5.21	51.74	-
Ghana	11	45.92	4.99	7.58	-
Botswana	12	79.64	1.69	13.63	-
Cameroon	13	55.37	4.40	8.75	-
Kenya	14	50.57	8.24	26.99	1.00
Madagascar	15	61.49	3.10	19.54	-
Angola	16	12.47	2.03	15.18	-
Lesotho	17	63.61	6.44	1.37	-
Zambia	18	79.37	6.80	-	1.00
Malawi	19	48.36	2.74	23.65	1.00
Burundi	20	35.99	1.66	4.97	-
Zimbabwe	21	37.26	1.99	-	1.00
Algeria	22	80.5	4.63	-	1.00
Nigeria	23	55.79	1.31	1.00	-
Niger	24	64.19	1.76	1.00	-
Burkina Faso	-	56.4	1.86	-	-
Gabon	-	79.48	-	-	-
Cote d'Ivoire	-	80.58	3.25	-	-
Rwanda	-	52.43	2.46	-	-
Sao Tome and Principe	-	-	10.22	-	-
DR Congo	-	46.47	-	-	-
Guinea	-	43.86	3.18	-	-
Mozambique	-	61.64	1.75	-	-
Namibia	-	55.77	5.26	-	-
Seychelles	-	-	1.88	-	-
Benin	-	59.41	4.85	-	-
Togo	-	57	17.51	-	-
Gambia	-	46.58	2.52	1.74	-
Guinea-Bissau	-	53.16	-	-	-
Congo Republic	-	9.23	6.70	-	-
Liberia	-	1	-	-	-
Eswatini	-	61.58	2.27	23.28	-

Table 20 Normalized values of green growth indicators for green economic opportunities (continued)

Country	Regional Rank	Indicators			
		GV1	GT1	GJ1	GN1
Sierra Leone	-	32.02	5.42	-	-
South Sudan	-	44.97	-	-	-
Central African Republic	-	-	1.68	-	-
Comoros	-	60.65	1.23	-	-
Eritrea	-	-	-	1.00	-
Mali	-	58.62	2.59	-	-
Sudan	-	48.52	1.03	-	-
Djibouti	-	100	-	-	-
Mauritania	-	72.96	1.03	-	-
AMERICAS					
Mexico	1	63.43	38.06	57.32	28.73
United States	2	62.31	42.33	71.98	18.23
Canada	3	62.77	22.54	68.54	31.28
Brazil	4	59.59	15.17	22.23	32.54
Dominican Republic	5	78.30	10.07	38.79	14.89
Costa Rica	6	75.45	9.65	32.28	12.52
Colombia	7	53.34	5.07	36.08	40.31
Peru	8	63.42	4.93	20.45	45.74
Chile	9	56.34	3.22	40.46	31.84
El Salvador	10	61.70	12.83	-	23.96
Ecuador	11	59.98	3.03	50.94	18.86
Argentina	12	61.58	5.79	27.88	20.09
Uruguay	13	61.76	2.74	16.29	14.87
Paraguay	14	64.14	2.60	47.03	-
Honduras	15	78.36	4.87	-	12.37
Bolivia	16	54.77	2.21	23.20	-
Panama	17	85.82	8.35	10.84	1.00
Guatemala	18	57.85	6.64	1.01	7.59
Nicaragua	19	73.22	1.83	-	1.00
Trinidad and Tobago	20	-	87.45	10.62	1.00
St. Vincent and the Grenadines	-	-	5.01	-	-
St. Lucia	-	-	7.59	-	-
Belize	-	51.23	10.75	-	-
Suriname	-	-	2.27	-	-
Jamaica	-	76.11	11.34	-	-
Cuba	-	-	-	1.00	23.79
Bahamas	-	51.61	13.13	9.02	-
Venezuela	-	64.41	-	-	-
St. Kitts and Nevis	-	-	9.39	-	-
Antigua and Barbuda	-	-	9.17	-	-
Guyana	-	78.96	1.75	-	-
Barbados	-	55.00	13.00	-	-

Table 20 Normalized values of green growth indicators for green economic opportunities (continued)

Country	Regional Rank	Indicators			
		GV1	GT1	GJ1	GN1
Bermuda	-	-	99.38	9.81	-
Haiti	-	73.74	-	-	-
Greenland	-	-	1.32	-	-
Aruba	-	-	12.37	-	-
Montserrat	-	-	1.69	-	-
<b>ASIA</b>					
Japan	1	64.25	53.05	46.15	25.78
Georgia	2	66.88	22.77	29.17	40.83
China	3	80.38	31.26	48.44	45.73
Philippines	4	80.20	17.16	38.75	19.42
Malaysia	5	59.00	26.66	34.82	33.62
South Korea	6	78.09	37.48	75.44	35.54
Turkey	7	69.90	23.74	53.17	11.69
Myanmar	8	80.44	4.80	46.83	-
Thailand	9	73.27	27.50	47.34	1.00
Israel	10	73.98	38.03	17.30	18.43
Nepal	11	98.54	2.54	26.16	-
Cyprus	12	65.22	10.71	25.91	1.00
Azerbaijan	13	63.13	2.05	73.46	-
India	14	76.33	20.74	49.72	10.85
Lebanon	15	28.60	12.99	39.56	-
Vietnam	16	71.52	9.02	31.92	1.00
Indonesia	17	70.77	9.63	25.80	1.00
Bangladesh	18	81.97	2.30	13.79	-
Armenia	19	50.85	5.73	38.34	1.00
Laos	20	48.76	2.86	5.88	-
Saudi Arabia	21	75.75	6.01	56.48	34.79
Sri Lanka	22	80.19	11.27	6.49	-
Kyrgyz Republic	23	64.04	9.53	21.76	1.00
Cambodia	24	67.55	2.86	1.06	-
Jordan	25	59.57	11.92	40.74	1.00
Kazakhstan	26	59.21	2.87	32.01	1.00
Kuwait	27	77.76	2.93	7.20	-
Qatar	28	89.88	1.00	22.50	-
Mongolia	29	46.99	1.57	38.98	1.00
Pakistan	30	60.36	3.76	19.10	-
Tajikistan	31	72.49	-	1.00	1.00
Afghanistan	32	62.01	3.60	1.00	-
Uzbekistan	33	86.93	1.99	52.12	1.00
Bhutan	-	75.28	-	-	-
Timor-Leste	-	42.29	4.08	-	-
Brunei Darussalam	-	91.15	5.88	35.47	-

Table 20 Normalized values of green growth indicators for green economic opportunities (continued)

Country	Regional Rank	Indicators			
		GV1	GT1	GJ1	GN1
Iran	-	-	5.98	65.88	-
Singapore	-	96.22	28.23	56.07	13.58
Maldives	-	-	1.07	1.00	-
United Arab Emirates	-	-	9.96	56.17	-
Oman	-	35.37	12.04	57.89	-
Syria	-	-	-	34.89	-
Yemen	-	-	4.47	32.94	-
Iraq	-	52.43	-	1.00	-
Bahrain	-	78.96	6.53	-	-
Palestine	-	-	5.54	30.31	-
Macao	-	-	1.41	1.00	1.00
Hong Kong	-	-	15.23	35.67	17.13
<b>EUROPE</b>					
Sweden	1	76.53	37.80	56.93	76.25
Denmark	2	78.32	44.21	83.55	43.85
Czech Republic	3	67.61	53.02	88.86	57.74
Germany	4	72.57	68.72	89.98	36.77
Austria	5	72.38	51.59	65.67	40.39
Finland	6	68.32	36.82	70.12	75.14
Slovakia	7	60.73	36.77	77.74	67.85
Switzerland	8	75.48	30.75	100.00	24.14
Lithuania	9	68.81	34.65	42.77	72.80
Hungary	10	72.68	53.37	69.53	55.64
Slovenia	11	69.55	35.93	62.56	44.44
Portugal	12	61.10	34.21	48.88	42.03
Estonia	13	75.17	34.85	25.25	98.15
Latvia	14	61.19	20.43	39.78	62.27
Belgium	15	68.65	25.47	48.39	100.00
Poland	16	68.00	34.05	60.35	65.74
France	17	66.16	31.45	52.14	42.02
Romania	18	56.06	56.33	49.58	54.35
Italy	19	63.14	50.32	65.62	14.79
Norway	20	76.97	22.86	50.39	34.85
Croatia	21	72.58	21.35	52.09	55.04
Netherlands	22	78.11	27.94	52.44	51.50
United Kingdom	23	59.27	42.67	62.88	16.68
Spain	24	67.58	22.12	57.70	48.92
Greece	25	53.72	14.56	35.45	51.55
Luxembourg	26	70.98	32.73	14.63	29.88
Bulgaria	27	73.39	22.02	45.75	39.98
Serbia	28	59.32	26.83	68.31	25.75
Russia	29	65.33	8.29	87.53	40.23

Table 20 Normalized values of green growth indicators for green economic opportunities (continued)

Country	Regional Rank	Indicators			
		GV1	GT1	GJ1	GN1
Ireland	30	74.48	10.41	13.90	54.22
Iceland	31	68.52	5.65	33.03	100.00
Moldova	32	61.08	11.43	33.79	42.90
Ukraine	33	57.54	10.48	63.66	40.63
Belarus	34	74.07	14.62	54.90	1.00
Albania	35	53.91	1.15	13.54	-
Montenegro	36	-	6.36	24.96	13.04
Bosnia and Herzegovina	37	-	28.02	30.94	1.00
Malta	38	-	21.66	1.59	1.00
Liechtenstein	-	-	-	1.00	-
Andorra	-	-	8.61	-	-
Macedonia	-	72.82	100.00	-	-
Monaco	-	-	-	-	1.00
San Marino	-	-	-	-	1.00
OCEANIA					
New Zealand	1	67.54	8.22	47.42	23.28
Australia	2	60.89	8.26	44.17	28.35
Kiribati	-	-	4.23	-	-
Palau	-	-	1.60	-	-
Fiji	-	-	4.39	85.34	-
Tonga	-	-	5.16	1.00	-
Vanuatu	-	85.25	-	-	-
Samoa	-	-	18.60	-	-
Solomon Islands	-	-	1.40	-	-
French Polynesia	-	-	4.76	-	-
New Caledonia	-	-	2.53	-	-

## Definitions:

GV1: Adjusted net savings, minus natural resources and pollution damages (Percent GNI)

GT1: Share of export of environmental goods (OECD &amp; APEC class.) to total export (Percent)

GJ1: Share of green employment in total manufacturing employment (Percent)

GN1: Share of patent publications in environmental technology to total patents (Percent)

Table 21 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													
Tanzania	1	21.15	13.53	33.26	74.06	96.21	100.00	83.25	1.00	69.54	4.24	24.72	58.39
Morocco	2	51.93	97.31	60.88	41.61	75.05	50.50	84.36	100.00	-	-	60.30	90.45
Tunisia	3	84.56	97.31	65.00	63.05	89.58	25.75	93.37	100.00	-	53.39	60.30	91.49
South Africa	4	-	83.66	82.22	85.64	99.60	100.00	1.00	67.07	35.47	92.91	58.98	73.43
Cabo Verde	5	-	84.47	53.70	47.75	-	75.25	80.11	95.83	38.13	91.99	58.98	-
Senegal	6	17.00	38.52	47.25	85.49	96.34	25.75	83.63	1.00	26.09	28.97	27.35	69.39
Mauritius	7	-	96.26	85.12	23.95	98.91	100.00	88.27	90.41	-	-	51.07	-
Uganda	8	1.79	7.77	21.46	70.02	95.69	100.00	79.25	1.00	31.60	10.70	27.35	49.88
Egypt	9	58.51	97.31	46.28	30.56	92.65	1.00	94.00	100.00	45.06	36.67	57.66	94.60
Ethiopia	10	6.42	19.65	10.31	77.74	93.06	25.75	90.22	1.00	-	14.17	19.45	33.27
Ghana	11	32.80	50.41	63.90	26.92	97.44	50.50	77.63	68.73	47.92	17.92	29.99	68.45
Botswana	12	-	55.11	77.97	19.85	96.58	75.25	52.60	1.00	-	100.00	48.44	-
Cameroon	13	-	38.90	34.99	62.60	94.78	25.75	70.54	1.00	65.26	11.84	28.67	65.03
Kenya	14	-	32.72	47.47	44.12	98.23	100.00	83.04	66.20	71.99	12.05	40.53	51.75
Madagascar	15	-	8.87	12.18	39.04	96.56	25.75	79.53	-	86.06	-	4.95	36.49
Angola	16	-	41.29	15.65	60.40	89.49	50.50	58.45	-	-	-	20.77	49.57
Lesotho	17	-	32.14	52.65	47.19	99.29	75.25	74.65	1.00	-	93.92	31.31	44.38
Zambia	18	-	21.79	43.18	36.56	95.19	100.00	33.59	1.00	11.20	7.59	37.90	43.34
Malawi	19	-	2.81	16.13	34.01	95.39	100.00	76.02	1.00	32.82	1.00	28.67	32.44
Burundi	20	-	1.00	21.54	72.99	98.05	75.25	85.99	1.00	87.29	2.72	23.40	50.50
Zimbabwe	21	-	30.38	40.19	64.06	97.51	75.25	76.78	1.00	1.00	19.75	39.21	65.24
Algeria	22	13.02	97.31	54.62	52.00	84.32	50.50	97.91	100.00	57.10	-	70.84	-
Nigeria	23	19.05	27.70	38.39	12.01	84.95	50.50	90.88	1.00	56.28	7.18	23.40	44.07
Niger	24	4.48	6.73	12.18	34.58	85.92	50.50	91.69	1.00	48.53	4.55	16.81	38.98
Burkina Faso	-	-	12.28	45.03	27.51	91.73	25.75	90.04	1.00	-	1.41	20.77	40.75
Gabon	-	-	88.88	66.74	36.46	96.80	25.75	87.33	18.45	-	-	32.62	62.02
Cote d'Ivoire	-	32.95	43.82	70.23	22.74	94.72	50.50	81.58	1.00	28.95	-	29.99	37.63
Rwanda	-	-	14.22	31.96	100.00	95.92	75.25	77.60	1.00	90.35	5.26	43.17	56.31
Sao Tome and Principe	-	-	34.69	32.67	37.00	-	1.00	45.16	31.00	-	51.87	40.53	11.07
DR Congo	-	-	6.22	13.34	18.70	97.77	-	80.64	-	-	-	22.08	19.58
Guinea	-	-	14.93	43.15	44.42	93.44	50.50	92.40	1.00	-	-	16.81	48.01
Mozambique	-	-	10.66	16.19	79.41	90.58	50.50	51.81	1.00	-	16.20	28.67	19.89
Namibia	-	-	45.88	53.54	84.22	99.99	100.00	25.36	1.00	35.07	-	49.76	56.10
Seychelles	-	-	97.31	100.00	43.00	-	75.25	71.62	100.00	-	-	61.61	-
Benin	-	-	19.00	38.22	15.32	88.08	50.50	66.59	1.00	-	9.82	20.77	38.98
Togo	-	-	23.76	32.53	35.81	93.00	100.00	78.79	1.00	79.74	17.92	24.72	43.65
Gambia	-	-	26.00	66.78	19.67	-	75.25	89.55	1.00	-	15.90	26.04	71.88
Guinea-Bissau	-	-	9.93	35.43	28.19	-	1.00	61.06	1.00	-	-	20.77	22.79

Table 21 Normalized values of green growth indicators for social inclusion (continued)

Country	Region-al Rank	Indicators											
		AB1	AB2	AB3	GB1	GB2	GB3	SE1	SE2	SE3	SP1	SP2	SP3
Congo Republic	-	42.25	45.72	42.32	23.29	91.71	25.75	64.68	1.00	-	-	19.45	50.40
Liberia	-	-	7.50	21.05	25.41	90.64	100.00	90.66	1.00	73.01	-	19.45	27.05
Eswatini	-	-	-	41.70	13.18	98.55	50.50	48.42	-	27.52	-	51.07	66.69
Sierra Leone	-	6.62	8.51	-	25.55	89.58	50.50	89.72	1.00	79.33	-	19.45	38.67
South Sudan	-	-	9.57	8.21	57.35	71.87	1.00	71.12	19.57	-	-	8.91	5.15
Equatorial Guinea	-	-	41.98	14.72	45.55	-	100.00	-	1.00	-	-	27.35	32.65
Central African Republic	-	-	12.02	4.97	17.97	85.37	25.75	-	1.00	-	-	11.54	1.00
Comoros	-	-	40.24	22.26	13.00	92.57	100.00	73.99	76.07	43.63	-	36.58	29.02
Chad	-	-	1.84	16.27	30.46	83.76	50.50	78.15	1.00	-	-	4.95	9.82
Eritrea	-	-	23.98	1.00	44.56	-	75.25	-	1.00	-	-	18.13	-
Mali	-	14.10	19.01	53.54	18.50	86.93	25.75	93.29	1.00	30.58	1.41	18.13	51.02
Somalia	-	-	13.60	18.24	49.23	94.99	50.50	-	1.00	-	-	1.00	25.18
Sudan	-	-	50.11	29.44	55.75	82.55	1.00	91.38	23.13	-	9.82	26.04	8.26
Djibouti	-	32.83	28.66	13.93	26.21	84.72	50.50	80.96	1.00	-	13.06	29.99	33.07
Mauritania	-	-	39.17	47.27	50.84	88.14	25.75	93.73	-	-	-	22.08	24.04
Libya	-	21.92	-	42.85	32.60	96.84	75.25	-	100.00	-	-	52.39	-
Mayotte	-	82.79	-	-	-	-	-	-	-	-	-	-	-
Reunion	-	95.96	-	-	-	-	-	-	-	-	-	-	-
St. Helena	-	88.57	-	-	-	-	-	-	-	-	-	-	-
AMERICAS													
Mexico	1	43.61	91.44	50.48	85.35	96.01	75.25	74.55	100.00	62.40	100.00	68.20	83.40
United States	2	94.17	97.31	79.98	39.45	99.84	75.25	82.30	100.00	-	100.00	78.74	-
Canada	3	89.92	97.31	62.69	54.36	99.96	100.00	92.98	100.00	73.83	100.00	85.33	99.99
Brazil	4	46.40	97.31	52.75	22.23	98.65	75.25	48.10	100.00	50.57	100.00	72.16	83.08
Dominican Republic	5	-	94.11	39.81	54.14	98.67	75.25	77.55	100.00	50.37	-	65.57	84.64
Costa Rica	6	93.45	97.09	88.86	70.48	95.93	25.75	68.23	99.22	61.18	46.40	69.52	95.95
Colombia	7	42.00	96.03	69.95	38.05	97.20	50.50	61.07	98.25	53.83	70.72	68.20	71.15
Peru	8	43.53	87.37	66.77	60.40	91.84	100.00	78.96	83.85	63.83	48.73	69.52	65.65
Chile	9	87.37	97.31	72.59	35.68	98.45	75.25	76.18	100.00	67.50	100.00	60.30	90.87
El Salvador	10	-	94.90	74.97	64.64	90.79	75.25	86.19	99.03	-	27.55	68.20	76.75
Ecuador	11	56.19	96.77	46.69	81.22	92.96	100.00	73.75	100.00	63.83	51.36	69.52	79.14
Argentina	12	-	97.31	72.72	77.86	98.43	50.50	81.57	100.00	61.18	100.00	68.20	84.75
Uruguay	13	-	97.31	87.94	45.00	98.04	50.50	84.54	100.00	63.22	100.00	73.47	-
Paraguay	14	58.98	82.54	51.25	30.70	98.09	100.00	72.30	98.91	63.01	21.16	58.98	82.25
Honduras	15	-	69.86	37.07	42.76	96.14	50.50	53.36	70.09	45.47	56.33	53.71	59.94
Bolivia	16	18.57	87.07	47.78	100.00	99.64	50.50	80.58	72.80	76.27	100.00	57.66	49.67
Panama	17	-	93.58	69.89	37.25	96.58	50.50	63.69	100.00	66.48	-	72.16	77.07
Guatemala	18	53.49	67.61	56.93	27.94	98.27	50.50	67.18	92.74	44.25	25.22	40.53	67.83
Nicaragua	19	48.85	65.21	55.47	89.25	91.33	75.25	72.00	62.09	-	-	64.25	56.21

Table 21 Normalized values of green growth indicators for social inclusion (continued)

Country	Region-al Rank	Indicators											
		AB1	AB2	AB3	GB1	GB2	GB3	SE1	SE2	SE3	SP1	SP2	SP3
Trinidad and Tobago	20	-	97.31	88.88	62.28	96.62	75.25	-	100.00	-	-	65.57	94.40
St. Vincent and the Grenadines	-	-	97.31	51.71	26.82	-	50.50	-	98.46	-	-	61.61	-
St. Lucia	-	-	96.65	55.58	34.01	-	100.00	57.40	98.46	-	-	57.66	88.38
Belize	-	-	89.99	28.92	19.57	96.84	50.50	-	99.86	44.25	-	52.39	94.81
Suriname	-	-	95.06	73.90	51.47	-	75.25	-	91.98	-	-	61.61	93.88
Dominica	-	-	90.38	56.93	50.50	-	50.50	-	100.00	-	-	-	-
Jamaica	-	-	91.18	52.24	35.57	99.68	50.50	-	99.07	-	29.37	53.71	40.75
Cuba	-	41.18	-	19.47	97.74	-	-	-	100.00	-	-	77.43	93.15
Bahamas	-	-	97.31	61.62	26.38	-	75.25	-	100.00	-	-	66.89	-
Venezuela	-	19.43	97.31	26.72	44.88	98.23	75.25	-	100.00	-	58.86	65.57	54.24
St. Kitts and Nevis	-	-	97.31	100.00	27.39	-	50.50	-	100.00	-	-	-	-
Antigua and Barbuda	-	-	97.31	100.00	23.00	-	75.25	-	100.00	-	83.28	64.25	-
Grenada	-	86.38	91.28	59.81	66.99	-	100.00	-	97.35	-	-	62.93	93.77
Guyana	-	-	82.31	40.11	64.12	-	100.00	-	92.59	28.13	-	62.93	67.73
Barbados	-	-	97.31	70.35	34.01	-	50.50	-	100.00	-	-	69.52	-
Bermuda	-	-	-	66.52	-	-	-	-	100.00	-	-	-	-
United States Virgin Islands	-	-	-	-	-	-	-	-	100.00	-	-	-	-
Puerto Rico	-	61.23	-	64.58	-	98.04	75.25	-	100.00	-	-	-	-
Haiti	-	-	19.36	21.62	6.03	97.00	100.00	82.08	1.00	-	-	32.62	31.61
Greenland	-	95.56	-	64.61	-	-	-	-	100.00	-	-	-	-
Anguilla	-	-	-	-	-	-	-	-	100.00	-	-	-	-
Aruba	-	-	-	74.28	-	-	-	-	100.00	-	100.00	-	-
British Virgin Islands	-	-	-	72.38	-	-	-	-	-	-	-	-	-
Cayman Islands	-	-	-	100.00	-	-	-	-	100.00	-	-	-	-
Curacao	-	-	-	70.44	-	-	-	-	100.00	89.53	-	-	-
French Guiana	-	90.26	-	-	-	-	-	-	-	-	-	-	89.10
Guadeloupe	-	97.25	-	-	-	-	-	-	-	-	-	-	94.40
Martinique	-	98.80	-	-	-	-	-	-	-	-	-	-	-
Sint Maarten	-	-	-	-	-	-	-	-	100.00	-	-	-	-
St. Pierre and Miquelon	-	82.17	-	-	-	-	-	-	-	-	-	-	-
Turks and Caicos Islands	-	-	-	-	-	-	-	-	100.00	-	-	-	-
ASIA													
Japan	1	98.53	97.31	85.68	21.10	99.93	50.50	93.14	100.00	94.02	100.00	77.43	-
Georgia	2	50.95	89.85	78.16	30.24	98.51	75.25	89.28	100.00	45.06	100.00	55.03	64.61
China	3	70.50	80.79	73.37	48.47	98.30	25.75	86.36	99.98	-	100.00	72.16	74.47
Philippines	4	46.26	67.46	58.60	59.31	95.00	100.00	76.53	94.13	59.34	63.52	48.44	55.48

**Table 21** 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
Malaysia	5	90.47	97.31	71.82	21.51	98.88	50.50	82.18	100.00	74.44	18.73	64.25	-
South Korea	6	99.01	97.31	87.46	34.88	99.94	25.75	94.99	100.00	-	100.00	81.38	-
Turkey	7	63.23	97.31	52.54	30.52	91.01	75.25	80.87	100.00	50.16	100.00	65.57	91.08
Myanmar	8	-	45.51	52.64	21.12	99.98	50.50	95.12	54.90	72.19	18.23	48.44	41.78
Thailand	9	-	88.78	100.00	11.73	99.17	50.50	89.06	100.00	69.75	81.76	73.47	75.41
Israel	10	96.33	97.31	75.69	54.63	99.66	50.50	85.37	100.00	69.95	100.00	76.11	-
Nepal	11	23.12	59.74	68.18	65.81	96.57	50.50	93.04	96.55	34.45	65.65	31.31	48.84
Cyprus	12	86.83	97.31	89.88	36.36	99.48	75.25	94.60	100.00	73.01	94.22	70.84	-
Azerbaijan	13	72.06	97.31	59.39	34.28	98.94	1.00	-	100.00	-	100.00	53.71	-
India	14	-	68.86	37.01	24.70	98.59	1.00	89.40	90.82	37.92	24.20	40.53	63.47
Lebanon	15	31.03	-	28.47	7.20	87.71	50.50	94.49	100.00	-	-	64.25	36.59
Vietnam	16	-	80.79	69.11	53.91	99.56	50.50	90.07	100.00	83.01	39.10	66.89	85.68
Indonesia	17	-	88.32	61.95	37.06	98.12	75.25	87.22	96.24	55.67	12.96	43.17	68.25
Bangladesh	18	52.91	53.07	48.47	41.97	86.36	25.75	93.32	81.44	44.04	37.18	31.31	51.02
Armenia	19	65.50	97.31	62.02	29.50	93.83	75.25	90.71	100.00	25.28	100.00	58.98	90.35
Laos	20	33.50	47.00	23.58	55.49	96.26	75.25	88.75	91.78	-	8.90	35.26	78.10
Saudi Arabia	21	76.49	97.31	67.13	40.34	93.46	25.75	-	100.00	67.09	3.84	65.57	83.19
Sri Lanka	22	-	61.89	72.40	12.44	99.90	25.75	83.95	97.43	44.65	26.61	55.03	-
Kyrgyz Republic	23	66.42	87.71	66.15	38.96	98.98	25.75	97.63	100.00	58.12	100.00	60.30	89.93
Cambodia	24	21.64	52.58	61.99	41.25	99.75	75.25	-	87.52	-	5.36	47.12	53.20
Jordan	25	86.46	97.31	34.24	31.45	81.03	25.75	92.06	100.00	-	45.89	68.20	75.72
Kazakhstan	26	88.92	97.31	73.43	54.66	98.99	50.50	98.04	100.00	-	82.37	68.20	-
Kuwait	27	100.00	97.31	86.86	10.15	97.72	1.00	-	100.00	-	41.13	68.20	-
Qatar	28	95.89	97.31	71.30	20.32	98.07	50.50	-	100.00	-	11.94	57.66	-
Mongolia	29	19.39	65.79	70.70	34.88	99.22	75.25	93.39	34.51	61.38	100.00	49.76	60.25
Pakistan	30	31.64	54.56	32.31	41.77	33.27	25.75	91.82	29.85	36.70	1.71	27.35	58.39
Tajikistan	31	44.91	89.47	51.27	38.72	95.98	50.50	91.96	99.89	-	100.00	57.66	73.02
Afghanistan	32	-	65.17	22.50	55.87	63.46	1.00	-	97.95	14.26	-	16.81	26.63
Uzbekistan	33	56.57	91.98	38.76	32.68	98.88	50.50	-	100.00	-	100.00	64.25	45.83
Bhutan	-	32.54	86.49	43.07	17.85	93.05	100.00	88.21	98.00	-	17.72	49.76	-
Timor-Leste	-	-	42.61	53.42	77.15	-	-	96.92	67.62	57.10	100.00	36.58	65.34
Brunei Darussalam	-	-	97.31	67.56	19.00	-	75.25	-	100.00	59.14	90.78	74.79	-
Iran	-	91.33	97.31	55.12	12.64	99.10	50.50	82.77	100.00	-	21.97	62.93	73.75
Singapore	-	100.00	97.31	86.25	46.54	99.40	75.25	-	100.00	91.57	48.22	81.38	-
North Korea	-	64.73	22.09	-	33.27	-	-	-	70.48	-	-	61.61	-
Maldives	-	-	97.20	81.20	12.64	-	75.25	94.73	99.86	52.00	100.00	49.76	68.76
United Arab Emirates	-	96.07	97.31	100.00	45.55	96.38	1.00	94.94	100.00	76.89	26.03	68.20	-
Turkmenistan	-	93.56	97.31	79.58	52.10	95.12	-	-	100.00	-	-	60.30	-
Oman	-	89.72	97.31	71.60	3.34	94.59	25.75	-	100.00	-	-	58.98	-

**Table 21** 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
Syria	-	-	91.79	57.18	27.14	93.77	1.00	-	76.26	-	-	47.12	60.67
Yemen	-	-	67.57	20.09	1.65	1.00	25.75	88.70	64.87	8.55	5.76	23.40	31.30
Iraq	-	47.11	97.31	48.59	50.96	94.49	50.50	96.45	100.00	-	-	48.44	52.58
Bahrain	-	97.35	97.31	60.47	15.85	97.54	1.00	-	100.00	-	-	69.52	-
Palestine	-	59.04	-	43.48	-	80.19	-	92.74	100.00	31.60	30.08	-	56.10
Macao	-	100.00	-	100.00	-	-	-	-	100.00	-	62.00	-	-
Hong Kong	-	95.65	-	100.00	-	99.77	75.25	-	100.00	-	-	-	-
Taiwan	-	-	-	-	-	-	-	100.00	-	-	-	-	-
EUROPE													
Sweden	1	96.47	97.31	81.33	87.23	99.91	100.00	97.70	100.00	87.49	100.00	81.38	100.00
Denmark	2	95.55	97.31	83.16	75.11	99.97	100.00	96.92	100.00	86.06	99.19	74.79	100.00
Czech Republic	3	95.95	97.31	71.79	45.55	98.92	100.00	99.97	100.00	88.51	100.00	68.20	-
Germany	4	98.43	97.31	83.66	62.16	99.98	75.25	94.46	100.00	87.90	100.00	77.43	99.99
Austria	5	97.70	97.31	71.25	65.38	99.92	100.00	96.48	100.00	86.06	100.00	72.16	-
Finland	6	99.39	97.31	78.37	83.17	99.93	100.00	98.32	100.00	82.60	100.00	70.84	-
Slovakia	7	90.65	97.31	80.51	40.60	99.55	75.25	100.00	100.00	79.13	100.00	69.52	-
Switzerland	8	97.36	97.31	84.79	65.35	99.85	100.00	93.55	100.00	87.70	99.70	77.43	-
Lithuania	9	91.20	97.31	98.63	43.13	99.14	100.00	88.33	100.00	83.62	100.00	64.25	-
Hungary	10	92.21	97.31	64.59	21.00	98.59	75.25	95.63	100.00	78.11	100.00	65.57	85.89
Slovenia	11	90.01	97.31	73.02	73.61	99.79	75.25	100.00	100.00	86.47	100.00	72.16	96.16
Portugal	12	89.44	97.31	75.34	69.86	99.32	100.00	92.16	100.00	82.80	100.00	76.11	96.26
Estonia	13	95.08	97.31	88.40	57.85	99.86	100.00	96.54	100.00	79.74	100.00	66.89	-
Latvia	14	89.97	97.31	64.36	36.64	99.72	100.00	90.34	100.00	84.02	100.00	61.61	-
Belgium	15	98.22	97.31	66.67	76.24	99.94	100.00	98.47	100.00	81.17	100.00	78.74	-
Poland	16	95.99	97.31	77.14	56.52	99.49	100.00	96.43	100.00	82.19	100.00	66.89	99.99
France	17	92.72	97.31	75.92	79.59	98.94	100.00	94.18	100.00	77.29	100.00	70.84	-
Romania	18	78.05	86.65	68.74	41.93	97.20	-	90.29	100.00	70.36	100.00	65.57	87.44
Italy	19	95.38	97.31	78.93	62.28	99.16	100.00	89.99	100.00	60.77	100.00	76.11	-
Norway	20	86.61	97.31	71.62	81.84	99.91	100.00	98.88	100.00	89.94	98.78	82.70	100.00
Croatia	21	72.77	92.51	63.95	41.65	98.53	100.00	96.14	100.00	72.19	57.04	61.61	-
Netherlands	22	98.64	97.31	81.81	73.60	99.93	100.00	97.27	100.00	91.37	98.99	81.38	-
United Kingdom	23	98.81	97.31	76.83	64.36	99.89	100.00	91.16	100.00	78.52	100.00	82.70	-
Spain	24	97.39	97.31	73.33	82.46	99.21	100.00	91.65	100.00	74.64	100.00	77.43	94.29
Greece	25	94.92	97.31	73.97	37.97	99.62	100.00	91.81	100.00	71.17	-	66.89	96.89
Luxembourg	26	98.08	97.31	85.19	57.09	99.80	100.00	91.30	100.00	89.12	100.00	77.43	-
Bulgaria	27	79.58	-	69.05	44.73	99.27	100.00	83.12	100.00	69.34	100.00	55.03	-
Serbia	28	46.88	81.85	53.08	69.11	99.33	100.00	90.05	100.00	65.26	-	53.71	96.26
Russia	29	66.89	94.64	89.10	32.24	99.81	50.50	87.57	100.00	74.64	100.00	65.57	-
Ireland	30	89.29	97.31	64.36	44.86	99.99	100.00	93.53	100.00	79.33	100.00	68.20	-
Iceland	31	90.36	97.31	79.46	76.44	-	100.00	98.58	100.00	89.94	79.73	78.74	-

Table 21 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
Moldova	32	71.34	97.31	48.17	46.08	99.36	25.75	99.35	100.00	43.23	74.87	58.98	38.57
Ukraine	33	79.11	97.31	68.70	25.14	98.97	1.00	99.11	100.00	66.28	95.95	57.66	80.28
Belarus	34	86.81	97.31	76.18	69.41	99.91	50.50	99.80	100.00	-	100.00	68.20	65.55
Albania	35	52.38	89.31	48.43	58.99	98.24	100.00	93.40	100.00	-	-	45.80	-
Montenegro	36	93.23	76.52	100.00	47.45	99.59	25.75	85.83	100.00	66.89	51.67	57.66	71.88
Bosnia and Herzegovina	37	52.66	70.66	59.20	43.43	97.38	50.50	93.46	100.00	56.69	-	48.44	92.11
Malta	38	96.29	97.31	94.15	26.11	99.86	75.25	96.74	100.00	85.04	100.00	76.11	-
Liechtenstein	-	99.82	-	84.81	24.76	-	-	-	100.00	-	-	-	-
Andorra	-	95.05	97.31	78.55	64.64	-	-	-	100.00	-	-	-	-
Macedonia	-	45.88	81.32	55.89	76.89	98.26	50.50	92.46	100.00	50.77	71.02	62.93	91.39
Faeroe Islands	-	-	-	74.97	-	-	-	-	100.00	-	-	-	-
Gibraltar	-	100.00	-	87.87	-	-	-	-	100.00	-	-	-	-
Isle of Man	-	97.05	-	-	-	-	-	-	100.00	-	-	-	-
Kosovo	-	-	-	-	-	-	-	96.50	-	-	-	-	-
Monaco	-	100.00	97.31	66.52	42.24	-	-	-	100.00	-	-	-	-
San Marino	-	87.97	97.31	70.88	50.50	-	75.25	-	100.00	-	-	-	-
<b>OCEANIA</b>													
New Zealand	1	94.02	97.31	83.27	80.20	99.94	75.25	-	100.00	75.66	100.00	82.70	-
Australia	2	74.26	97.31	69.77	60.40	99.89	100.00	91.69	100.00	81.78	70.92	82.70	-
Kiribati	-	-	48.60	15.41	13.91	-	100.00	-	89.42	4.26	11.64	22.08	-
American Samoa	-	7.61	-	-	-	-	-	-	-	-	-	-	-
Palau	-	-	97.31	67.66	25.75	-	75.25	-	100.00	73.62	100.00	-	-
Northern Mariana Islands	-	89.69	-	-	-	-	-	-	100.00	-	-	-	-
Fiji	-	-	59.47	55.52	32.68	-	50.50	88.44	91.94	58.93	87.13	52.39	88.38
Marshall Islands	-	-	78.52	5.90	19.00	-	75.25	-	96.58	-	80.75	-	-
Tonga	-	-	72.24	32.15	15.67	-	75.25	87.60	98.95	-	72.94	44.48	-
Vanuatu	-	40.96	31.10	39.38	1.00	-	50.50	87.28	37.29	-	7.28	31.31	-
Samoa	-	51.01	63.62	25.28	20.80	-	75.25	85.72	96.62	22.62	100.00	44.48	-
Micronesia, Fed. Sts.	-	-	40.68	3.06	1.00	-	75.25	84.36	81.94	51.59	100.00	29.99	-
Solomon Islands	-	-	31.70	29.19	4.96	-	25.75	88.32	80.30	-	19.44	29.99	-
Papua New Guinea	-	-	26.65	16.12	1.00	-	25.75	80.83	49.72	-	3.63	20.77	-
Nauru	-	-	94.40	44.89	21.85	-	-	-	100.00	-	100.00	-	-
Guam	-	99.52	-	-	-	-	-	-	100.00	-	-	-	-
Cook Islands	-	-	87.71	-	-	-	-	-	-	-	100.00	-	-
French Polynesia	-	-	-	61.71	-	-	-	-	100.00	-	-	-	-

Table 21 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
New Caledonia	-	96.47	-	53.95	-	-	-	-	100.00	-	-	-	-
Niue	-	97.06	91.44	-	-	-	-	-	-	-	-	-	-
Tuvalu	-	1.00	69.59	30.72	14.21	-	-	85.47	100.00	40.78	-	-	-

## Definitions:

AB1: Population with access to safely managed water and sanitation (Percent)

AB2: Population with access to electricity and clean fuels/technology (Percent)

AB3: Fixed Internet broadband and mobile cellular subscriptions (Number per 100 people)

GB1: Proportion of seats held by women in national parliaments (Percent)

GB2: Ratio of female to male with account in financial institution, age 15+ (Percent)

GB3: Getting paid, covering laws and regulations for equal gender pay (Score)

SE1: Inequality in income based on Atkinson (Index)

SE2: Ratio of urban to rural, access to safely managed water/sanitation &amp; electricity (Percent)

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

SP1: Proportion of population above statutory pensionable age receiving pension (Percent)

SP2: Healthcare access and quality index (Index)

SP3: Proportion of urban population living in slums (Percent)

Table 22 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
<b>AFRICA</b>							
Tanzania	1	2	0	1	0	3	8%
Morocco	2	0	0	0	2	2	6%
Tunisia	3	0	0	0	1	1	3%
South Africa	4	0	0	0	1	1	3%
Cabo Verde	5	2	0	1	3	6	17%
Senegal	6	2	0	1	0	3	8%
Mauritius	7	0	0	1	4	5	14%
Uganda	8	0	1	1	0	2	6%
Egypt	9	0	0	0	0	0	0%
Ethiopia	10	0	1	1	1	3	8%
Ghana	11	1	0	1	0	2	6%
Botswana	12	1	1	1	3	6	17%
Cameroon	13	0	0	1	1	2	6%
Kenya	14	0	1	0	1	2	6%
Madagascar	15	0	0	1	3	4	11%
Angola	16	0	0	1	4	5	14%
Lesotho	17	2	1	1	2	6	17%
Zambia	18	2	1	1	1	5	14%
Malawi	19	0	1	0	1	2	6%
Burundi	20	0	1	1	1	3	8%
Zimbabwe	21	0	1	1	1	3	8%
Algeria	22	0	0	1	2	3	8%
Nigeria	23	0	0	1	0	1	3%
Niger	24	0	1	1	0	2	6%
Burkina Faso	-	0	1	2	2	5	14%
Gabon	-	2	0	3	3	8	22%
Cote d'Ivoire	-	1	0	2	1	4	11%
Rwanda	-	0	1	2	1	4	11%
Sao Tome and Principe	-	0	0	3	3	6	17%
DR Congo	-	2	0	3	5	10	28%
Guinea	-	2	0	2	3	7	19%
Mozambique	-	0	0	2	2	4	11%
Namibia	-	2	0	2	2	6	17%

Table 22 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
Seychelles	-	3	0	3	5	11	31%
Benin	-	2	0	2	2	6	17%
Togo	-	2	0	2	1	5	14%
Gambia	-	2	0	1	3	6	17%
Guinea-Bissau	-	3	0	3	4	10	28%
Congo Republic	-	2	0	2	2	6	17%
Liberia	-	2	0	3	2	7	19%
Eswatini	-	3	1	1	4	9	25%
Sierra Leone	-	1	0	2	2	5	14%
South Sudan	-	0	4	3	3	10	28%
Equatorial Guinea	-	3	0	4	5	12	33%
Central African Republic	-	2	1	3	4	10	28%
Comoros	-	4	0	2	2	8	22%
Chad	-	1	1	4	3	9	25%
Eritrea	-	3	0	3	6	12	33%
Mali	-	0	1	2	0	3	8%
Somalia	-	4	0	4	4	12	33%
Sudan	-	1	1	2	2	6	17%
Djibouti	-	3	0	3	1	7	19%
Mauritania	-	2	0	2	4	8	22%
Libya	-	1	0	4	5	10	28%
British Indian Ocean Territory	-	8	11	4	12	35	97%
Mayotte	-	8	9	4	11	32	89%
Reunion	-	7	9	4	11	31	86%
St. Helena	-	7	11	4	11	33	92%
Western Sahara	-	7	9	4	12	32	89%
<b>AMERICAS</b>							
Mexico	1	0	0	0	0	0	0%
United States	2	0	0	0	2	2	6%
Canada	3	0	0	0	0	0	0%
Brazil	4	0	0	0	0	0	0%
Dominican Republic	5	0	0	0	2	2	6%
Costa Rica	6	0	1	0	0	1	3%
Colombia	7	0	0	0	0	0	0%



Table 22 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
Peru	8	0	0	0	0	0	0%
Chile	9	0	0	0	0	0	0%
El Salvador	10	0	0	1	2	3	8%
Ecuador	11	0	0	0	0	0	0%
Argentina	12	0	0	0	1	1	3%
Uruguay	13	2	1	0	2	5	14%
Paraguay	14	0	1	1	0	2	6%
Honduras	15	0	0	1	1	2	6%
Bolivia	16	0	1	1	0	2	6%
Panama	17	0	0	0	2	2	6%
Guatemala	18	0	0	0	0	0	0%
Nicaragua	19	0	0	1	2	3	8%
Trinidad and Tobago	20	1	0	1	4	6	17%
St. Vincent and the Grenadines	-	5	0	3	6	14	39%
St. Lucia	-	4	0	3	4	11	31%
Belize	-	1	0	2	3	6	17%
Suriname	-	0	0	3	5	8	22%
Dominica	-	2	1	4	7	14	39%
Jamaica	-	0	0	2	3	5	14%
Cuba	-	0	0	2	6	8	22%
Bahamas	-	2	0	1	6	9	25%
Venezuela	-	1	0	3	2	6	17%
St. Kitts and Nevis	-	4	2	3	7	16	44%
Antigua and Barbuda	-	1	0	3	5	9	25%
Grenada	-	2	0	4	4	10	28%
Guyana	-	1	1	2	4	8	22%
Barbados	-	1	1	2	6	10	28%
Bermuda	-	6	4	2	10	22	61%
United States Virgin Islands	-	6	4	4	11	25	69%
Puerto Rico	-	2	4	4	7	17	47%
Haiti	-	0	0	3	3	6	17%
Greenland	-	7	4	3	9	23	64%
Anguilla	-	7	8	4	11	30	83%

Table 22 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
Aruba	-	6	6	3	9	24	67%
Bonaire, Saint Eustatius and Saba	-	7	10	4	12	33	92%
British Virgin Islands	-	5	5	4	11	25	69%
Cayman Islands	-	6	6	4	10	26	72%
Curacao	-	6	6	4	9	25	69%
Falkland Islands	-	6	8	4	12	30	83%
French Guiana	-	7	8	4	10	29	81%
Guadeloupe	-	7	9	4	10	30	83%
Martinique	-	7	9	4	11	31	86%
Montserrat	-	7	9	3	12	31	86%
Saint-Martin	-	8	7	4	12	31	86%
Sint Maarten	-	6	8	4	11	29	81%
St. Barths	-	8	11	4	12	35	97%
St. Pierre and Miquelon	-	7	10	4	11	32	89%
Turks and Caicos Islands	-	6	6	4	11	27	75%
<b>ASIA</b>							
Japan	1	0	0	0	1	1	3%
Georgia	2	0	0	0	0	0	0%
China	3	0	0	0	1	1	3%
Philippines	4	0	0	0	0	0	0%
Malaysia	5	1	0	0	1	2	6%
South Korea	6	0	0	0	2	2	6%
Turkey	7	0	0	0	0	0	0%
Myanmar	8	2	0	1	1	4	11%
Thailand	9	0	0	0	1	1	3%
Israel	10	0	0	0	1	1	3%
Nepal	11	0	1	1	0	2	6%
Cyprus	12	0	0	0	1	1	3%
Azerbaijan	13	0	2	1	3	6	17%
India	14	0	0	0	1	1	3%
Lebanon	15	0	0	1	3	4	11%
Vietnam	16	0	0	0	1	1	3%
Indonesia	17	0	0	0	1	1	3%

Table 22 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
Bangladesh	18	0	0	1	0	1	3%
Armenia	19	0	1	0	0	1	3%
Laos	20	0	1	1	1	3	8%
Saudi Arabia	21	0	0	0	1	1	3%
Sri Lanka	22	0	0	1	2	3	8%
Kyrgyz Republic	23	0	1	0	0	1	3%
Cambodia	24	0	0	1	2	3	8%
Jordan	25	0	0	0	1	1	3%
Kazakhstan	26	0	1	0	2	3	8%
Kuwait	27	1	1	1	3	6	17%
Qatar	28	1	0	1	3	5	14%
Mongolia	29	1	1	0	0	2	6%
Pakistan	30	0	0	1	0	1	3%
Tajikistan	31	0	2	1	1	4	11%
Afghanistan	32	2	2	1	3	8	22%
Uzbekistan	33	1	1	0	2	4	11%
Bhutan	-	0	2	3	2	7	19%
Timor-Leste	-	2	1	2	3	8	22%
Brunei Darussalam	-	3	0	1	4	8	22%
Iran	-	1	0	2	1	4	11%
Singapore	-	2	0	0	2	4	11%
North Korea	-	3	1	4	7	15	42%
Maldives	-	2	0	2	2	6	17%
United Arab Emirates	-	0	1	2	1	4	11%
Turkmenistan	-	2	1	4	5	12	33%
Oman	-	0	0	1	4	5	14%
Syria	-	1	0	3	4	8	22%
Yemen	-	1	0	2	1	4	11%
Iraq	-	0	0	2	2	4	11%
Bahrain	-	1	1	2	4	8	22%
Palestine	-	3	6	2	4	15	42%
Macao	-	6	9	1	8	24	67%
Hong Kong	-	5	8	1	7	21	58%
Taiwan	-	8	9	4	11	32	89%

Table 22 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
<b>EUROPE</b>							
Sweden	1	0	0	0	0	0	0%
Denmark	2	0	0	0	0	0	0%
Czech Republic	3	0	1	0	1	2	6%
Germany	4	0	0	0	0	0	0%
Austria	5	0	1	0	1	2	6%
Finland	6	0	0	0	1	1	3%
Slovakia	7	0	1	0	1	2	6%
Switzerland	8	0	1	0	1	2	6%
Lithuania	9	0	0	0	1	1	3%
Hungary	10	0	1	0	0	1	3%
Slovenia	11	0	0	0	0	0	0%
Portugal	12	1	0	0	0	1	3%
Estonia	13	0	0	0	1	1	3%
Latvia	14	0	1	0	1	2	6%
Belgium	15	0	0	0	1	1	3%
Poland	16	0	0	0	0	0	0%
France	17	0	0	0	1	1	3%
Romania	18	0	0	0	1	1	3%
Italy	19	0	0	0	1	1	3%
Norway	20	0	0	0	0	0	0%
Croatia	21	0	0	0	1	1	3%
Netherlands	22	0	0	0	1	1	3%
United Kingdom	23	0	0	0	1	1	3%
Spain	24	0	0	0	0	0	0%
Greece	25	0	0	0	1	1	3%
Luxembourg	26	0	1	0	1	2	6%
Bulgaria	27	0	0	0	2	2	6%
Serbia	28	0	1	0	1	2	6%
Russia	29	0	0	0	1	1	3%
Ireland	30	1	0	0	1	2	6%
Iceland	31	0	0	0	2	2	6%
Moldova	32	0	1	0	0	1	3%
Ukraine	33	0	0	0	0	0	0%

Table 22 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
Belarus	34	1	1	0	1	3	8%
Albania	35	0	1	1	3	5	14%
Montenegro	36	1	0	1	0	2	6%
Bosnia and Herzegovina	37	1	0	1	1	3	8%
Malta	38	0	1	1	1	3	8%
Liechtenstein	-	6	3	3	8	20	56%
Andorra	-	6	1	3	7	17	47%
Macedonia	-	0	1	2	0	3	8%
Aland Islands	-						
Faeroe Islands	-	5	6	4	10	25	69%
Gibraltar	-	7	7	4	9	27	75%
Guernsey	-	7	11	4	12	34	94%
Isle of Man	-	7	9	4	10	30	83%
Jersey	-	7	11	4	12	34	94%
Kosovo	-	8	11	4	11	34	94%
Monaco	-	8	7	3	7	25	69%
San Marino	-	8	8	3	6	25	69%
Svalbard and Jan Mayen Islands	-	8	11	4	12	35	97%
Vatican	-	8	10	4	12	34	94%
<b>OCEANIA</b>							
New Zealand	1	0	0	0	2	2	6%
Australia	2	0	0	0	1	1	3%
Kiribati	-	4	2	3	4	13	36%
American Samoa	-	7	3	4	11	25	69%
Palau	-	5	2	3	5	15	42%
Northern Mariana Islands	-	7	5	4	10	26	72%
Fiji	-	0	0	2	2	4	11%
Marshall Islands	-	5	0	4	6	15	42%
Tonga	-	3	0	2	4	9	25%
Vanuatu	-	2	1	3	3	9	25%
Samoa	-	2	0	3	2	7	19%
Micronesia, Fed. Sts.	-	4	1	4	3	12	33%
Solomon Islands	-	4	0	3	4	11	31%

Table 22 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
Papua New Guinea	-	1	0	4	4	9	25%
Nauru	-	5	3	4	7	19	53%
Guam	-	7	4	4	10	25	69%
Christmas Island	-	8	11	4	12	35	97%
Cocos (Keeling) Islands	-	8	11	4	12	35	97%
Cook Islands	-	5	9	4	10	28	78%
French Polynesia	-	5	5	3	10	23	64%
New Caledonia	-	5	5	3	9	22	61%
Niue	-	5	8	4	10	27	75%
Norfolk Island	-	8	11	4	12	35	97%
Pitcairn	-	8	11	4	12	35	97%
Tokelau	-	8	8	4	12	32	89%
Tuvalu	-	4	4	4	5	17	47%
Wallis and Futuna Islands	-	7	10	4	12	33	92%



## References

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- Acosta, L.A., Maharjan, P., Peyriere, H., Galotto, L., Mamiit, R. J., Ho, C., ... Anastasia, O. (2019). Green Growth Index: Concept, Methods and Applications (No. 5). GGGI Technical Report. Green Growth Performance Measurement (GGPM) Program, Global Green Growth Institute (GGGI).
- Acosta, Lilibeth A., Balmes, C. O., Mamiit, R. J., Maharjan, P., Hartman, K., Anastasia, O., & Puyo, N. M. (2019). Assessment and Main Findings on the Green Growth Index (No. 3). GGGI Insight Brief. Seoul, South Korea: Green Growth Performance Measurement, Global Green Growth Institute (GGGI).
- ADB. (2012). Japan: Updating and Improving the Social Protection Index (No. 44152). Technical Assistance Consultant's Report. Asian Development Bank (ADB).
- AfDB. (2015). Greening the African Economy: Towards a Green Growth Index for African Countries. Abidjan, Côte d'Ivoire.
- Allwood, J. M., Ashby, M. F., Gutowski, T. G., & Worrell, E. (2011). Material Efficiency: A White Paper. Resources, Conservation and Recycling, 55, 362–381.
- Auzins, A., Geipele, S., & Geipele, I. (2014). New Indicator System for Evaluation of Land Use Efficiency. In Proceedings of the 2014 International Conference on Industrial Engineering and Operations Management (pp. 2285–2293). Bali, Indonesia.
- Berg, E., Bhattacharyya, S., Rajasekhar, D., & Manjula, R. (2018). Can Public Works Increase Equilibrium Wages? Evidence from India's National Rural Employment Guarantee. World Development, 103, 239–254.
- Buseth, J. T. (2017). The Green Economy in Tanzania: From Global Discourses to Institutionalization. Geoforum, 86, 42–52.
- Carroll, J. L., & Daigneault, A. J. (2019). Achieving Ambitious Climate Targets: Is It Economical for New Zealand to Invest in Agricultural GHG Mitigation? Environmental Research Letters, 14, 1–11.
- Cecchini, S. (2020). Universal Social Protection in Latin America and the Caribbean: Selected Texts 2006-2019. United Nations Economic Commission for Latin America and the Caribbean (UN ECLAC).
- Clench-Aas, J., & Holte, A. (2018). Measures that increase social equality are effective in improving life satisfaction in times of economic crisis. BMC Public Health, 18(1), 1–11.
- da Rocha, S. M., Almasy, D., & Pinter, L. (2017). Social and Cultural Values and Impacts of Nature-based Solutions and Natural Areas. Deliverable 1.3 Part IV. European Union (EU).
- Dampney, F. G., Birkhofer, K., Nsiah, P. K., & de la Riva, E. G. (2020). Soil Properties and Biomass Attributes in a Former Gravel Mine Area after Two Decades of Forest Restoration. Land, 9, 1–18.
- EEA. (2015). The European Environment - State and Outlook 2015: Protecting, Conserving and Enhancing Natural Capital. Copenhagen, Denmark: European Environment Agency (EEA).
- EEA. (2017). Glossary: List of Environmental Terms Used by EEA. Retrieved from [https://www.eea.europa.eu/help/glossary#c4=10&c0=all&b\\_start=10&c2=environmental+quality](https://www.eea.europa.eu/help/glossary#c4=10&c0=all&b_start=10&c2=environmental+quality)
- EIGE. (2020). Gender Equality Index 2020: Key Findings for the EU. European Institute for Gender Equality (EIGE).
- ESCWA. (2015). Inclusive Social Development. New York, USA: Economic and Social Commission for Western Asia (ESWA).
- Estévez-Abe, M. (2013). An International Comparison of Institutional Requisites for Gender Equality: Why Is the Japanese Gender Gap So Persistent? Japan Labor Review, 10(2), 82–100.
- European Parliament. (2019). Plurilateral Environmental Goods Agreement (EGA). Retrieved from [http://www.europarl.europa.eu/legislative-train/theme-a-balanced-and-progressive-trade-policy-to-harness-globalisation/file-environmental-goods-agreement-\(ega\)%0APlurilateral](http://www.europarl.europa.eu/legislative-train/theme-a-balanced-and-progressive-trade-policy-to-harness-globalisation/file-environmental-goods-agreement-(ega)%0APlurilateral)
- Eyraud, L., Wane, A. A., Zhang, C., & Clements, B. J. (2011). Who's Going Green and Why? Trends and Determinants of Green Investment (IMF Working Paper No. 296). International Monetary Fund (IMF).
- Fukuda-Parr, S. (2019). Keeping Out Extreme Inequality from the SDG Agenda – The Politics of Indicators. Global Policy, 10, 61–69.
- Gao, Y., Tsai, S.-B., Xue, X., Ren, T., Du, X., Chen, Q., & Wang, J. (2018). An Empirical Study on Green Innovation Efficiency in the Green Institutional Environment. Sustainability, 10(3), 1–13.
- GGGI. (2019). Fiji Green Jobs Assessment: A Preliminary Study of Green Employment in Fiji. Global Green Growth Institute (GGGI).
- Hamdan, J. (2019). The Impact of Mobile Money in Developing Countries (No. 131). DIW Roundup: Politik im Fokus.
- He, K., Qi, Y., Huang, Y., Chen, H., Sheng, Z., Xu, X., & Duan, L. (2016). Response of Aboveground Biomass and Diversity to Nitrogen Addition—a Five-year Experiment in Semi-arid Grassland of Inner Mongolia, China. Scientific Reports, 6, 1–9.
- Holmes, I., Orozco, D., & Paniagua Borrego, A. (2017). Accelerating Green Infrastructure Financing in Mexico Towards Sustainable Economic Growth. E3G.
- IEA. (2019). Africa Energy Outlook 2019. Paris, France: International Energy Agency (IEA).
- IISD. (2019). In Advance of HLPF 2019, Experts Review Progress on SDG 10. Retrieved from <https://sdg.iisd.org/news/in-advance-of-hlpf-2019-experts-review-progre...>
- ILO. (2015). Two Defining Challenges for the Twenty-first Century. In Decent Work, Green Jobs and the Sustainable Economy (pp. 1–8). Geneva, Switzerland: International Labour Organization (ILO).
- IPBES. (2018). The Regional Assessment Report on Biodiversity and Ecosystem Services for Asia and the Pacific. Bonn, Germany: Intergovernmental Science-policy Platform on Biodiversity and Ecosystem Services.
- IPCC. (2013). IPCC, 2013: Annex III: Glossary. In S. Planton (Ed.), Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (pp. 1447–1466). Cambridge, UK and New York, USA: Cambridge University Press. Retrieved from [https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5\\_AnnexIII\\_FINAL.pdf](https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_AnnexIII_FINAL.pdf)

- IRENA, & C2E2. (2015). Synergies Between Renewable Energy and Energy Efficiency, Working Paper. Copenhagen, Denmark: International Renewable Energy Agency (IRENA) and Copenhagen Centre on Energy Efficiency (C2E2).
- Kutscher, C. F., Milford, J. B., & Keith, F. (2018). Principles of Sustainable Energy Systems (3rd ed.). Boca Raton, Florida, United States: CRC Press Taylor & Francis Group.
- Lafortune, G., Fuller, G., Moreno, J., Schmidt-Traub, G., & Kroll, C. (2018). SDG Index and Dashboards: Detailed Methodological Paper. Bertelsmann Stiftung and the Sustainable Development Solutions Network (SDSN).
- Li, S., Su, J., Lang, X., Liu, W., & Ou, G. (2018). Positive Relationship Between Species Richness and Aboveground Biomass Across Forest Strata in a Primary Pinus kesiya Forest. *Scientific Reports*, 8, 1–9.
- Lifset, R., & Eckelman, M. (2013). Material Efficiency in a Multi-Material World. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, 371, 1–30.
- Lović Obradović, S. (2019). Environmental Investments. In L. Filho, A. M. Azul, L. Brandli, P. G. Özuyar, & T. Wall (Eds.), *Climate Action. Encyclopedia of the UN Sustainable Development Goals* (pp. 1–12). Switzerland: Springer Nature.
- Mohammadi, K., Sohrabi, Y., Heidari, G., Khalesro, S., & Majidi, M. (2012). Effective Factors on Biological Nitrogen Fixation. *African Journal of Agricultural Research*, 7(12), 1782–1788.
- Montañez, A. (2000). Overview and Case Studies on Biological Nitrogen Fixation: Perspectives and Limitations. *Science in Agriculture*, 1–11.
- Navis, K. (2019). Where is Mobile Money Making the Biggest Difference for Financial Inclusion for Young People? Retrieved from <https://www.cgdev.org/blog/where-mobile-money-making-biggest-difference-financial-inclusion-young-people>
- OECD. (2018). *The Framework for Policy Action on Inclusive Growth*. Paris, France: OECD Publishing.
- OECD. (2019a). *Measuring Distance to the SDG Targets: Metadata*. Paris, France: OECD Publishing.
- OECD. (2019b). *Measuring Distance to the SDG Targets 2019: An Assessment of Where OECD Countries Stand*. Paris, France: OECD Publishing.
- OECD. (2019c). *Nutrient Balances in Agriculture. In Trends and Drivers of Agri-environmental Performance in OECD Countries*. Paris, France: OECD Publishing.
- OECD, IEA, ITF, & NEA. (2015). *Aligning Policies for a Low-carbon Economy. Aligning Policies for a Low-carbon Economy*. Paris, France: OECD Publishing.
- OECD, & WB. (2006). *Liberalisation and Universal Access to Basic Services: Telecommunications, Water and Sanitation, Financial Services, and Electricity*. OECD Trade Policy Studies. Paris: OECD Publishing.
- PAGE. (2017a). *The Green Economy Progress Measurement Framework - Application*. Geneva, Switzerland: United Nations Environment Programme (UNEP).
- PAGE. (2017b). *The Green Economy Progress Measurement Framework - Methodology*. Geneva, Switzerland: United Nations Environment Programme (UNEP).
- Pociovălișteanu, D. M., Novo-Corti, I., Aceleanu, M. I., Șerban, A. C., & Grecu, E. (2015). Employment Policies for a Green Economy at the European Union Level. *Sustainability*, 7, 9231–9250.
- Pokhrel, S., & Sherpa, C. (2020). Analyzing the Relationship, Distribution of Tree Species Diversity, and Above-Ground Biomass on the Chitwan-Annapurna Landscape in Nepal. *International Journal of Forestry Research*, 2020, 1–10.
- Ravallion, M. (2020). *On the Origins of the Idea of Ending Poverty* (NREB Working Paper No. 27808). National Bureau of Economic Research (NBER).
- Sachs, J., Schmidt-Traub, G., Kroll, C., Lafortune, G., & Fuller, G. (2019). *Sustainable Development Report 2019*. New York, USA: Bertelsmann Stiftung and Sustainable Development Solutions Network (SDSN).
- Sachs, Jeffrey, Schmidt-Traub, G., Kroll, C., Lafortune, G., & Fuller, G. (2018). *SDG Index and Dashboards Report 2018*. New York, USA: Bertelsmann Stiftung and Sustainable Development Solutions Network (SDSN).
- Schiederig, T., Tietze, F., & Herstatt, C. (2011). *What is Green Innovation - A Quantitative Literature Review* (Working Paper No. 63). Hamburg, Germany: Hamburg University of Technology (TUHH) and Institute for Technology and Innovation Management (TIM).
- Small, N., Munday, M., & Durance, I. (2017). The Challenge of Valuing Ecosystem Services that have No Material Benefits. *Global Environmental Change*, 44, 57–67. <https://doi.org/10.1016/j.gloenvcha.2017.03.005>
- Smith, P. (2018). *Managing the Global Land Resource*. *Proceedings of the Royal Society B: Biological Sciences*, 285, 1–9.
- Soumare, A., Diedhiou, A. G., Thuita, M., Hafidi, M., Ouhdouch, Y., Gopalakrishnan, S., & Kouisni, L. (2020). Exploiting Biological Nitrogen Fixation: A Route Towards a Sustainable Agriculture. *Plants*, 9(8), 1–22.
- Symon, C. (2013). *Climate Change: Action, Trends and Implications for Business. Fifth Assessment Report (AR5)*. The Hague, Netherlands: European Climate Foundation.
- UCLG. (2014). *Basic Services for All in an Urbanizing World*. (UCLG, Ed.). Barcelona, Spain: United Cities and Local Governments (UCLG).
- UN Women. (2018). *Turning Promises into Action: Gender Equality in the 2030 Agenda for Sustainable Development*. New York, USA: United Nations Entity for Gender Equality and the Empowerment of Women (UN Women).
- UNDP. (2018). *Human Development Indices and Indicators: 2018 Statistical Update - Jordan. Briefing Note for Countries on the 2018 Statistical Update*. United Nations Development Programme (UNDP).
- UNDP. (2019a). *Human Development Report 2019*. New Delhi, India: United Nations Development Programme (UNDP).
- UNDP. (2019b). *Universal Health Coverage for Sustainable Development - Issue Brief*. United Nations Development Programme (UNDP).
- UNEP-WCMC and IUCN. (2016). *Protected Planet Report 2016*. Cambridge, UK and Gland, Switzerland: United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) and International Union for Conservation of Nature (IUCN).
- UNEP. (2014). *Water and Energy Efficiency: Information Brief*. Nairobi, Kenya: United Nations Environment Programme (UNEP).
- UNEP. (2019). *Air Pollution in Asia and the Pacific: Science-based Solutions Summary*. United Nations Environment Programme (UNEP).
- UNEP, ILO, IOE, & ITUC. (2008). *Green Jobs: Towards Decent Work in a Sustainable, Low-Carbon World*. Nairobi, Kenya: United Nations Environment Programme (UNEP), International Labour Organization (ILO), International Organisation of Employers (IOE), International Trade Union Confederation (ITUC).
- UNICEF. (2011). *Promoting Gender Equality: An Equity-Focused Approach to Programming: Operational Guidance Overview*. New York, USA: United Nations Children's Fund (UNICEF).
- UNICEF, & WHO. (2019). *Progress on Household Drinking Water, Sanitation and Hygiene 2000-2017: Special Focus on Inequalities*. United Nations Children's Fund (UNICEF) and World Health Organization (WHO).
- UNRISD. (2010). *Combating Poverty and Inequality: Structural Change, Social Policy, and Politics*. Geneva, Switzerland: United Nations Research Institute for Social Development (UNRISD).
- UNSTATS. (2020a). *Indicator 15.2.1: Progress Towards Sustainable Forest Management*. United Nations Statistics Division (UNSTATS).
- UNSTATS. (2020b). *Indicator 3.8.1: Coverage of Essential Health Services*. United Nations Statistics Division (UNSTATS).
- Wang, Z., Yang, J., Deng, X., & Lan, X. (2015). Optimal water resources allocation under the constraint of land use in the Heihe river basin of China. *Sustainability*, 7(2), 1558–1575.
- Wendling, Z. A., Emerson, J. W., Esty, D. C., Levy, M. A., de Sherbinin, A., Spiegel, N. R., ... Quay, A. N. (2018). *2018 Environmental Performance Index*. New Haven, CT: Yale Center for Environmental Law & Policy.
- WHO. (2015). *World Malaria Report 2015: Summary*. World Health Organization (WHO).

## Appendices

<b>Appendix 1</b>	Summary of methods for the Green Growth Index
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# Appendix 1

## Summary of Methods for the Green Growth Index<sup>1</sup>

### 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 policy making:

- 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 policy relevance of the indicators at the national and regional contexts.

#### A.2 Participatory Approach

The stakeholder engagement process was initiated in 2016 and completed in early 2019. The three main phases included:

1. Phase 1 – Pilot: GGGI developed a pilot version of the Index covering 34 GGGI member and partner countries<sup>2</sup>. 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 an 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.

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. 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<sup>3</sup> to validate the sustainability targets. These expert inputs from the online survey and consultations were used to finalize the Index.

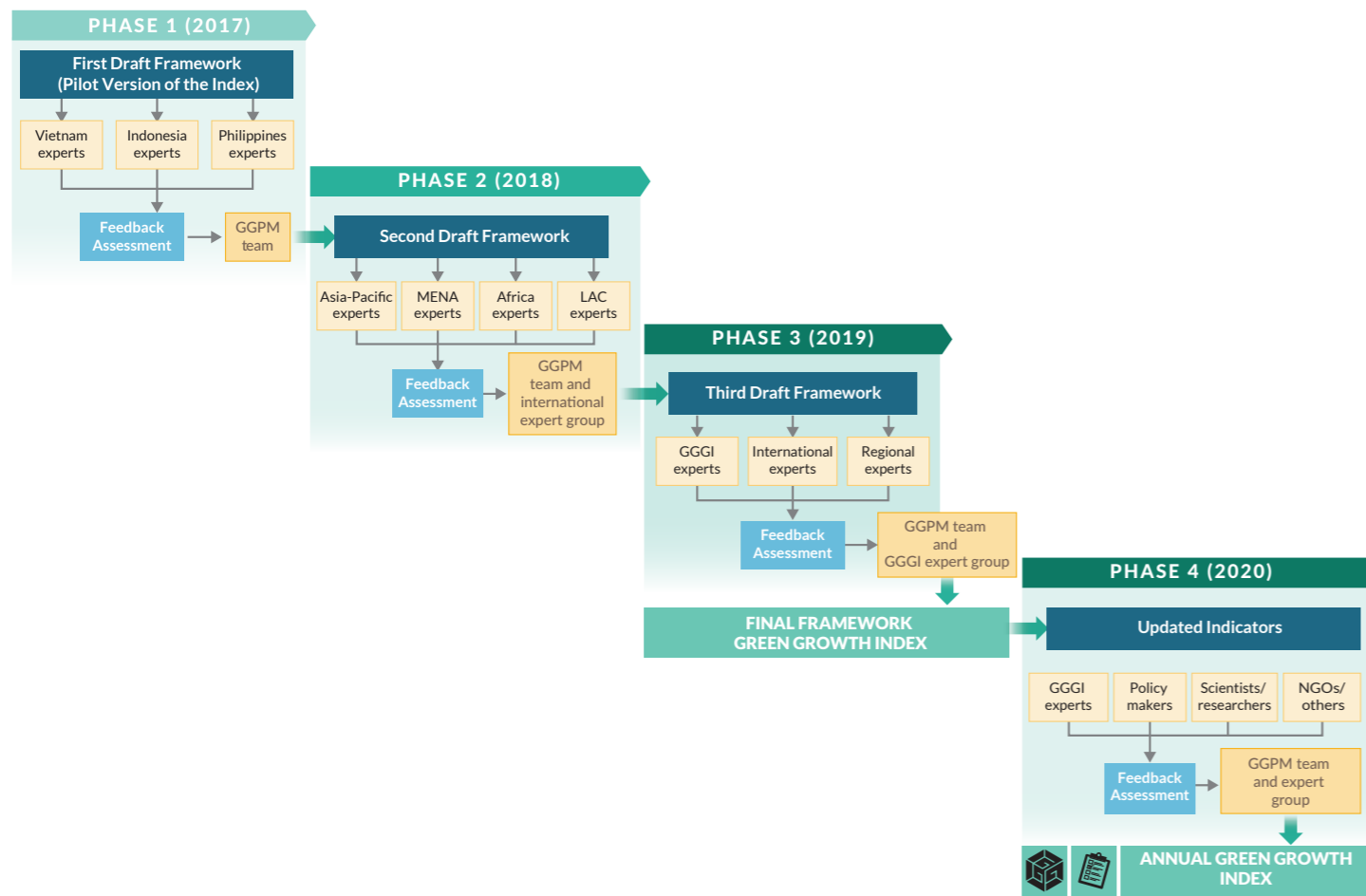
4. Phase 4 – Annual Expert Consultations: The fourth phase of the Index development process is the expert consultations which are conducted every year to continuously improve the indicators of the Green Growth Index. As discussed in chapter 5.3 Next steps forward and as indicated in Table 4, missing green growth indicators will need to be included and proxy variables will still need to be replaced with more relevant indicators when data become available in the next years. Detailed description of this year's consultations is discussed in chapter 5 Expert consultations and Appendix 2.

<sup>1</sup>Information in this Appendix was adapted from Acosta, L.A., C.O. Balmes, R.J. Mamiit, P. Maharjan, K. Hartman, O. Anastasia, and N.M. Puyo. (2019). *Assessment and Main findings on the Green Growth Index*, GGGI Insight Brief No. 3, Green Growth Performance Measurement, Global Green Growth Institute, Seoul, South Korea. [http://greengrowthindex.gggi.org/wp-content/uploads/2020/04/GGGI-Insight-Brief-No.-3\\_Final.pdf](http://greengrowthindex.gggi.org/wp-content/uploads/2020/04/GGGI-Insight-Brief-No.-3_Final.pdf)

<sup>2</sup>"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.

<sup>3</sup>IASS, PIK, FAO, SDSN and OECD.

**Figure A** Process for developing the framework of the Green Growth Index



## 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<sup>4</sup> (Figure B). A composite index combines a number of 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.

<sup>4</sup>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 B** Stepwise approach for developing the Green Growth Index



### B.2 Empirical Steps

The Green Growth Index was constructed through aggregation of the normalized indicators (metrics), indicator categories (pillars), and dimensions (goals) (Figure C). Prior to 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. Available data for all the indicators were scaled except for the GHG emissions, export of environmental goods, and patents of environmental technology. 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 statistical properties and normalized values of the indicators,<sup>5</sup> their values were capped using lower or upper fences based on the interquartile range from 75th and 25th percentiles. The aims of the correlation analysis are to identify redundant indicators with very strong correlation to improve the explanatory power of the indicators and verify whether indicators have acceptable levels of association in their respective dimensions. Indicators with very strong

correlation were excluded from the framework and replaced with ones having acceptable levels of association.

4. **Indicator weights:** The indicators have implicitly equal weights (i.e., no weights are attached to them). The explicit weights of the indicators are not equal because the number of indicators in each indicator category (or pillar) is not equal. The results from Principal Component Analysis validated the level of inequality in the explicit weights of the indicators. The results from Analytic Hierarchy Process revealed that there is low consensus among experts on the weights to be assigned to the indicators.
5. **Indicator normalization:** To translate the indicators with different units into a common scale, it is necessary to apply a normalization method. Through normalization, the indicator values measured in different units can 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.

The normalized indicators were used as inputs to the aggregation model (i.e., level 1) as presented. The two most common and simple methods of aggregation 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 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% 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% rule on

<sup>5</sup>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.

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 on the dimensions and the 25% rule on missing values was not applied. At this level of aggregation, no dimension was allowed to easily substitute the other dimensions to improve the Green Growth Index.

Python software was used to conduct all the analysis described above, except for the correlation analysis which was done in Prism (GraphPad Software). Detailed discussion on the steps involved in 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. 2019).

## C. Validating and Improving the Index

Composite indices often face criticism because they can be misleading if badly constructed and interpreted.<sup>6</sup> Thus, the final important step in developing a composite index is the evaluation of the confidence in the model and its underlying assumptions (i.e. robustness check).

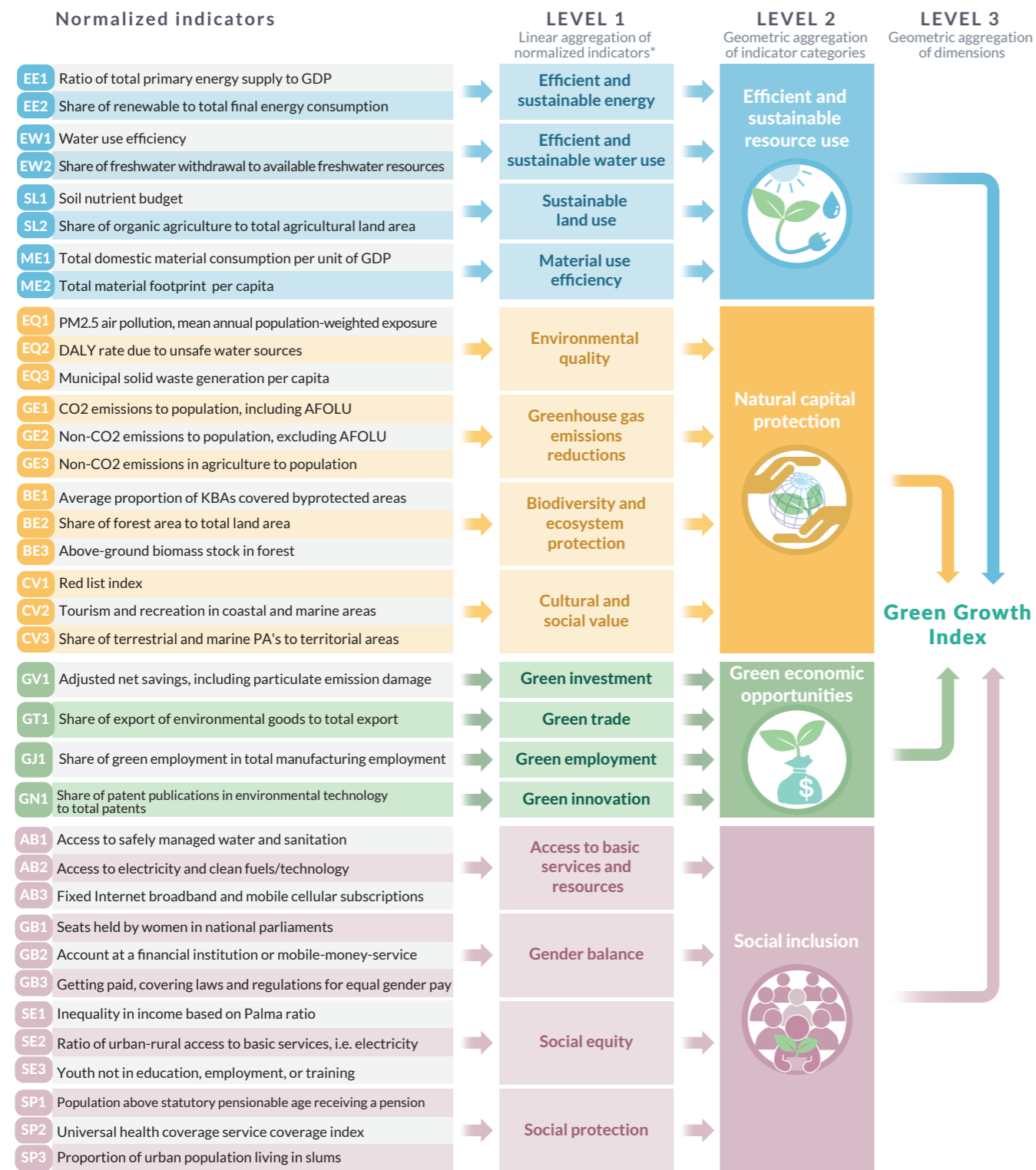
Three different types of analyses were conducted to validate the robustness of the Green Growth Index:

- Explanatory power: Using regression models, the ability of the indicators and their aggregated values (i.e., indicator categories, dimensions) to explain the structure of the Index was analyzed.
- Sensitivity analysis: The sensitivity of the Green Growth Index to changes in the input variables of the aggregation model at Level 1 was analyzed.

- Uncertainty analysis: The uncertainty analysis evaluates the impact of the assumptions made and methods used to build the model on the Index.

The results from the regression models suggested that sufficient variation in the Green Growth Index is explained by the dimensions, indicator categories, and indicators, while those from sensitivity and uncertainty analyses showed that the Green Growth Index is robust with respect to changes in model inputs and assumptions. Details of the results for the 2019 Green Growth Index are provided in chapter 5 of GGGI Technical Report Number 5, Green Growth Index: Concepts, Methods, Applications (2019) and GGGI Technical Report Number 9, Green Growth Index: Robustness Check (2019). Those for 2020 Green Growth Index will be published in a technical report that will be dedicated to the validation of the Index and its updated list of green growth indicators.

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



\*No aggregation for indicators of green economic opportunities

<sup>6</sup>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>



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# Appendix 4

## The GGPM Team



The GGPM team members during one of the online meetings from their respective work locations. From left to right and, from top to bottom: Sarah Gerrard, Hermen Gerrit Hendrik Luchtenbelt, Ruben Sabado, Jr., Michelle Nazareth, Simon Zabrocki, Benjamar Hope Flores, Jeremiah Ross Eugenio, Olivia Nanfuka, and Lilibeth Acosta.

**Lilibeth Acosta** is a Specialist in GGGI's Climate Action and Inclusive Development Division and Program Manager for the Green Growth Performance Measurement. Lilibeth has over 15 years of experience in indicator development, integrated assessment and scenario modelling of climate change vulnerability and adaptation as well as sustainable development in the fields of ecosystem and biodiversity, agriculture and land use, and renewable energy. She worked as development specialist in the National Economic Development Authority in the Philippines, senior scientist in the Potsdam Institute for Climate Impact Research in Germany, and researcher in Environmental Science departments in the universities in Japan, Belgium, UK and the Philippines. Before joining GGGI, she worked as consultant in the ADB, UNCCD and UNCTAD. She holds a PhD in Agricultural Policy from University of Bonn (Germany), MPhil in Economics and Politics of Development from University of Cambridge (England), and BSc in Agricultural Economics from the University of the Philippines.

**Jeremiah Ross Eugenio** is a GGPM researcher and member of the publication team of Sarena Grace Quiñones, who is coordinating editorial, layout, and research support to the GGPM. He has been part of Sarena's team since October 2019. His tasks include

literature review and preparation of references in Mendeley software, encoding of results from the online survey and reviews of online tools and literature, preparation of graphics for and analysis of these results, and provide research support to the modelling team of the Green Growth Index and Simulation Tool. He earned his Bachelor of Science degree in Agricultural Economics with major in marketing and prices from the University of the Philippines in Los Baños. He participated in various seminars that are relevant to the Index and Tool including farm tourism in the Philippines, assessment of neighborhood and spillover effects of technical efficiency of irrigated rice farms, and responding to food security and inclusiveness concern in the ASEAN region.

**Benjamar Hope Flores** joined the GGPM as intern in 2018 and consultant in 2019 supporting the preparation of the technical report on Green Growth Index which was published in 2019. This year, he is supporting the development of the Simulation Tool, particularly the models related to efficient and sustainable energy use. He works as teaching and graduate research assistant in the Seoul National University of Science and Technology, where he is currently doing his PhD study. He also worked as data collection specialist in the private firm Rho AI, consultant in the Smart

Communications, Inc., and as researcher in various institutions including the University of the Philippines and Department of Science and Technology, and Line Seiki Philippines Inc. He earned his degrees on Bachelor of Science in Electrical Engineering from the University of the Philippines in Diliman and Master of Science in Electrical Engineering from Seoul National University of Science and Technology.

**Sarah Gerrard** is a GGPM consultant for the 2020 Green Growth Index and Simulation Tool. Her work in GGPM has focused on results analysis for the 2020 Green Growth Index, in particular a subregional analysis of green growth dimensions as well as assessing top country performance. She has also contributed as a leading author to the publication of the 2020 Green Growth Technical Report. Sarah has further been working on the GGPM Simulation Tool, supporting the development of the efficient and sustainable resource use and green economic opportunities models. Before joining GGGI, she has previously worked in sustainable urban development by interning at the United Nations Economic and Social Commission for Asia and the Pacific (UN ESCAP). Sarah holds a Master of Environmental Science with a specialization in land and water management and a BSc in Environmental Science and Natural Resource Management, both from the University of Western Australia.

**Hermen Luchtenbelt** is a GGPM research consultant for the 2020 Green Growth Index and Simulation Tool. He joined the GGPM as an intern in May 2020 and as a consultant in November 2020. His main contributions to the simulation tool were with models related to natural capital protection, land-use, and greenhouse gas emissions. Other tasks included preparing the spatial maps in the 2020 Green Growth Technical Report. Before joining GGGI, he did field work at the Osotua foundation and supported in the development of a showcase for cattle, culture, and wildlife interactions in the Masai Mara. Hermen has a MSc in climate studies specialized in biogeochemical cycles and a MSc in Environmental Economics and Natural Resource Management at Wageningen University in the Netherlands. Before that he completed his BSc in Economics and Governance, specialized in Agricultural Economics at the same university.

**Olivia Nanfuka** joined GGPM team as intern in May 2020 and as consultant in the GGGI Country Office in Uganda in November 2020. She is contributing to the development of the Simulation Tool, particularly the models related to efficient and sustainable energy use. Her key areas of interest include improving access to modern energy; clean cooking energy and reliable electricity for rural communities (bio-energy, hydro and solar energy), energy efficiency and management, renewable energy policy, energy economics, savings and energy yield assessments. Before joining GGGI, she had experience working as Health and Safety Assistant in the JUAJAMII start-up company in Algeria as well as sustainability and policy intern in the Atacama Consulting, shift superintendent in the Bwendero Dairy Farm Limited Distillers, and teaching assistant in the Ndejje University in Uganda. She completed her BSc Chemical Engineering in the Ndejje University in Uganda and MSc Energy Engineering in Pan African University Institute for Water and Energy Science in Algeria.

**Michelle Nazareth** is a GGPM consultant for the 2020 Green Growth Index and Simulation Tool, contributing to the analysis of the results for the 2020 Green Growth Index and supporting the development of the models related to social inclusion. She also contributed to an article on social inclusion that was submitted by GGGI to an international journal. She worked as intern in the Environmental Synergies in Development and graduate research consultant in the United Nations Office for the Coordination of Humanitarian Affairs. She completed her Bachelor of Arts (Triple Major) in Economics, Sociology and Psychology in the Christ University in India and Master of Science in Development Management in the London School of Economics and Political Science.

**Ruben Sabado, Jr.** is a GGPM researcher and member of the publication team of Sarena Grace Quiñones, who is coordinating editorial, layout, and research support to the GGPM. He has been part of Sarena's team since July 2020. His tasks include literature review and preparation of references in Mendeley software, encoding of results from the online survey and reviews of online tools and literature, preparation of graphics for and analysis of these results, and provide research support to the modelling team of the Simulation Tool. He earned his Bachelor of Science degree in Agricultural Economics with major in marketing and prices from the University of the Philippines in Los Baños. He attended various seminars that are related to the Green Growth Index and Simulation tool such as the Philippine Rice Information System (PRISM) and success stories of the Farmer-Scientists RDE Training Program (FSTP).

**Simon Zabrocki** joined GGGI as programmer and modeler consultant in July 2020, with main tasks of developing an automated collection and processing of data for the Green Growth Index computation, designing user-friendly dashboards to allow policy makers exploring and analyzing Green Growth data and scores, and contributing to a policy simulation tool development by implementing and integrating models and policy scenarios. Before joining GGGI, he worked as data scientist in HawaDawa company on air quality management in Germany and in Sanofi, Biologics Development R&D in the United States, Python developer for an applicant tracking system in Manatal in Thailand, and teacher in Bac Ninh high School for gifted students in Vietnam. He earned his Bachelor in Engineering and Master of Science in Applied Mathematics in École Polytechnique in France, and Master Mathematics for Data Science in the Technische Universität München in Germany.



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