06

Results and discussion

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6.1 Dimensions by regions

Green Growth Index rankings are provided for countries within five geographic regions — Africa, the Americas, Asia, Europe, and Oceania — several of which include subregions. Table 8 presents the country groups by region and subregion which were used in this report. The United Nations' "geoscheme" (UN Secretariat Statistics Division, n.d.) serves as the basis for the grouping. Across all regions, scores for green growth dimensions are generally the highest for natural capital protection and social inclusion, and the lowest for green economic opportunities (Figure 19).

Europe performs significantly better than the rest of the regions, with an overall score of 80. This implies that many countries in this region have almost reached sustainability targets for social inclusion. The largest discrepancies in scores are evident for social inclusion, with Africa scoring the lowest, with below 40.

The regional scores for natural capital protection are relatively close, at around 60, with only Asia scoring below 60. Oceania slightly performs better than Europe in efficient and sustainable resource use. It is worth noting, however, that only six countries in Oceania have scores for this dimension (Table A1.5).

The scores for African and American regions are at par at 40, which are significantly lower than for Oceania and Europe. The lowest performing region for this dimension is Asia. Only Europe performs relatively well in green economic opportunities, albeit the score is still low, at 40. The Americas, Asia, and Oceania also score low for this dimension, at about 20. The score of about 17 percent for green economic opportunities in Africa is the lowest across not only regions but also dimensions.

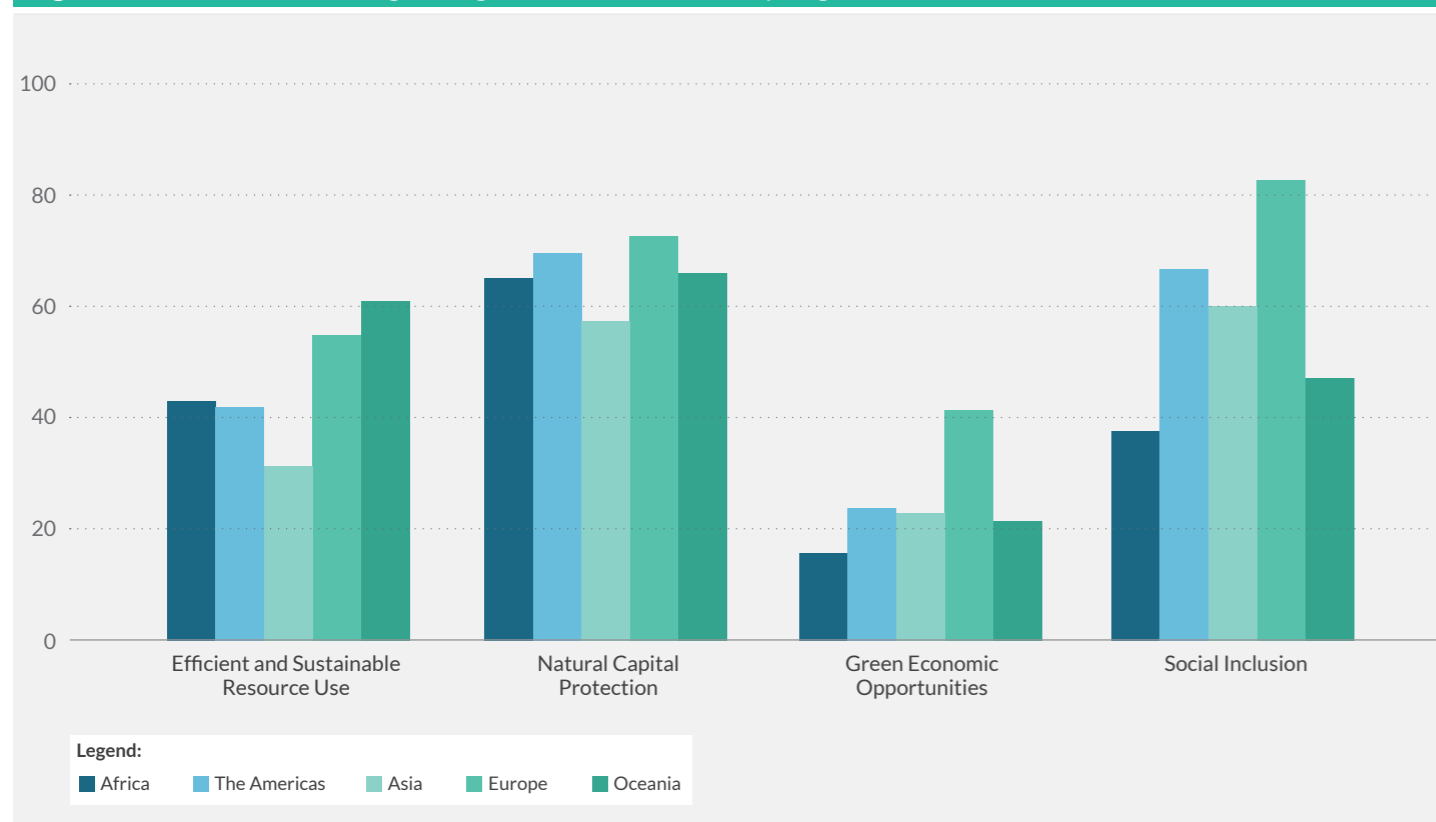**Figure 19** Performance in green growth dimensions by region

Table 8. Country groups by region and subregion

Region	Subregion	Countries/territories*
Africa	Eastern Africa	Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Malawi, Mauritius, Mozambique, Rwanda, Seychelles, Somalia, Sudan South, Tanzania, Uganda, Zambia, Zimbabwe
	Middle Africa	Angola, Cameroon, Central African Republic, Chad, Democratic Republic of Congo, Republic of Congo, Equatorial Guinea, Gabon, Sao Tome and Principe
	Northern Africa	Algeria, Egypt, Libya, Morocco, Sudan, Tunisia
	Southern Africa	Botswana, Eswatini, Lesotho, Namibia, South Africa
	Western Africa	Benin, Burkina Faso, Cabo Verde, Cote d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Togo
The Americas	Caribbean	Antigua and Barbuda, Aruba, Bahamas, Barbados, Cayman Islands, Cuba, Dominica, Dominican Republic, Grenada, Haiti, Jamaica, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, Turks and Caicos Islands, British Virgin Islands, U.S. Virgin Islands
	Central America	Belize, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama
	Northern America	Bermuda, Canada, Greenland, United States of America
	South America	Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay, Venezuela
Asia	Central Asia	Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan
	East Asia	China, Hong Kong China SAR, Japan, Democratic People's Republic of Korea, Republic of Korea, Macao China SAR, Mongolia
	Southeastern Asia	Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar Philippines, Singapore, Thailand, Timor-Leste, Viet Nam
	South Asia	Afghanistan, Bangladesh, Bhutan, India, Iran, Maldives, Nepal, Pakistan, Sri Lanka
	Western Asia	Armenia, Azerbaijan, Bahrain, Cyprus, Georgia, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, Syria, Turkey, United Arab Emirates, Yemen
Europe	Eastern Europe	Belarus, Bulgaria, Czechia, Hungary, Moldova, Poland, Romania, Russian Federation, Slovakia, Ukraine
	Northern Europe	Denmark, Estonia, Faeroe Islands, Finland, Iceland, Ireland, Latvia, Lithuania, Norway, Sweden, United Kingdom
	Southern Europe	Albania, Andorra, Bosnia and Herzegovina, Croatia, Gibraltar, Greece, Italy, North Macedonia, Malta, Montenegro, Portugal, Serbia, Slovenia, Spain
	Western Europe	Austria, Belgium, France, Germany, Liechtenstein, Luxembourg, Netherlands, Switzerland
Oceania	Australia and New Zealand	Australia, New Zealand
	Melanesia	Fiji, New Caledonia, Papua New Guinea, Solomon Islands, Vanuatu
	Micronesia	Guam, Kiribati, Marshall Islands, Federated States of Micronesia, Nauru, Northern Mariana Islands, Palau
	Polynesia	American Samoa, French Polynesia, Samoa, Tonga

Source: https://unstats.un.org/unsd/methodology/m49/
*Only includes countries/territories with scores for at least one green growth dimension.*

To better understand the estimated Green Growth Index results for each of the five regions, the sections below provide a more in-depth discussion on the scores related to resource efficiency, natural capital protection, green economic opportunities, and social inclusion at the subregional level.

6.1.1 Africa

The Green Growth Index includes results for five subregions in Africa — Eastern, Middle, Northern, Southern, and Western Africa (Figure 20) — and includes 21 countries for which data are sufficient across all dimensions (Table A1.5 in Appendix 1). Africa's countries score from very low to moderate, with Eastern African countries representing half of the ranked countries. Except for Southern Africa, the average Green Growth Index scores for the African subregions are below 40. Both natural capital protection and social inclusion contribute to the relatively better green growth performance in Southern Africa. Its score for social inclusion is highest in Africa, at over 60, which is mainly attributed to high performance in gender balance (Table A1.9). The high score for social inclusion in Southern Africa is not able to offset the low scores in other subregions, particularly Eastern and Middle Africa (Figure 20), resulting in Africa having the lowest score for social inclusion globally (Figure 19). Similar to most other African subregions, Southern Africa has a very low score for green economic opportunities.

Figure 20 Green Growth Index and dimension subindices in the African subregions
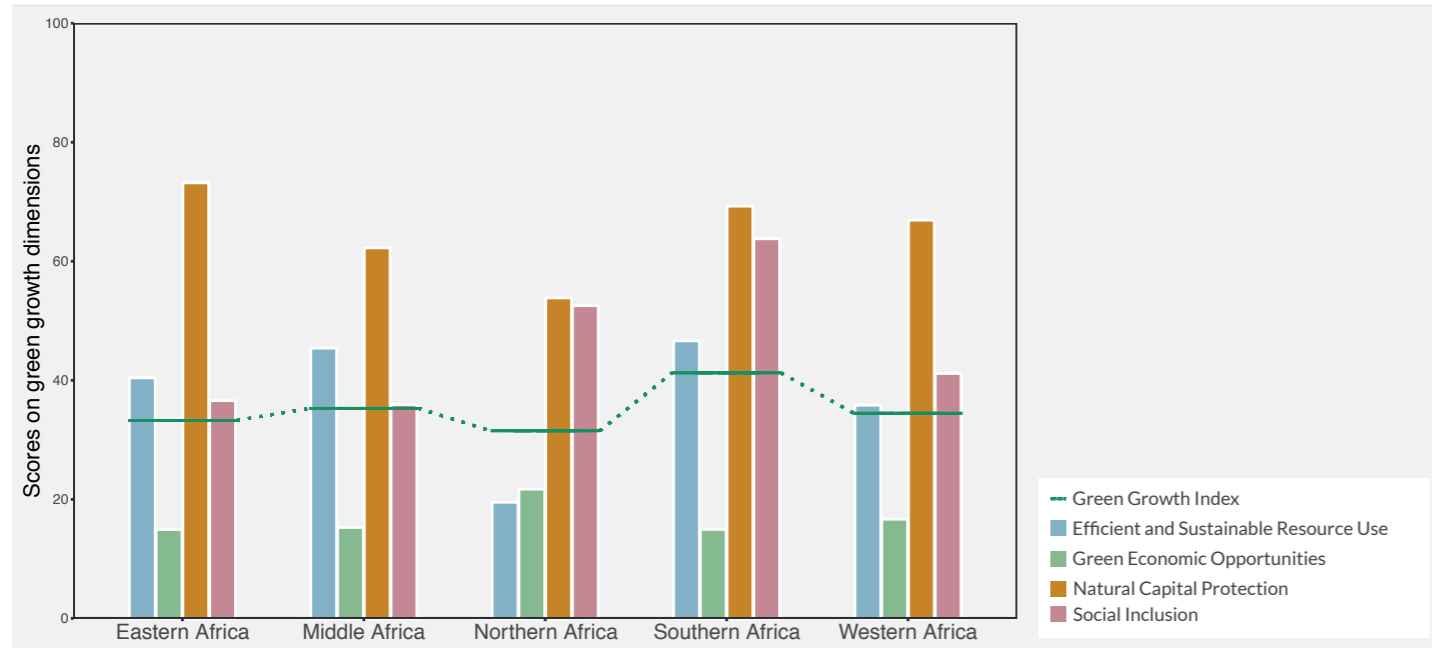
For Eastern Africa, natural capital protection is the main contributing dimension to its subregional Green Growth Index performance. It has the highest score for this dimension in the African region, of over 70 (Figure 20). Similar to many parts of Africa, the Eastern subregion has a rich natural resource base. For instance, Zambia in Eastern Africa scores 78 in natural capital protection, the fourth highest score in the region (Table A1.7). Zambia ranks as one of the global leaders in biodiversity and habitat protection. It has 635 protected areas covering nearly 38 percent of its territory (Wendling & Levy, 2018). A large part of these protected areas covers key biodiversity areas.

In contrast, Northern Africa lags behind the other subregions with the lowest score for natural capital protection (Figure 20). The United Nations Economic Commission for Africa reported that the Northern subregion has limited natural resources compared to other African subregions (UNECA, 2015), and most countries in the subregion remain natural resource-dependent (AfDB, 2018). Northern Africa has also the lowest performance in efficient and sustainable resource use, with an average score of less than 20. This is mainly attributed to the very low scores for this dimension in Northern African countries, such as Algeria and Egypt (Table A1.1). Not only in the Northern subregion, but generally Africa as a continent has a high resource use intensity. To produce USD1 of GDP, for example, most African countries need seven kilograms of domestic resources, about five times the global average (Giljum & Polzin, 2009). There is significant room to improve resource efficiencies across the continent, such as with respect to low-efficiency technologies being used in resource-intensive activities, such as agriculture and mining.

In almost all African subregions, performance in green economic opportunities is the lowest among the four green growth dimensions (Figure 20). In North Africa, the slightly higher score for green economic opportunities is mainly due to high green investment in Egypt and Morocco (Table A1.8). In many Northern African countries, however, not only the scarcity of natural resources but also the "limited funding capacity, lack of expertise, poor access to technology, ineffective innovation systems, and the diminutive scope of the domestic market" constrain the scale-up of green economic opportunities in the subregion (UNECA, 2015: p.ix). Northern Africa has low levels of local skills as well as limited physical infrastructure to support green economic initiatives. To accelerate green economic opportunities, and increased its Green Growth Index score, the subregion will require enhancement of local skills and improvement to infrastructure.

6.1.2 The Americas

The Americas have four subregions – the Caribbean, Central America, Northern America, and South America. With an average index score of above 50, Northern America has the highest green growth performance in the Americas (Figure 21). This can be attributed to the United States and Canada leading the region in the social inclusion dimension with scores of over 80 (Table A1.2 in Appendix 1). Both Canada and the United States mainstream social inclusion in their policy priorities. In the region, the United States ranks first in GDP share spent on social programs as well as in promoting financial inclusion and empowerment by gender (Americas Quarterly, 2016). But Northern America's performance in natural capital protection lags behind the other subregions, due mainly to low scores in GHG emission reductions (Table A1.7). Meanwhile, its overall performance in efficient and sustainable resource use is comparable to other subregions, except for the Caribbean, which has a low score for this dimension.

Figure 21 Green Growth Index and dimension subindices in the American subregions
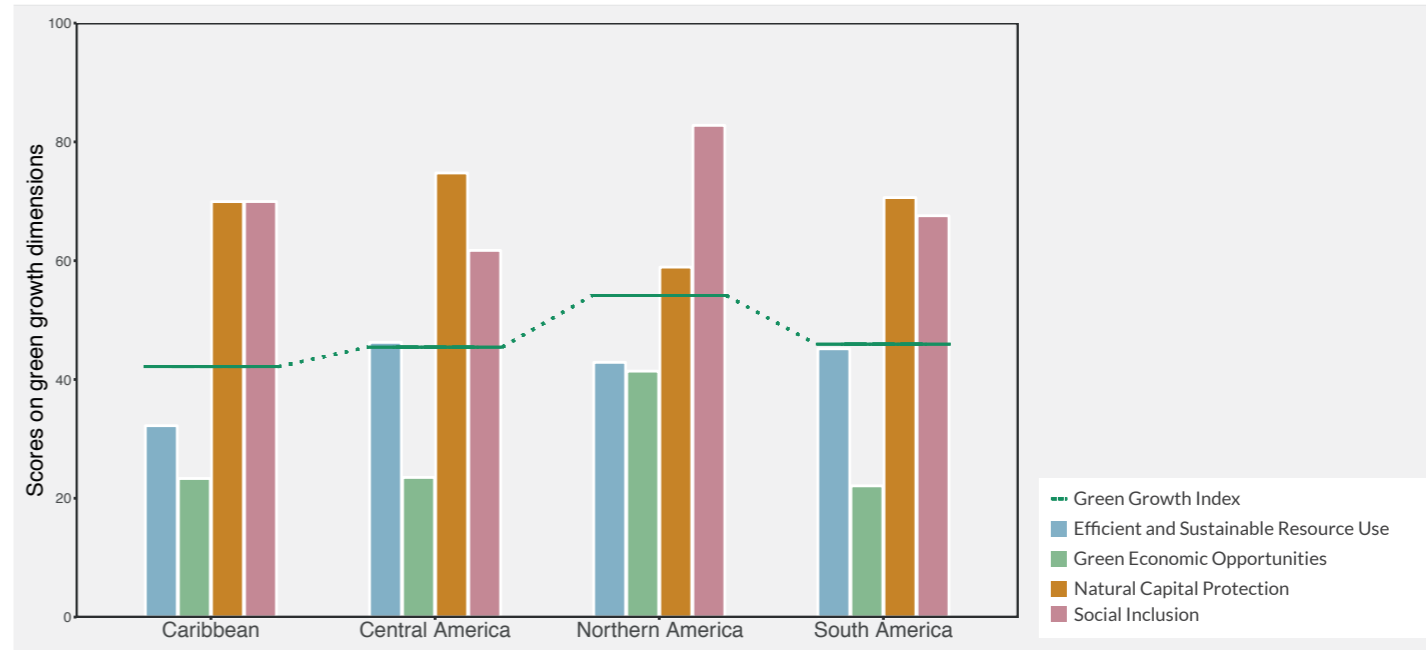
Central America is the region's frontrunner in the natural capital protection with a score of over 70 and, together with South America, has the highest score in efficient and sustainable resource use (Figure 21). Considered one of the world's biological hotspots, it is no surprise that Central America leads the region in natural capital protection. One of the forerunners in the subregion is Costa Rica, which pioneered the implementation of the payment for ecosystem services (PES) scheme to conserve its forest and water resources (Barton, 2013). The current set of indicators for green economic opportunities does not cover PES due to a lack of data. The score for this dimension is thus currently low for Costa Rica at about 23 (Table A1.2). In the last four years, however, it is important to note that Costa Rica also generates at least 95 percent of its electricity from renewable energy resources (Rodriguez, 2019). Costa Rica's score for efficient and sustainable energy is 81 (Table A1.6).

The Caribbean has the lowest score for efficient and sustainable resource use which, together with a low score in green economic opportunities, makes it the least performing subregion in the Americas. The low score for efficient and sustainable resource use in the Caribbean is mainly due to the very low score of Trinidad and Tobago, with only 19 (Table A1.2). The Dominican Republic, meanwhile, has a score of 55, which is higher than that of the United States and Canada. In recent years, the Dominican Republic introduced aggressive policies and initiatives for higher energy efficiency. For example, in 2018, UNEP reported that the Dominican Republic had set out a plan to be the first all-LED lighting island nation, an initiative that may result in approximately USD 120 million annual savings in electricity costs (UNEP, 2018a).

Excluding the scores for efficient and sustainable resource use, South America's scores are comparable to the Caribbean. The score for this dimension for South America is higher than that for the Caribbean and almost the same level as those for Central America and Northern America (Figure 21). Uruguay is one of the forerunners in efficient and sustainable resource use in South America and ranks the highest in efficient and sustainable energy, where the country scores very high, at 93 (Table A1.6). About 80 percent of the country's power system is based on renewables and, similar to Costa Rica, almost all its electricity is generated through renewable energy (IRENA, 2018). In 2018, Uruguay invested 3 percent of its GDP in the renewable energy sector, creating over 11,000 jobs (Proaño, 2018). Uruguay's score for green investment is 70, while for green employment is only 8 (Table A1.8). The Green Growth Index currently lacks an indicator for employment in renewable energy due to lack of data, hence the very low score for green employment for Uruguay.

6.1.3 Asia

Asia consists of five subregions — Central Asia, Eastern Asia, Southeastern Asia, Southern Asia, and Western Asia. East Asian countries dominate the Asian region in the social inclusion dimension (Figure 22), with Japan scoring 83, the highest in the region after Singapore (Table A1.3 in Appendix 1). Despite this, the overall green growth performance in Eastern Asia is comparable to Southeastern Asia due to the higher scores for efficient and sustainable resource use and natural capital protection in the latter subregion. On the one hand, East Asian countries, including China and Japan, have very low scores for sustainable land use, mainly due to a very low share of organic agriculture to total agricultural land area (Table A1.6 and Table A1.10). On the other hand, Southeastern Asian countries have the highest score for the natural capital dimension, mainly due to the subregion's rich biological diversity.

Figure 22 Green Growth Index and dimension subindices in the Asian subregions
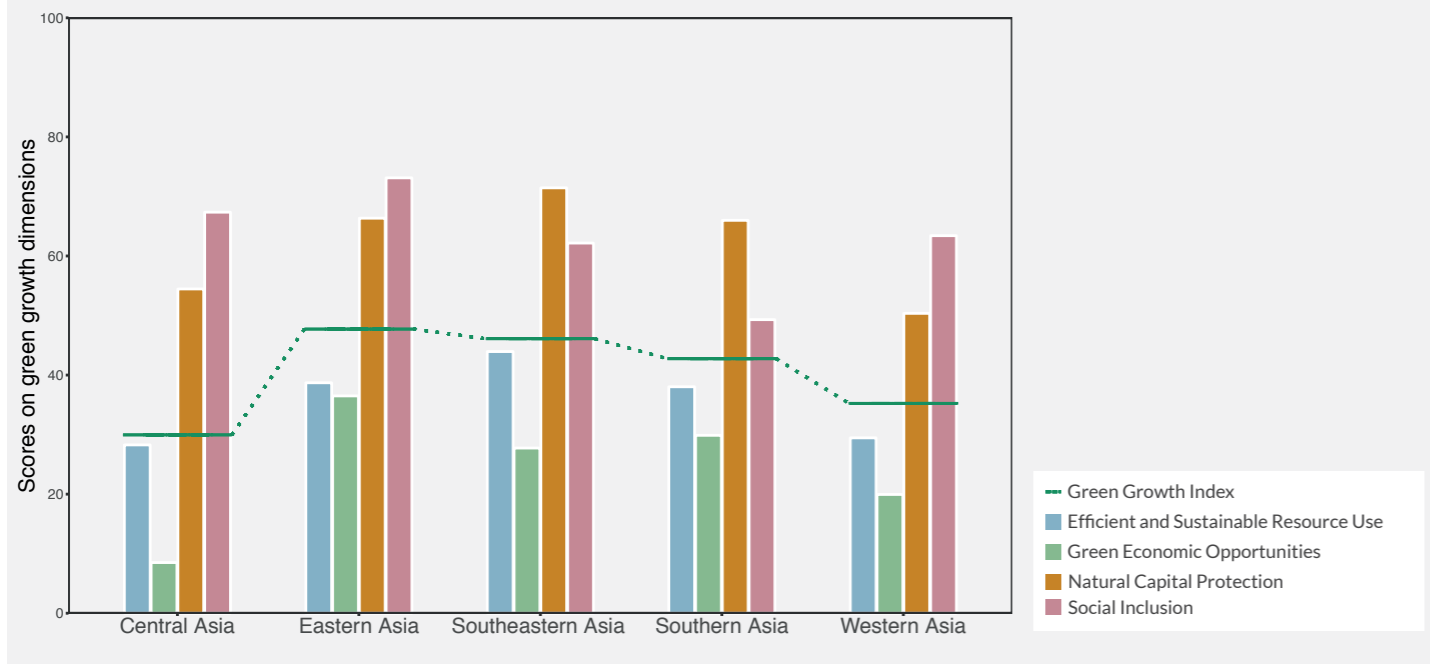
The ASEAN Centre for Biodiversity has reported that Southeastern Asia has the highest mean proportion of country-endemic bird and mammal species, at 9 and 11 percent, respectively, compared to other world regions (Sodhi, et al. 2010). This high species diversity and endemicity partly brought about the high natural capital protection score for Southeast Asia. Almost half of the 10 best performers in natural capital protection are countries from the Southeastern subregion which can be attributed to comparatively higher GHG emission reductions and biodiversity and ecosystem protection, with scores of at least 75 and 70, respectively (Table A1.7). Scores for these natural capital protection indicators in East Asia are lower: below 75 for GHG emission reductions and below 60 for biodiversity and ecosystem protection in countries such as China, the Republic of Korea, and Mongolia.

After Eastern Asia, Central Asia has the second highest score for social inclusion in Asia (Figure 22). Central and Eastern Asia's high social inclusion ratings are commensurate to the public policies and initiatives implemented in countries such as the Republic of Korea, Japan, and Kazakhstan. The three countries provide 100 percent access to basic services, such as electricity. The population of the Republic of Korea also has 100 percent access to fiber Internet subscriptions, demonstrating full accessibility of information, communication, and technology services (Schwab, 2018).

While Central Asia shows promising scores for the social inclusion dimension, it is performing worse in green economic opportunities compared to other subregions. The same pattern is apparent in Western Asia, with only a low score for green economic opportunities. The lack of patents supporting green investment and trade in countries such as Qatar, Iraq, and Jordan contributed to the low green economic opportunities score for Western Asia (Schwab, 2018). Except for Georgia and Oman, the scores for green economic opportunities in the subregion are lower than 30 (Table A1.8), which is mainly due to a very low share of export of environmental goods (Table A1.12)

The Southern subregion has the lowest score for social inclusion. This is attributed to a very low performance in gender balance and social protection in many South Asian countries (Table A1.9). Except for Nepal, the scores for the proportion of seats held by women in national parliaments are less than 50 (Table A1.13). Moreover, Afghanistan, India, and Pakistan have the lowest scores of only 1 for gender-equal employment payment. The "patriarchal values and social norms keep gender inequalities alive" in the Southern Asia subregion, where "discriminatory practices begin even before birth" (UNICEF, n.d.). Except for Sri Lanka scoring 60 in access to health care, many other countries in South Asia have scores below 30 for this indicator (Table A1.13). Sri Lanka's government provides universal health coverage (Perera, 2015).

6.1.4 Europe

As a region, Europe has the strongest overall performance, with scores that are mostly high (Table A1.4 in Appendix 1). The four subregions — Eastern, Northern, Southern, and Western Europe — have scores for natural capital protection and social inclusion dimensions ranging from high to very high (Figure 23). Scores for social inclusion are very high in Northern and Western Europe. Most countries in both subregions are welfare state economies, where governments ensure the socio-economic well-being of the population. Countries implement programs and initiatives supporting social and economic inclusiveness, including the provision of free health care services for all. Although reforms are still underway, social inclusion is at the heart of national priorities. Countries such as Sweden and Germany have been expanding social policies related to work-life balance, wages, and education, contributing to the high social inclusion score for Europe (Bonoli & Natali, 2012).

Figure 23 Green Growth Index and dimension subindices in the European subregions
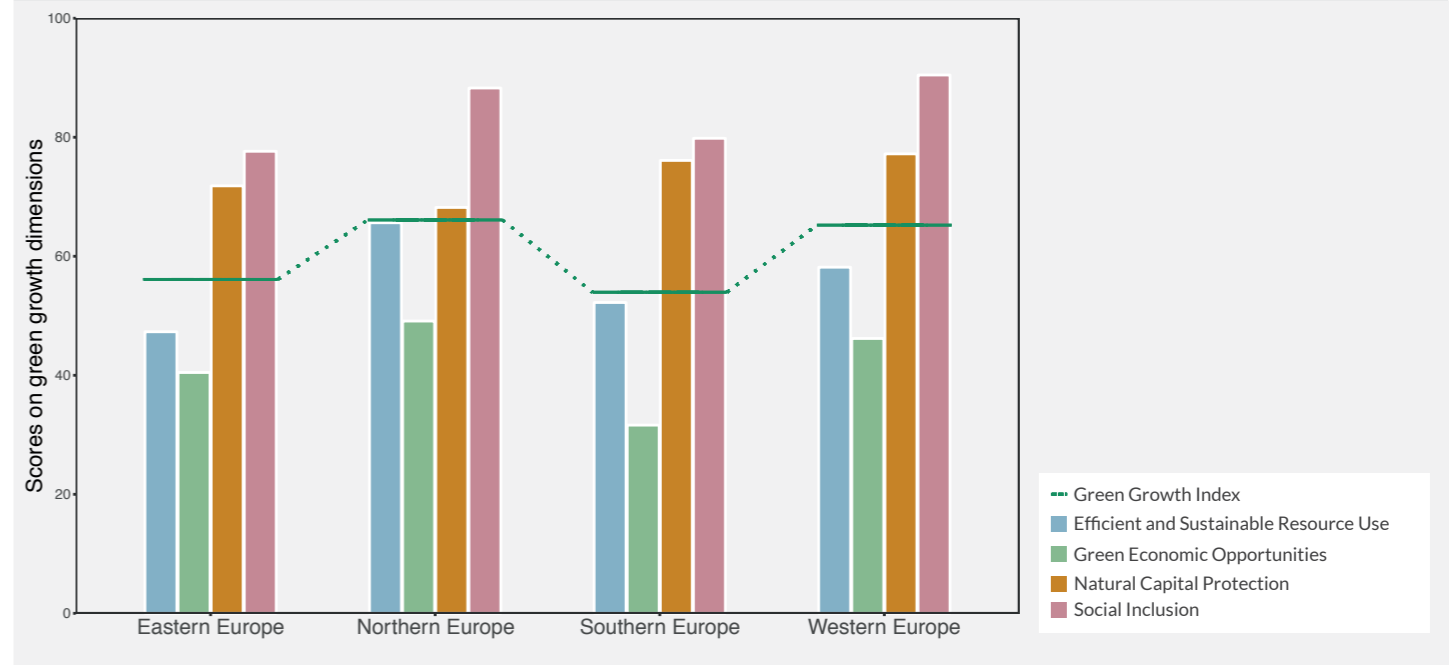
Intensive resource use has propelled economic development in Europe. Although members of the European Union support resource efficiency through the Europe 2020 strategy (European Commission, 2011), the overall score for efficient and sustainable resource use is only high in Northern Europe. Scores for this dimension remain at a moderate level in other subregions, inlcuding Western Europe (Figure 23). Except for Austria, which scores 72 for efficient and sustainable resource use, the rest of the subregion have scores below 60 for this dimension due to low performance in sustainable land use (Table A1.6). Although the share of organic farming in the food market has increased in Western Europe and stimulated organic agriculture exports to the subregion (Skrodzka, 2017), agricultural production in Western European countries remains predominantly intensive. The main reason for poor performance in sustainable land use is low soil organic carbon content resulting from intensive agriculture. Environmental issues related to air and water have been addressed through environmental regulations, but those "associated with soil degradation have been given marginal consideration" (Virto et al., 2015: p.334). The scores for sustainable land use are only 30 for the Netherlands and Austria; 25 for Germany and Belgium; and 21 for France (Table A1.10).

All the subregions, except for Southern Europe, have moderate ratings for green economic opportunities. (Figure 23). The low performance for this dimension in Southern Europe is due to the scores of below 10 for Montenegro, Bosnia and Herzegovina, and Malta (Table A1.8). The lack of green innovation and little opportunities for green employment are the main reasons for these very low scores. Unlike other European Union countries from the South, Malta performs very low on both indicators, with scores of 1, and thus has the lowest index rank in Europe. Although Malta's Eco-Innovation Index has improved, it continues to face challenges that affect its green innovation, including the lack of space and local resources, energy dependency, water scarcity, and waste management (European Commission, 2019a).

Eastern Europe's performance as a whole is only slightly better than Southern Europe's. Its score on green economic opportunities is more comparable to those for Western Europe (Figure 23). On social inclusion, its score is slightly lower than Southern Europe's. This is caused by only moderate scores for gender balance in Ukraine, Russian Federation, and Moldova (Table A1.9). Ukraine has the lowest score for gender balance in Europe. Although Ukraine is committed to adhering to international frameworks on gender equality and women empowerment, it continues to face challenges in implementing them. These include not only patriarchal attitudes and stereotypes but also governance issues, such as weak rule of law and low institutional capacity to support gender equality (United Nations, n.d.).

6.1.5 Oceania

Oceania comprises four subregions — Australia and New Zealand, Melanesia, Micronesia, and Polynesia. While subregional analyses are possible for the other world regions, data limitations in Oceania confines the subregional assessment to Australia, Fiji, and New Zealand. As a result, the presentation of the scores for the Green Growth Index and the four dimensions are at the country levels.

Although the trend for Australia and New Zealand is consistent with the other world regions in terms of social inclusion, that for Fiji shows the opposite (Figure 24). One reason for this apparent difference is the economic performance of the countries. Similar to most of the countries in the other Oceania subregions, Fiji is a developing country, while Australia and New Zealand are developed nations that follow the welfare state model, which supports social inclusion. This explains the lower score for social inclusion in Fiji.

Figure 24 Green Growth Index and dimension subindices in the Oceania countries
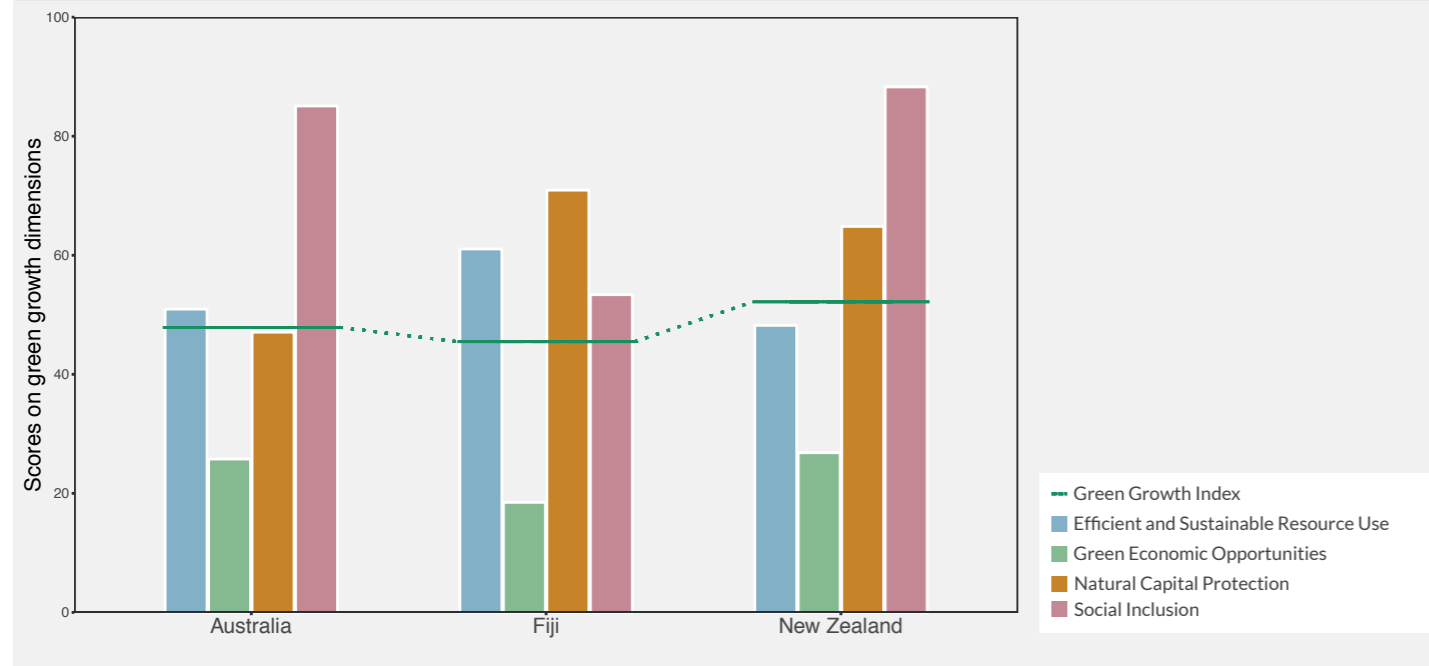
Fiji and the other countries in Melanesia, Micronesia, and Polynesia have higher ratings in the natural capital dimension than Australia and New Zealand. Palau, American Samoa, and Northern Marianas have the highest scores, above 75 (Table A1.5 in Appendix 1). The Pacific islands and territories have unique and diverse ecosystems, which are traditionally integrated into the ways of living of the local and indigenous communities (Jupiter et al., 2014). In terms of

green economic opportunities, Australia and New Zealand are the region's leaders, while Fiji, Samoa, Vanuatu, and Papua New Guinea outperform Australia and New Zealand in resource efficiency, with scores above 55 (see Appendix A, Table 5). Land area and population are factors that likely contribute to the difference in scores, as Fiji's land area is 15 times smaller than New Zealand's and its population is one-twenty-seventh that of Australia (WB, 2016).

6.2 Top Country Performance

The top-ranking countries by region are Denmark in Europe, with an index score of 75.32; Singapore in Asia, with an index score of 58.53; the Dominican Republic in the Americas, with an index score of 55.10; New Zealand in Oceania, with an index score of 52.17; and Botswana in Africa, with an index score of 45.88 (Figure 25). Figure 25 shows the scores of the indicator categories used to compute the Green Growth Index for these five countries. The integration of

the benchmarking method in the normalization process allows for measuring the distance of the indicators to the sustainability targets, that is, that a score of 100 means the target was reached (chapter 5.6.2). Note that many of the targets refer to the SDG targets for 2030 (Table 4). Moreover, other targets are not based on the SDGs but on mean values of top five performers for a given indicator; this implies that at least three countries have already reached the targets.

Figure 25 Distance to targets of green growth indicators in top performing countries by region
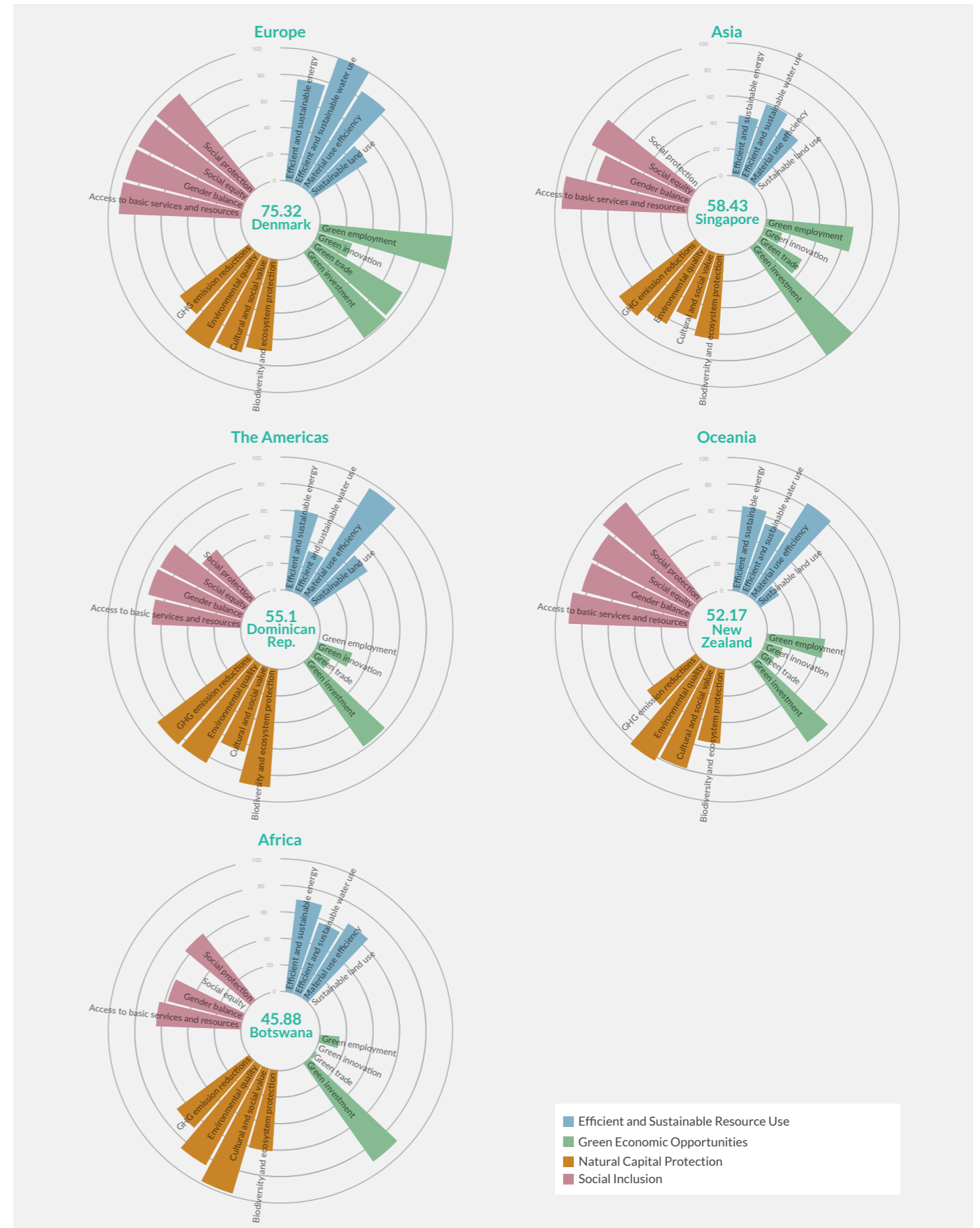
Denmark has reached targets for efficient and sustainable water use and green employment (Figure 25). Denmark has made significant improvements in its water consumption, consuming an average of only 104 liters of water per person a day in 2016 and decreasing further to 103 liters in 2017 (DANVA, 2017; Christian, 2018). Green jobs are rapidly increasing in Denmark, particularly in the industrial sector (State of Green, 2018). Denmark also performs well in all four pillars of social inclusion, almost reaching the targets, with scores higher than 80. With a score of 92 for social inclusion, Denmark comes close to the top performer globally, Sweden, which scores almost 94 (Table A1.4 in Appendix 1). Sweden holds the second highest score for the Green Growth Index, with score only slightly lower than Denmark's.

Singapore has reached the target for green investment (Figure 25), which is represented by adjusted net savings minus natural resources and pollution damages. As one of the few economically developed countries in Asia, it also performs well in providing access to basic services and resources to its population, with a score of 84. However, its performance in efficient and sustainable resource use is the lowest compared to the top countries in the other regions. Singapore's manufacturing industry is responsible for about half of its electricity consumption, which is causing challenges in the adoption of energy-efficient practices and technologies (Sioshansi, 2013). A low score for efficient and sustainable resource use, however, may also be attributed to the lack of data on sustainable land use.

The Dominican Republic almost reached the targets for material use efficiency as well as for biodiversity and ecosystem protection (Figure 25). The country is considered unique as far as protection of natural resources is concerned, with protected areas making up 25 percent of its land area and 54 percent of its territorial seas (Dudley, Boucher, Cuttelod, & Langhammer, 2014). The Dominican Republic also excels in other pillars for natural capital protection, including GHG emission reductions and environmental quality. However, performance in green economic opportunities is not very promising, with very low and low scores for green trade and innovation, respectively. The government has so far

allocated 0.03 percent of its GDP to innovation (Dominican Today, 2019). Innovation on green products could help the country promote green exports. The Dominican Republic lacks data on green employment, which also affects its score for green economic opportunities.

New Zealand has very high scores for all pillars of social inclusion, particularly for social protection (Figure 25). The need to promote equal opportunity for indigenous peoples has driven the country's social policy (Humpage, 2006). When it comes to natural capital protection, the country, although on its way to achieving targets for environmental quality and cultural and social value, has only moderate scores for biodiversity and ecosystem protection and for GHG emission reductions. Agriculture contributes significantly to GHG emissions, and industrial practices contribute to biodiversity degradation (Smith, 2015). New Zealand also receives very low scores for sustainable land use in connection with agricultural practices.

Botswana performs very well in most pillars for natural capital protection, particularly for cultural and social value and environmental quality (Figure 25). The government is actively taking part in preserving wildlife and habitats as part of a strategy for sustainable tourism (Ledger, 2017). Going forward, it is possible that the government's recent decision to lift its ban on hunting elephants to address impacts of the high elephant population on agricultural livelihoods (Burke, 2019) will lead to reduced scores in this area. Botswana scores very high on green investment but very low on green employment and green trade. The country's trade performance in nontraditional commodities is weak and low-tech (Baker, 2019), indicating opportunities for strengthening green trade.

It is worth noting that among the five top-ranking countries, Botswana has the largest data gap (7 indicators or 19 percent), mainly on indicators for social inclusion (Table A1.14 in Appendix 1). Dominican Republic and Singapore have missing data for only two and three indicators, respectively. Data for all indicators for Denmark and New Zealand are available.

6.3 Exceptional country performance

The results of the subindex for efficient and sustainable resource use have shown few exceptional performances for the region in Africa (Figure 2). Countries such as Chad (76), the Congo Republic (84), and Gabon (79) have high to very high scores for this dimension (Table A1.6 in Appendix 1). Their scores are higher than those for

Denmark, which is the top-ranking country with the highest global score in the Green Growth Index. Figure 26 shows that the three African countries perform better than Denmark in most of the indicators for efficient and sustainable resource.

Figure 26 Indicators for efficiency and sustainable resource use for countries with exceptional performance
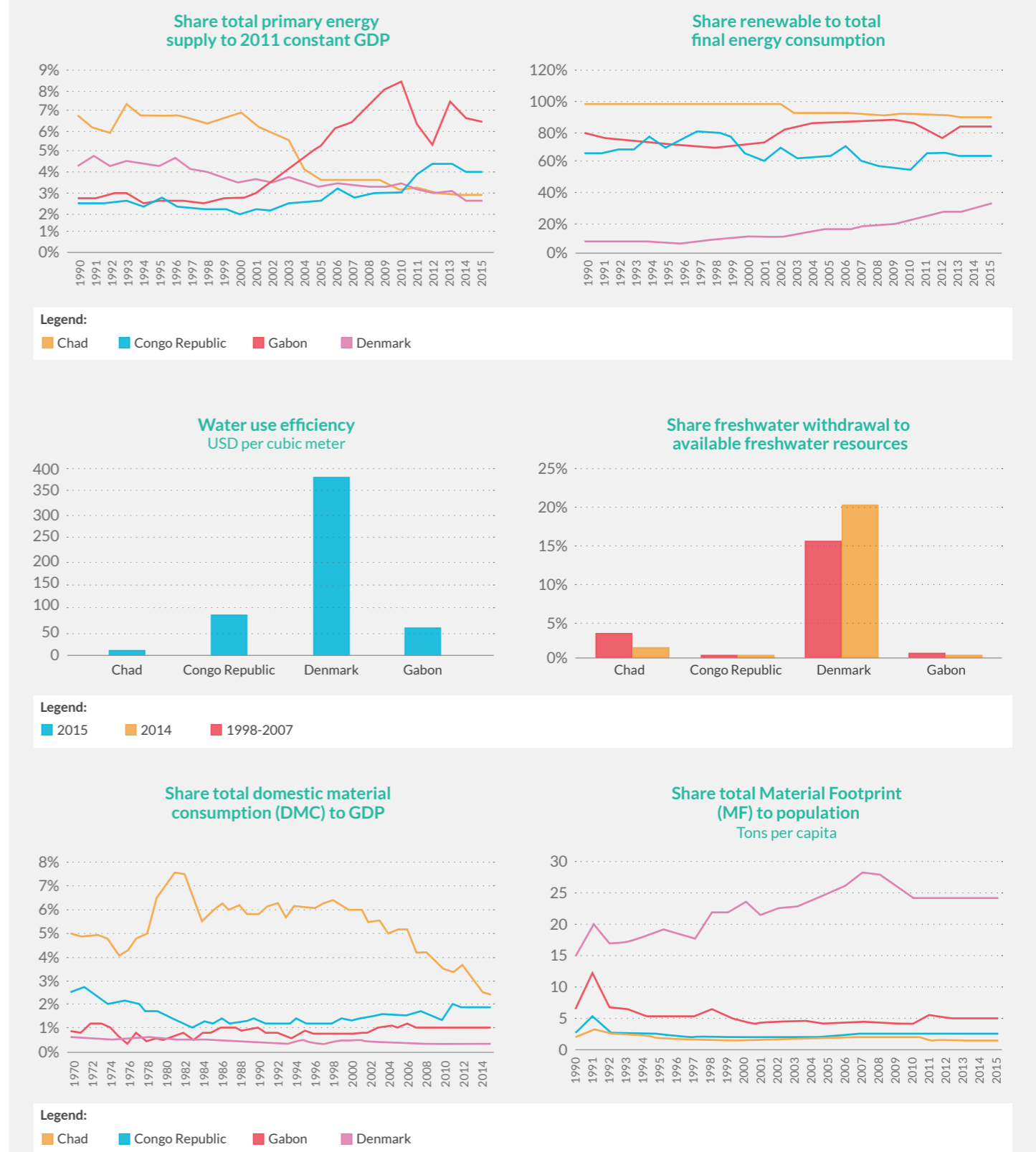
Note: Sources of the data are described in Acosta (2019).

Except for Gabon, where the share of total primary energy supply to GDP has been increasing, the trend in the other countries shows either a significant decline, such as in the case of Chad, or relatively stable over time, such as in the case of the Congo Republic and Denmark (Figure 26). By 2015, Chad had reached the same level as Denmark. Chad has also the highest share of renewable energy to final energy consumption as compared to the other two African countries. Although Denmark has shown an increasing trend in share of renewable energy from 1990 to 2015, it continued to have much lower share than the African countries. It is worth noting here that the indicator on renewable energy, representing SDG Indicator 7.2.1 of the SDG Indicator, includes hydro, solid biofuels, wind, solar, liquid biofuels, biogas, geothermal, marine, and waste (UNSTATS, 2019). This very high renewable energy share of energy consumption is due to two main factors. In Gabon and the Congo Republic, a large share of net electric generation comes from hydropower, usually large dams (UNEP, 2017a). In the Congo Republic, this share is 53 percent, and in Gabon 43 percent in 2015 (IEA, 2015). A second major phenomenon is the inadequacy of the electric sector, leading to the use of biomass, such as charcoal and wood, as the major energy source. In Gabon, this is less the case; in the Congo Republic, only 66 percent of the population had access to electricity in 2017, while in Chad as low as 11 percent in 2017 (WB, 2019a). This implies biofuels dominate the energy mix, but they are not used in a sustainable way or respecting natural capital.

Although water use efficiency is very high in Denmark, it has a much higher share of freshwater withdrawal to available freshwater resources than the three African countries (Figure 26). Gabon and the Congo Republic have a very large amount of freshwater available due to climatic and geographic conditions. Both countries have extensive surface and groundwater, including rivers and aquifers (UN, 1989). Chad has a very large aquifer — Lake Chad Basin — but most groundwater use is done through small-scale shallow wells with very little quantity. Thus, the share of freshwater withdrawal to available freshwater resources is comparatively quite low. Nevertheless, the Lake Chad Basin aquifer is very sensible to climate change, and in recent years, a significant drop in groundwater recharge has been detected (GWP, 2013).

With regard to material use efficiency, the share of total domestic material consumption (DMC) to GDP is very low not only in Denmark but also in the Congo Republic and Gabon (Figure 26). Chad has a higher level because of its low GDP and dependence on the primary sector (e.g. farming, grazing, mining, forestry, fishing, etc.), which is 45 percent of the GDP in 2018 (WB, 2019b). Nevertheless, the value of this indicator was one-third below the world average in 2015. This could be attributed to low development and inefficient use of materials in industries, and the dependence of the economies on agriculture and/or oil production.

In Denmark, the share of material footprint to population is high and increasing, while in African countries, this has remained relatively stable at a low level. Material consumption correlates to the standard of living. Chad has the lowest material footprint and has a GDP per capita of USD1,745 (constant 2011 PPP) in 2017 (WB, 2019c). The Congo Republic has a slightly higher material footprint and had a GDP

per capita of USD5,024 in 2018. Finally, Gabon, which had a much higher GDP per capita of USD15,922 in 2018, has more than thrice the material footprint of Chad. Figure 27 shows that low material footprint per capita is not a distinct characteristic of these three African countries, which have low-income levels. Many other low-income countries have low material footprint (MF) per capita. And as income level increases, the values for this indicator also increases.

Figure 27 Scatter plot of material footprint (MF) per capita according to income group
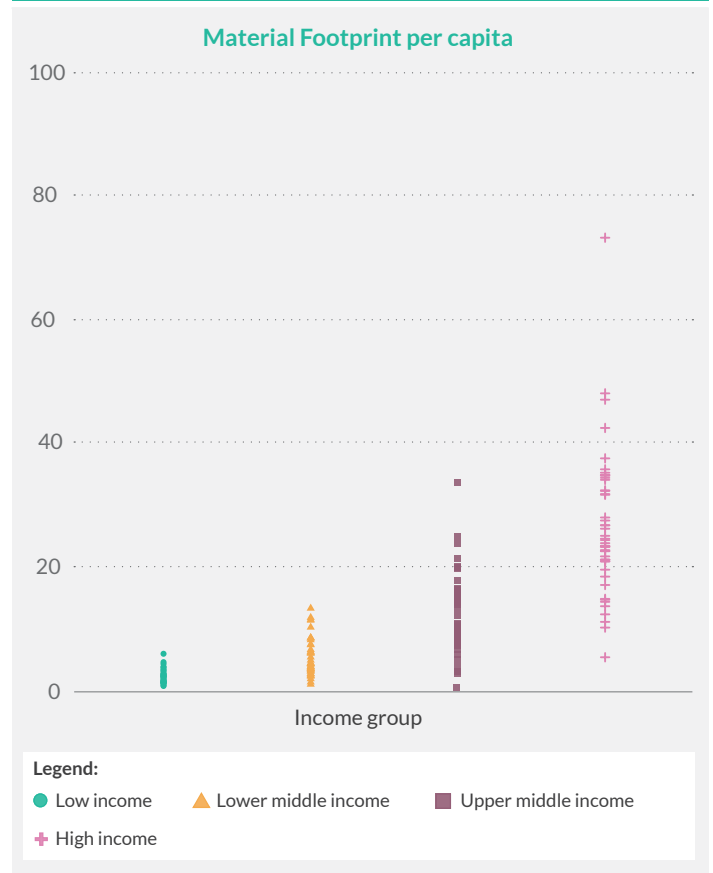
All in all, these values for Chad, Gabon, and the Congo Republic on the efficient and sustainable resource use can be explained by the nature of the indicators for this dimension. These countries have high renewable energy use because of their use of hydropower and biomass. Their energy efficiency is high because of low electric production and connection to an electric grid, usually concentrated in cities. Low water use with high freshwater stocks raises the subindex even more, with low material footprint on the production and consumption side further contributing to high values for this green growth dimension.