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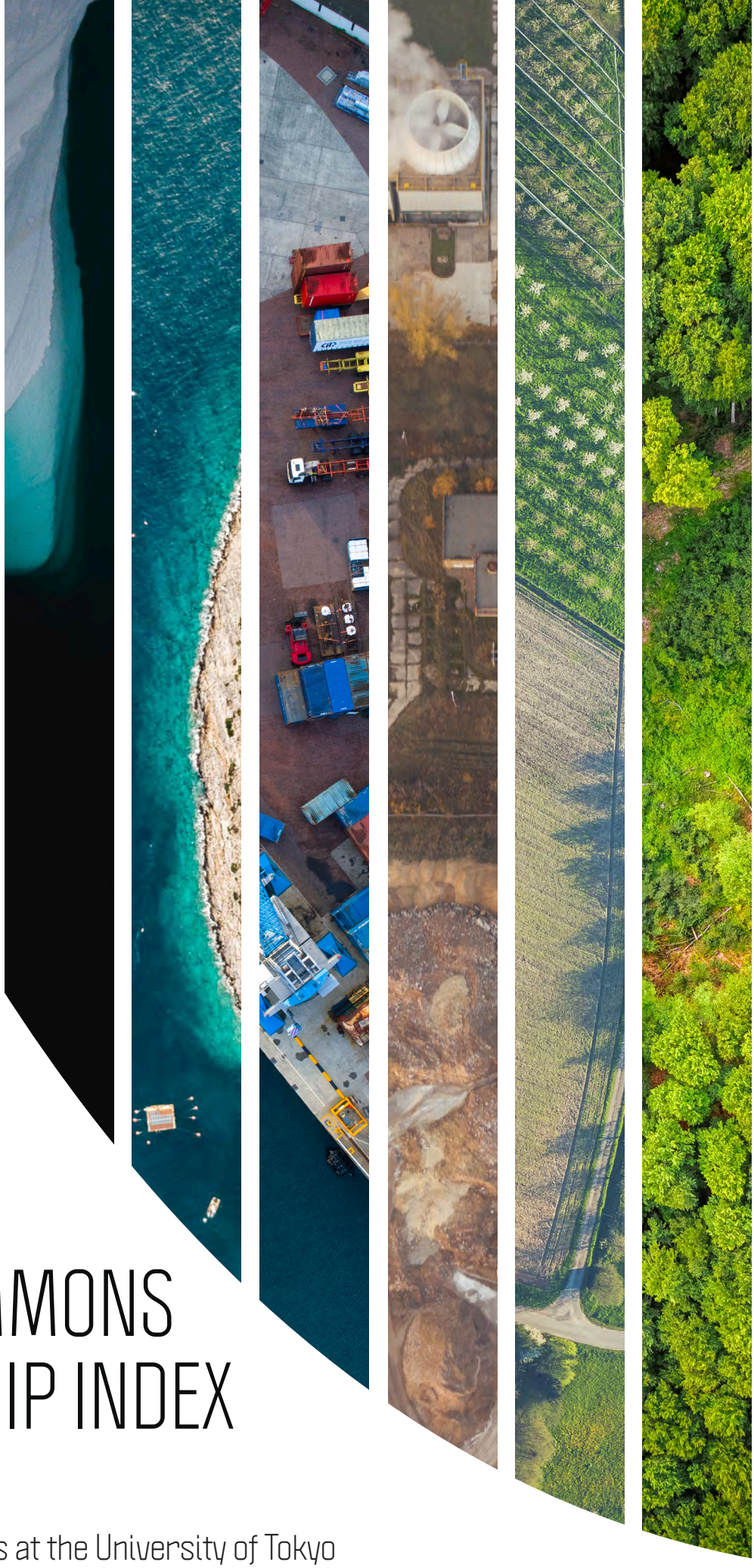

GLOBAL COMMONS STEWARDSHIP INDEX

PILOT VERSION

Center for Global Commons at the University of Tokyo
Sustainable Development Solutions Network
Yale Center for Environmental Law & Policy

This report was prepared by the Sustainable Development Solutions Network, Paris, the Yale Center for Environmental Law & Policy, New Haven, CT, and the Center for Global Commons at the University of Tokyo. The analysis and report production were undertaken by Zachary A. Wendling, Guillaume Lafortune, Finn Woelm, Reed Miller, and Akiyuki Kawasaki under the direction of Guido Schmidt-Traub, Daniel C. Esty, and Naoko Ishii.

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Executive Summary

The University of Tokyo established the Center for the Global Commons (CGC) in August 2020 to support the sustainable management of the Global Commons in line with the "Planetary Boundaries" framework. The CGC seeks to equip stakeholders with the knowledge, policy framing, processes, and tools to halt and reverse the degradation of Global Commons.

The sustainable management of the Global Commons requires better data and metrics to guide better policies. To this end, we present the Pilot Global Commons Stewardship Index (Pilot GCS Index) prepared by the Sustainable Development Solutions Network (SDSN), the Yale Center for Environmental Law & Policy, and the Center for Global Commons at the University of Tokyo.

Five major principles guide the design of the Pilot GCS Index. First, it uses a framework that integrates multiple dimensions of the Global Commons into a comprehensive assessment of impacts. Second, the Pilot GCS Index tracks impacts within territorial borders and transboundary impacts or spillovers through trade and physical flows. Spillovers are attributed to the country of final consumption. Third, we estimate the distance to target for all metrics in the Pilot GCS Index to quantify and compare priorities within and across countries. Fourth, the Index focuses on outcome-based measures of environmental impacts at the country level. And fifth, the Index relies on data that are timely and can be updated regularly.

The design of the initial Pilot GCS Index is simple and transparent following established methodologies. We organize the index into two pillars covering domestic environmental impacts and spillovers, respectively. Each pillar is divided into six sub-pillars: aerosols, biodiversity, climate change, land, oceans, and water. Scores are normalized for each indicator and first aggregated by sub-pillar, then by pillar, and finally for the entire index. We present ratings based on per capita impacts and also identify the countries with the greatest absolute impacts on the Global Commons. In this initial edition, we were able to include 34 indicators using data from official and non-official sources. All metrics are globally relevant, statistically valid and reliable, up to date, collected according to internationally approved methods, and available for a large range of countries. The Pilot GCS Index reports results for 50 countries that have some of the greatest impacts on the Global Commons.

The Pilot GCS Index generates four initial findings:

1. Most countries generate large negative impacts on the Global Commons, but variations across countries are substantial. This variation generates opportunities for poor performers to learn from countries that generate lower per capita impacts on the Global Commons. Many developing countries have better ratings, but no country achieves the best or second-best rating (AAA and AA) on the index or within any of its sub-pillars. Small, rich countries with high trade-intensities rate worst on the Pilot GCS Index.

2. International spillovers account for a large share of countries' impacts on the Global Commons, particularly in relation to greenhouse gas emissions, biodiversity threats, and water scarcity embodied in imports.

3. In absolute terms, the greatest negative impacts arise from the world's largest economies: China, the United States, India, Japan, the EU, and Russia.

4. There are major gaps in availability and coverage of data for the Global Commons, particularly in relation to biodiversity loss at the genetic and population levels; disruptions to the phosphorus cycle; land degradation, especially from agriculture; hazardous waste; and water quality and scarcity.

We will improve the GCS Index and issue annual reports. We will consult expert communities on improving the data, methods, and presentation of the index. We will include more data, present country-level trends, and introduce scores and rankings. We will help identify major data and knowledge gaps and work with partners to help close them. In these ways, the GCS Index will become a tool for drawing attention to countries' impacts on the Global Commons and for devising better ways to manage them.

Abbreviations

CBA	Consumption-based accounting
CCPI	Climate Change Performance Index
CGC	Center for Global Commons
CH_4	Methane
CO_2	Carbon dioxide
COVID-19	Coronavirus disease 2019
EEZ	Exclusive economic zone
EIA	Energy Information Administration (US)
EPI	Environmental Performance Index
EVI	Environmental Vulnerability Index
F-gas	Fluorinated gas
FAO	Food and Agriculture Organization (UN)
FELD	Food, Environment, Land, and Development
GCS	Global Commons Stewardship
GDP	Gross domestic product
GGI	Green Growth Index
GHG	Greenhouse gas
HFC	Hydrofluorocarbon
HPI	Happy Planet Index
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
MRIO	Multi-regional Input-Output
N_2O	Nitrous oxide
NH_3	Ammonia
NO_X	Nitrogen oxides
OECD	Organisation for Economic Co-operation and Development
PBA	Production-based accounting
PFC	Perfluorocarbons
PIK	Potsdam Institute for Climate Impact Research
$PM_{2.5}$	Particulate Matter (≤ 2.5 µm in diameter)
SDGs	Sustainable Development Goals
SDSN	Sustainable Development Solutions Network
SF_6	Sulfur hexafluoride
SO_2	Sulfur dioxide
SOPAC	South Pacific Applied Geoscience Commission
UN	United Nations
UNEP	United Nations Environment Programme
UNFCCC	UN Framework Convention on Climate Change
WRI	World Resources Institute
WWF	World Wildlife Fund for Nature

1. Stewardship of the Global Commons

1.1 The State of the Global Commons

The state of the Global Commons is poor and worsening. At current rates of atmospheric carbon accumulation, average global temperatures are projected to rise by over 3°C before the end of the century. Pollutants cause the premature deaths of 5 million people every year. The combination of high demographic pressure and unsustainable agricultural practices threaten the productive capacity and resilience of key land and water systems. Eight million tonnes of plastic waste enter the oceans every year, and one third of fish stocks are over-exploited. In 2010, UN member states agreed a set of twenty targets to stem the loss of biodiversity. Ten years later, none of those targets have been met. The WWF estimated that globally, populations of nearly 21,000 species of mammals, fish, birds, reptiles, and amphibians plummeted by an average of 68 percent between 1970 and 2016. Moreover, the Global Commons are deeply interconnected, with a crisis in one, such as climate change, profoundly affecting others, such as oceans. Yet the Global Commons are systemically undervalued and over-exploited despite how essential they are to survival and flourishing of all life, including human.

1.2 Introducing the Center for the Global Commons

Earlier this year, the University of Tokyo established the Center for the Global Commons (CGC) to catalyze the systems transformations we need in order to safeguard the Global Commons. Currently, there is no widely accepted definition of the Global Commons. As such, one of the main purposes of the Center is to develop analytical and operational frameworks for the Global Commons to enable the concept to be commonly used by stakeholders across government, business, civil society, and academia.

To this end, CGC draws on the science-based definition of "Global Commons in the Anthropocene" by the Stockholm Resilience Center (Nakicenovic et al., 2016), which refers to the ecosystems, biomes, and processes that regulate the stability and resilience of the Earth system. Our work is informed by the Planetary Boundaries framework (Rockström et al., 2009; Steffen et al., 2015), which covers stratospheric ozone depletion, biodiversity loss and extinctions, chemical pollution, climate change, ocean acidification, nitrogen and phosphorous overload, and atmospheric aerosol loading – all of which are critical to supporting life on Earth. CGC aims to equip stakeholders with the knowledge, framings, processes, and tools to enable humanity to operate within these boundaries.

The Center is partnering with SYSTEMIQ, the Sustainable Development Solutions Network (SDSN), Yale University, the World Resources Institute (WRI), and the Potsdam Institute for Climate Impact Research (PIK) to pursue several workstreams:

(1) **Global Commons Stewardship Framework (GCS Framework)**. SYSTEMIQ will develop research and thought leadership on a philosophy of change for articulating a comprehensive understanding of factors that affect the Global Commons and recommend how to navigate them. As part of this, the Center will examine the deeper conceptual understandings – economic, political and social – that govern how the Commons are perceived and managed and, where necessary, propose new concepts and understandings.

(2) **Global Commons Stewardship Index (GCS Index)**. With this report, SDSN, Yale University, and the University of Tokyo are launching a preliminary Pilot GCS Index that measures country-level impacts on the Global Commons. It accounts separately for environmental impacts resulting from domestic activity and international spillovers, resulting from trade, flow of pollutants, and the depletion of natural resources. The Pilot GCS Index marks the beginning of a three-year process to engage the technical and policy communities around the world on how best to track countries' contributions towards the Global Commons.

(3) **Systems Transformations**. WRI, through its Systems Change Lab, will identify and analyze key systems transformations that are required for ensuring sound Global Commons Stewardship. WRI will promote collaboration on select transformations through multi-stakeholder coalitions.

(4) **Modelling Pathways**. Using Integrated Assessment Modelling, PIK will develop mid-century Transformation Pathways toward Global Commons Stewardship. These Transformation Pathways will consider a broad range of Sustainable Development Goals (SDGs) as interim milestones by 2030.

Together, these four work streams will develop and promote the concept and management strategies for the Global Commons.

2. The Pilot Global Commons Stewardship Index

Conserving and sustainably managing the Global Commons requires sound data and metrics to guide better decisions and improved policies. Actionable data provide enable stakeholders to assess threats to the Earth's safe operating space, establish priorities for action, formulate outcome-focused strategies, and track progress. Quantifying overall performance, especially by comparisons across countries, can raise the visibility of the Global Commons, illustrate best practices, and help generate political momentum.

Indeed, three types of data are needed to ensure sustainable stewardship of the Global Commons. The first type includes data about the biophysical state of the Global Commons. A number of international, scientific assessments consolidate and vet such data, including the

Intergovernmental Panel on Climate Change (IPCC) and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). Scientific frameworks, such as Planetary Boundaries (Rockström et al., 2009; Steffen et al., 2015), help consolidate biophysical data and establish boundaries for a safe operating space for humanity. A second type of data tracks performance of countries by measuring and reporting progress towards outcome targets, such as the SDGs. The Pilot Global Commons Stewardship (GCS) Index falls into this category by tracking countries' domestic and international environmental impacts on the Global Commons. A third type of data describes and assesses countries' policies to gauge whether they are on track towards meeting longer-term objectives or to identify policy gaps. Examples of this type of assessment include the Climate Action Tracker, which tracks countries' energy policies in relation to climate change, and the Food, Environment, Land, and Development (FELD) Action Tracker, currently under development by the Food and Land-Use Coalition. Over time, the Global Commons Stewardship Initiative aims to contribute to and improve all three types of data.

Our initial work suggests that an integrated perspective on the Global Commons is necessary and will support better policies at national and global levels. In the GCS Index, we therefore seek to aggregate different indicators from many different sources into an overall picture of how each country is affecting the Global Commons. To this end the Pilot GCS Index provides a composite index that aggregates the best available data on countries' impacts on Global Commons.

In our experience, including with the Environmental Performance Index (Wendling et al., 2020) and the SDG Index (Sachs et al., 2020), composite indicators are excellent communication tools, and they can highlight priority challenges. But to help drive action, they require clearly identified components that align with operational priorities. We have designed the Pilot GCS Index to balance the competing needs between a clear overall message and clarity on operational priorities. Over the coming years, we will refine the presentation and analysis to support improved communication and policy action.

As highlighted in this report, many data gaps and insufficiencies persist (Table 6), including considerable lags in data becoming available. For example, the data used in the Pilot GCS Index do not reflect impacts from the COVID-19 pandemic. One of our objectives is to fill these data gaps and help reduce the time it takes to produce and share new data.

2.1. Need for a new index for the Global Commons

Several aggregate measures exist for tracking environmental impacts on the Global Commons, including the Environmental Performance Index (EPI) (Wendling et al., 2020), the Green Growth Index (GGI) (Acosta et al., 2019), the Environmental Vulnerability Index (EVI) (SOPAC & UNEP, 2005), the Climate Change Performance Index (CCPI) (Burck et al., 2019), the Happy Planet Index (HPI) (New Economics Foundation, 2016), and the Ecological

Footprint (Wackernagel et al., 2019). None of these indices focus on the Global Commons. In many cases, their data, methodology, and presentation do not lend themselves to an application for the Global Commons.

We have encountered the following issues with available aggregate indices, which in turn guide the design of the GCS Index:

Not truly comprehensive: A comprehensive measure of environmental impacts should cover climate, biodiversity, pollution, and resource use, as illustrated by the EPI and the GGI. Yet other aggregate measures, such as the Ecological Footprint or the CCPI, are not truly comprehensive, as they mainly consider greenhouse gas emissions.

Too broad in scope: Some aggregate indices include metrics that are not directly related to environmental impacts. Examples include variables related to infrastructure investments (*e.g.*, wastewater treatment) or policy inputs (*e.g.*, adoption of regulations and conventions), both of which tend to be highly correlated with per capita income. As a result, rich countries score well on the EPI, for example, even though they account for a high per capita use of environmental resources and pollution. They also generate large negative spillovers on other countries and the Global Commons.

Ignore international spillovers: No existing composite index tracks transboundary spillovers of environmental harm. As some countries adopt ambitious decarbonization targets and action plans, it is crucial to track spillovers to ensure that decarbonization targets are not achieved by outsourcing the production of high-emitting industrial sectors, such as cement or steel, to other countries and then re-importing the production. Measures exist to track trade-related spillovers, but they tend not to be produced by official statistics agencies. Beyond trade-related environmental harms, it is also important to track transboundary physical flows – such as air or water pollution – where production or consumption in one nation spills over onto neighboring countries and beyond.

Infrequently updated: Sustainability indicators must be updated frequently and in a timely manner to inform policymaking and stakeholder engagement. Data providers must ensure that indicators will be available in the future.

2.2 Developing the Pilot GCS Index

Measuring countries' impacts on the Global Commons represents major conceptual, methodological, and communication challenges. We anticipate that a sound GCS Index will require several years of iteration and consultations with experts and users. In this spirit, we present here a very first and preliminary Pilot GCS Index for critical review. We look forward to comments and suggestions from users, which we will incorporate in a revised version next year. Over time, we expect to move toward a robust measure of the Global Commons.

Five guiding principles and objectives inform the design of the Pilot GCS Index.

1. Provide a comprehensive multi-dimensional assessment of environmental impacts on Global Commons: Using an integrated framework, the Pilot GCS Index tracks countries' overall impacts on the Global Commons, especially in the areas of climate change, pollution, biodiversity, and natural resource use.

2. Track transboundary spillovers: The Pilot GCS Index tracks a country's environmental impacts within its borders as well as transboundary impacts generated through trade and physical flows. In particular, we use Multi-Region Input-Output tables (MRIOs) to track where international spillovers occur along the supply chains of imported goods.

3. Estimate distance to targets: To quantify and compare priorities within and across countries, the Pilot GCS Index computes a country's distance to time-bound targets. We draw on the latest science, internationally agreed targets (including the SDGs and the objectives of the Paris Climate Change Agreement), and relative performance across countries to determine suitable time-bound thresholds that countries need to achieve to ensure sound stewardship of the Global Commons.

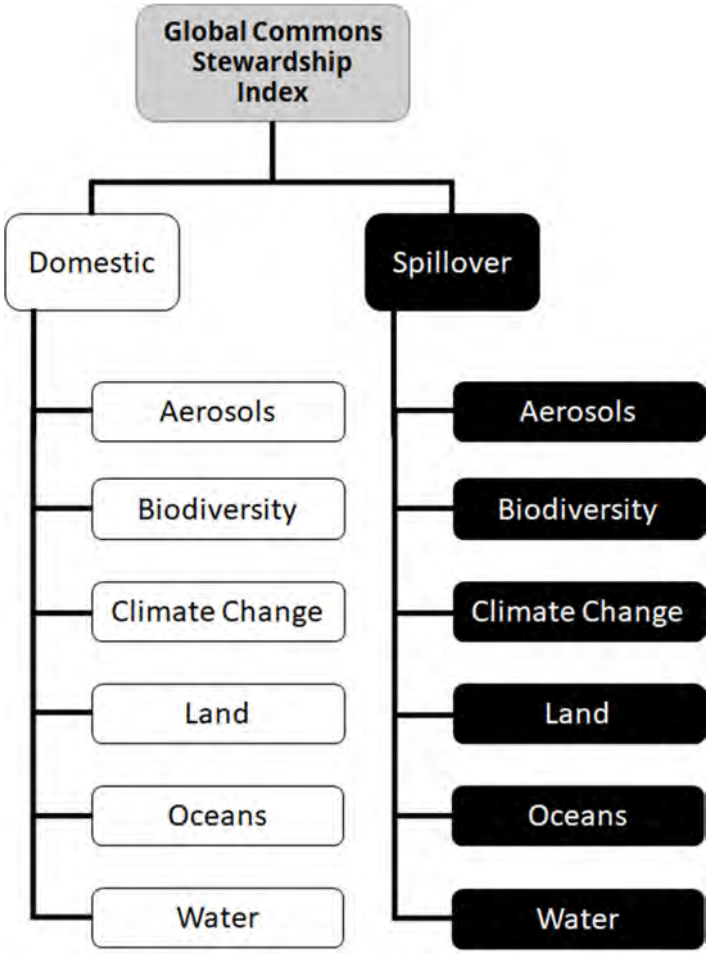
4. Focus on outcome metrics: The Pilot GCS Index focuses on outcome-based measures of environmental impacts, as opposed to input-based measurements that translate efforts independently of results. It considers both official metrics produced by national and international statistical offices and – where necessary – unofficial metrics from high-quality sources. Appendix B (Section 2) describes all indicators included in the Pilot GCS Index.

5. Use timely data and regular updates: The Pilot GCS Index uses the most recent data available and works with data providers to reduce lags in publishing new data. We plan to update the GCS Index regularly.

2.3 Constructing the Pilot GCS Index

Based on the emerging definitions of the Global Commons and available data, we cover six sub-pillars in the Pilot GCS Index: aerosols, biodiversity, climate change, land, oceans, and water (Figure 1). For each sub-pillar we track domestic or territorial impacts and international spillovers or transboundary impacts. Here we outline the methodology and data, which are described in detail in Appendix B.

Figure 1. Conceptual framework of categories within the Pilot Global Commons Stewardship Index



For the initial Pilot GCS Index, we have identified a total of 34 indicators from a variety of sources – 23 domestic indicators and 11 spillover indicators (Table 1). As described in the methodology (Appendix B), the indicators are globally relevant, valid and reliable, up to date, collected according to internationally approved methods, and available for a large range of countries.

Table 1. Indicators included in the Pilot Global Commons Stewardship Index.

Pillar	Sub-Pillar	Indicator
Domestic	*Aerosols*	Domestic NOx emissions
		Domestic SO_2 emissions
		Annual mean concentration of $PM_{2.5}$
Domestic	*Biodiversity*	Terrestrial biodiversity threats embodied in domestic production
		Freshwater biodiversity threats embodied in domestic production
		Marine biodiversity threats embodied in domestic production
		Red List Index of species survival
		Mean area that is not protected in terrestrial sites important to biodiversity
		Mean area that is not protected in freshwater sites important to biodiversity
		Mean area that is not protected in marine sites important to biodiversity
Domestic	*Climate*	Domestic greenhouse gas emissions
		Domestic black carbon emissions
Domestic	*Land*	Domestic ammonia emissions
		Sustainable Nitrogen Management Index
		Non-Recycled Municipal Solid Waste
		Permanent deforestation (5-year average)
		Human Trophic Level
Domestic	*Oceans*	Fish caught from overexploited or collapsed fish stocks
		Fish caught by trawling
Domestic	*Water*	Anthropogenic wastewater that does not receive treatment
		Nitrogen exportable to water bodies
		Domestic scarce water consumption
		Freshwater withdrawal
Spillover	*Aerosols*	NOx emissions embodied in imports
		SO_2 emissions embodied in imports
Spillover	*Biodiversity*	Terrestrial biodiversity threats embodied in imports
		Freshwater biodiversity threats embodied in imports
		Marine biodiversity threats embodied in imports
Spillover	*Climate*	Greenhouse gas emissions embodied in imports
		CO_2 emissions embodied in fossil fuel exports
Spillover	*Land*	Ammonia emissions embodied in imports
Spillover	*Oceans*	Ocean Health Index: Clean Waters
Spillover	*Water*	Nitrogen exportable to water bodies embodied in imports
		Scarce water consumption embodied in imports

The initial Pilot GCS Index covers 50 countries. We focus on rich and large countries that are likely to have the highest per capita or absolute impacts on the Global Commons. Results are presented in proportional terms to allow for comparison across countries. We also highlight the absolute impacts of the 10 countries with the greatest impact on the Global Commons.

We aggregate countries' performance on the Global Commons into ratings. Ratings on all indicators are aggregated first for each sub-pillar, then by pillar, and finally into an overall rating for the country. Ratings range from fully protecting the Global Commons (AAA) to severely lacking (CCC). In future editions of the GCS Index, we plan to introduce quantitative scores for each country and country rankings.

The Pilot GCS Index is an initial prototype, and all results are provisional. We put forth this Pilot Index as an invitation to expert communities to provide critiques, feedback, and recommendations for improving the data, methodology, and presentation of the GCS Index.

3. Initial results

Table 2 summarizes the initial Pilot GCS ratings for 50 countries. We present ratings for domestic impacts, spillovers, and the overall scores. Rich countries have the greatest negative impacts on Global Commons. Small wealthy countries, such as Luxemburg and Switzerland, perform particularly poorly on spillovers.

Country profiles (Appendix A) summarize all the data used in constructing the aggregate ratings. They help pin-point strengths and weaknesses in countries' performance in safeguarding the Global Commons.

Table 2. Country ratings in the overall Pilot GCS Index and by pillar using **proportional** indicators.

	Overall	Domestic	Spillover		Overall	Domestic	Spillover
Argentina	BB	CCC	A	Japan	B	BB	CCC
Australia	CCC	CCC	CCC	Korea, Rep.	B	B	B
Austria	B	BB	CCC	Latvia	BB	BB	BB
Bangladesh	BBB	BBB	A	Lithuania	BB	BB	B
Belgium	CCC	BB	CCC	Luxembourg	CCC	B	CCC
Brazil	BBB	BB	A	Mexico	BB	B	A
Canada	CCC	CCC	CCC	Netherlands	CCC	BB	CCC
Chile	BBB	BB	A	New Zealand	CCC	CCC	BB
China	BB	B	A	Nigeria	BBB	BBB	A
Colombia	BBB	BB	A	Norway	CCC	BB	CCC
Czechia	BB	BB	BB	Pakistan	BBB	B	A
Denmark	B	BB	CCC	Philippines	BBB	BBB	A
Estonia	BB	BB	BB	Poland	BB	BB	BBB
Ethiopia	BBB	BB	A	Portugal	B	B	CCC
Finland	BB	BBB	B	Russia	BB	B	BBB
France	B	BBB	CCC	Saudi Arabia	CCC	CCC	B
Germany	B	BB	CCC	Slovakia	BB	BB	B
Greece	B	B	B	Slovenia	B	BB	CCC
Hungary	BBB	BB	BBB	South Africa	BB	B	BBB
Iceland	CCC	CCC	CCC	Spain	B	B	B
India	BBB	BB	A	Sweden	B	BBB	CCC
Indonesia	BBB	BB	A	Switzerland	CCC	BBB	CCC
Ireland	B	BB	CCC	Turkey	BB	B	BBB
Israel	CCC	CCC	CCC	United Kingdom	B	BBB	CCC
Italy	B	BB	CCC	United States	B	CCC	B

Table 3 lists the 10 countries with the largest absolute impacts on the Global Commons. In absolute terms, Table 3 shows that the relatively large countries, by population or wealth, have the greatest impacts on the Global Commons. The relationship between domestic and spillover ratings can sometimes be comparable, as with China or India, though some countries exhibit a divide as to whether their impacts are mostly occurring within their borders or through trans-boundary activities, as with France or the United Kingdom.

Table 3. 10 countries with the greatest **absolute** impacts on the Global Commons.

	Overall	Domestic	Spillover
China	CCC	CCC	CCC
France	CCC	BB	CCC
Germany	CCC	B	CCC
India	CCC	CCC	CCC
Italy	CCC	B	CCC
Japan	CCC	CCC	CCC
Mexico	CCC	CCC	B
Russia	CCC	CCC	CCC
United Kingdom	CCC	BB	CCC
United States	CCC	CCC	CCC

4. Findings

Five key findings emerge from the Pilot Global Commons Stewardship Index.

Most countries generate large negative impacts on the Global Commons, but variations across countries are substantial. No country in our sample has successfully mitigated its impacts to the Global Commons. In fact, no country obtains the highest or second-highest possible ratings (AAA and AA) on the overall index or its constituent pillars and sub-pillars. Yet, there is high variability in country performance, which can help poor performers understand how to do better. Many developing countries have smaller impacts on the Global Commons than wealthier countries, buoyed in large part by better ratings in the spillover pillar. Small, rich countries with high trade-intensity, however, score notably worse in this pillar due to imported goods that have negative impacts on the Global Commons throughout the supply chain.

International spillovers account for a large share of country impacts. Countries primarily affect the Global Commons through impacts within their borders, but trans-boundary spillovers do play a large role. Switzerland, for example, emitted 6.0 tonnes of CO_2-eq. per person domestically, but imported 4.8 tonnes of CO_2-eq. per person through the products and services it consumes, which represent 44% of its total footprint. Likewise, for every species threatened within Belgium, environmental spillovers from the country threaten 186 terrestrial species, 60 freshwater aquatic species, and 91 marine species elsewhere in the world. Stakeholders need to

closely examine how domestic performance compares to spillovers in order to improve the stewardship of the Global Commons.

Absolute impacts. Results in absolute terms identify the greatest negative impacts from the world's largest economies: China, the United States, India, Japan, the EU, and Russia. Within the sub-pillars of the Pilot GCS Index, we find the greatest absolute negative impacts from the following countries:

- **Aerosols**: China, Japan, United States, India, United Kingdom
- **Biodiversity**: China, USA, Japan, India, France
- **Climate Change**: Australia, USA, China, India, Germany
- **Land**: USA, Japan, China, Germany, France
- **Oceans**: Israel, Belgium, Slovenia, Poland, Italy
- **Water**: India, China, USA, Russia, Saudi Arabia

Major data gaps. Despite an abundance of data on environmental performance and new tools for tracking spillover impacts, there are major gaps in availability and coverage of data, particularly in relation to biodiversity loss at the genetic and population levels; disruptions to the phosphorus cycle; land degradation, especially from agriculture; hazardous waste; and water quality and scarcity.

5. Next steps

Over the coming years, the GCS Index team and members of the Global Commons Initiative will refine and improve the index in several ways.

5.1 Consultations

We have reviewed the scientific and policy literature and consulted many experts in the preparation of this Pilot GCS Index, but many more consultations are needed to improve the analysis and presentation. To this end, we will engage with scientists, policymakers, and other experts for each sub-pillar of the GCS Index to test assumptions and methods, identify better data sources, and sharpen the focus and presentation of the results. Different disciplines will also provide new tools to accelerate our progress, as, for example, the field of industrial ecology continues to develop better ways of understanding global supply chains and their impacts on the Global Commons. Consultation with global experts should occur both through general invitations for feedback and targeted approaches to facilitate dialogues in structured settings to identify research agendas for the GCS Index team and our collaborators.

5.2 Methodological improvements

We have already identified several improvements that we would like to make to the next iteration of the GCS Index. First, more data are needed to provide an accurate and comprehensive picture of countries' impacts on the Global Commons. We intend to augment the current list of indicators and also fill critical data gaps. Where data on direct impacts are missing, we will seek proxy metrics.

Second, time series data are essential for tracking progress. Future versions of the GCS Index will therefore incorporate trend data to show whether countries are headed in the right direction and to understand where progress needs to be accelerated. As part of this work, we will investigate how the lag between impact and data production can be shortened, including though the consideration of real-time data.

Third, we will critically review performance thresholds or "targets" for each indicator. This review will consist of both statistical analyses and investigations into appropriate target levels. To this end we will consult with members of international assessments, such as the Earth Commission, the Intergovernmental Panel on Climate Changes (IPCC), the International Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), and the International Resource Panel (IRP).

Fourth, as the data and methods supporting the GCS Index become more robust, we will generate country scores and rankings to complement qualitative and disaggregated ratings. This will help improve the country profiles, here included in Appendix A.

5.3 Dissemination

We will work with the Center for Global Commons at the University of Tokyo to disseminate findings from the GCS Index to a wide audience. This will include publications in policy journals as well as the scientific literature. Most importantly, we will establish online tools for the presentation and use of the GCS Index and its data.

6. References

Acosta, L. A., Maharjan, P., Peyriere, H., Galotto, L., Mamiit, R. J., Ho, C., Flores, B. H., & Anastasia, O. (2019). *Green Growth Index: Concepts, Methods and Applications* (No. 5 GGGI Technical Report). Green Growth Performance Measurement (GGPM) Program, Global Green Growth Institute. http://greengrowthindex.gggi.org/

Afionis, S., Sakai, M., Scott, K., Barrett, J., & Gouldson, A. (2017). Consumption-based carbon accounting: Does it have a future? Consumption-based carbon accounting. *Wiley Interdisciplinary Reviews: Climate Change*, *8*(1), e438. https://doi.org/10.1002/wcc.438

BirdLife International. (2019). *World Database of Key Biodiversity Areas*. http://www.keybiodiversityareas.org

Bonhommeau, S., Dubroca, L., Le Pape, O., Barde, J., Kaplan, D. M., Chassot, E., & Nieblas, A.-E. (2013). Eating up the world's food web and the human trophic level. *Proceedings of the National Academy of Sciences*, *110*(51), 20617–20620. https://doi.org/10.1073/pnas.1305827110

Burck, J., Hagen, U., Höhne, N., Nascimento, L., Bals, C., & Germanwatch. (2019). *Climate Change Performance Index Results 2020*.

Curtis, P. G., Slay, C. M., Harris, N. L., Tyukavina, A., & Hansen, M. C. (2018). Classifying drivers of global forest loss. *Science*, *361*(6407), 1108–1111. https://doi.org/10.1126/science.aau3445

Food and Agriculture Organization. (2016). *AQUASTAT Main Database*. AQUASTAT. http://www.fao.org/nr/water/aquastat/data/query/index.html?lang=en

Gütschow, J., Jeffery, M. L., Gieseke, R., Gebel, R., Stevens, D., Krapp, M., & Rocha, M. (2016). The PRIMAP-hist national historical emissions time series. *Earth System Science Data*, *8*(2), 571–603. https://doi.org/10.5194/essd-8-571-2016

Halpern, B. S., Longo, C., Lowndes, J. S. S., Best, B. D., Frazier, M., Katona, S. K., Kleisner, K. M., Rosenberg, A. A., Scarborough, C., & Selig, E. R. (2015). Patterns and Emerging Trends in Global Ocean Health. *PLOS ONE*, *10*(3), e0117863. https://doi.org/10.1371/journal.pone.0117863

IUCN. (2020). *The IUCN Red List of Threatened Species. Version 2020-1*. https://www.iucnredlist.org

Joint Research Centre. (2016). *Atmospheric Particles-Equivalent Black Carbon MAAP (2016)* [Text]. Knowledge for Policy - European Commission. https://ec.europa.eu/knowledge4policy/dataset/jrc-abcis-ap-ebcma-2016_en

Kander, A., Jiborn, M., Moran, D. D., & Wiedmann, T. O. (2015). National greenhouse-gas accounting for effective climate policy on international trade. *Nature Climate Change*, *5*(5), 431–435. https://doi.org/10.1038/nclimate2555

Kanemoto, K., Lenzen, M., Peters, G. P., Moran, D. D., & Geschke, A. (2012). Frameworks for Comparing Emissions Associated with Production, Consumption, And International Trade. *Environmental Science & Technology*, *46*(1), 172–179. https://doi.org/10.1021/es202239t

Kaza, S., Yao, L., Bhada-Tata, P., & Von Woerden, F. (2018). *What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050* (Urban Development Series). World Bank. http://datatopics.worldbank.org/what-a-waste/trends_in_solid_waste_management.html

Lafortune, G., Fuller, G., Moreno, J., Schmidt-Traub, G., & Kroll, C. (2018). *SDG Index and Dashboards. Detailed Methodological paper*. Bertelsmann Stiftung and Sustainable Development Solutions Network. http://sdgindex.org/assets/files/2018/Methodological%20Paper_v1_gst_jmm_Aug2018_FINAL.pdf

Lenzen, M., Kanemoto, K., Moran, D., & Geschke, A. (2012). *Mapping the structure of the world economy*. Environmental Science & Technology 46(15) pp 8374–8381. DOI: 10.1021/es300171x

Lenzen, M., Malik, A., Li, M., Fry, J., Weisz, H., Pichler, P. P., Chaves, L. S. M., Capon, A., & Pencheon, D. (2020). *The global environmental footprint of healthcare*. The Lancet Planetary Health (under review).

Lenzen, M., Moran, D., Kanemoto, K., Foran, B., Lobefaro, L., & Geschke, A. (2012). International trade drives biodiversity threats in developing nations. *Nature*, *486*(7401), 109–112. https://doi.org/10.1038/nature11145

Lenzen, M., Moran, D., Kanemoto, K., & Geschke, A. (2013). Building Eora: A Global Multi-Region Input–Output Database at High Country and Sector Resolution. *Economic Systems Research*, *25*(1), 20–49. https://doi.org/10.1080/09535314.2013.769938

Lenzen, M., Sun, Y.-Y., Faturay, F., Ting, Y.-P., Geschke, A., & Malik, A. (2018). The carbon footprint of global tourism. *Nature Climate Change*, *8*(6), 522–528. https://doi.org/10.1038/s41558-018-0141-x

Nakicenovic, N., Rockström, J., Gaffney, O., & Zimm, C. (2016). *Global Commons in the Anthropocene: World Development on a Stable and Resilient Planet* (Working Paper WP-16-019). International Institute for Applied Systems Analysis. http://pure.iiasa.ac.at/id/eprint/14003/1/WP-16-019.pdf

New Economics Foundation. (2016). *Happy Planet Index*. http://happyplanetindex.org/

Ocean Health Index. (2019). *Ocean Health Index 2019 global assessment*. National Center for Ecological Analysis and Synthesis, University of California, Santa Barbara. http://data.oceanhealthindex.org/data-and-downloads

Oita, A., Malik, A., Kanemoto, K., Geschke, A., Nishijima, S., & Lenzen, M. (2016). Substantial nitrogen pollution embedded in international trade. *Nature Geoscience*, *9*(2), 111–115. https://doi.org/10.1038/ngeo2635

Pauly, D., Zeller, D., & Palomares, M. L. D. (Eds.). (2020). *Sea Around Us Concepts, Design and Data*. seaaroundus.org

Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin, F. S. I., Lambin, E., Lenton, T., Scheffer, M., Folke, C., Schellnhuber, H. J., Nykvist, B., de Wit, C., Hughes, T., van der Leeuw, S., Rodhe, H., Sörlin, S., Snyder, P., Costanza, R., Svedin, U., … Foley, J. (2009). Planetary Boundaries: Exploring the Safe Operating Space for Humanity. *Ecology and Society*, *14*(2). https://doi.org/10.5751/ES-03180-140232

Sachs, J. D., Schmidt-Traub, G., Kroll, C., Durand-Delacre, D., & Teksoz, K. (2017). *SDG Index and Dashboards Report 2017. Global Responsibilities—International Spillovers in Achieving the Goals*. Bertelsmann Stiftung and Sustainable Development Solutions Network. http://sdgindex.org/

Sachs, J. D., Schmidt-Traub, G., Kroll, C., Lafortune, G., Fuller, G., & Woelm, F. (2020). *Sustainable Development Report 2020*. Cambridge University Press.

Schmidt-Traub, G., Hoff, H., & Bernlöhr, M. (2019). *International spillovers and the Sustainable Development Goals (SDGs)* [SDSN Policy Brief]. Sustainable Development Solutions Network (SDSN).

South Pacific Applied Geoscience Commission, & United Nations Environment Programme. (2005). *Environmental Vulnerability Index*. http://www.vulnerabilityindex.net/

Stanaway, J. D., Afshin, A., Gakidou, E., Lim, S. S., Abate, D., Abate, K. H., Abbafati, C., Abbasi, N., Abbastabar, H., Abd-Allah, F., Abdela, J., Abdelalim, A., Abdollahpour, I., Abdulkader, R. S., Abebe, M., Abebe, Z., Abera, S. F., Abil, O. Z., Abraha, H. N., … Murray, C. J. L. (2018). Global, regional, and national comparative risk assessment of 84 behavioural, environmental and occupational, and metabolic risks or clusters of risks for 195 countries and territories, 1990–2017: A systematic analysis for the Global Burden of Disease Study 2017. *The Lancet*, *392*(10159), 1923–1994. https://doi.org/10.1016/S0140-6736(18)32225-6

Steffen, W., Richardson, K., Rockstrom, J., Cornell, S. E., Fetzer, I., Bennett, E. M., Biggs, R., Carpenter, S. R., de Vries, W., de Wit, C. A., Folke, C., Gerten, D., Heinke, J., Mace, G. M., Persson, L. M., Ramanathan, V., Reyers, B., & Sorlin, S. (2015). Planetary boundaries: Guiding human development on a changing planet. *Science*, *347*(6223), 1259855–1259855. https://doi.org/10.1126/science.1259855

UN Department of Economic and Social Affairs. (2020). *UN Comtrade Database*. https://comtrade.un.org/data/

U.S. Energy Information Administration. (2020). *International Portal*. https://www.eia.gov/international/overview/world

Wackernagel, M., Beyers, B., & Rout, K. (2019). *Ecological footprint: Managing our biocapacity budget*. https://www.footprintnetwork.org/

Wendling, Z. A., Emerson, J. W., de Sherbinin, A., Esty, D. C., & et al. (2020). *2020 Environmental Performance Index*. Yale Center for Environmental Law & Policy. epi.yale.edu

Zhang, X., & Davidson, E. (2019). *Sustainable Nitrogen Management Index* [Preprint]. Soil Science. https://doi.org/10.1002/essoar.10501111.1

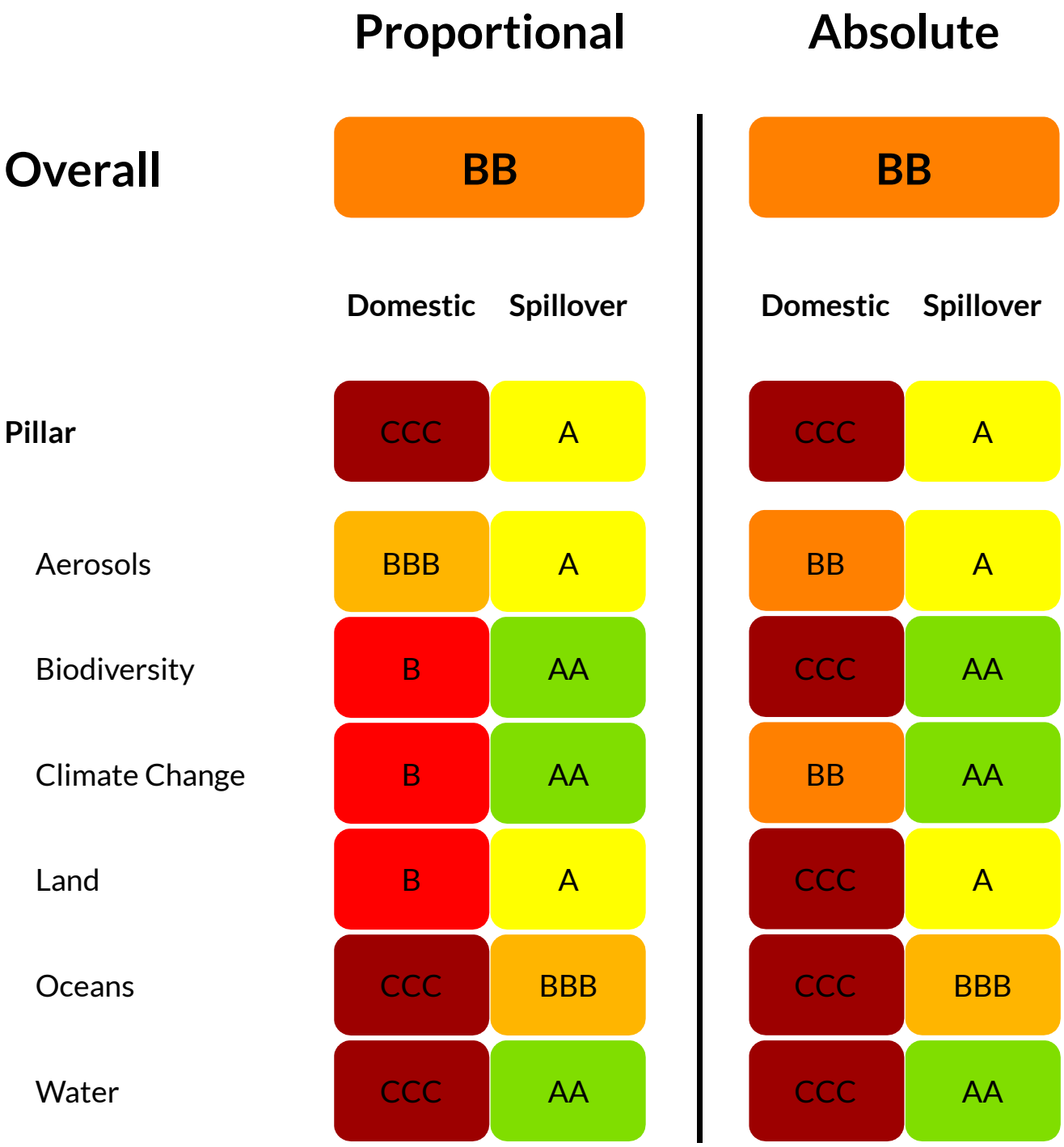
Appendix A: Country Profiles

Argentina

Latin America & Caribbean

Population [millions]	45.2	**GDP** [$, billions]	453.9
Land area [km^2, thousands]	2,786.5	**GDP** per capita	10,044

Country ratings on impacts to Global Commons



Argentina

Latin America & Caribbean

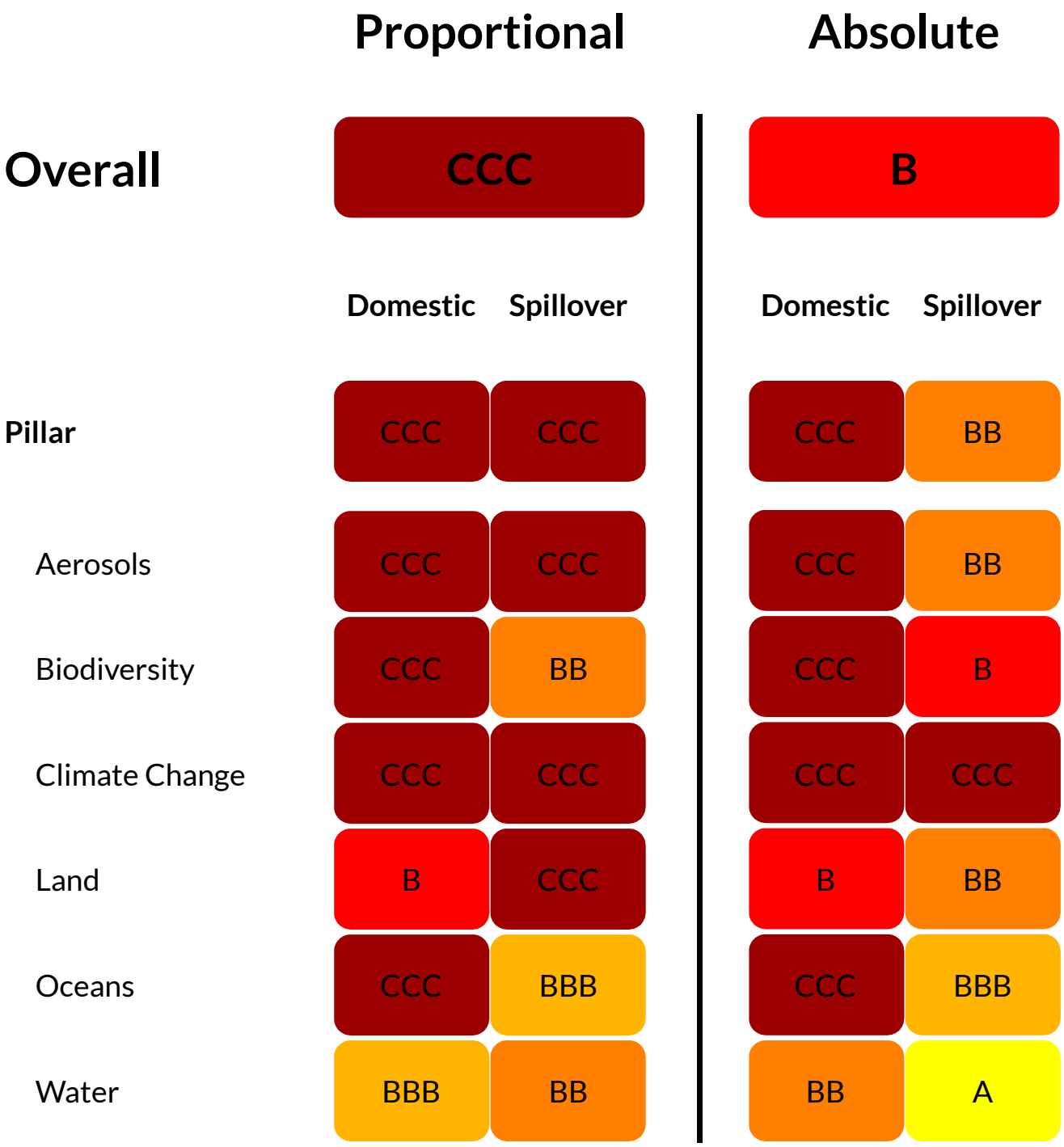
		Proportional		Absolute			
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	6.57	BB	Gg	283.06	B	2015
NO_X emissions, spillover	kg/capita	1.62	A	Gg	69.96	A	2015
SO_2 emissions, domestic	kg/capita	21.51	A	Gg	926.58	BBB	2015
SO_2 emissions, spillover	kg/capita	7.29	A	Gg	313.83	A	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	13.31	BBB	$\mu g/m^3$	13.31	BBB	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	5.61	A	spp.	249.04	BBB	2018
Terrestrial spp. threatened, spillover	spp./million	0.50	AA	spp.	22.03	A	2018
Freshwater spp. threatened, domestic	spp./million	0.21	AA	spp.	9.17	AA	2018
Freshwater spp. threatened, spillover	spp./million	0.03	AA	spp.	1.51	AA	2018
Marine spp. threatened, domestic	spp./million	0.78	AA	spp.	34.39	BBB	2018
Marine spp. threatened, spillover	spp./million	0.04	AA	spp.	1.58	AA	2018
Red List Index	unitless	0.86	BB	unitless	0.86	BB	2019
Unprotected terrestrial sites	%	68.20	CCC	%	68.20	CCC	2019
Unprotected freshwater sites	%	56.27	CCC	%	56.27	CCC	2019
Unprotected marine sites	%	59.47	CCC	%	59.47	CCC	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	8.20	B	Pg CO_2e	0.35	BB	2014
GHG emissions, spillover	t CO_2e/capita	1.70	A	Pg CO_2e	0.07	A	2014
Black carbon emissions	kg/capita	0.45	BB	Gg	18.48	A	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.00	AA	t CO_2/capita	0.00	AA	2018
Land							
NH_3 emissions, domestic	kg/capita	19.95	CCC	Tg	859.21	CCC	2015
NH_3 emissions, spillover	kg/capita	1.34	A	kg	57.53	A	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.32	BBB	unitless	0.32	BBB	2015
Non-Recycled Waste	kg/capita/day	na	na	Gg	na	na	na
Deforestation	%	0.44	BBB	10^3 hectares	161.59	CCC	2018
Human Trophic Level	unitless	2.41	B	unitless	2.41	B	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	74.02	CCC	%	74.02	CCC	2014
Fish caught by trawling	%	51.63	CCC	%	51.63	CCC	2014
Ocean Health Index: Clean Waters	unitless	81.93	BBB	unitless	81.93	BBB	2019
Water							
Untreated wastewater	%	94.08	CCC	%	94.08	CCC	2018
Nitrogen emissions, domestic	kg/capita	32.10	CCC	Tg	1.38	CCC	2015
Nitrogen emissions, spillover	kg/capita	2.04	A	Gg	87.96	AA	2015
Scarce water consumption, domestic	10^3 m^3/capita	0.60	AA	10^9 m^3	23.80	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	0.50	AA	10^9 m^3	21.18	AA	2015
Water stress	%	10.46	A	10^9 m^3	37.69	BB	2011

Australia

OECD

Population [millions]	25.5	**GDP** [$, billions]	1,138.5
Land area [km^2, thousands]	7,716.5	**GDP** per capita	44,649

Country ratings on impacts to Global Commons



Australia

OECD

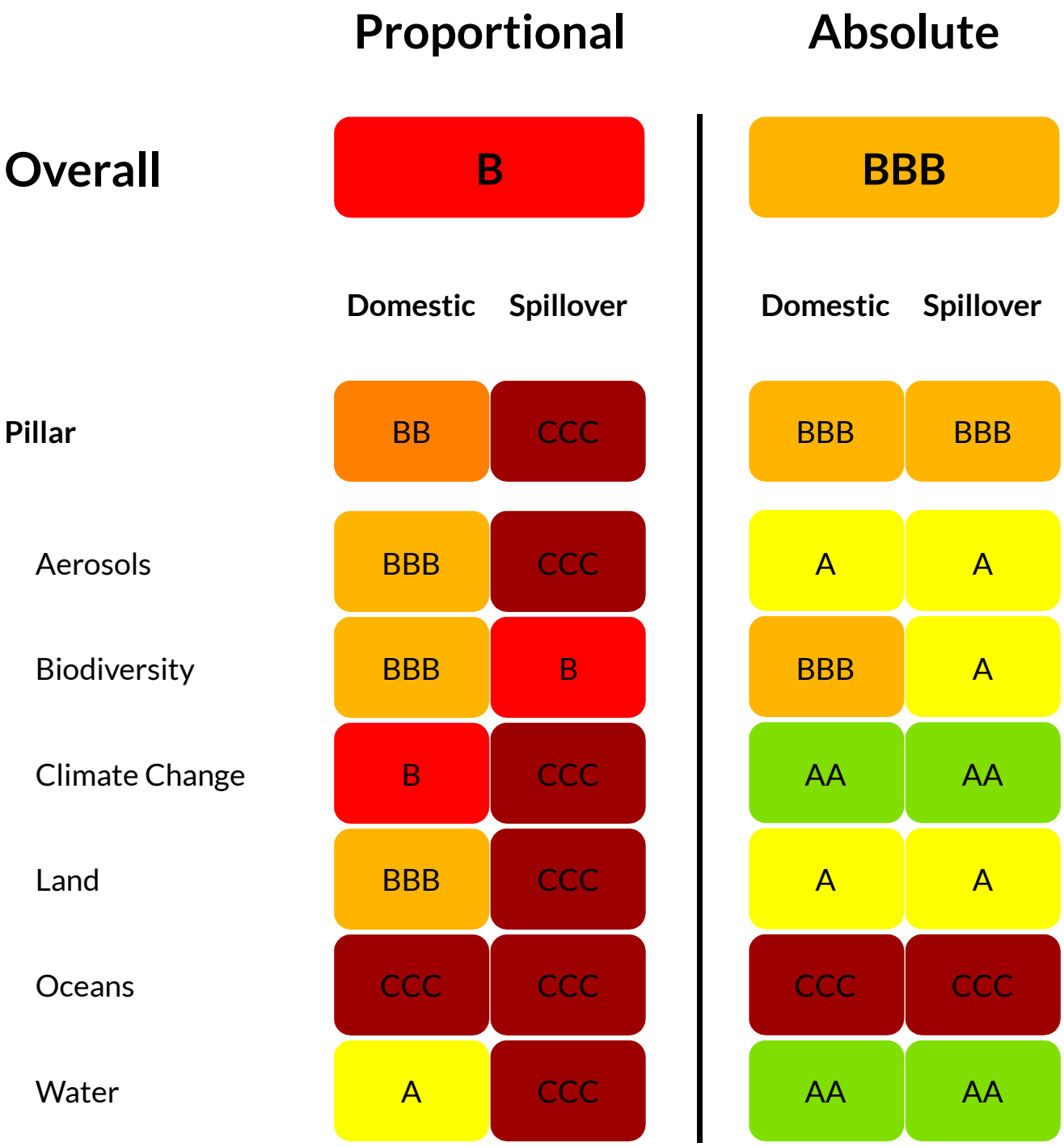
		Proportional		Absolute			
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	26.50	CCC	Gg	634.11	CCC	2015
NO_X emissions, spillover	kg/capita	6.40	CCC	Gg	153.06	BB	2015
SO_2 emissions, domestic	kg/capita	193.67	CCC	Gg	4,635.05	CCC	2015
SO_2 emissions, spillover	kg/capita	27.47	CCC	Gg	657.46	B	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	8.55	AA	$\mu g/m^3$	8.55	AA	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	19.35	B	spp.	481.76	B	2018
Terrestrial spp. threatened, spillover	spp./million	2.39	B	spp.	59.45	BB	2018
Freshwater spp. threatened, domestic	spp./million	4.03	B	spp.	100.22	CCC	2018
Freshwater spp. threatened, spillover	spp./million	0.29	BBB	spp.	7.31	BBB	2018
Marine spp. threatened, domestic	spp./million	18.21	CCC	spp.	453.38	CCC	2018
Marine spp. threatened, spillover	spp./million	0.78	BB	spp.	19.46	CCC	2018
Red List Index	unitless	0.82	CCC	unitless	0.82	CCC	2019
Unprotected terrestrial sites	%	44.32	CCC	%	44.32	CCC	2019
Unprotected freshwater sites	%	62.32	CCC	%	62.32	CCC	2019
Unprotected marine sites	%	36.84	CCC	%	36.84	CCC	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	23.80	CCC	Pg CO_2e	0.56	CCC	2014
GHG emissions, spillover	t CO_2e/capita	7.50	CCC	Pg CO_2e	0.18	BB	2014
Black carbon emissions	kg/capita	0.95	CCC	Gg	20.97	A	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	45.10	CCC	t CO_2/capita	45.10	CCC	2018
Land							
NH_3 emissions, domestic	kg/capita	40.62	CCC	Tg	972.20	CCC	2015
NH_3 emissions, spillover	kg/capita	5.45	CCC	kg	130.32	BB	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.63	B	unitless	0.63	B	2015
Non-Recycled Waste	kg/capita/day	0.83	CCC	Gg	20.47	A	2017
Deforestation	%	0.03	AA	10^3 hectares	13.20	AA	2018
Human Trophic Level	unitless	2.47	B	unitless	2.47	B	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	73.69	CCC	%	73.69	CCC	2014
Fish caught by trawling	%	19.30	BB	%	19.30	BB	2014
Ocean Health Index: Clean Waters	unitless	80.26	BBB	unitless	80.26	BBB	2019
Water							
Untreated wastewater	%	7.30	AA	%	7.30	AA	2018
Nitrogen emissions, domestic	kg/capita	58.10	CCC	Tg	1.39	CCC	2015
Nitrogen emissions, spillover	kg/capita	8.72	B	Gg	208.77	A	2015
Scarce water consumption, domestic	10^3 m^3/capita	1.90	AA	10^9 m^3	46.20	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	3.20	BB	10^9 m^3	76.35	A	2015
Water stress	%	6.41	AA	10^9 m^3	15.94	A	2017

Austria

OECD

Population [millions]	9.0	**GDP** [$, billions]	409.2
Land area [km^2, thousands]	83.8	**GDP** per capita	45,437

Country ratings on impacts to Global Commons



Austria

OECD

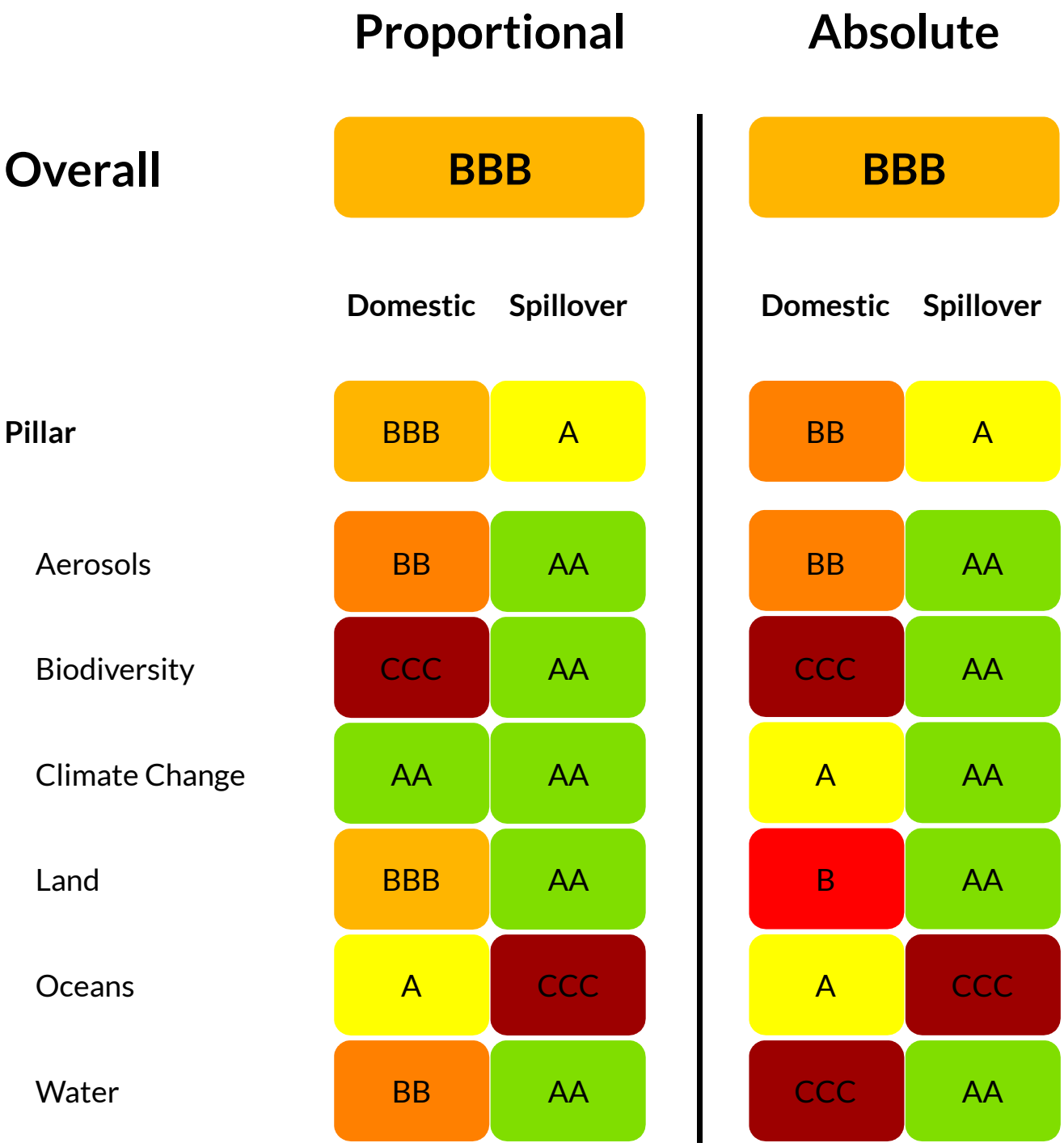
		Proportional			Absolute		
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	7.22	BB	Gg	62.70	AA	2015
NO_X emissions, spillover	kg/capita	6.67	CCC	Gg	57.92	A	2015
SO_2 emissions, domestic	kg/capita	46.19	BBB	Gg	400.85	A	2015
SO_2 emissions, spillover	kg/capita	39.31	CCC	Gg	341.18	BBB	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	12.48	BBB	$\mu g/m^3$	12.48	BBB	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	2.06	AA	spp.	18.28	AA	2018
Terrestrial spp. threatened, spillover	spp./million	4.13	CCC	spp.	36.72	BBB	2018
Freshwater spp. threatened, domestic	spp./million	2.80	BBB	spp.	24.90	A	2018
Freshwater spp. threatened, spillover	spp./million	0.35	BB	spp.	3.15	A	2018
Marine spp. threatened, domestic	spp./million	0.00	AA	spp.	0.01	AA	2018
Marine spp. threatened, spillover	spp./million	0.07	AA	spp.	0.63	AA	2018
Red List Index	unitless	0.89	BB	unitless	0.89	BB	2019
Unprotected terrestrial sites	%	32.66	B	%	32.66	B	2019
Unprotected freshwater sites	%	28.78	B	%	28.78	B	2019
Unprotected marine sites	%	na	na	%	na	na	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	9.60	B	Pg CO_2e	0.08	AA	2014
GHG emissions, spillover	t CO_2e/capita	10.00	CCC	Pg CO_2e	0.09	A	2014
Black carbon emissions	kg/capita	0.59	B	Gg	4.94	AA	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.30	AA	t CO_2/capita	0.30	AA	2018
Land							
NH_3 emissions, domestic	kg/capita	7.51	BB	Tg	65.18	AA	2015
NH_3 emissions, spillover	kg/capita	8.94	CCC	kg	77.57	A	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.39	BBB	unitless	0.39	BBB	2015
Non-Recycled Waste	kg/capita/day	0.65	B	Gg	5.81	AA	2018
Deforestation	%	0.00	AA	10^3 hectares	0.03	AA	2018
Human Trophic Level	unitless	2.41	B	unitless	2.41	B	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	na	na	%	na	na	2014
Fish caught by trawling	%	na	na	%	na	na	2014
Ocean Health Index: Clean Waters	unitless	na	na	unitless	na	na	2019
Water							
Untreated wastewater	%	6.00	AA	%	6.00	AA	2018
Nitrogen emissions, domestic	kg/capita	11.79	BB	Tg	0.10	AA	2015
Nitrogen emissions, spillover	kg/capita	14.68	CCC	Gg	127.43	A	2015
Scarce water consumption, domestic	10^3 m^3/capita	0.10	AA	10^9 m^3	1.09	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	6.20	CCC	10^9 m^3	53.80	AA	2015
Water stress	%	9.65	AA	10^9 m^3	3.49	AA	2010

Bangladesh

East & South Asia

Population [millions]	164.7	**GDP** [$, billions]	198.1
Land area [km^2, thousands]	140.3	**GDP** per capita	1,203

Country ratings on impacts to Global Commons



Bangladesh

East & South Asia

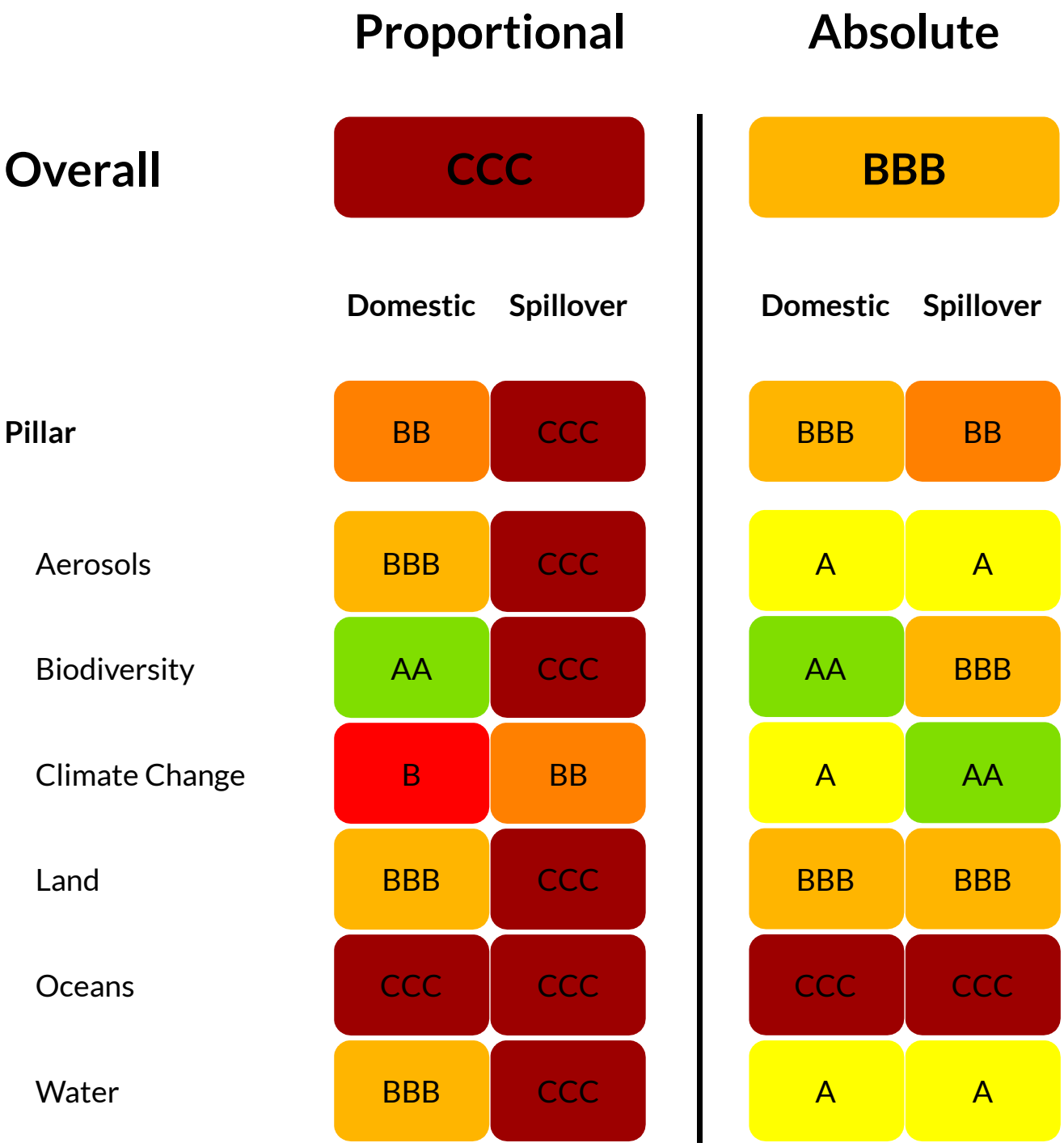
		Proportional		Absolute			
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	0.44	AA	Gg	68.40	AA	2015
NO_X emissions, spillover	kg/capita	0.13	AA	Gg	21.01	AA	2015
SO_2 emissions, domestic	kg/capita	1.38	AA	Gg	215.26	AA	2015
SO_2 emissions, spillover	kg/capita	0.75	AA	Gg	117.70	AA	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	60.85	CCC	$\mu g/m^3$	60.85	CCC	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	0.07	AA	spp.	10.51	AA	2018
Terrestrial spp. threatened, spillover	spp./million	0.01	AA	spp.	1.69	AA	2018
Freshwater spp. threatened, domestic	spp./million	0.03	AA	spp.	4.91	AA	2018
Freshwater spp. threatened, spillover	spp./million	0.00	AA	spp.	0.22	AA	2018
Marine spp. threatened, domestic	spp./million	0.02	AA	spp.	3.02	AA	2018
Marine spp. threatened, spillover	spp./million	0.00	AA	spp.	0.09	AA	2018
Red List Index	unitless	0.76	CCC	unitless	0.76	CCC	2019
Unprotected terrestrial sites	%	56.35	CCC	%	56.35	CCC	2019
Unprotected freshwater sites	%	100.00	CCC	%	100.00	CCC	2019
Unprotected marine sites	%	74.15	CCC	%	74.15	CCC	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	1.00	AA	Pg CO_2e	0.16	A	2014
GHG emissions, spillover	t CO_2e/capita	0.20	AA	Pg CO_2e	0.03	AA	2014
Black carbon emissions	kg/capita	0.25	BBB	Gg	38.18	BBB	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.00	AA	t CO_2/capita	0.00	AA	2015
Land							
NH_3 emissions, domestic	kg/capita	3.17	A	Tg	495.61	CCC	2015
NH_3 emissions, spillover	kg/capita	0.10	AA	kg	15.58	AA	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.67	B	unitless	0.67	B	2015
Non-Recycled Waste	kg/capita/day	na	na	Gg	na	na	na
Deforestation	%	0.25	A	10^3 hectares	5.43	AA	2018
Human Trophic Level	unitless	2.13	A	unitless	2.13	A	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	1.70	AA	%	1.70	AA	2014
Fish caught by trawling	%	16.10	BBB	%	16.10	BBB	2014
Ocean Health Index: Clean Waters	unitless	33.52	CCC	unitless	33.52	CCC	2019
Water							
Untreated wastewater	%	100.00	CCC	%	100.00	CCC	2018
Nitrogen emissions, domestic	kg/capita	5.77	A	Tg	0.90	CCC	2015
Nitrogen emissions, spillover	kg/capita	0.17	AA	Gg	26.84	AA	2015
Scarce water consumption, domestic	10^3 m^3/capita	0.20	AA	10^9 m^3	24.19	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	0.10	AA	10^9 m^3	16.70	AA	2015
Water stress	%	5.72	AA	10^9 m^3	35.87	BB	2008

Belgium

OECD

Population [millions]	11.6	**GDP** [$, billions]	494.4
Land area [km^2, thousands]	30.7	**GDP** per capita	42,659

Country ratings on impacts to Global Commons



Belgium

OECD

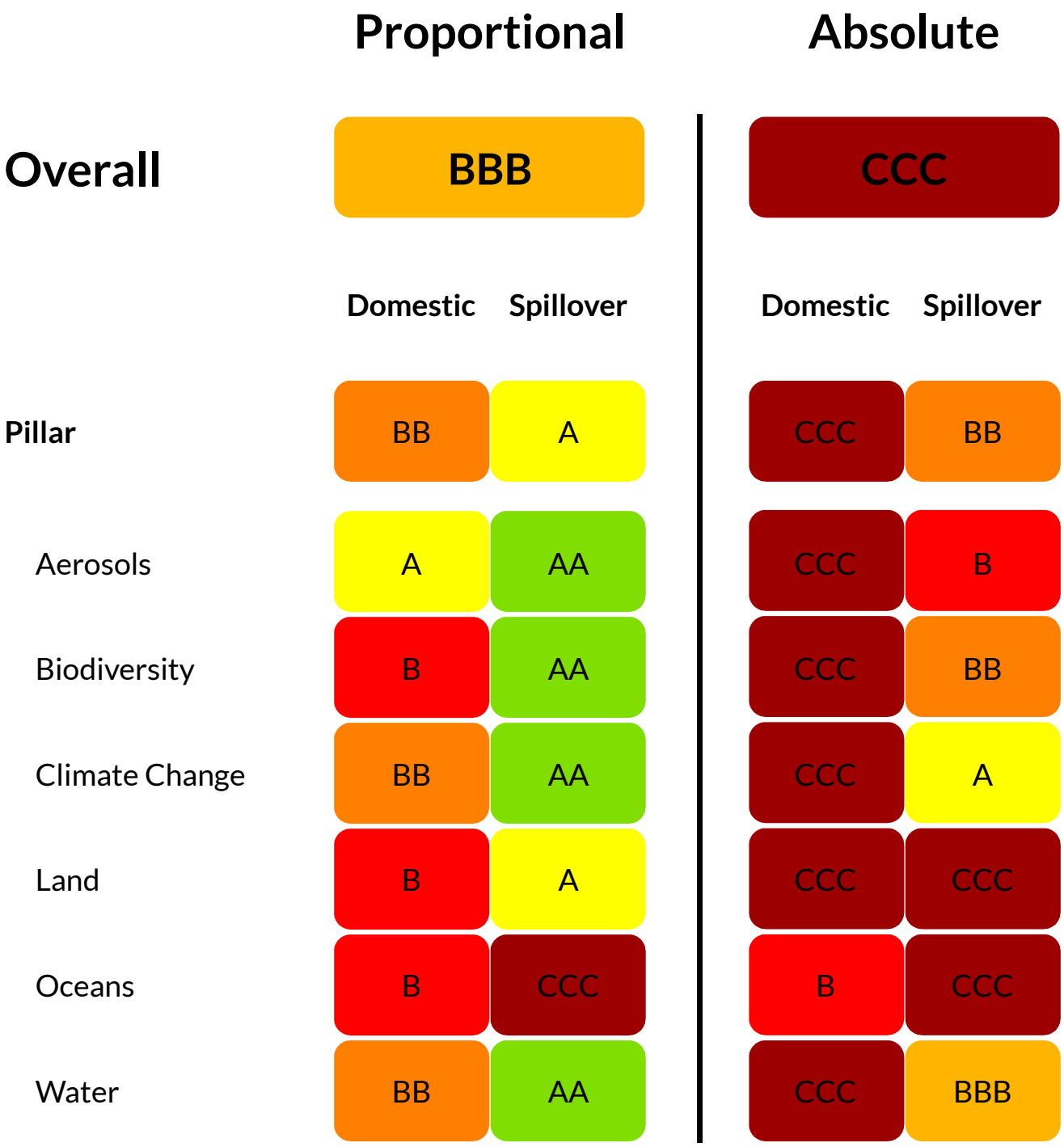
		Proportional		Absolute			
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	8.30	B	Gg	93.65	A	2015
NO_X emissions, spillover	kg/capita	6.32	CCC	Gg	71.38	A	2015
SO_2 emissions, domestic	kg/capita	37.33	A	Gg	421.43	A	2015
SO_2 emissions, spillover	kg/capita	28.42	CCC	Gg	320.76	BBB	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	12.89	BBB	$\mu g/m^3$	12.89	BBB	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	0.02	AA	spp.	0.25	AA	2018
Terrestrial spp. threatened, spillover	spp./million	3.98	CCC	spp.	45.70	BB	2018
Freshwater spp. threatened, domestic	spp./million	0.01	AA	spp.	0.14	AA	2018
Freshwater spp. threatened, spillover	spp./million	0.74	CCC	spp.	8.52	BB	2018
Marine spp. threatened, domestic	spp./million	0.00	AA	spp.	0.03	AA	2018
Marine spp. threatened, spillover	spp./million	0.23	A	spp.	2.68	A	2018
Red List Index	unitless	0.99	AA	unitless	0.99	AA	2019
Unprotected terrestrial sites	%	15.85	BBB	%	15.85	BBB	2019
Unprotected freshwater sites	%	6.98	A	%	6.98	A	2019
Unprotected marine sites	%	8.34	A	%	8.34	A	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	9.90	B	Pg CO_2e	0.11	A	2014
GHG emissions, spillover	t CO_2e/capita	7.50	CCC	Pg CO_2e	0.08	A	2014
Black carbon emissions	kg/capita	0.42	BB	Gg	4.57	AA	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.00	AA	t CO_2/capita	0.00	AA	2019
Land							
NH_3 emissions, domestic	kg/capita	6.20	BBB	Tg	69.97	AA	2015
NH_3 emissions, spillover	kg/capita	9.08	CCC	kg	102.46	BBB	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.72	CCC	unitless	0.72	CCC	2015
Non-Recycled Waste	kg/capita/day	0.51	BB	Gg	5.85	AA	2018
Deforestation	%	0.01	AA	10^3 hectares	0.07	AA	2018
Human Trophic Level	unitless	2.38	BB	unitless	2.38	BB	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	na	na	%	na	na	2014
Fish caught by trawling	%	50.33	CCC	%	50.33	CCC	2014
Ocean Health Index: Clean Waters	unitless	31.90	CCC	unitless	31.90	CCC	2019
Water							
Untreated wastewater	%	32.12	BB	%	32.12	BB	2018
Nitrogen emissions, domestic	kg/capita	8.13	BBB	Tg	0.09	AA	2015
Nitrogen emissions, spillover	kg/capita	14.24	CCC	Gg	160.71	A	2015
Scarce water consumption, domestic	10^3 m^3/capita	1.00	AA	10^9 m^3	11.63	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	5.60	CCC	10^9 m^3	63.54	A	2015
Water stress	%	49.07	B	10^9 m^3	3.99	AA	2015

Brazil

Latin America & Caribbean

Population [millions]	212.6	**GDP** [$, billions]	2,343.7
Land area [km^2, thousands]	8,552.0	**GDP** per capita	11,026

Country ratings on impacts to Global Commons



Brazil

Latin America & Caribbean

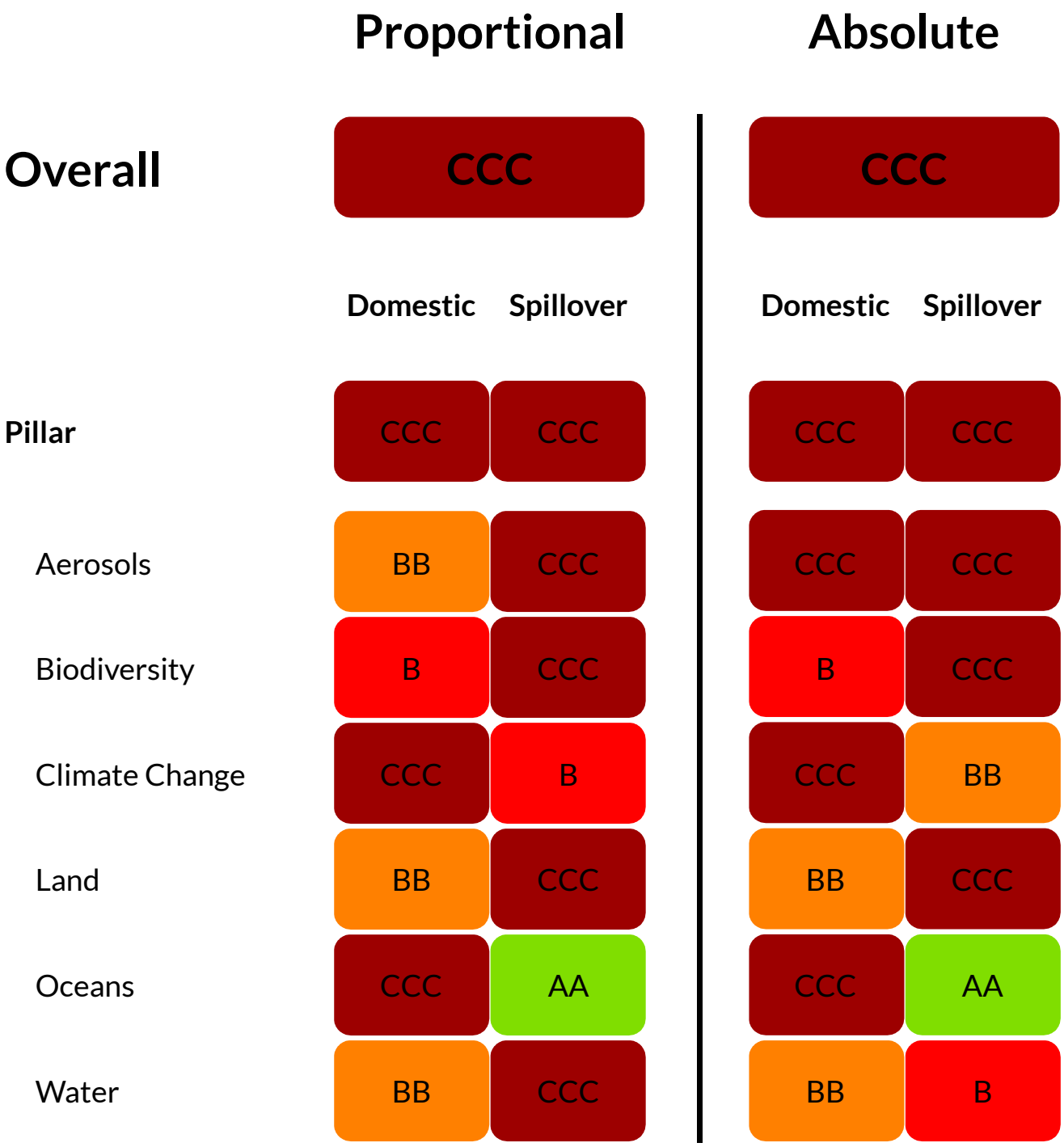
		Proportional			Absolute		
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	5.28	BBB	Gg	1,079.39	CCC	2015
NO_X emissions, spillover	kg/capita	0.72	AA	Gg	147.09	BB	2015
SO_2 emissions, domestic	kg/capita	9.25	AA	Gg	1,890.90	CCC	2015
SO_2 emissions, spillover	kg/capita	4.21	AA	Gg	860.23	CCC	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	12.71	BBB	$\mu g/m^3$	12.71	BBB	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	5.35	A	spp.	1,120.81	CCC	2018
Terrestrial spp. threatened, spillover	spp./million	0.30	AA	spp.	63.62	B	2018
Freshwater spp. threatened, domestic	spp./million	0.29	AA	spp.	60.67	BB	2018
Freshwater spp. threatened, spillover	spp./million	0.03	AA	spp.	6.19	BBB	2018
Marine spp. threatened, domestic	spp./million	0.60	AA	spp.	126.42	CCC	2018
Marine spp. threatened, spillover	spp./million	0.03	AA	spp.	6.43	BBB	2018
Red List Index	unitless	0.90	BBB	unitless	0.90	BBB	2019
Unprotected terrestrial sites	%	57.24	CCC	%	57.24	CCC	2019
Unprotected freshwater sites	%	79.18	CCC	%	79.18	CCC	2019
Unprotected marine sites	%	42.78	CCC	%	42.78	CCC	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	5.60	BBB	Pg CO_2e	1.14	CCC	2014
GHG emissions, spillover	t CO_2e/capita	0.90	AA	Pg CO_2e	0.19	BB	2014
Black carbon emissions	kg/capita	0.90	CCC	Gg	176.24	CCC	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.00	AA	t CO_2/capita	0.00	AA	2018
Land							
NH_3 emissions, domestic	kg/capita	17.52	CCC	Tg	3,582.48	CCC	2015
NH_3 emissions, spillover	kg/capita	1.10	A	kg	225.06	CCC	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.50	BB	unitless	0.50	BB	2015
Non-Recycled Waste	kg/capita/day	0.85	CCC	Gg	148.92	CCC	2000
Deforestation	%	0.56	BB	10^3 hectares	2,758.60	CCC	2018
Human Trophic Level	unitless	2.37	BB	unitless	2.37	BB	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	31.59	CCC	%	31.59	CCC	2014
Fish caught by trawling	%	17.81	BBB	%	17.81	BBB	2014
Ocean Health Index: Clean Waters	unitless	60.15	CCC	unitless	60.15	CCC	2019
Water							
Untreated wastewater	%	50.70	CCC	%	50.70	CCC	2018
Nitrogen emissions, domestic	kg/capita	26.48	CCC	Tg	5.41	CCC	2015
Nitrogen emissions, spillover	kg/capita	1.97	AA	Gg	402.52	BB	2015
Scarce water consumption, domestic	10^3 m^3/capita	0.00	AA	10^9 m^3	9.96	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	0.40	AA	10^9 m^3	84.37	A	2015
Water stress	%	3.11	AA	10^9 m^3	65.68	CCC	2017

Canada

OECD

Population [millions]	37.7	**GDP** [$, billions]	1,939.6
Land area [km^2, thousands]	9,942.3	**GDP** per capita	51,392

Country ratings on impacts to Global Commons



Canada

OECD

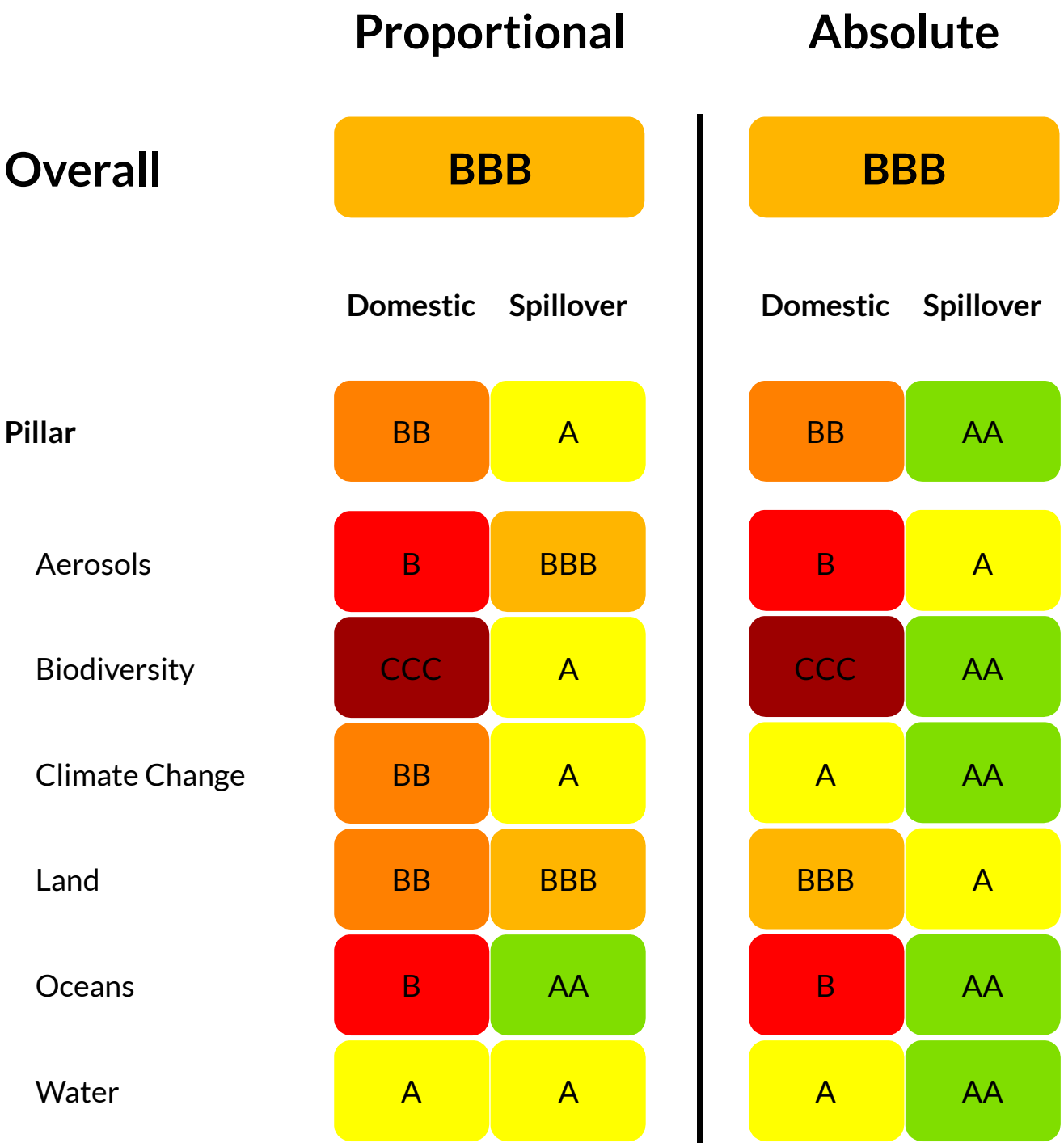
		Proportional			Absolute		
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	16.75	CCC	Gg	603.51	CCC	2015
NO_X emissions, spillover	kg/capita	5.56	CCC	Gg	200.17	CCC	2015
SO_2 emissions, domestic	kg/capita	62.59	BB	Gg	2,254.97	CCC	2015
SO_2 emissions, spillover	kg/capita	26.41	CCC	Gg	951.46	CCC	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	6.43	AA	$\mu g/m^3$	6.43	AA	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	1.56	AA	spp.	57.66	AA	2018
Terrestrial spp. threatened, spillover	spp./million	3.51	CCC	spp.	130.11	CCC	2018
Freshwater spp. threatened, domestic	spp./million	0.58	AA	spp.	21.32	A	2018
Freshwater spp. threatened, spillover	spp./million	0.54	CCC	spp.	20.10	CCC	2018
Marine spp. threatened, domestic	spp./million	0.20	AA	spp.	7.51	AA	2018
Marine spp. threatened, spillover	spp./million	0.90	B	spp.	33.43	CCC	2018
Red List Index	unitless	0.97	AA	unitless	0.97	AA	2019
Unprotected terrestrial sites	%	71.86	CCC	%	71.86	CCC	2019
Unprotected freshwater sites	%	78.89	CCC	%	78.89	CCC	2019
Unprotected marine sites	%	67.03	CCC	%	67.03	CCC	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	20.20	CCC	Pg CO_2e	0.72	CCC	2014
GHG emissions, spillover	t CO_2e/capita	8.10	CCC	Pg CO_2e	0.29	CCC	2014
Black carbon emissions	kg/capita	0.91	CCC	Gg	31.01	BBB	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	3.50	A	t CO_2/capita	3.45	A	2019
Land							
NH_3 emissions, domestic	kg/capita	14.45	CCC	Tg	520.61	CCC	2015
NH_3 emissions, spillover	kg/capita	8.94	CCC	kg	322.10	CCC	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.47	BB	unitless	0.47	BB	2015
Non-Recycled Waste	kg/capita/day	na	na	Gg	na	na	na
Deforestation	%	0.00	AA	10^3 hectares	11.03	AA	2018
Human Trophic Level	unitless	2.35	BB	unitless	2.35	BB	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	45.51	CCC	%	45.51	CCC	2014
Fish caught by trawling	%	28.68	B	%	28.68	B	2014
Ocean Health Index: Clean Waters	unitless	93.98	AA	unitless	93.98	AA	2019
Water							
Untreated wastewater	%	32.56	BB	%	32.56	BB	2018
Nitrogen emissions, domestic	kg/capita	28.32	CCC	Tg	1.02	CCC	2015
Nitrogen emissions, spillover	kg/capita	16.70	CCC	Gg	601.60	CCC	2015
Scarce water consumption, domestic	10^3 m^3/capita	0.10	AA	10^9 m^3	4.66	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	7.00	CCC	10^9 m^3	253.62	B	2015
Water stress	%	3.67	AA	10^9 m^3	35.60	BB	2017

Chile

OECD

Population [millions]	19.1	**GDP** [$, billions]	435.2
Land area [km^2, thousands]	759.0	**GDP** per capita	22,767

Country ratings on impacts to Global Commons



Chile

OECD

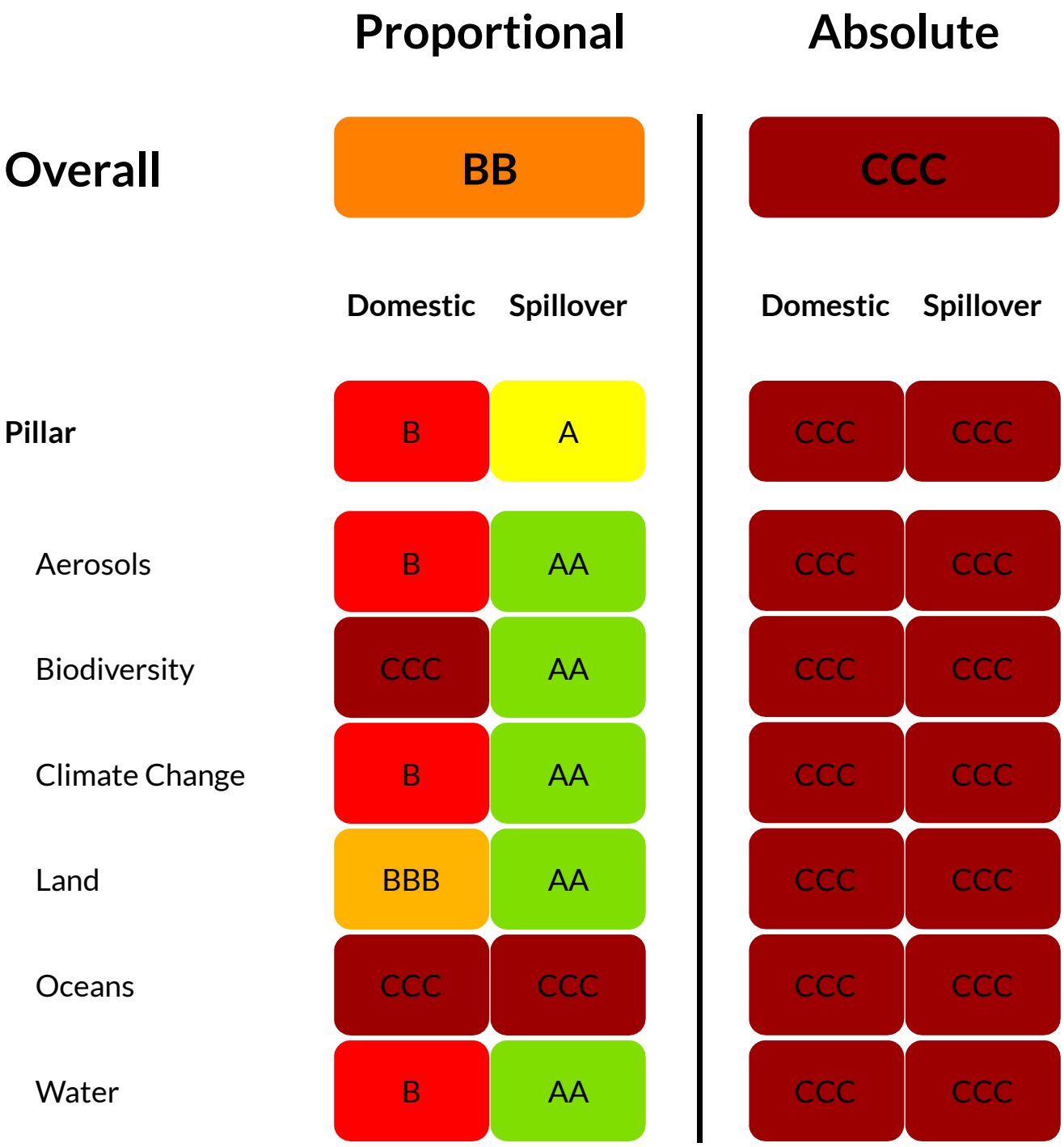
		Proportional			Absolute		
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	7.81	BB	Gg	140.40	BBB	2015
NO_X emissions, spillover	kg/capita	2.13	BBB	Gg	38.25	AA	2015
SO_2 emissions, domestic	kg/capita	102.99	CCC	Gg	1,850.59	CCC	2015
SO_2 emissions, spillover	kg/capita	10.00	BBB	Gg	179.64	A	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	21.04	CCC	$\mu g/m^3$	21.04	CCC	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	8.51	A	spp.	159.39	A	2018
Terrestrial spp. threatened, spillover	spp./million	1.03	BBB	spp.	19.35	A	2018
Freshwater spp. threatened, domestic	spp./million	0.42	AA	spp.	7.80	AA	2018
Freshwater spp. threatened, spillover	spp./million	0.09	AA	spp.	1.60	AA	2018
Marine spp. threatened, domestic	spp./million	2.14	BBB	spp.	40.02	BB	2018
Marine spp. threatened, spillover	spp./million	0.04	AA	spp.	0.71	AA	2018
Red List Index	unitless	0.75	CCC	unitless	0.75	CCC	2019
Unprotected terrestrial sites	%	65.78	CCC	%	65.78	CCC	2019
Unprotected freshwater sites	%	64.68	CCC	%	64.68	CCC	2019
Unprotected marine sites	%	72.93	CCC	%	72.93	CCC	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	5.70	BBB	Pg CO_2e	0.10	A	2014
GHG emissions, spillover	t CO_2e/capita	2.70	BBB	Pg CO_2e	0.05	AA	2014
Black carbon emissions	kg/capita	1.07	CCC	Gg	18.13	A	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.10	AA	t CO_2/capita	0.11	AA	2018
Land							
NH_3 emissions, domestic	kg/capita	6.55	BBB	Tg	117.66	A	2015
NH_3 emissions, spillover	kg/capita	2.88	BBB	kg	51.82	A	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.78	CCC	unitless	0.78	CCC	2015
Non-Recycled Waste	kg/capita/day	1.19	CCC	Gg	21.95	A	2017
Deforestation	%	0.04	AA	10^3 hectares	7.50	AA	2018
Human Trophic Level	unitless	2.33	BB	unitless	2.33	BB	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	41.49	CCC	%	41.49	CCC	2014
Fish caught by trawling	%	1.10	AA	%	1.10	AA	2014
Ocean Health Index: Clean Waters	unitless	93.81	AA	unitless	93.81	AA	2019
Water							
Untreated wastewater	%	28.14	BBB	%	28.14	BBB	2018
Nitrogen emissions, domestic	kg/capita	11.01	BB	Tg	0.20	A	2015
Nitrogen emissions, spillover	kg/capita	4.61	BBB	Gg	82.83	AA	2015
Scarce water consumption, domestic	10^3 m^3/capita	0.60	AA	10^9 m^3	10.17	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	1.00	A	10^9 m^3	17.78	AA	2015
Water stress	%	8.98	AA	10^9 m^3	35.36	BB	2006

China

East & South Asia

Population [millions]	1,439.3	**GDP** [$, billions]	11,159.1
Land area [km^2, thousands]	9,400.0	**GDP** per capita	7,753

Country ratings on impacts to Global Commons



China

East & South Asia

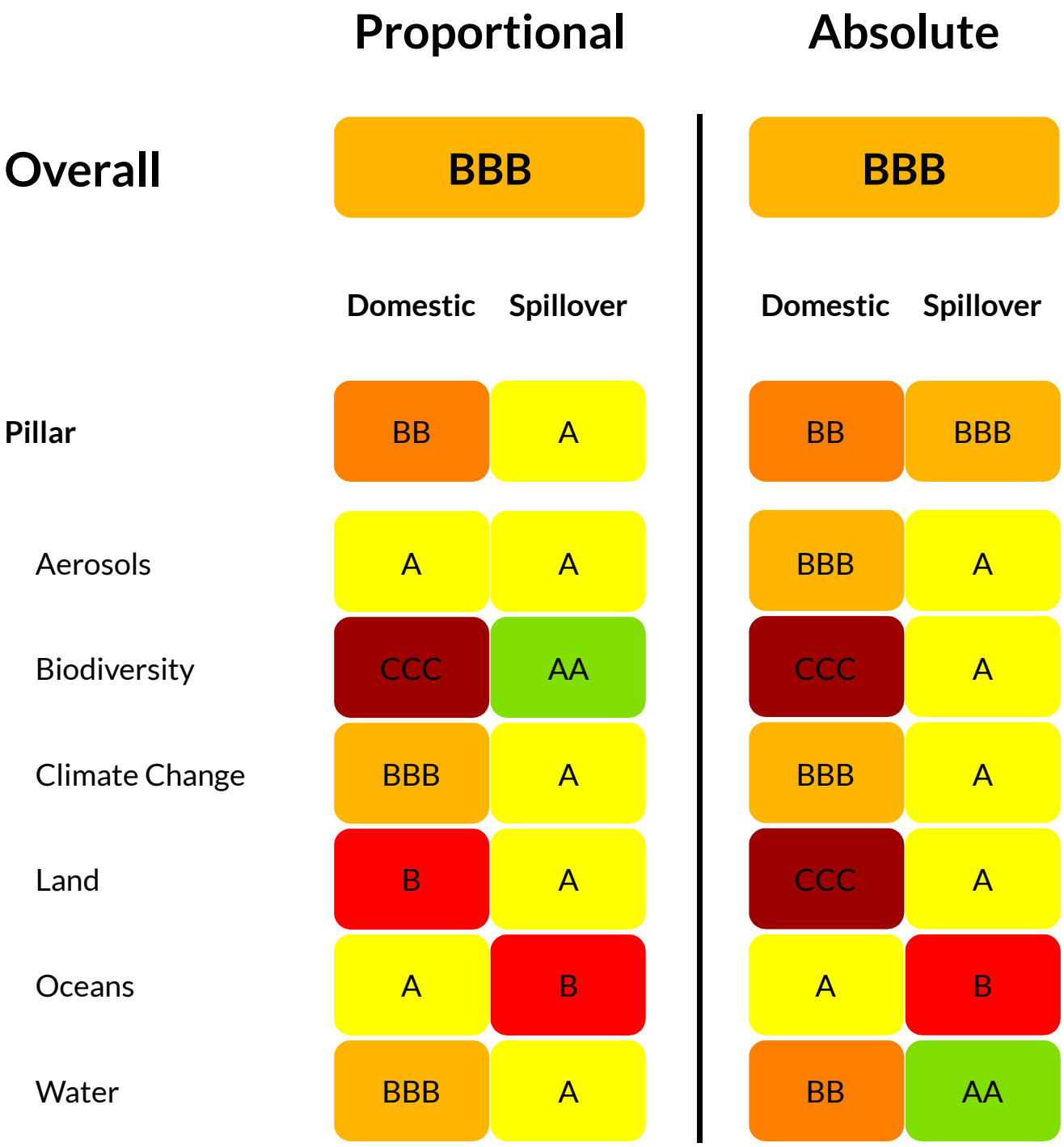
		Proportional			Absolute		
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	4.77	BBB	Gg	6,707.17	CCC	2015
NO_X emissions, spillover	kg/capita	0.51	AA	Gg	723.59	CCC	2015
SO_2 emissions, domestic	kg/capita	30.49	A	Gg	42,888.97	CCC	2015
SO_2 emissions, spillover	kg/capita	3.25	AA	Gg	4,578.11	CCC	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	52.66	CCC	$\mu g/m^3$	52.66	CCC	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	0.70	AA	spp.	997.56	CCC	2018
Terrestrial spp. threatened, spillover	spp./million	0.52	A	spp.	735.52	CCC	2018
Freshwater spp. threatened, domestic	spp./million	0.17	AA	spp.	248.36	CCC	2018
Freshwater spp. threatened, spillover	spp./million	0.08	AA	spp.	120.55	CCC	2018
Marine spp. threatened, domestic	spp./million	0.09	AA	spp.	126.83	CCC	2018
Marine spp. threatened, spillover	spp./million	0.04	AA	spp.	61.53	CCC	2018
Red List Index	unitless	0.74	CCC	unitless	0.74	CCC	2019
Unprotected terrestrial sites	%	90.07	CCC	%	90.07	CCC	2019
Unprotected freshwater sites	%	90.55	CCC	%	90.55	CCC	2019
Unprotected marine sites	%	91.72	CCC	%	91.72	CCC	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	9.50	B	Pg CO_2e	13.25	CCC	2014
GHG emissions, spillover	t CO_2e/capita	0.70	AA	Pg CO_2e	0.99	CCC	2014
Black carbon emissions	kg/capita	1.16	CCC	Gg	1,576.95	CCC	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.00	AA	t CO_2/capita	0.02	AA	2018
Land							
NH_3 emissions, domestic	kg/capita	5.53	BBB	Tg	7,779.71	CCC	2015
NH_3 emissions, spillover	kg/capita	0.69	AA	kg	974.46	CCC	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.69	B	unitless	0.69	B	2015
Non-Recycled Waste	kg/capita/day	0.31	BBB	Gg	426.65	CCC	2010
Deforestation	%	0.01	AA	10^3 hectares	12.18	AA	2018
Human Trophic Level	unitless	2.19	A	unitless	2.19	A	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	8.78	A	%	8.78	A	2014
Fish caught by trawling	%	51.50	CCC	%	51.50	CCC	2014
Ocean Health Index: Clean Waters	unitless	35.03	CCC	unitless	35.03	CCC	2019
Water							
Untreated wastewater	%	90.64	CCC	%	90.64	CCC	2018
Nitrogen emissions, domestic	kg/capita	11.42	BB	Tg	16.07	CCC	2015
Nitrogen emissions, spillover	kg/capita	1.06	AA	Gg	1,495.36	CCC	2015
Scarce water consumption, domestic	10^3 m^3/capita	2.00	AA	10^9 m^3	2,828.78	CCC	2015
Scarce water consumption, spillover	10^3 m^3/capita	0.60	AA	10^9 m^3	789.58	CCC	2015
Water stress	%	43.40	B	10^9 m^3	594.20	CCC	2015

Colombia

OECD

Population [millions]	50.9	**GDP** [$, billions]	391.4
Land area [km^2, thousands]	1,144.0	**GDP** per capita	7,692

Country ratings on impacts to Global Commons



Colombia

OECD

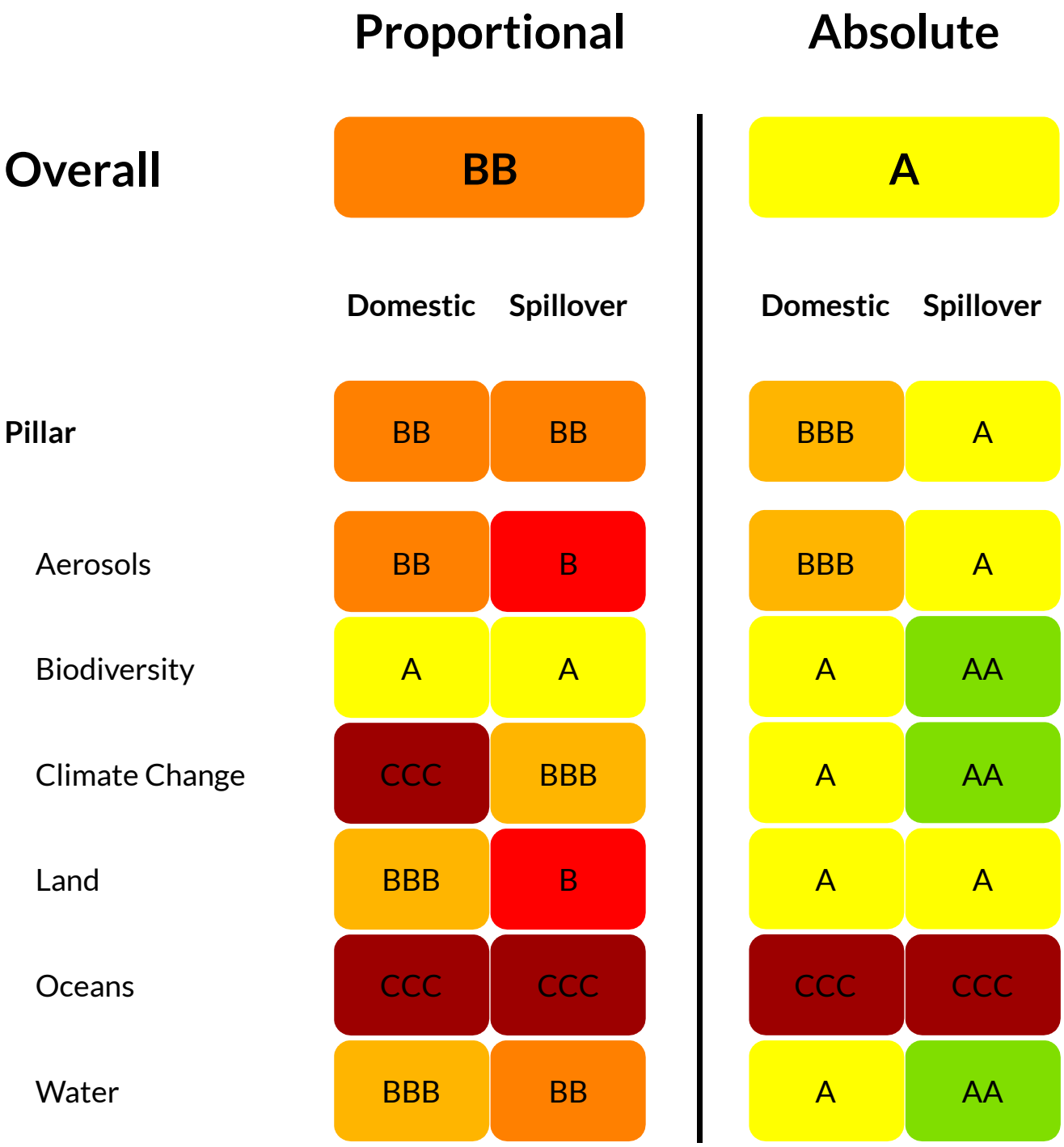
		Proportional		Absolute			
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	2.51	A	Gg	119.04	A	2015
NO_X emissions, spillover	kg/capita	1.06	A	Gg	50.20	A	2015
SO_2 emissions, domestic	kg/capita	9.37	AA	Gg	445.25	A	2015
SO_2 emissions, spillover	kg/capita	4.91	A	Gg	233.55	A	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	16.53	BB	$\mu g/m^3$	16.53	BB	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	14.45	BB	spp.	717.56	CCC	2018
Terrestrial spp. threatened, spillover	spp./million	0.99	A	spp.	49.05	BB	2018
Freshwater spp. threatened, domestic	spp./million	1.73	A	spp.	86.09	B	2018
Freshwater spp. threatened, spillover	spp./million	0.06	AA	spp.	2.77	A	2018
Marine spp. threatened, domestic	spp./million	1.34	A	spp.	66.65	CCC	2018
Marine spp. threatened, spillover	spp./million	0.05	AA	spp.	2.50	A	2018
Red List Index	unitless	0.73	CCC	unitless	0.73	CCC	2019
Unprotected terrestrial sites	%	57.11	CCC	%	57.11	CCC	2019
Unprotected freshwater sites	%	52.56	CCC	%	52.56	CCC	2019
Unprotected marine sites	%	43.62	CCC	%	43.62	CCC	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	4.40	BBB	Pg CO_2e	0.21	BBB	2014
GHG emissions, spillover	t CO_2e/capita	1.20	A	Pg CO_2e	0.06	A	2014
Black carbon emissions	kg/capita	0.33	BBB	Gg	15.03	A	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	4.20	BBB	t CO_2/capita	4.22	BBB	2018
Land							
NH_3 emissions, domestic	kg/capita	7.95	BB	Tg	377.63	B	2015
NH_3 emissions, spillover	kg/capita	1.40	A	kg	66.65	A	2015
Sustainable Nitrogen Mgmt. Index	unitless	1.06	CCC	unitless	1.06	CCC	2015
Non-Recycled Waste	kg/capita/day	na	na	Gg	na	na	na
Deforestation	%	0.23	A	10^3 hectares	185.32	CCC	2018
Human Trophic Level	unitless	2.27	BBB	unitless	2.27	BBB	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	11.82	BBB	%	11.82	BBB	2014
Fish caught by trawling	%	8.82	A	%	8.82	A	2014
Ocean Health Index: Clean Waters	unitless	63.49	B	unitless	63.49	B	2019
Water							
Untreated wastewater	%	74.44	CCC	%	74.44	CCC	2018
Nitrogen emissions, domestic	kg/capita	11.02	BB	Tg	0.52	BB	2015
Nitrogen emissions, spillover	kg/capita	2.48	A	Gg	117.79	AA	2015
Scarce water consumption, domestic	10^3 m^3/capita	0.00	AA	10^9 m^3	0.98	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	0.80	AA	10^9 m^3	38.02	AA	2015
Water stress	%	1.76	AA	10^9 m^3	11.77	A	2008

Czechia

OECD

Population [millions]	10.7	**GDP** [$, billions]	349.2
Land area [km^2, thousands]	78.6	**GDP** per capita	32,606

Country ratings on impacts to Global Commons



Czechia

OECD

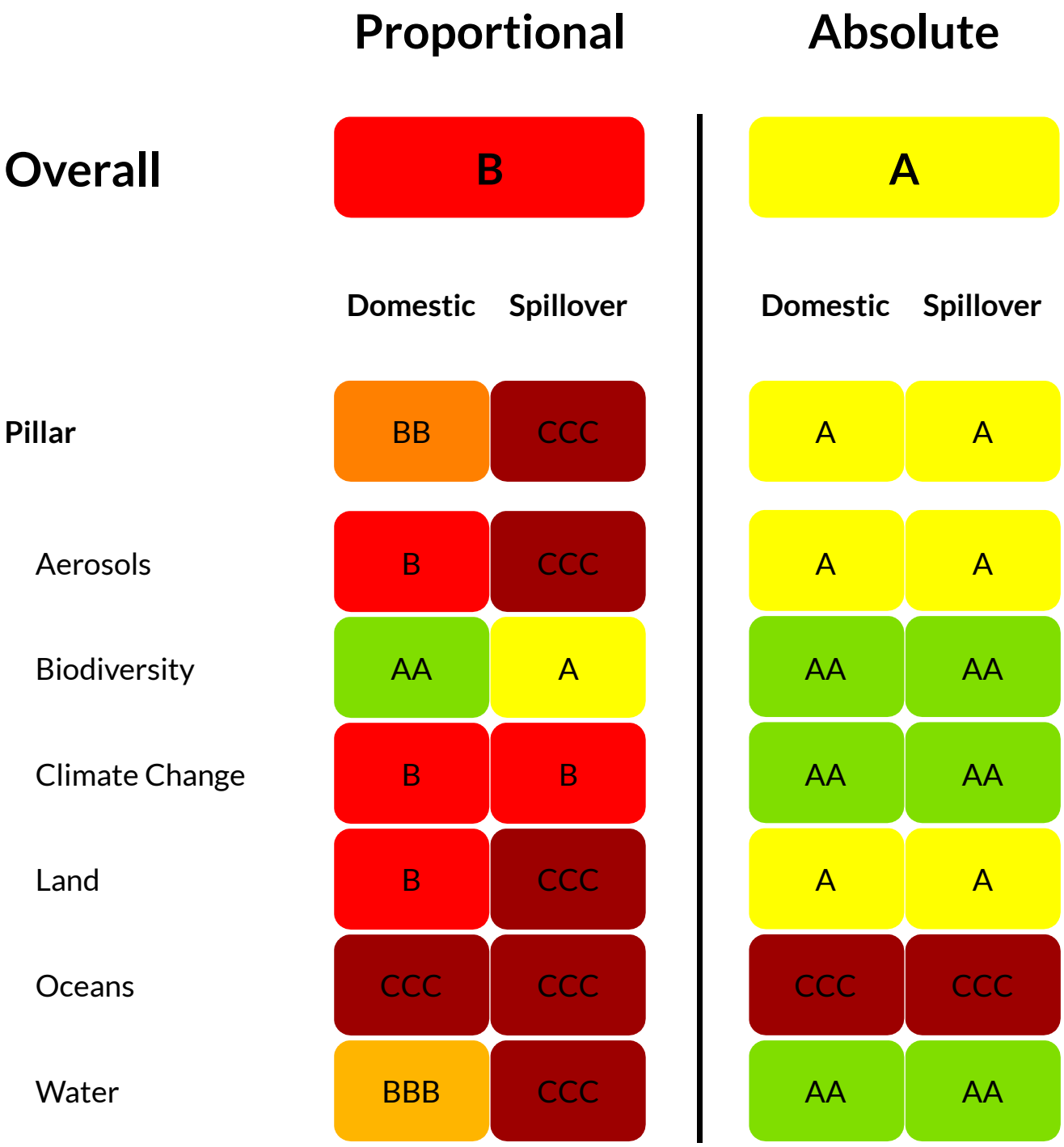
		Proportional		Absolute			
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	10.00	B	Gg	105.97	A	2015
NO_X emissions, spillover	kg/capita	4.29	B	Gg	45.43	A	2015
SO_2 emissions, domestic	kg/capita	53.45	BBB	Gg	566.63	A	2015
SO_2 emissions, spillover	kg/capita	21.69	B	Gg	229.91	A	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	16.07	BB	$\mu g/m^3$	16.07	BB	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	0.52	AA	spp.	5.50	AA	2018
Terrestrial spp. threatened, spillover	spp./million	1.43	BBB	spp.	15.20	A	2018
Freshwater spp. threatened, domestic	spp./million	0.04	AA	spp.	0.39	AA	2018
Freshwater spp. threatened, spillover	spp./million	0.18	A	spp.	1.91	AA	2018
Marine spp. threatened, domestic	spp./million	0.00	AAA	spp.	0.00	AAA	2018
Marine spp. threatened, spillover	spp./million	0.05	AA	spp.	0.57	AA	2018
Red List Index	unitless	0.97	AA	unitless	0.97	AA	2019
Unprotected terrestrial sites	%	5.27	AA	%	5.27	AA	2019
Unprotected freshwater sites	%	7.89	A	%	7.89	A	2019
Unprotected marine sites	%	na	na	%	na	na	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	12.10	CCC	Pg CO_2e	0.13	A	2014
GHG emissions, spillover	t CO_2e/capita	5.10	CCC	Pg CO_2e	0.05	A	2014
Black carbon emissions	kg/capita	0.74	CCC	Gg	7.81	AA	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.70	AA	t CO_2/capita	0.67	AA	2019
Land							
NH_3 emissions, domestic	kg/capita	6.22	BBB	Tg	65.93	AA	2015
NH_3 emissions, spillover	kg/capita	4.29	B	kg	45.53	A	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.49	BB	unitless	0.49	BB	2015
Non-Recycled Waste	kg/capita/day	0.63	B	Gg	6.70	AA	2018
Deforestation	%	0.01	AA	10^3 hectares	0.22	AA	2018
Human Trophic Level	unitless	2.38	BB	unitless	2.38	BB	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	na	na	%	na	na	2014
Fish caught by trawling	%	na	na	%	na	na	2014
Ocean Health Index: Clean Waters	unitless	na	na	unitless	na	na	2019
Water							
Untreated wastewater	%	39.25	BB	%	39.25	BB	2018
Nitrogen emissions, domestic	kg/capita	11.52	BB	Tg	0.12	AA	2015
Nitrogen emissions, spillover	kg/capita	7.06	BB	Gg	74.81	AA	2015
Scarce water consumption, domestic	10^3 m^3/capita	0.20	AA	10^9 m^3	2.27	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	2.70	BB	10^9 m^3	28.67	AA	2015
Water stress	%	24.79	BBB	10^9 m^3	1.63	AA	2017

Denmark

OECD

Population [millions]	5.8	**GDP** [$, billions]	270.4
Land area [km^2, thousands]	43.1	**GDP** per capita	46,683

Country ratings on impacts to Global Commons



Denmark

OECD

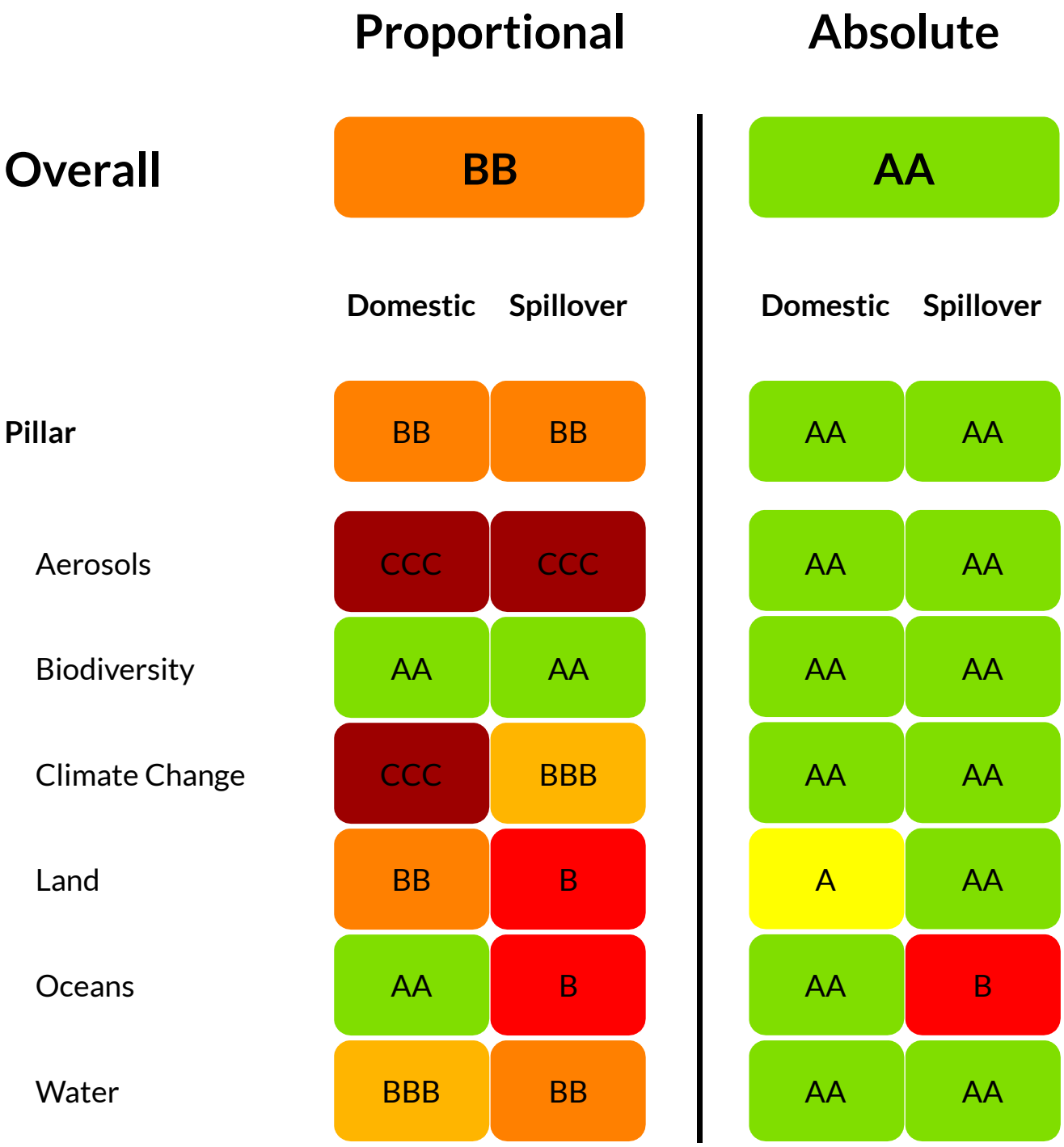
		Proportional			Absolute		
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	11.06	CCC	Gg	62.92	AA	2015
NO_X emissions, spillover	kg/capita	6.38	CCC	Gg	36.27	AA	2015
SO_2 emissions, domestic	kg/capita	132.27	CCC	Gg	752.46	BBB	2015
SO_2 emissions, spillover	kg/capita	39.11	CCC	Gg	222.46	A	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	10.03	A	$\mu g/m^3$	10.03	A	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	0.03	AA	spp.	0.19	AA	2018
Terrestrial spp. threatened, spillover	spp./million	1.57	BB	spp.	9.05	AA	2018
Freshwater spp. threatened, domestic	spp./million	0.01	AA	spp.	0.04	AA	2018
Freshwater spp. threatened, spillover	spp./million	0.11	A	spp.	0.65	AA	2018
Marine spp. threatened, domestic	spp./million	0.07	AA	spp.	0.39	AA	2018
Marine spp. threatened, spillover	spp./million	0.08	AA	spp.	0.44	AA	2018
Red List Index	unitless	0.97	AA	unitless	0.97	AA	2019
Unprotected terrestrial sites	%	13.80	BBB	%	13.80	BBB	2019
Unprotected freshwater sites	%	8.25	A	%	8.25	A	2019
Unprotected marine sites	%	13.15	A	%	13.15	A	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	9.30	B	Pg CO_2e	0.05	AA	2014
GHG emissions, spillover	t CO_2e/capita	9.30	CCC	Pg CO_2e	0.05	A	2014
Black carbon emissions	kg/capita	0.50	B	Gg	2.78	AA	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.00	AA	t CO_2/capita	0.00	AA	2019
Land							
NH_3 emissions, domestic	kg/capita	17.03	CCC	Tg	96.87	A	2015
NH_3 emissions, spillover	kg/capita	8.06	CCC	kg	45.87	A	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.37	BBB	unitless	0.37	BBB	2015
Non-Recycled Waste	kg/capita/day	1.10	CCC	Gg	6.33	AA	2018
Deforestation	%	0.01	AA	10^3 hectares	0.07	AA	2018
Human Trophic Level	unitless	2.49	B	unitless	2.49	B	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	45.10	CCC	%	45.10	CCC	2014
Fish caught by trawling	%	15.04	BBB	%	15.04	BBB	2014
Ocean Health Index: Clean Waters	unitless	52.50	CCC	unitless	52.50	CCC	2019
Water							
Untreated wastewater	%	0.00	AAA	%	0.00	AAA	2018
Nitrogen emissions, domestic	kg/capita	25.60	CCC	Tg	0.15	A	2015
Nitrogen emissions, spillover	kg/capita	13.12	CCC	Gg	74.62	AA	2015
Scarce water consumption, domestic	10^3 m^3/capita	0.80	AA	10^9 m^3	4.45	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	5.30	CCC	10^9 m^3	30.07	AA	2015
Water stress	%	20.04	BBB	10^9 m^3	0.74	AA	2016

Estonia

OECD

Population [millions]	1.3	**GDP** [$, billions]	39.1
Land area [km^2, thousands]	45.4	**GDP** per capita	29,481

Country ratings on impacts to Global Commons



Estonia

OECD

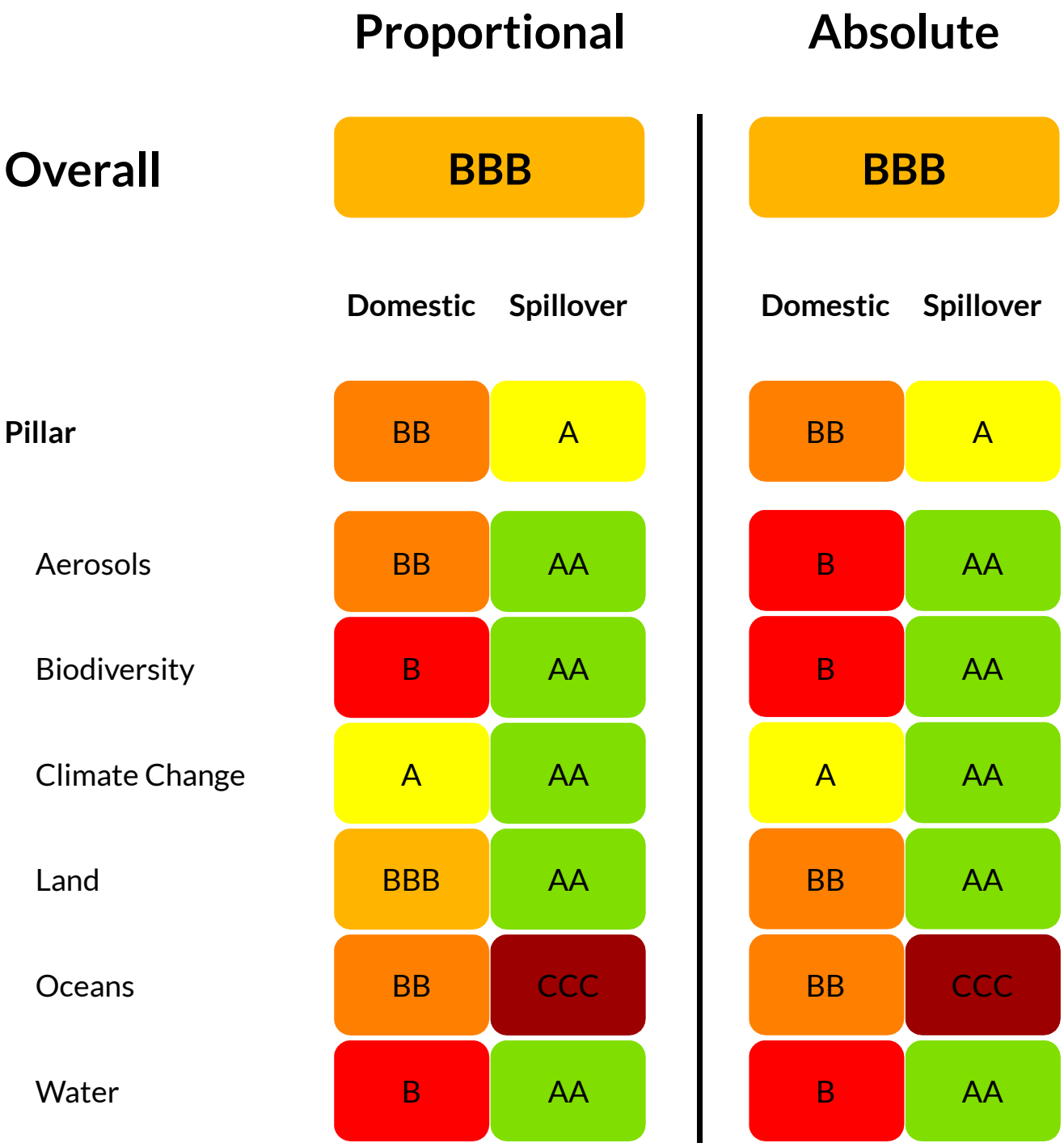
		Proportional			Absolute		
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	11.95	CCC	Gg	15.72	AA	2015
NO_X emissions, spillover	kg/capita	6.93	CCC	Gg	9.11	AA	2015
SO_2 emissions, domestic	kg/capita	276.09	CCC	Gg	363.16	A	2015
SO_2 emissions, spillover	kg/capita	35.20	CCC	Gg	46.30	AA	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	6.73	AA	$\mu g/m^3$	6.73	AA	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	0.13	AA	spp.	0.18	AA	2018
Terrestrial spp. threatened, spillover	spp./million	0.24	AA	spp.	0.31	AA	2018
Freshwater spp. threatened, domestic	spp./million	0.05	AA	spp.	0.06	AA	2018
Freshwater spp. threatened, spillover	spp./million	0.02	AA	spp.	0.03	AA	2018
Marine spp. threatened, domestic	spp./million	0.02	AA	spp.	0.02	AA	2018
Marine spp. threatened, spillover	spp./million	0.07	AA	spp.	0.09	AA	2018
Red List Index	unitless	0.99	AA	unitless	0.99	AA	2019
Unprotected terrestrial sites	%	5.13	AA	%	5.13	AA	2019
Unprotected freshwater sites	%	6.50	AA	%	6.50	AA	2019
Unprotected marine sites	%	2.92	AA	%	2.92	AA	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	14.00	CCC	Pg CO_2e	0.02	AA	2014
GHG emissions, spillover	t CO_2e/capita	5.60	CCC	Pg CO_2e	0.01	AA	2014
Black carbon emissions	kg/capita	1.00	CCC	Gg	1.33	AA	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.00	AA	t CO_2/capita	0.00	AA	2019
Land							
NH_3 emissions, domestic	kg/capita	7.88	BB	Tg	10.36	AA	2015
NH_3 emissions, spillover	kg/capita	4.02	B	kg	5.29	AA	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.62	B	unitless	0.62	B	2015
Non-Recycled Waste	kg/capita/day	0.78	CCC	Gg	1.03	AA	2018
Deforestation	%	0.01	AA	10^3 hectares	0.31	AA	2018
Human Trophic Level	unitless	2.47	B	unitless	2.47	B	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	1.40	AA	%	1.40	AA	2014
Fish caught by trawling	%	8.55	A	%	8.55	A	2014
Ocean Health Index: Clean Waters	unitless	65.96	B	unitless	65.96	B	2019
Water							
Untreated wastewater	%	30.40	BB	%	30.40	BB	2018
Nitrogen emissions, domestic	kg/capita	14.76	B	Tg	0.02	AA	2015
Nitrogen emissions, spillover	kg/capita	6.67	BB	Gg	8.77	AA	2015
Scarce water consumption, domestic	10^3 m^3/capita	0.20	AA	10^9 m^3	0.21	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	2.60	BBB	10^9 m^3	3.38	AA	2015
Water stress	%	19.30	A	10^9 m^3	1.78	AA	2017

Ethiopia

Africa

Population [millions]	115.0	**GDP** [$, billions]	65.5
Land area [km^2, thousands]	1,138.3	**GDP** per capita	570

Country ratings on impacts to Global Commons



Ethiopia

Africa

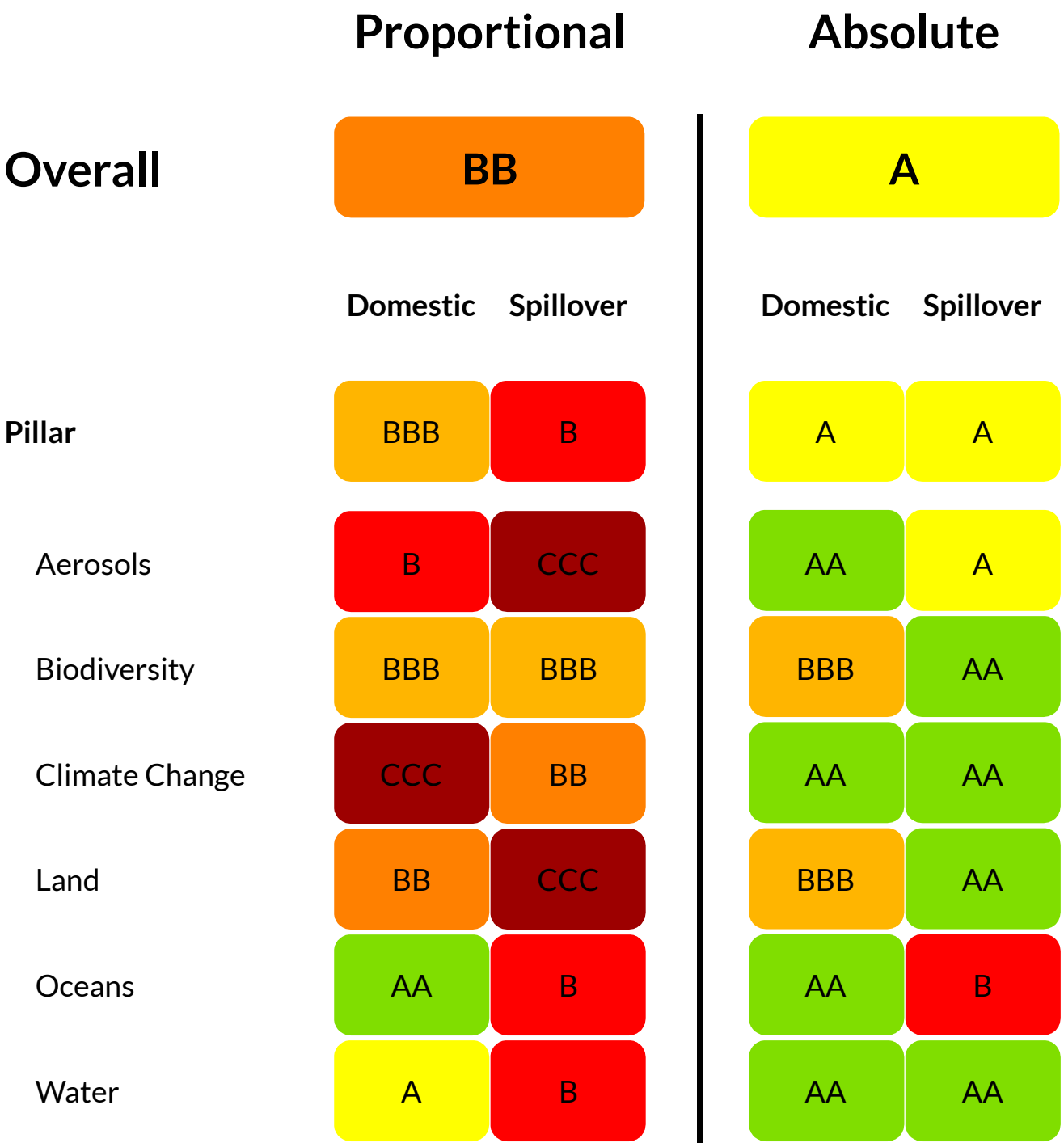
		Proportional			Absolute		
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	1.45	AA	Gg	146.02	BBB	2015
NO_X emissions, spillover	kg/capita	0.04	AA	Gg	3.75	AA	2015
SO_2 emissions, domestic	kg/capita	2.26	AA	Gg	228.10	AA	2015
SO_2 emissions, spillover	kg/capita	0.19	AA	Gg	18.74	AA	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	38.98	CCC	$\mu g/m^3$	38.98	CCC	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	1.19	AA	spp.	130.00	A	2018
Terrestrial spp. threatened, spillover	spp./million	0.01	AA	spp.	1.12	AA	2018
Freshwater spp. threatened, domestic	spp./million	0.10	AA	spp.	10.97	AA	2018
Freshwater spp. threatened, spillover	spp./million	0.00	AA	spp.	0.27	AA	2018
Marine spp. threatened, domestic	spp./million	0.01	AA	spp.	0.68	AA	2018
Marine spp. threatened, spillover	spp./million	0.00	AA	spp.	0.10	AA	2018
Red List Index	unitless	0.84	B	unitless	0.84	B	2019
Unprotected terrestrial sites	%	81.90	CCC	%	81.90	CCC	2019
Unprotected freshwater sites	%	83.83	CCC	%	83.83	CCC	2019
Unprotected marine sites	%	na	na	%	na	na	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	1.50	AA	Pg CO_2e	0.14	A	2014
GHG emissions, spillover	t CO_2e/capita	0.00	AA	Pg CO_2e	0.00	AA	2014
Black carbon emissions	kg/capita	0.78	CCC	Gg	68.56	B	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.00	AA	t CO_2/capita	0.00	AA	2017
Land							
NH_3 emissions, domestic	kg/capita	7.74	BB	Tg	780.45	CCC	2015
NH_3 emissions, spillover	kg/capita	0.03	AA	kg	3.13	AA	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.66	B	unitless	0.66	B	2015
Non-Recycled Waste	kg/capita/day	na	na	Gg	na	na	na
Deforestation	%	0.09	AA	10^3 hectares	11.26	AA	2018
Human Trophic Level	unitless	2.11	A	unitless	2.11	A	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	na	na	%	na	na	2014
Fish caught by trawling	%	na	na	%	na	na	2014
Ocean Health Index: Clean Waters	unitless	na	na	unitless	na	na	2019
Water							
Untreated wastewater	%	100.00	CCC	%	100.00	CCC	2018
Nitrogen emissions, domestic	kg/capita	10.92	BB	Tg	1.10	CCC	2015
Nitrogen emissions, spillover	kg/capita	0.05	AA	Gg	4.97	AA	2015
Scarce water consumption, domestic	10^3 m^3/capita	0.20	AA	10^9 m^3	15.42	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	0.00	AA	10^9 m^3	2.55	AA	2015
Water stress	%	32.26	BB	10^9 m^3	10.55	A	2016

Finland

OECD

Population [millions]	5.5	**GDP** [$, billions]	224.9
Land area [km^2, thousands]	335.2	**GDP** per capita	40,586

Country ratings on impacts to Global Commons



Finland

OECD

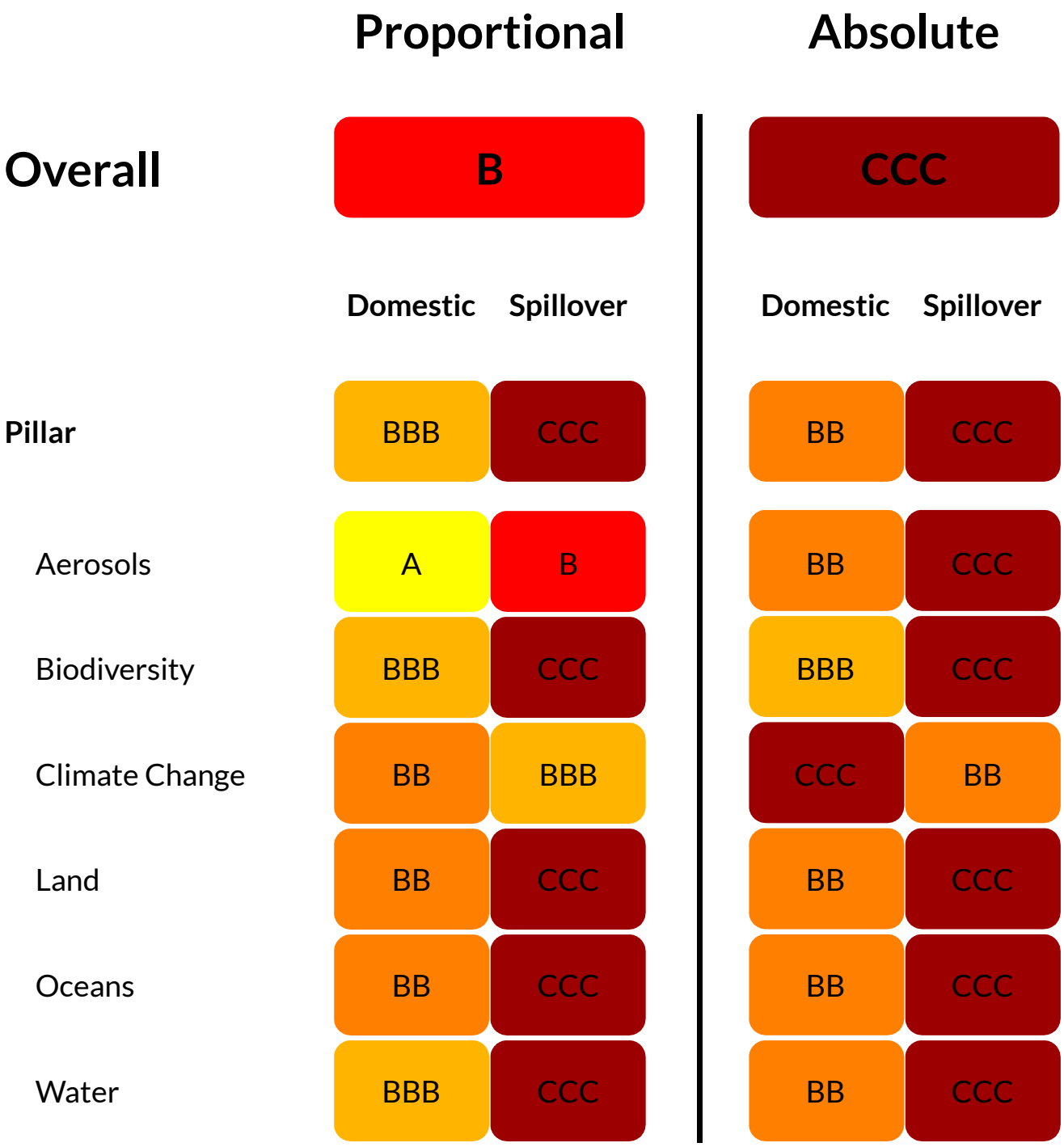
		Proportional			Absolute		
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	14.80	CCC	Gg	81.12	A	2015
NO_X emissions, spillover	kg/capita	9.72	CCC	Gg	53.26	A	2015
SO_2 emissions, domestic	kg/capita	96.02	B	Gg	526.30	A	2015
SO_2 emissions, spillover	kg/capita	40.01	CCC	Gg	219.29	A	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	5.86	AAA	$\mu g/m^3$	5.86	AAA	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	0.51	AA	spp.	2.80	AA	2018
Terrestrial spp. threatened, spillover	spp./million	1.71	BB	spp.	9.44	AA	2018
Freshwater spp. threatened, domestic	spp./million	0.21	AA	spp.	1.16	AA	2018
Freshwater spp. threatened, spillover	spp./million	0.26	BBB	spp.	1.46	AA	2018
Marine spp. threatened, domestic	spp./million	0.04	AA	spp.	0.24	AA	2018
Marine spp. threatened, spillover	spp./million	0.07	AA	spp.	0.39	AA	2018
Red List Index	unitless	0.99	AA	unitless	0.99	AA	2019
Unprotected terrestrial sites	%	28.20	B	%	28.20	B	2019
Unprotected freshwater sites	%	26.34	BB	%	26.34	BB	2019
Unprotected marine sites	%	39.03	CCC	%	39.03	CCC	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	10.90	CCC	Pg CO_2e	0.06	AA	2014
GHG emissions, spillover	t CO_2e/capita	7.40	CCC	Pg CO_2e	0.04	AA	2014
Black carbon emissions	kg/capita	1.02	CCC	Gg	5.47	AA	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.00	AA	t CO_2/capita	0.00	AA	2018
Land							
NH_3 emissions, domestic	kg/capita	7.44	BBB	Tg	40.78	AA	2015
NH_3 emissions, spillover	kg/capita	5.77	CCC	kg	31.65	AA	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.63	B	unitless	0.63	B	2015
Non-Recycled Waste	kg/capita/day	0.87	CCC	Gg	4.81	AA	2018
Deforestation	%	0.00	AA	10^3 hectares	0.47	AA	2018
Human Trophic Level	unitless	2.57	CCC	unitless	2.57	CCC	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	6.22	A	%	6.22	A	2014
Fish caught by trawling	%	0.00	AAA	%	0.00	AAA	2014
Ocean Health Index: Clean Waters	unitless	69.99	B	unitless	69.99	B	2019
Water							
Untreated wastewater	%	0.00	AAA	%	0.00	AAA	2018
Nitrogen emissions, domestic	kg/capita	11.33	BB	Tg	0.06	AA	2015
Nitrogen emissions, spillover	kg/capita	9.45	B	Gg	51.81	AA	2015
Scarce water consumption, domestic	10^3 m^3/capita	0.30	AA	10^9 m^3	1.49	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	3.70	B	10^9 m^3	20.51	AA	2015
Water stress	%	15.56	A	10^9 m^3	6.56	AA	2006

France

OECD

Population [millions]	65.3	**GDP** [$, billions]	2,850.1
Land area [km^2, thousands]	549.2	**GDP** per capita	43,664

Country ratings on impacts to Global Commons



France

OECD

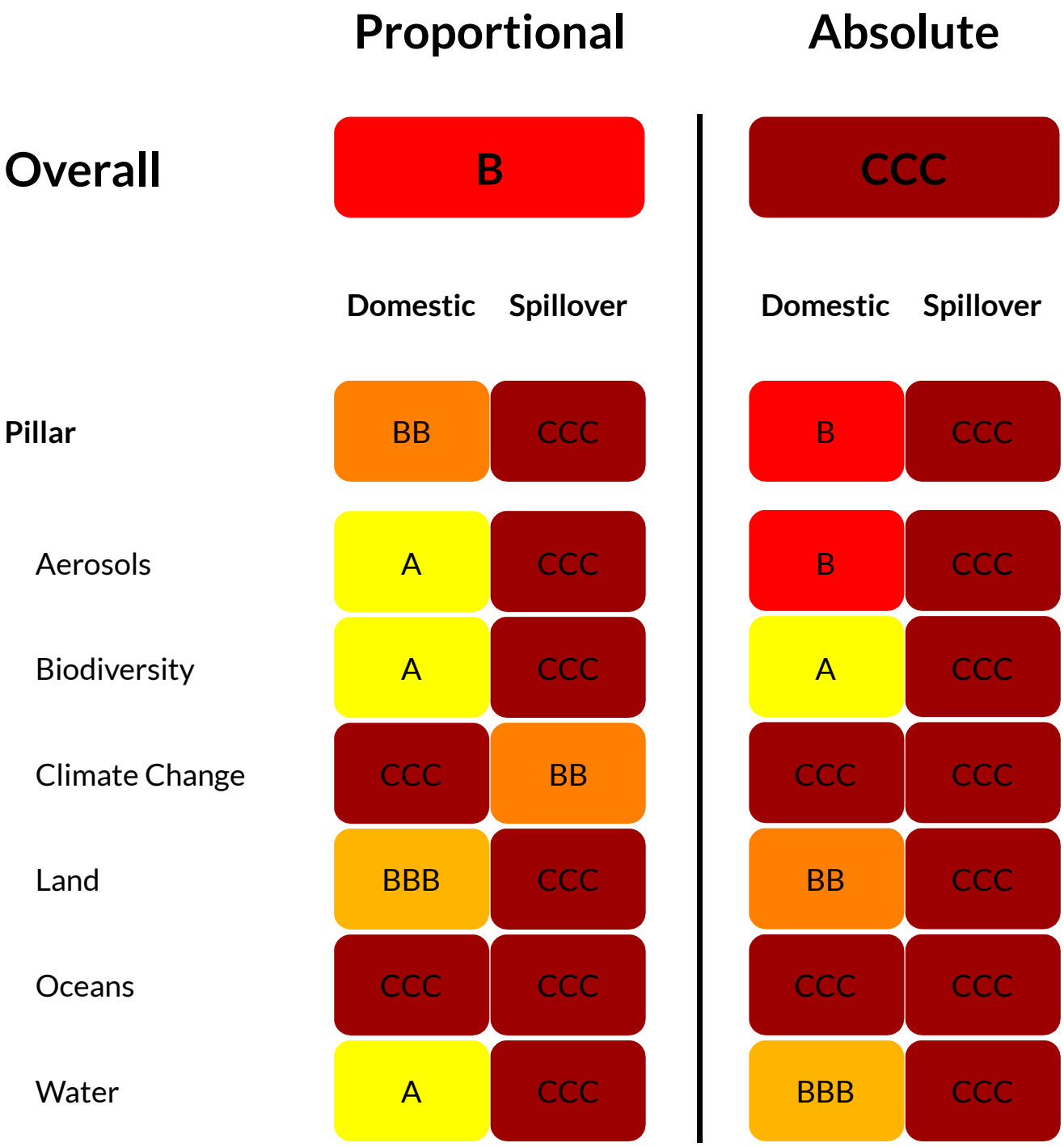
		Proportional			Absolute		
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	5.67	BBB	Gg	365.71	CCC	2015
NO_X emissions, spillover	kg/capita	4.61	B	Gg	297.18	CCC	2015
SO_2 emissions, domestic	kg/capita	13.72	AA	Gg	884.38	BBB	2015
SO_2 emissions, spillover	kg/capita	22.95	CCC	Gg	1,479.33	CCC	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	11.81	BBB	$\mu g/m^3$	11.81	BBB	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	2.39	AA	spp.	155.07	A	2018
Terrestrial spp. threatened, spillover	spp./million	6.42	CCC	spp.	416.95	CCC	2018
Freshwater spp. threatened, domestic	spp./million	1.38	A	spp.	89.72	B	2018
Freshwater spp. threatened, spillover	spp./million	0.68	CCC	spp.	44.14	CCC	2018
Marine spp. threatened, domestic	spp./million	0.24	AA	spp.	15.52	A	2018
Marine spp. threatened, spillover	spp./million	0.44	BBB	spp.	28.77	CCC	2018
Red List Index	unitless	0.87	BB	unitless	0.87	BB	2019
Unprotected terrestrial sites	%	19.65	BBB	%	19.65	BBB	2019
Unprotected freshwater sites	%	21.89	BB	%	21.89	BB	2019
Unprotected marine sites	%	18.87	BBB	%	18.87	BBB	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	7.40	BB	Pg CO_2e	0.47	CCC	2014
GHG emissions, spillover	t CO_2e/capita	5.90	CCC	Pg CO_2e	0.38	CCC	2014
Black carbon emissions	kg/capita	0.44	BB	Gg	27.87	A	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.00	AA	t CO_2/capita	0.00	AA	2018
Land							
NH_3 emissions, domestic	kg/capita	10.58	B	Tg	681.78	CCC	2015
NH_3 emissions, spillover	kg/capita	7.37	CCC	kg	475.28	CCC	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.39	BBB	unitless	0.39	BBB	2015
Non-Recycled Waste	kg/capita/day	0.83	CCC	Gg	54.11	BB	2018
Deforestation	%	0.01	AA	10^3 hectares	1.35	AA	2018
Human Trophic Level	unitless	2.48	B	unitless	2.48	B	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	16.04	BB	%	16.04	BB	2014
Fish caught by trawling	%	20.14	BB	%	20.14	BB	2014
Ocean Health Index: Clean Waters	unitless	49.08	CCC	unitless	49.08	CCC	2019
Water							
Untreated wastewater	%	12.00	A	%	12.00	A	2018
Nitrogen emissions, domestic	kg/capita	18.44	CCC	Tg	1.19	CCC	2015
Nitrogen emissions, spillover	kg/capita	11.73	CCC	Gg	756.34	CCC	2015
Scarce water consumption, domestic	10^3 m^3/capita	1.00	AA	10^9 m^3	66.53	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	5.50	CCC	10^9 m^3	353.27	CCC	2015
Water stress	%	23.15	BBB	10^9 m^3	26.44	BBB	2016

Germany

OECD

Population [millions]	83.8	**GDP** [$, billions]	3,977.9
Land area [km^2, thousands]	356.8	**GDP** per capita	47,478

Country ratings on impacts to Global Commons



Germany

OECD

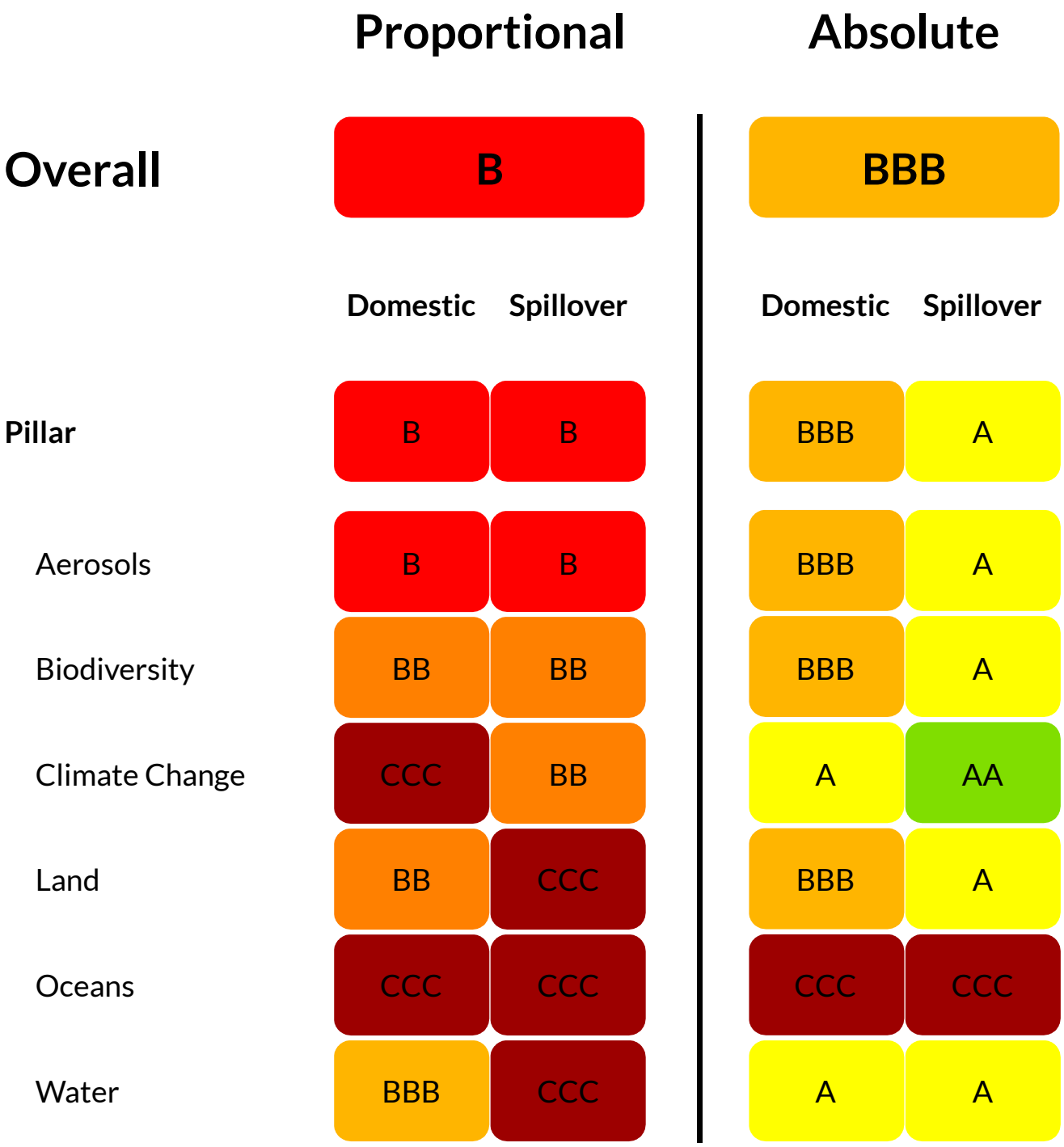
		Proportional			Absolute		
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	5.93	BBB	Gg	484.96	CCC	2015
NO_X emissions, spillover	kg/capita	5.41	CCC	Gg	442.45	CCC	2015
SO_2 emissions, domestic	kg/capita	15.50	AA	Gg	1,267.99	BB	2015
SO_2 emissions, spillover	kg/capita	28.81	CCC	Gg	2,356.33	CCC	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	12.03	BBB	$\mu g/m^3$	12.03	BBB	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	0.31	AA	spp.	25.50	AA	2018
Terrestrial spp. threatened, spillover	spp./million	5.12	CCC	spp.	425.98	CCC	2018
Freshwater spp. threatened, domestic	spp./million	0.24	AA	spp.	19.61	AA	2018
Freshwater spp. threatened, spillover	spp./million	0.62	CCC	spp.	51.64	CCC	2018
Marine spp. threatened, domestic	spp./million	0.01	AA	spp.	1.13	AA	2018
Marine spp. threatened, spillover	spp./million	0.28	A	spp.	23.48	CCC	2018
Red List Index	unitless	0.98	AA	unitless	0.98	AA	2019
Unprotected terrestrial sites	%	21.17	BB	%	21.17	BB	2019
Unprotected freshwater sites	%	18.67	BBB	%	18.67	BBB	2019
Unprotected marine sites	%	30.55	B	%	30.55	B	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	10.80	CCC	Pg CO_2e	0.88	CCC	2014
GHG emissions, spillover	t CO_2e/capita	7.30	CCC	Pg CO_2e	0.59	CCC	2014
Black carbon emissions	kg/capita	0.30	BBB	Gg	24.37	A	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.20	AA	t CO_2/capita	0.23	AA	2018
Land							
NH_3 emissions, domestic	kg/capita	5.89	BBB	Tg	481.97	CCC	2015
NH_3 emissions, spillover	kg/capita	8.64	CCC	kg	706.52	CCC	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.51	BB	unitless	0.51	BB	2015
Non-Recycled Waste	kg/capita/day	0.55	BB	Gg	45.64	BB	2018
Deforestation	%	0.00	AA	10^3 hectares	0.06	AA	2018
Human Trophic Level	unitless	2.44	B	unitless	2.44	B	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	46.55	CCC	%	46.55	CCC	2014
Fish caught by trawling	%	21.27	BB	%	21.27	BB	2014
Ocean Health Index: Clean Waters	unitless	50.96	CCC	unitless	50.96	CCC	2019
Water							
Untreated wastewater	%	3.00	AA	%	3.00	AA	2018
Nitrogen emissions, domestic	kg/capita	9.23	BB	Tg	0.75	CCC	2015
Nitrogen emissions, spillover	kg/capita	14.20	CCC	Gg	1,161.31	CCC	2015
Scarce water consumption, domestic	10^3 m^3/capita	0.60	AA	10^9 m^3	46.34	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	7.60	CCC	10^9 m^3	619.33	CCC	2015
Water stress	%	33.50	BB	10^9 m^3	24.44	BBB	2016

Greece

OECD

Population [millions]	10.4	**GDP** [$, billions]	256.1
Land area [km^2, thousands]	132.7	**GDP** per capita	24,574

Country ratings on impacts to Global Commons



Greece

OECD

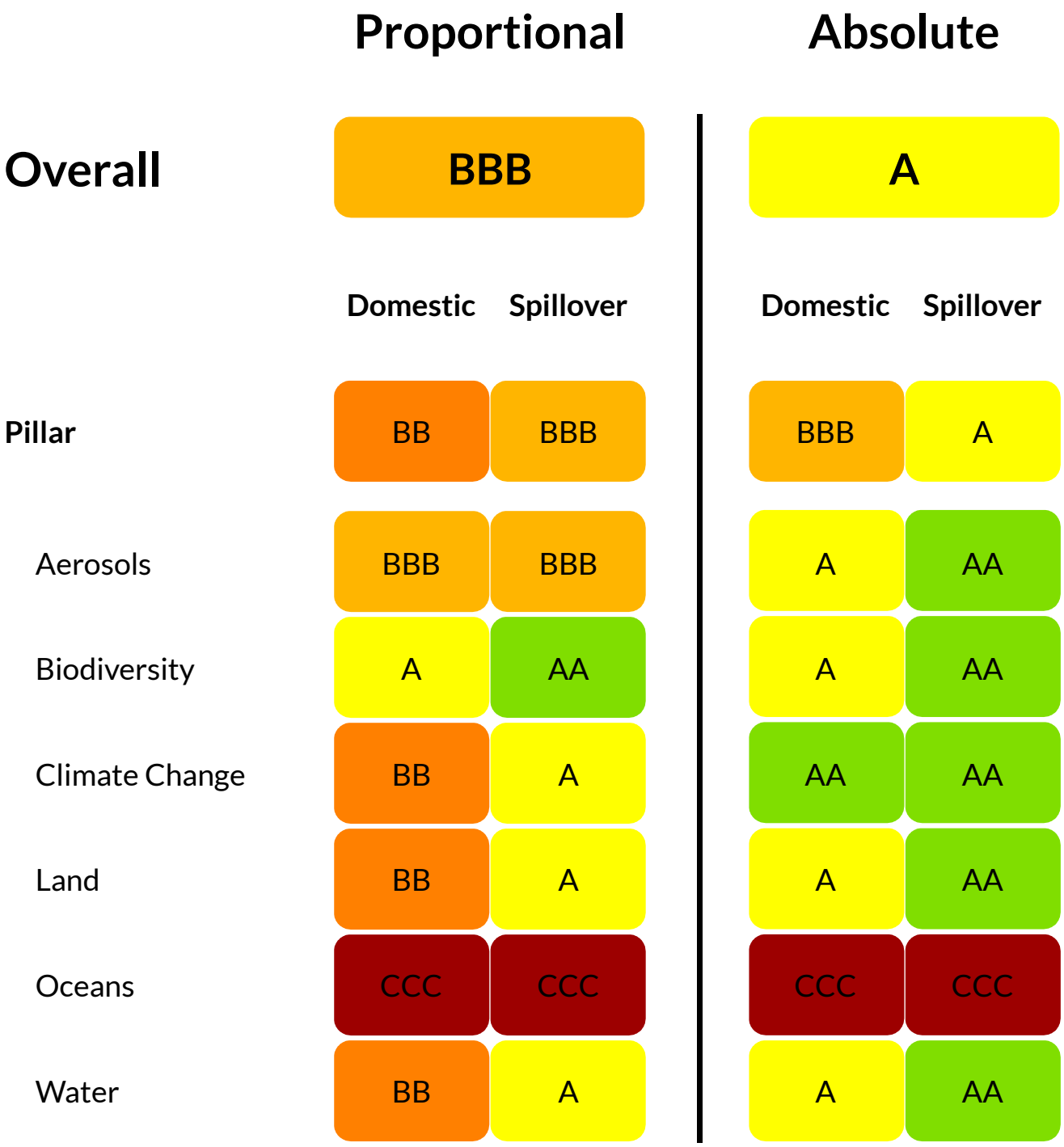
		Proportional		Absolute			
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	10.16	CCC	Gg	108.33	A	2015
NO_X emissions, spillover	kg/capita	4.72	B	Gg	50.30	A	2015
SO_2 emissions, domestic	kg/capita	100.09	CCC	Gg	1,066.96	BB	2015
SO_2 emissions, spillover	kg/capita	23.16	CCC	Gg	246.83	A	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	16.22	BB	$\mu g/m^3$	16.22	BB	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	25.36	CCC	spp.	266.84	BBB	2018
Terrestrial spp. threatened, spillover	spp./million	2.49	B	spp.	26.25	A	2018
Freshwater spp. threatened, domestic	spp./million	5.20	CCC	spp.	54.73	BBB	2018
Freshwater spp. threatened, spillover	spp./million	0.41	B	spp.	4.28	A	2018
Marine spp. threatened, domestic	spp./million	1.43	A	spp.	15.02	A	2018
Marine spp. threatened, spillover	spp./million	0.19	AA	spp.	1.95	AA	2018
Red List Index	unitless	0.85	B	unitless	0.85	B	2019
Unprotected terrestrial sites	%	13.96	BBB	%	13.96	BBB	2019
Unprotected freshwater sites	%	12.76	A	%	12.76	A	2019
Unprotected marine sites	%	13.91	BBB	%	13.91	BBB	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	10.20	CCC	Pg CO_2e	0.11	A	2014
GHG emissions, spillover	t CO_2e/capita	6.80	CCC	Pg CO_2e	0.07	A	2014
Black carbon emissions	kg/capita	0.42	BB	Gg	4.81	AA	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.00	AA	t CO_2/capita	0.01	AA	2019
Land							
NH_3 emissions, domestic	kg/capita	9.21	BB	Tg	98.17	A	2015
NH_3 emissions, spillover	kg/capita	5.75	CCC	kg	61.33	A	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.64	B	unitless	0.64	B	2015
Non-Recycled Waste	kg/capita/day	1.14	CCC	Gg	12.04	AA	2017
Deforestation	%	0.00	AA	10^3 hectares	0.04	AA	2018
Human Trophic Level	unitless	2.38	BB	unitless	2.38	BB	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	48.55	CCC	%	48.55	CCC	2014
Fish caught by trawling	%	41.42	CCC	%	41.42	CCC	2014
Ocean Health Index: Clean Waters	unitless	58.54	CCC	unitless	58.54	CCC	2019
Water							
Untreated wastewater	%	18.34	A	%	18.34	A	2018
Nitrogen emissions, domestic	kg/capita	17.49	CCC	Tg	0.19	A	2015
Nitrogen emissions, spillover	kg/capita	9.72	B	Gg	103.60	AA	2015
Scarce water consumption, domestic	10^3 m^3/capita	5.90	A	10^9 m^3	62.78	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	7.50	CCC	10^9 m^3	80.04	A	2015
Water stress	%	22.74	BBB	10^9 m^3	11.24	A	2016

Hungary

OECD

Population [millions]	9.7	**GDP** [$, billions]	258.7
Land area [km^2, thousands]	92.9	**GDP** per capita	26,778

Country ratings on impacts to Global Commons



Hungary

OECD

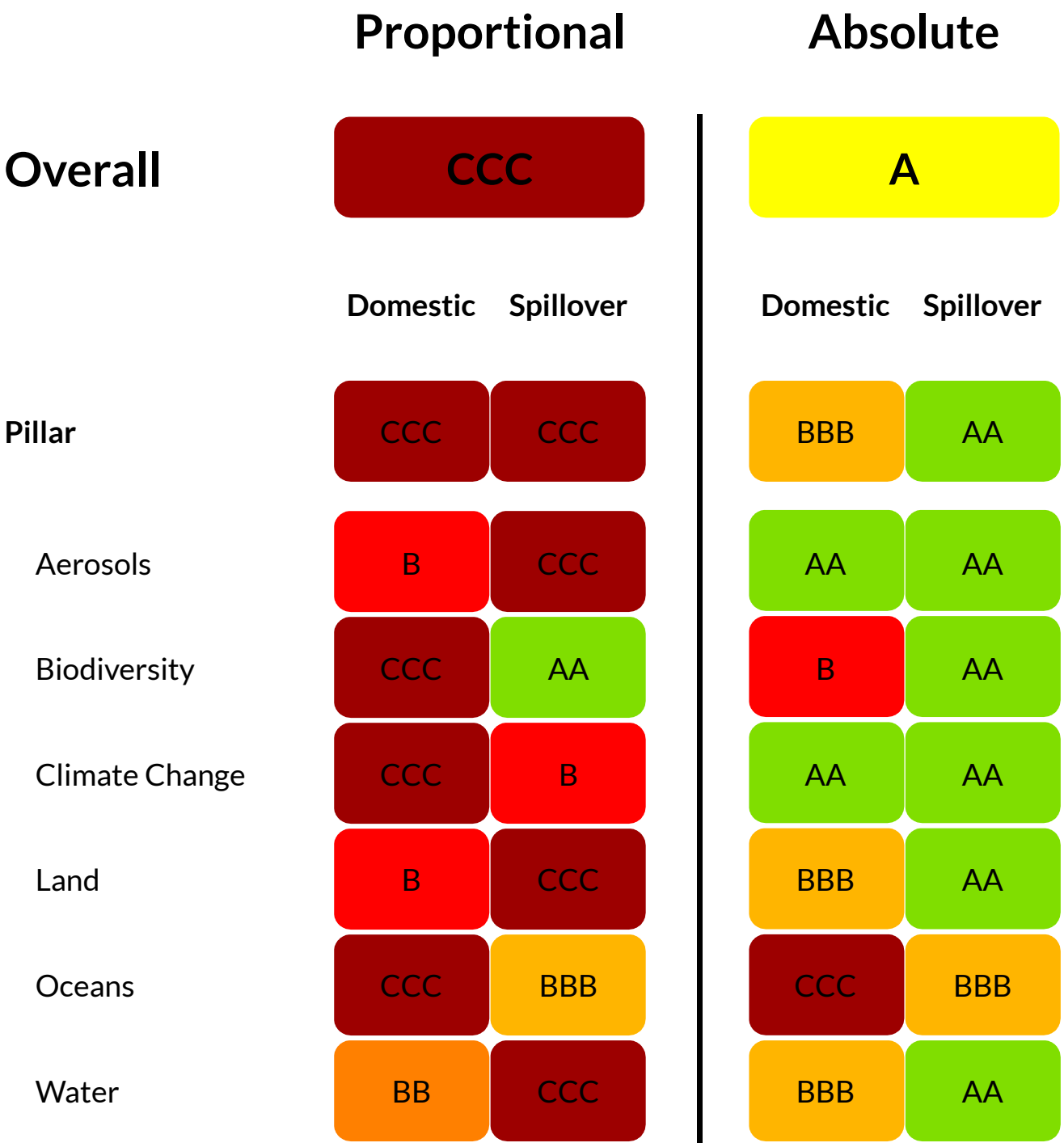
		Proportional		Absolute			
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	5.46	BBB	Gg	53.36	AA	2015
NO_X emissions, spillover	kg/capita	2.43	BBB	Gg	23.81	AA	2015
SO_2 emissions, domestic	kg/capita	39.77	A	Gg	388.89	A	2015
SO_2 emissions, spillover	kg/capita	14.04	BB	Gg	137.26	AA	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	15.93	BB	$\mu g/m^3$	15.93	BB	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	0.86	AA	spp.	8.32	AA	2018
Terrestrial spp. threatened, spillover	spp./million	0.37	AA	spp.	3.61	AA	2018
Freshwater spp. threatened, domestic	spp./million	0.28	AA	spp.	2.76	AA	2018
Freshwater spp. threatened, spillover	spp./million	0.07	AA	spp.	0.64	AA	2018
Marine spp. threatened, domestic	spp./million	0.00	AAA	spp.	0.00	AAA	2018
Marine spp. threatened, spillover	spp./million	0.03	AA	spp.	0.27	AA	2018
Red List Index	unitless	0.93	BBB	unitless	0.93	BBB	2019
Unprotected terrestrial sites	%	17.47	BBB	%	17.47	BBB	2019
Unprotected freshwater sites	%	15.18	BBB	%	15.18	BBB	2019
Unprotected marine sites	%	na	na	%	na	na	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	6.50	BB	Pg CO_2e	0.06	AA	2014
GHG emissions, spillover	t CO_2e/capita	3.20	BB	Pg CO_2e	0.03	AA	2014
Black carbon emissions	kg/capita	0.36	BB	Gg	3.58	AA	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.30	AA	t CO_2/capita	0.27	AA	2019
Land							
NH_3 emissions, domestic	kg/capita	9.96	BB	Tg	97.38	A	2015
NH_3 emissions, spillover	kg/capita	1.91	A	kg	18.68	AA	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.35	BBB	unitless	0.35	BBB	2015
Non-Recycled Waste	kg/capita/day	0.66	B	Gg	6.41	AA	2018
Deforestation	%	0.01	AA	10^3 hectares	0.20	AA	2018
Human Trophic Level	unitless	2.42	B	unitless	2.42	B	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	na	na	%	na	na	2014
Fish caught by trawling	%	na	na	%	na	na	2014
Ocean Health Index: Clean Waters	unitless	na	na	unitless	na	na	2019
Water							
Untreated wastewater	%	46.24	B	%	46.24	B	2018
Nitrogen emissions, domestic	kg/capita	20.69	CCC	Tg	0.20	A	2015
Nitrogen emissions, spillover	kg/capita	3.09	A	Gg	30.26	AA	2015
Scarce water consumption, domestic	10^3 m^3/capita	0.20	AA	10^9 m^3	2.29	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	1.30	A	10^9 m^3	13.14	AA	2015
Water stress	%	7.77	AA	10^9 m^3	4.50	AA	2017

Iceland

OECD

Population [millions]	0.3	**GDP** [$, billions]	15.9
Land area [km^2, thousands]	102.1	**GDP** per capita	46,483

Country ratings on impacts to Global Commons



Iceland

OECD

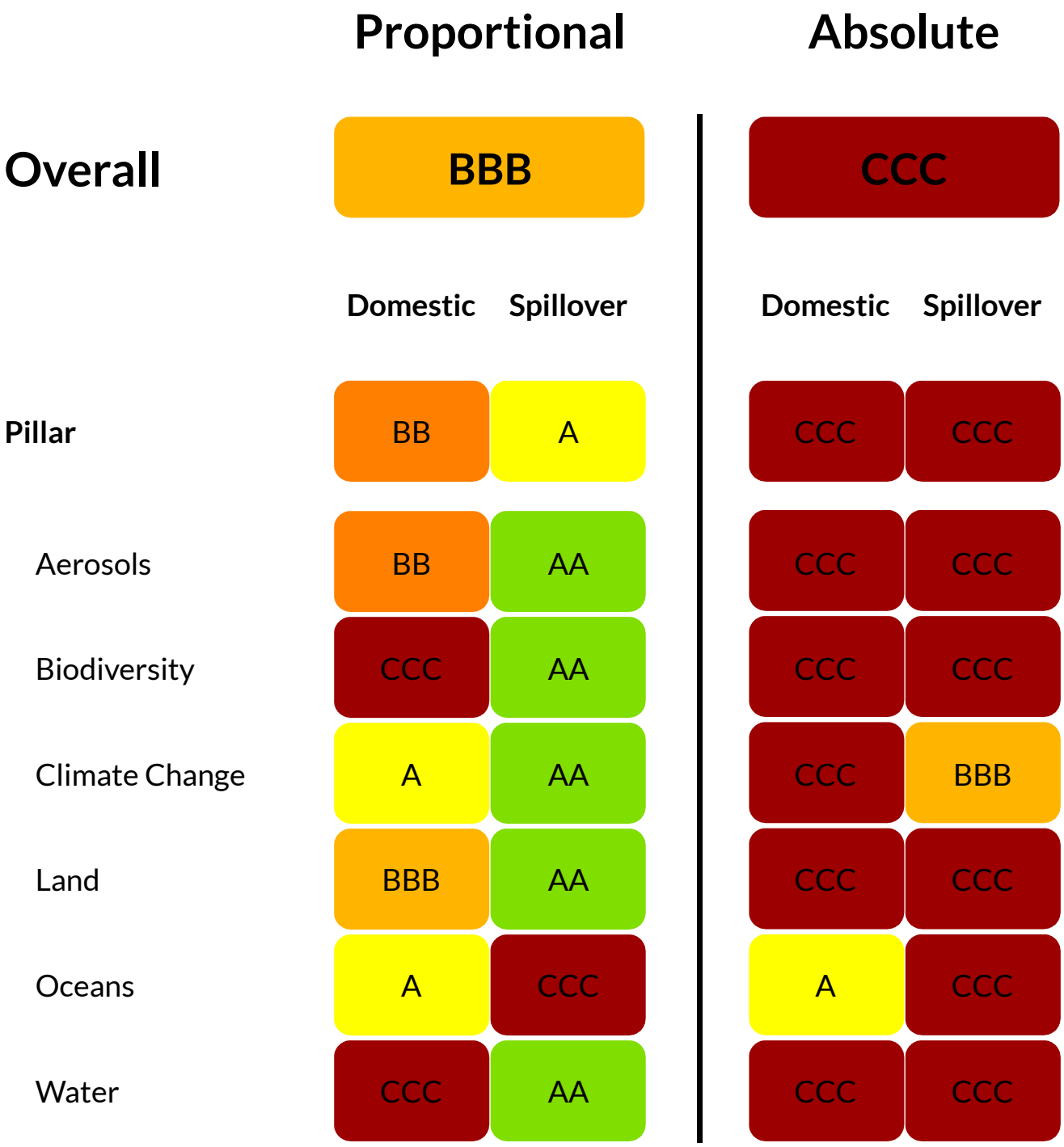
		Proportional		Absolute			
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	6.32	BB	Gg	2.09	AA	2015
NO_X emissions, spillover	kg/capita	9.90	CCC	Gg	3.27	AA	2015
SO_2 emissions, domestic	kg/capita	431.21	CCC	Gg	142.40	AA	2015
SO_2 emissions, spillover	kg/capita	54.72	CCC	Gg	18.07	AA	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	6.48	AA	$\mu g/m^3$	6.48	AA	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	1.81	AA	spp.	0.61	AA	2018
Terrestrial spp. threatened, spillover	spp./million	0.41	AA	spp.	0.14	AA	2018
Freshwater spp. threatened, domestic	spp./million	0.02	AA	spp.	0.01	AA	2018
Freshwater spp. threatened, spillover	spp./million	0.02	AA	spp.	0.01	AA	2018
Marine spp. threatened, domestic	spp./million	10.71	CCC	spp.	3.61	AA	2018
Marine spp. threatened, spillover	spp./million	0.00	AAA	spp.	0.00	AAA	2018
Red List Index	unitless	0.86	B	unitless	0.86	B	2019
Unprotected terrestrial sites	%	80.92	CCC	%	80.92	CCC	2019
Unprotected freshwater sites	%	66.46	CCC	%	66.46	CCC	2019
Unprotected marine sites	%	83.39	CCC	%	83.39	CCC	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	15.50	CCC	Pg CO_2e	0.01	AA	2014
GHG emissions, spillover	t CO_2e/capita	10.20	CCC	Pg CO_2e	0.00	AA	2014
Black carbon emissions	kg/capita	0.42	BB	Gg	0.14	AA	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.00	AAA	t CO_2/capita	0.00	AAA	2017
Land							
NH_3 emissions, domestic	kg/capita	8.62	BB	Tg	2.85	AA	2015
NH_3 emissions, spillover	kg/capita	7.31	CCC	kg	2.41	AA	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.64	B	unitless	0.64	B	2015
Non-Recycled Waste	kg/capita/day	1.37	CCC	Gg	0.46	AA	2017
Deforestation	%	na	na	10^3 hectares	na	na	2018
Human Trophic Level	unitless	2.58	CCC	unitless	2.58	CCC	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	58.28	CCC	%	58.28	CCC	2014
Fish caught by trawling	%	19.75	BB	%	19.75	BB	2014
Ocean Health Index: Clean Waters	unitless	79.29	BBB	unitless	79.29	BBB	2019
Water							
Untreated wastewater	%	84.52	CCC	%	84.52	CCC	2018
Nitrogen emissions, domestic	kg/capita	12.98	B	Tg	0.00	AA	2015
Nitrogen emissions, spillover	kg/capita	11.79	CCC	Gg	3.89	AA	2015
Scarce water consumption, domestic	10^3 m^3/capita	0.00	AA	10^9 m^3	0.00	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	5.10	CCC	10^9 m^3	1.67	AA	2015
Water stress	%	0.35	AA	10^9 m^3	0.26	AA	2016

India

East & South Asia

Population [millions]	1,380.0	**GDP** [$, billions]	2,899.4
Land area [km^2, thousands]	3,167.0	**GDP** per capita	2,101

Country ratings on impacts to Global Commons



India

East & South Asia

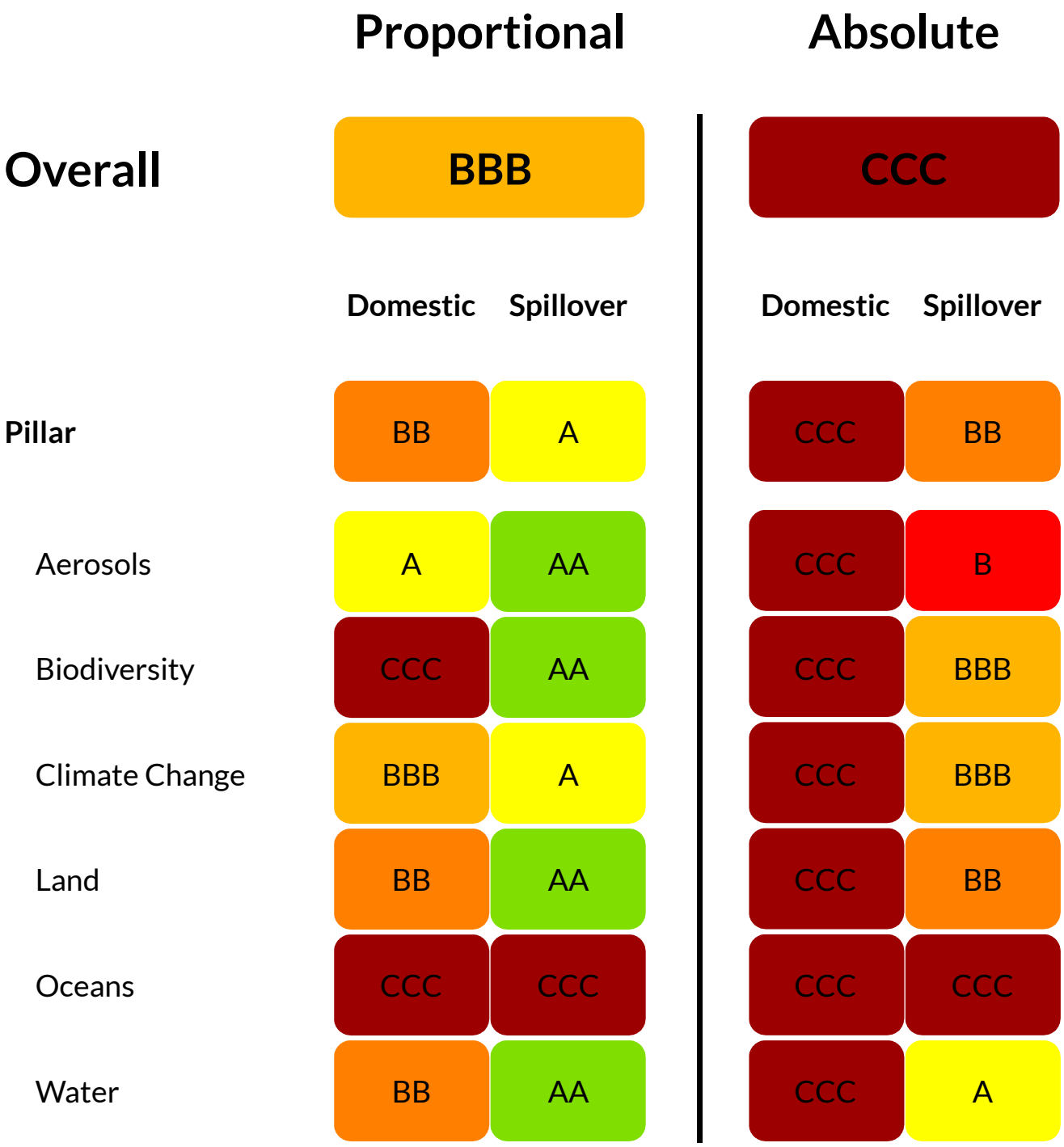
	Proportional			Absolute			
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	1.88	AA	Gg	2,461.88	CCC	2015
NO_X emissions, spillover	kg/capita	0.22	AA	Gg	292.58	CCC	2015
SO_2 emissions, domestic	kg/capita	7.00	AA	Gg	9,173.67	CCC	2015
SO_2 emissions, spillover	kg/capita	1.03	AA	Gg	1,344.83	CCC	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	90.87	CCC	$\mu g/m^3$	90.87	CCC	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	0.61	AA	spp.	829.13	CCC	2018
Terrestrial spp. threatened, spillover	spp./million	0.12	AA	spp.	155.59	CCC	2018
Freshwater spp. threatened, domestic	spp./million	0.19	AA	spp.	256.62	CCC	2018
Freshwater spp. threatened, spillover	spp./million	0.02	AA	spp.	21.01	CCC	2018
Marine spp. threatened, domestic	spp./million	0.06	AA	spp.	82.22	CCC	2018
Marine spp. threatened, spillover	spp./million	0.00	AA	spp.	6.71	BBB	2018
Red List Index	unitless	0.67	CCC	unitless	0.67	CCC	2019
Unprotected terrestrial sites	%	78.98	CCC	%	78.98	CCC	2019
Unprotected freshwater sites	%	81.36	CCC	%	81.36	CCC	2019
Unprotected marine sites	%	81.20	CCC	%	81.20	CCC	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	2.60	A	Pg CO_2e	3.33	CCC	2014
GHG emissions, spillover	t CO_2e/capita	0.20	AA	Pg CO_2e	0.26	CCC	2014
Black carbon emissions	kg/capita	0.59	B	Gg	724.35	CCC	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.00	AA	t CO_2/capita	0.00	AA	2018
Land							
NH_3 emissions, domestic	kg/capita	3.60	A	Tg	4,711.72	CCC	2015
NH_3 emissions, spillover	kg/capita	0.29	AA	kg	376.20	CCC	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.89	CCC	unitless	0.89	CCC	2015
Non-Recycled Waste	kg/capita/day	na	na	Gg	na	na	na
Deforestation	%	0.04	AA	10^3 hectares	13.33	AA	2018
Human Trophic Level	unitless	2.24	BBB	unitless	2.24	BBB	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	12.00	BBB	%	12.00	BBB	2014
Fish caught by trawling	%	5.77	AA	%	5.77	AA	2014
Ocean Health Index: Clean Waters	unitless	29.52	CCC	unitless	29.52	CCC	2019
Water							
Untreated wastewater	%	97.75	CCC	%	97.75	CCC	2018
Nitrogen emissions, domestic	kg/capita	6.96	BBB	Tg	9.13	CCC	2015
Nitrogen emissions, spillover	kg/capita	0.44	AA	Gg	575.02	B	2015
Scarce water consumption, domestic	10^3 m^3/capita	6.30	A	10^9 m^3	8,290.66	CCC	2015
Scarce water consumption, spillover	10^3 m^3/capita	0.40	AA	10^9 m^3	540.47	CCC	2015
Water stress	%	66.49	CCC	10^9 m^3	647.50	CCC	2010

Indonesia

East & South Asia

Population [millions]	273.5	**GDP** [$, billions]	1,172.0
Land area [km^2, thousands]	1,917.3	**GDP** per capita	4,285

Country ratings on impacts to Global Commons



Indonesia

East & South Asia

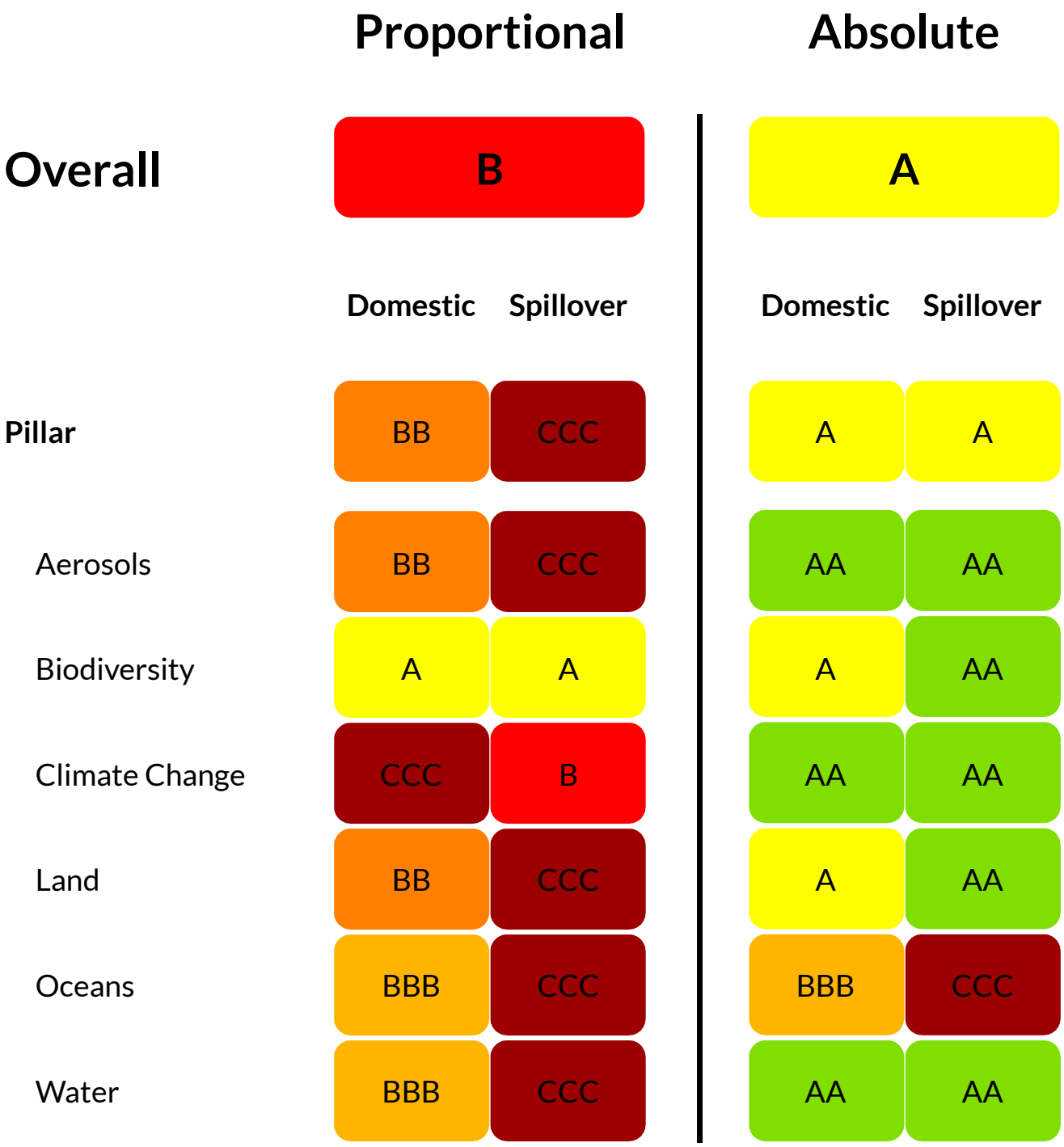
		Proportional			Absolute		
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	2.77	A	Gg	715.59	CCC	2015
NO_X emissions, spillover	kg/capita	0.62	AA	Gg	159.36	BB	2015
SO_2 emissions, domestic	kg/capita	11.00	AA	Gg	2,842.47	CCC	2015
SO_2 emissions, spillover	kg/capita	2.51	AA	Gg	647.49	B	2015
$PM_{2.5}$ concentration	µg/m³	16.50	BB	µg/m³	16.50	BB	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	3.90	AA	spp.	1,043.64	CCC	2018
Terrestrial spp. threatened, spillover	spp./million	0.16	AA	spp.	43.59	BBB	2018
Freshwater spp. threatened, domestic	spp./million	0.32	AA	spp.	86.06	B	2018
Freshwater spp. threatened, spillover	spp./million	0.02	AA	spp.	6.34	BBB	2018
Marine spp. threatened, domestic	spp./million	1.32	A	spp.	352.85	CCC	2018
Marine spp. threatened, spillover	spp./million	0.02	AA	spp.	5.59	BBB	2018
Red List Index	unitless	0.75	CCC	unitless	0.75	CCC	2019
Unprotected terrestrial sites	%	73.89	CCC	%	73.89	CCC	2019
Unprotected freshwater sites	%	58.98	CCC	%	58.98	CCC	2019
Unprotected marine sites	%	73.94	CCC	%	73.94	CCC	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	4.10	BBB	Pg CO_2e	1.04	CCC	2014
GHG emissions, spillover	t CO_2e/capita	0.50	AA	Pg CO_2e	0.13	BBB	2014
Black carbon emissions	kg/capita	0.75	CCC	Gg	181.02	CCC	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	3.00	A	t CO_2/capita	3.00	A	2018
Land							
NH_3 emissions, domestic	kg/capita	3.69	A	Tg	954.40	CCC	2015
NH_3 emissions, spillover	kg/capita	0.52	AA	kg	134.91	BB	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.69	B	unitless	0.69	B	2015
Non-Recycled Waste	kg/capita/day	na	na	Gg	na	na	na
Deforestation	%	1.05	CCC	10^3 hectares	1,578.91	CCC	2018
Human Trophic Level	unitless	2.18	A	unitless	2.18	A	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	21.16	B	%	21.16	B	2014
Fish caught by trawling	%	43.60	CCC	%	43.60	CCC	2014
Ocean Health Index: Clean Waters	unitless	58.00	CCC	unitless	58.00	CCC	2019
Water							
Untreated wastewater	%	99.98	CCC	%	99.98	CCC	2018
Nitrogen emissions, domestic	kg/capita	5.96	A	Tg	1.54	CCC	2015
Nitrogen emissions, spillover	kg/capita	0.91	AA	Gg	235.59	A	2015
Scarce water consumption, domestic	10^3 m³/capita	0.50	AA	10^9 m³	127.93	AA	2015
Scarce water consumption, spillover	10^3 m³/capita	0.40	AA	10^9 m³	115.41	A	2015
Water stress	%	29.68	BBB	10^9 m³	222.60	CCC	2016

Ireland

OECD

Population [millions]	4.9	**GDP** [$, billions]	332.5
Land area [km^2, thousands]	70.1	**GDP** per capita	67,335

Country ratings on impacts to Global Commons



Ireland

OECD

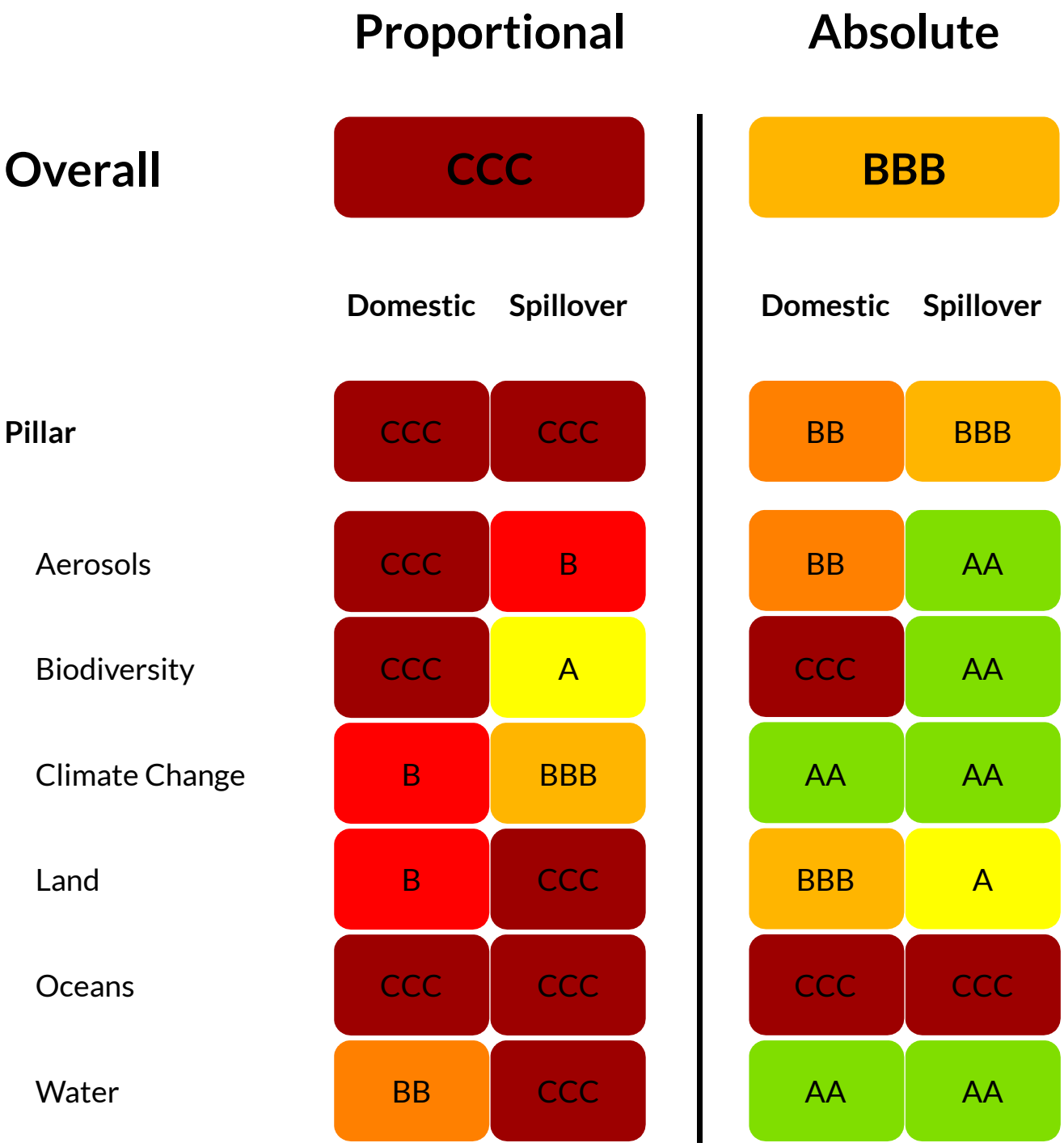
		Proportional			Absolute		
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	9.17	B	Gg	42.67	AA	2015
NO_X emissions, spillover	kg/capita	5.99	CCC	Gg	27.89	AA	2015
SO_2 emissions, domestic	kg/capita	97.24	B	Gg	452.40	A	2015
SO_2 emissions, spillover	kg/capita	37.99	CCC	Gg	176.75	A	2015
$PM_{2.5}$ concentration	µg/m³	8.21	AA	µg/m³	8.21	AA	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	0.10	AA	spp.	0.48	AA	2018
Terrestrial spp. threatened, spillover	spp./million	1.56	BB	spp.	7.50	AA	2018
Freshwater spp. threatened, domestic	spp./million	0.43	AA	spp.	2.09	AA	2018
Freshwater spp. threatened, spillover	spp./million	0.15	A	spp.	0.73	AA	2018
Marine spp. threatened, domestic	spp./million	0.88	AA	spp.	4.23	AA	2018
Marine spp. threatened, spillover	spp./million	0.09	AA	spp.	0.45	AA	2018
Red List Index	unitless	0.92	BBB	unitless	0.92	BBB	2019
Unprotected terrestrial sites	%	14.03	BBB	%	14.03	BBB	2019
Unprotected freshwater sites	%	1.49	AA	%	1.49	AA	2019
Unprotected marine sites	%	16.86	BBB	%	16.86	BBB	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	12.70	CCC	Pg CO_2e	0.06	AA	2014
GHG emissions, spillover	t CO_2e/capita	8.90	CCC	Pg CO_2e	0.04	AA	2014
Black carbon emissions	kg/capita	0.36	BBB	Gg	1.64	AA	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.00	AA	t CO_2/capita	0.01	AA	2018
Land							
NH_3 emissions, domestic	kg/capita	23.21	CCC	Tg	107.99	A	2015
NH_3 emissions, spillover	kg/capita	7.86	CCC	kg	36.58	AA	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.01	AA	unitless	0.01	AA	2015
Non-Recycled Waste	kg/capita/day	0.94	CCC	Gg	4.47	AA	2017
Deforestation	%	0.01	AA	10^3 hectares	0.16	AA	2018
Human Trophic Level	unitless	2.40	B	unitless	2.40	B	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	21.37	B	%	21.37	B	2014
Fish caught by trawling	%	3.79	AA	%	3.79	AA	2014
Ocean Health Index: Clean Waters	unitless	61.30	CCC	unitless	61.30	CCC	2019
Water							
Untreated wastewater	%	10.28	A	%	10.28	A	2018
Nitrogen emissions, domestic	kg/capita	29.45	CCC	Tg	0.14	AA	2015
Nitrogen emissions, spillover	kg/capita	12.88	CCC	Gg	59.91	AA	2015
Scarce water consumption, domestic	10^3 m³/capita	0.10	AA	10^9 m³	0.24	AA	2015
Scarce water consumption, spillover	10^3 m³/capita	4.90	CCC	10^9 m³	22.81	AA	2015
Water stress	%	3.64	AA	10^9 m³	0.76	AA	2009

Israel

OECD

Population [millions]	8.7	**GDP** [$, billions]	286.8
Land area [km^2, thousands]	22.5	**GDP** per capita	33,132

Country ratings on impacts to Global Commons



Israel

OECD

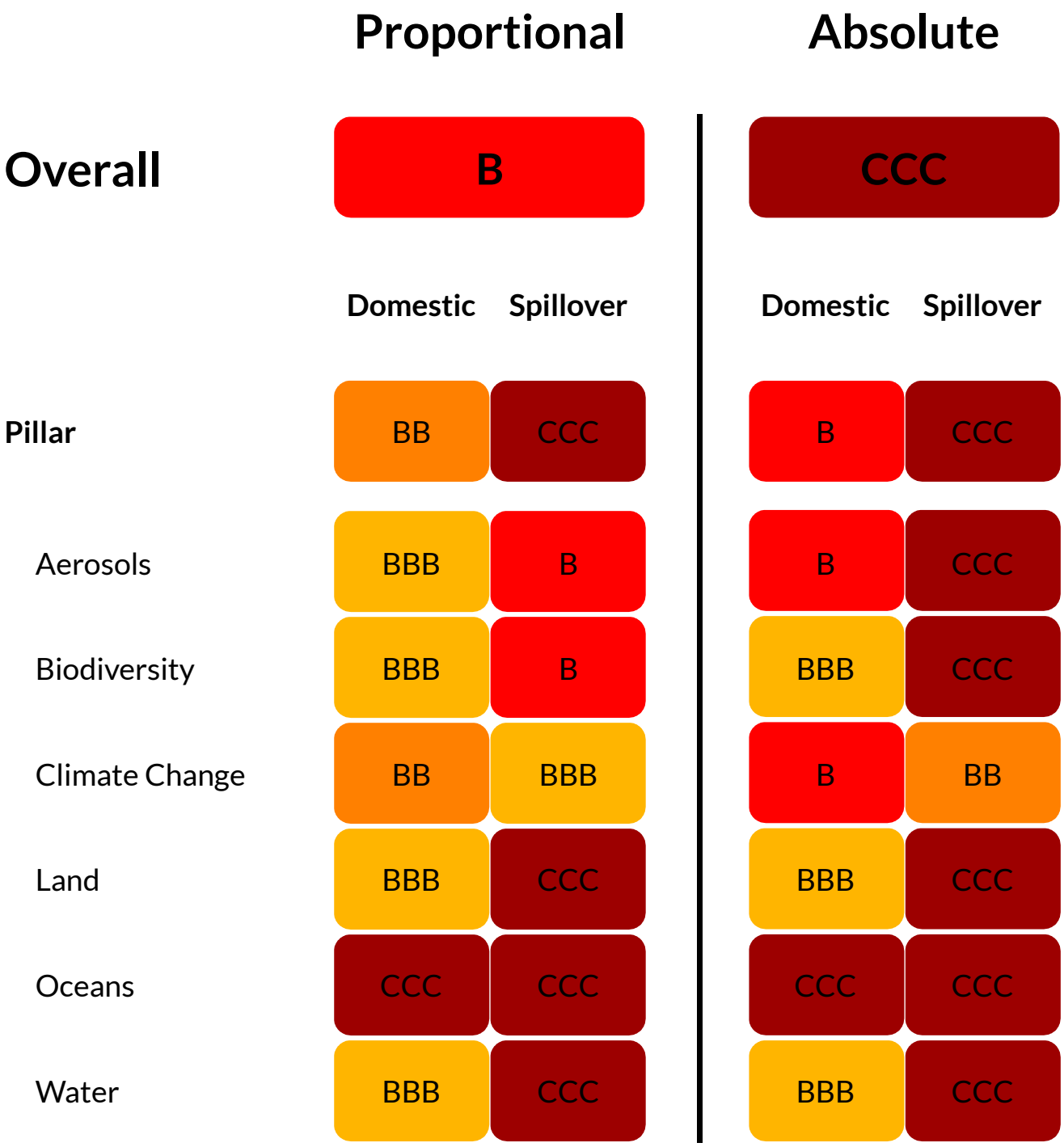
		Proportional			Absolute		
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	11.42	CCC	Gg	91.10	A	2015
NO_X emissions, spillover	kg/capita	4.15	B	Gg	33.10	AA	2015
SO_2 emissions, domestic	kg/capita	121.57	CCC	Gg	969.98	BBB	2015
SO_2 emissions, spillover	kg/capita	22.96	CCC	Gg	183.18	A	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	21.38	CCC	$\mu g/m^3$	21.38	CCC	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	1.06	AA	spp.	8.92	AA	2018
Terrestrial spp. threatened, spillover	spp./million	1.96	BB	spp.	16.47	A	2018
Freshwater spp. threatened, domestic	spp./million	0.39	AA	spp.	3.29	AA	2018
Freshwater spp. threatened, spillover	spp./million	0.18	A	spp.	1.53	AA	2018
Marine spp. threatened, domestic	spp./million	0.13	AA	spp.	1.06	AA	2018
Marine spp. threatened, spillover	spp./million	0.03	AA	spp.	0.26	AA	2018
Red List Index	unitless	0.76	CCC	unitless	0.76	CCC	2019
Unprotected terrestrial sites	%	79.67	CCC	%	79.67	CCC	2019
Unprotected freshwater sites	%	74.77	CCC	%	74.77	CCC	2019
Unprotected marine sites	%	89.17	CCC	%	89.17	CCC	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	10.40	CCC	Pg CO_2e	0.08	AA	2014
GHG emissions, spillover	t CO_2e/capita	5.40	CCC	Pg CO_2e	0.04	AA	2014
Black carbon emissions	kg/capita	0.14	A	Gg	1.05	AA	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.00	AA	t CO_2/capita	0.02	AA	2018
Land							
NH_3 emissions, domestic	kg/capita	1.78	AA	Tg	14.23	AA	2015
NH_3 emissions, spillover	kg/capita	7.90	CCC	kg	63.04	A	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.87	CCC	unitless	0.87	CCC	2015
Non-Recycled Waste	kg/capita/day	1.43	CCC	Gg	12.02	AA	2018
Deforestation	%	0.01	AA	10^3 hectares	0.00	AA	2018
Human Trophic Level	unitless	2.41	B	unitless	2.41	B	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	na	na	%	na	na	2014
Fish caught by trawling	%	52.68	CCC	%	52.68	CCC	2014
Ocean Health Index: Clean Waters	unitless	30.22	CCC	unitless	30.22	CCC	2019
Water							
Untreated wastewater	%	18.30	A	%	18.30	A	2018
Nitrogen emissions, domestic	kg/capita	2.60	AA	Tg	0.02	AA	2015
Nitrogen emissions, spillover	kg/capita	13.70	CCC	Gg	109.33	AA	2015
Scarce water consumption, domestic	10^3 m^3/capita	8.80	BBB	10^9 m^3	70.27	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	4.20	B	10^9 m^3	33.48	AA	2015
Water stress	%	103.36	CCC	10^9 m^3	1.20	AA	2017

Italy

OECD

Population [millions]	60.5	**GDP** [$, billions]	2,142.3
Land area [km^2, thousands]	301.6	**GDP** per capita	35,432

Country ratings on impacts to Global Commons



Italy

OECD

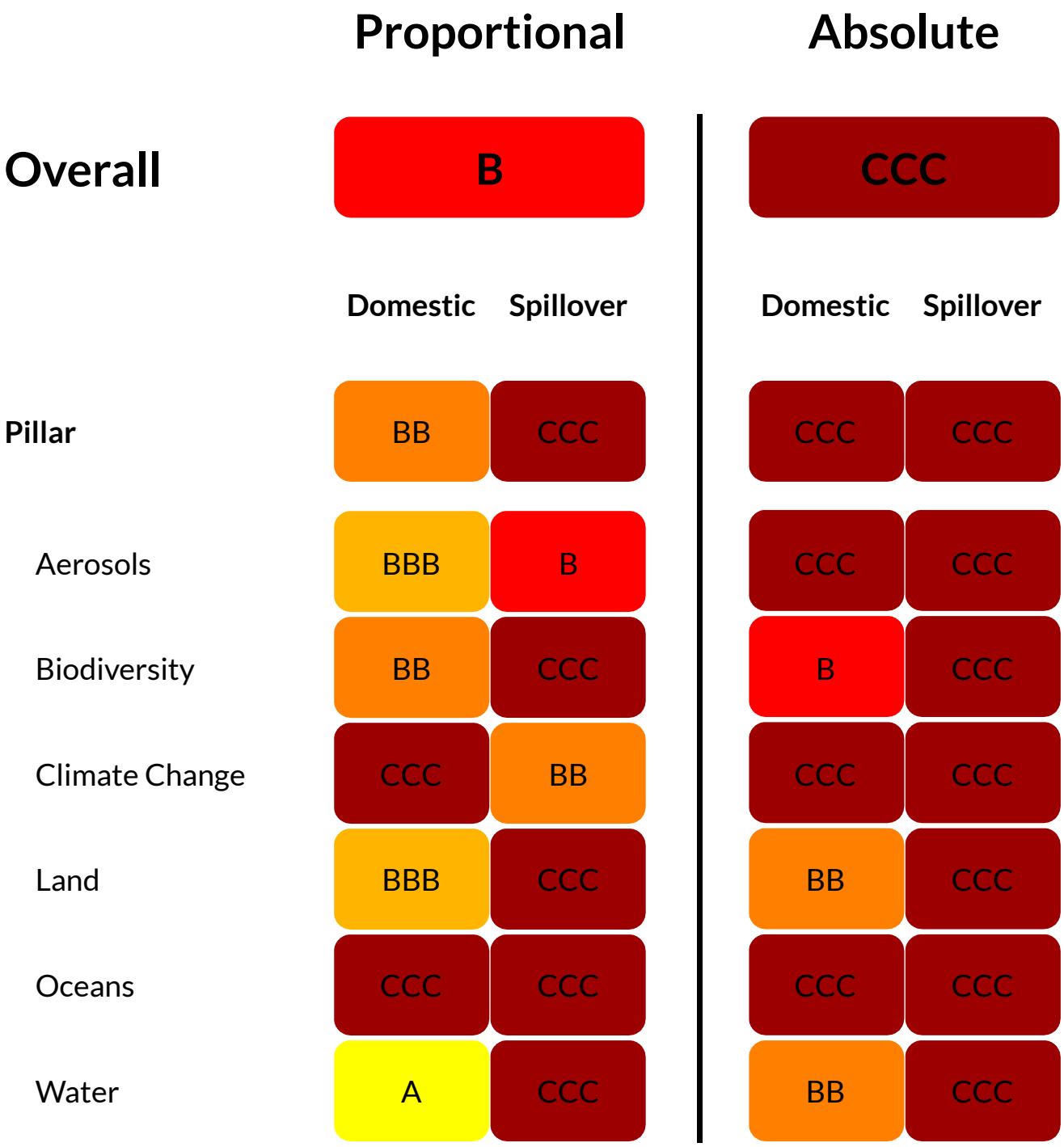
		Proportional			Absolute		
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	6.56	BB	Gg	397.70	CCC	2015
NO_X emissions, spillover	kg/capita	4.14	B	Gg	250.75	CCC	2015
SO_2 emissions, domestic	kg/capita	22.58	A	Gg	1,368.13	BB	2015
SO_2 emissions, spillover	kg/capita	22.22	B	Gg	1,346.30	CCC	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	16.75	BB	$\mu g/m^3$	16.75	BB	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	4.62	A	spp.	280.14	BBB	2018
Terrestrial spp. threatened, spillover	spp./million	3.07	CCC	spp.	186.37	CCC	2018
Freshwater spp. threatened, domestic	spp./million	0.82	AA	spp.	49.81	BBB	2018
Freshwater spp. threatened, spillover	spp./million	0.46	B	spp.	27.75	CCC	2018
Marine spp. threatened, domestic	spp./million	0.30	AA	spp.	17.98	A	2018
Marine spp. threatened, spillover	spp./million	0.30	A	spp.	18.22	CCC	2018
Red List Index	unitless	0.90	BBB	unitless	0.90	BBB	2019
Unprotected terrestrial sites	%	22.65	BB	%	22.65	BB	2019
Unprotected freshwater sites	%	15.34	BBB	%	15.34	BBB	2019
Unprotected marine sites	%	22.83	BB	%	22.83	BB	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	7.20	BB	Pg CO_2e	0.44	B	2014
GHG emissions, spillover	t CO_2e/capita	5.40	CCC	Pg CO_2e	0.32	CCC	2014
Black carbon emissions	kg/capita	0.44	BB	Gg	26.16	A	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.00	AA	t CO_2/capita	0.01	AA	2018
Land							
NH_3 emissions, domestic	kg/capita	5.15	BBB	Tg	312.28	BB	2015
NH_3 emissions, spillover	kg/capita	6.16	CCC	kg	373.00	CCC	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.59	B	unitless	0.59	B	2015
Non-Recycled Waste	kg/capita/day	0.62	B	Gg	37.52	BBB	2018
Deforestation	%	0.00	AA	10^3 hectares	0.43	AA	2018
Human Trophic Level	unitless	2.42	B	unitless	2.42	B	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	75.10	CCC	%	75.10	CCC	2014
Fish caught by trawling	%	43.54	CCC	%	43.54	CCC	2014
Ocean Health Index: Clean Waters	unitless	49.98	CCC	unitless	49.98	CCC	2019
Water							
Untreated wastewater	%	41.25	B	%	41.25	B	2018
Nitrogen emissions, domestic	kg/capita	8.97	BBB	Tg	0.54	BB	2015
Nitrogen emissions, spillover	kg/capita	9.93	B	Gg	601.53	CCC	2015
Scarce water consumption, domestic	10^3 m^3/capita	1.70	AA	10^9 m^3	105.69	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	6.30	CCC	10^9 m^3	383.01	CCC	2015
Water stress	%	30.13	BB	10^9 m^3	34.19	BB	2015

Japan

OECD

Population [millions]	126.5	**GDP** [$, billions]	6,187.2
Land area [km^2, thousands]	373.1	**GDP** per capita	48,920

Country ratings on impacts to Global Commons



Japan

OECD

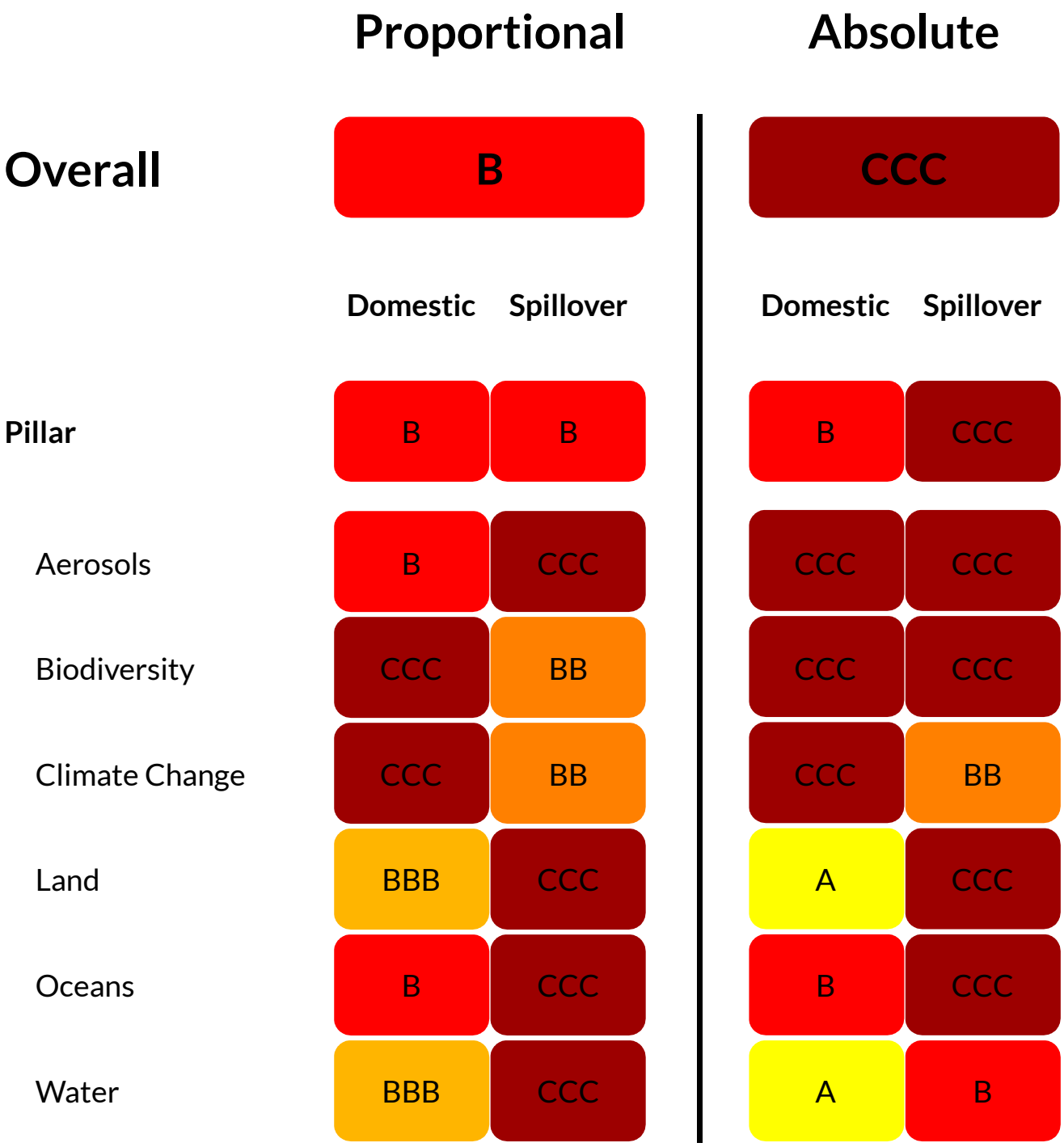
		Proportional			Absolute		
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	6.31	BB	Gg	807.08	CCC	2015
NO_X emissions, spillover	kg/capita	4.62	B	Gg	591.80	CCC	2015
SO_2 emissions, domestic	kg/capita	32.39	A	Gg	4,145.19	CCC	2015
SO_2 emissions, spillover	kg/capita	23.13	CCC	Gg	2,960.66	CCC	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	11.71	A	$\mu g/m^3$	11.71	A	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	1.00	AA	spp.	127.52	A	2018
Terrestrial spp. threatened, spillover	spp./million	4.55	CCC	spp.	578.85	CCC	2018
Freshwater spp. threatened, domestic	spp./million	0.14	AA	spp.	18.10	AA	2018
Freshwater spp. threatened, spillover	spp./million	0.59	CCC	spp.	75.50	CCC	2018
Marine spp. threatened, domestic	spp./million	0.95	AA	spp.	121.30	CCC	2018
Marine spp. threatened, spillover	spp./million	1.01	CCC	spp.	128.75	CCC	2018
Red List Index	unitless	0.78	CCC	unitless	0.78	CCC	2019
Unprotected terrestrial sites	%	35.17	CCC	%	35.17	CCC	2019
Unprotected freshwater sites	%	37.12	CCC	%	37.12	CCC	2019
Unprotected marine sites	%	35.15	CCC	%	35.15	CCC	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	10.40	CCC	Pg CO_2e	1.33	CCC	2014
GHG emissions, spillover	t CO_2e/capita	6.60	CCC	Pg CO_2e	0.84	CCC	2014
Black carbon emissions	kg/capita	0.24	BBB	Gg	31.28	BBB	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.00	AA	t CO_2/capita	0.00	AA	2019
Land							
NH_3 emissions, domestic	kg/capita	1.28	AA	Tg	163.68	A	2015
NH_3 emissions, spillover	kg/capita	7.52	CCC	kg	962.86	CCC	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.59	B	unitless	0.59	B	2015
Non-Recycled Waste	kg/capita/day	0.74	B	Gg	93.72	CCC	2017
Deforestation	%	0.00	AA	10^3 hectares	0.11	AA	2018
Human Trophic Level	unitless	2.38	BB	unitless	2.38	BB	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	70.83	CCC	%	70.83	CCC	2014
Fish caught by trawling	%	20.38	BB	%	20.38	BB	2014
Ocean Health Index: Clean Waters	unitless	59.36	CCC	unitless	59.36	CCC	2019
Water							
Untreated wastewater	%	24.68	BBB	%	24.68	BBB	2018
Nitrogen emissions, domestic	kg/capita	1.96	AA	Tg	0.25	A	2015
Nitrogen emissions, spillover	kg/capita	12.63	CCC	Gg	1,616.55	CCC	2015
Scarce water consumption, domestic	10^3 m^3/capita	0.40	AA	10^9 m^3	56.01	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	4.20	B	10^9 m^3	537.46	CCC	2015
Water stress	%	37.34	BB	10^9 m^3	81.22	CCC	2009

Korea, Rep.

OECD

Population [millions]	51.3	**GDP** [$, billions]	1,372.1
Land area [km^2, thousands]	100.5	**GDP** per capita	26,762

Country ratings on impacts to Global Commons



Korea, Rep.

OECD

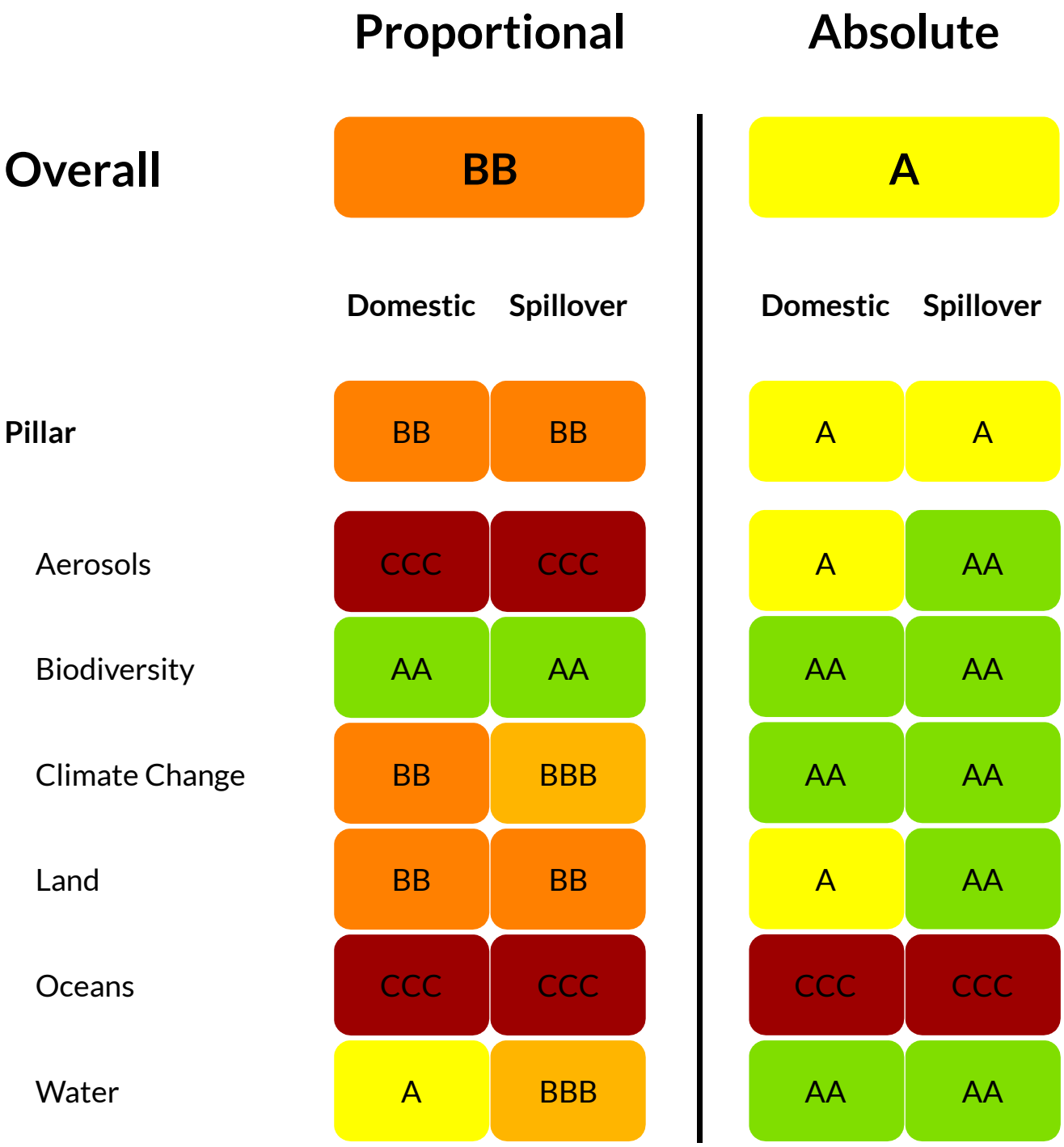
		Proportional			Absolute		
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	10.92	CCC	Gg	554.94	CCC	2015
NO_X emissions, spillover	kg/capita	5.90	CCC	Gg	300.06	CCC	2015
SO_2 emissions, domestic	kg/capita	29.10	A	Gg	1,479.17	B	2015
SO_2 emissions, spillover	kg/capita	24.82	CCC	Gg	1,261.55	CCC	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	25.04	CCC	$\mu g/m^3$	25.04	CCC	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	0.34	AA	spp.	17.26	AA	2018
Terrestrial spp. threatened, spillover	spp./million	2.18	B	spp.	111.38	CCC	2018
Freshwater spp. threatened, domestic	spp./million	0.03	AA	spp.	1.30	AA	2018
Freshwater spp. threatened, spillover	spp./million	0.35	BB	spp.	17.80	CCC	2018
Marine spp. threatened, domestic	spp./million	0.21	AA	spp.	10.94	AA	2018
Marine spp. threatened, spillover	spp./million	0.43	BBB	spp.	22.06	CCC	2018
Red List Index	unitless	0.73	CCC	unitless	0.73	CCC	2019
Unprotected terrestrial sites	%	62.53	CCC	%	62.53	CCC	2019
Unprotected freshwater sites	%	63.21	CCC	%	63.21	CCC	2019
Unprotected marine sites	%	61.45	CCC	%	61.45	CCC	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	14.10	CCC	Pg CO_2e	0.72	CCC	2014
GHG emissions, spillover	t CO_2e/capita	7.00	CCC	Pg CO_2e	0.35	CCC	2014
Black carbon emissions	kg/capita	0.65	CCC	Gg	32.05	BBB	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.00	AA	t CO_2/capita	0.00	AA	2018
Land							
NH_3 emissions, domestic	kg/capita	1.57	AA	Tg	79.54	AA	2015
NH_3 emissions, spillover	kg/capita	5.57	CCC	kg	283.28	CCC	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.64	B	unitless	0.64	B	2015
Non-Recycled Waste	kg/capita/day	0.42	BBB	Gg	21.52	A	2016
Deforestation	%	0.02	AA	10^3 hectares	0.96	AA	2018
Human Trophic Level	unitless	2.28	BBB	unitless	2.28	BBB	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	6.14	A	%	6.14	A	2014
Fish caught by trawling	%	40.96	CCC	%	40.96	CCC	2014
Ocean Health Index: Clean Waters	unitless	59.77	CCC	unitless	59.77	CCC	2019
Water							
Untreated wastewater	%	23.16	BBB	%	23.16	BBB	2018
Nitrogen emissions, domestic	kg/capita	1.98	AA	Tg	0.10	AA	2015
Nitrogen emissions, spillover	kg/capita	9.59	B	Gg	487.63	B	2015
Scarce water consumption, domestic	10^3 m^3/capita	1.20	AA	10^9 m^3	63.46	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	6.20	CCC	10^9 m^3	317.02	CCC	2015
Water stress	%	84.76	CCC	10^9 m^3	29.04	BBB	2005

Latvia

OECD

Population [millions]	1.9	**GDP** [$, billions]	47.3
Land area [km^2, thousands]	64.5	**GDP** per capita	25,064

Country ratings on impacts to Global Commons



Latvia

OECD

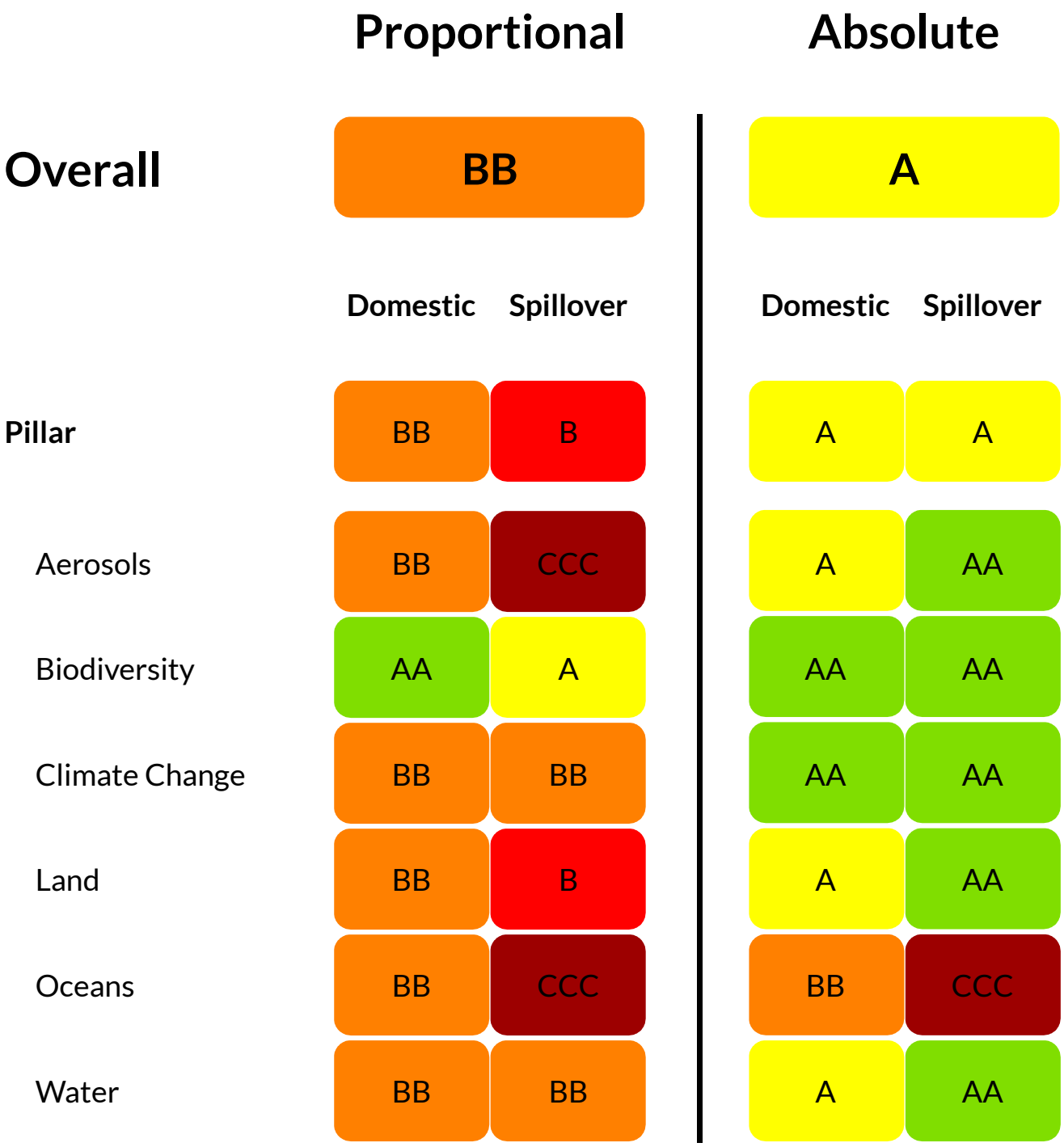
		Proportional		Absolute			
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	8.94	B	Gg	17.86	AA	2015
NO_X emissions, spillover	kg/capita	3.59	BB	Gg	7.17	AA	2015
SO_2 emissions, domestic	kg/capita	161.74	CCC	Gg	323.09	AA	2015
SO_2 emissions, spillover	kg/capita	36.00	CCC	Gg	71.91	AA	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	13.43	BBB	$\mu g/m^3$	13.43	BBB	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	0.35	AA	spp.	0.67	AA	2018
Terrestrial spp. threatened, spillover	spp./million	0.22	AA	spp.	0.42	AA	2018
Freshwater spp. threatened, domestic	spp./million	0.13	AA	spp.	0.25	AA	2018
Freshwater spp. threatened, spillover	spp./million	0.02	AA	spp.	0.05	AA	2018
Marine spp. threatened, domestic	spp./million	0.02	AA	spp.	0.03	AA	2018
Marine spp. threatened, spillover	spp./million	0.00	AA	spp.	0.01	AA	2018
Red List Index	unitless	0.99	AA	unitless	0.99	AA	2019
Unprotected terrestrial sites	%	2.78	AA	%	2.78	AA	2019
Unprotected freshwater sites	%	2.51	AA	%	2.51	AA	2019
Unprotected marine sites	%	3.86	AA	%	3.86	AA	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	5.80	BBB	Pg CO_2e	0.01	AA	2014
GHG emissions, spillover	t CO_2e/capita	5.00	B	Pg CO_2e	0.01	AA	2014
Black carbon emissions	kg/capita	1.07	CCC	Gg	2.27	AA	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.00	AA	t CO_2/capita	0.00	AA	2018
Land							
NH_3 emissions, domestic	kg/capita	8.61	BB	Tg	17.20	AA	2015
NH_3 emissions, spillover	kg/capita	3.78	BB	kg	7.56	AA	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.56	B	unitless	0.56	B	2015
Non-Recycled Waste	kg/capita/day	0.79	CCC	Gg	1.52	AA	2018
Deforestation	%	0.00	AA	10^3 hectares	0.00	AA	2018
Human Trophic Level	unitless	2.41	B	unitless	2.41	B	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	53.99	CCC	%	53.99	CCC	2014
Fish caught by trawling	%	0.56	AA	%	0.56	AA	2014
Ocean Health Index: Clean Waters	unitless	53.55	CCC	unitless	53.55	CCC	2019
Water							
Untreated wastewater	%	9.30	AA	%	9.30	AA	2018
Nitrogen emissions, domestic	kg/capita	16.51	CCC	Tg	0.03	AA	2015
Nitrogen emissions, spillover	kg/capita	6.44	BB	Gg	12.87	AA	2015
Scarce water consumption, domestic	10^3 m^3/capita	0.00	AA	10^9 m^3	0.01	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	2.10	BBB	10^9 m^3	4.27	AA	2015
Water stress	%	1.07	AA	10^9 m^3	0.18	AA	2017

Lithuania

OECD

Population [millions]	2.7	**GDP** [$, billions]	80.4
Land area [km^2, thousands]	64.9	**GDP** per capita	29,524

Country ratings on impacts to Global Commons



Lithuania

OECD

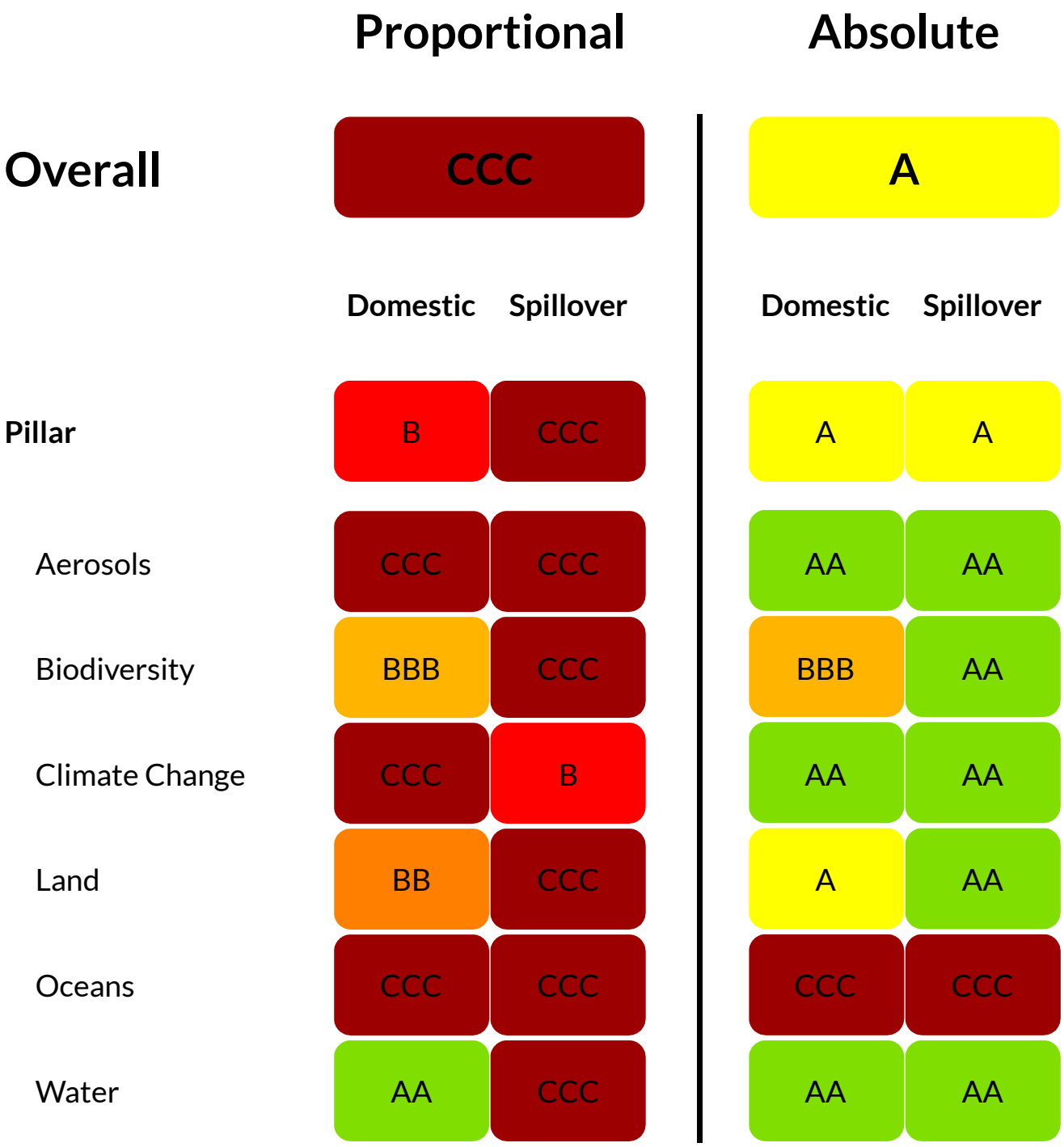
		Proportional		Absolute			
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	6.35	BB	Gg	18.62	AA	2015
NO_X emissions, spillover	kg/capita	5.48	CCC	Gg	16.06	AA	2015
SO_2 emissions, domestic	kg/capita	118.81	CCC	Gg	348.33	AA	2015
SO_2 emissions, spillover	kg/capita	28.13	CCC	Gg	82.47	AA	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	11.85	BBB	$\mu g/m^3$	11.85	BBB	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	0.24	AA	spp.	0.66	AA	2018
Terrestrial spp. threatened, spillover	spp./million	0.66	A	spp.	1.85	AA	2018
Freshwater spp. threatened, domestic	spp./million	0.10	AA	spp.	0.28	AA	2018
Freshwater spp. threatened, spillover	spp./million	0.11	A	spp.	0.30	AA	2018
Marine spp. threatened, domestic	spp./million	0.01	AA	spp.	0.02	AA	2018
Marine spp. threatened, spillover	spp./million	0.13	AA	spp.	0.35	AA	2018
Red List Index	unitless	0.99	AA	unitless	0.99	AA	2019
Unprotected terrestrial sites	%	8.94	A	%	8.94	A	2019
Unprotected freshwater sites	%	4.80	AA	%	4.80	AA	2019
Unprotected marine sites	%	16.55	BBB	%	16.55	BBB	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	7.50	BB	Pg CO_2e	0.02	AA	2014
GHG emissions, spillover	t CO_2e/capita	6.40	CCC	Pg CO_2e	0.02	AA	2014
Black carbon emissions	kg/capita	0.61	CCC	Gg	1.91	AA	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.00	AA	t CO_2/capita	0.00	AA	2018
Land							
NH_3 emissions, domestic	kg/capita	12.48	B	Tg	36.60	AA	2015
NH_3 emissions, spillover	kg/capita	4.38	B	kg	12.86	AA	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.49	BB	unitless	0.49	BB	2015
Non-Recycled Waste	kg/capita/day	0.53	BB	Gg	1.48	AA	2018
Deforestation	%	0.00	AAA	10^3 hectares	0.00	AAA	2018
Human Trophic Level	unitless	2.49	B	unitless	2.49	B	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	na	na	%	na	na	2014
Fish caught by trawling	%	1.37	AA	%	1.37	AA	2014
Ocean Health Index: Clean Waters	unitless	45.07	CCC	unitless	45.07	CCC	2019
Water							
Untreated wastewater	%	48.61	B	%	48.61	B	2018
Nitrogen emissions, domestic	kg/capita	25.67	CCC	Tg	0.08	AA	2015
Nitrogen emissions, spillover	kg/capita	7.41	BB	Gg	21.74	AA	2015
Scarce water consumption, domestic	10^3 m^3/capita	0.00	AA	10^9 m^3	0.12	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	3.00	BB	10^9 m^3	8.70	AA	2015
Water stress	%	1.87	AA	10^9 m^3	0.26	AA	2017

Luxembourg

OECD

Population [millions]	0.6	**GDP** [$, billions]	59.0
Land area [km^2, thousands]	2.6	**GDP** per capita	94,278

Country ratings on impacts to Global Commons



Luxembourg

OECD

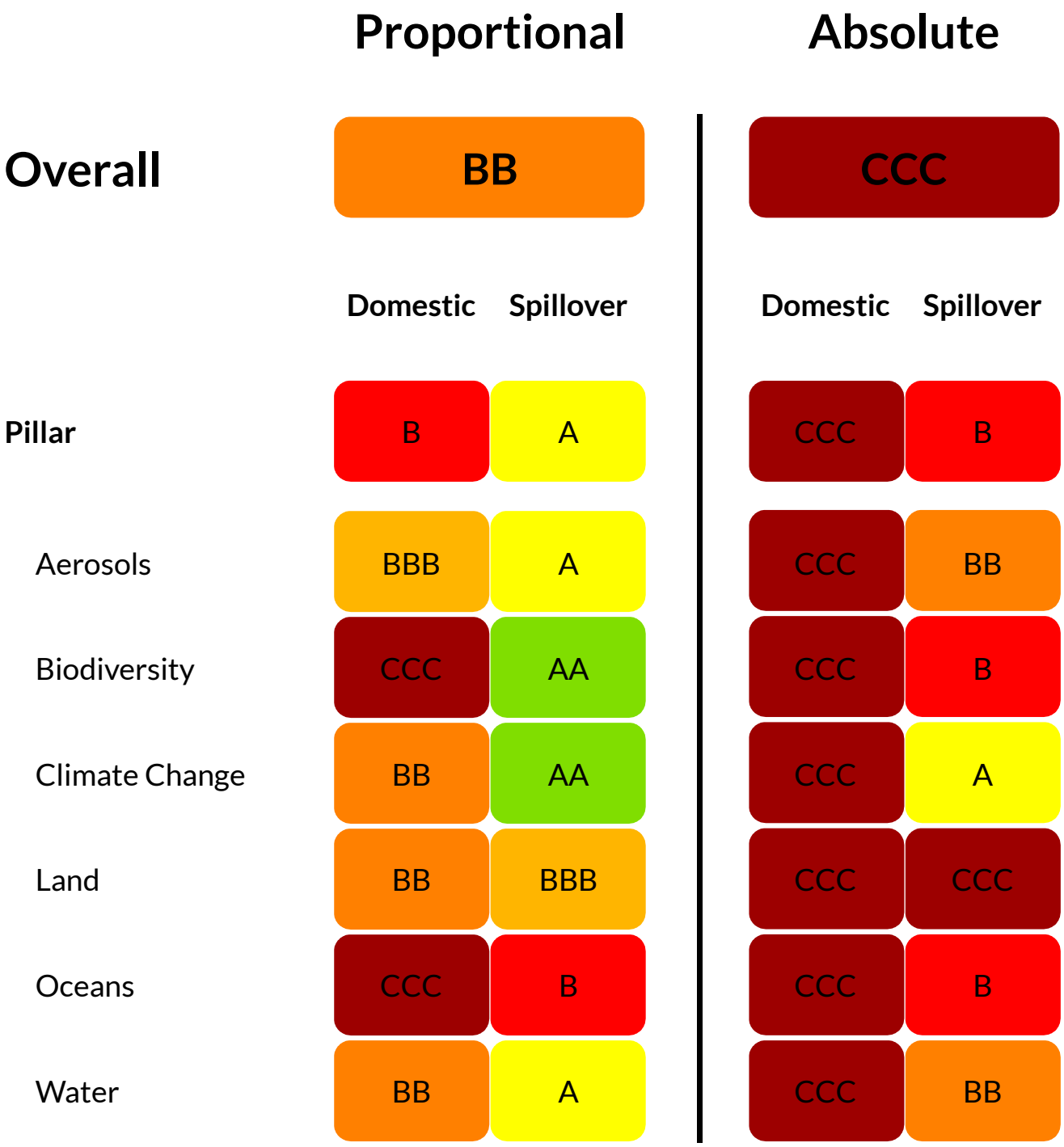
		Proportional		Absolute			
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	22.17	CCC	Gg	12.57	AA	2015
NO_X emissions, spillover	kg/capita	31.12	CCC	Gg	17.63	AA	2015
SO_2 emissions, domestic	kg/capita	236.64	CCC	Gg	134.12	AA	2015
SO_2 emissions, spillover	kg/capita	131.07	CCC	Gg	74.28	AA	2015
$PM_{2.5}$ concentration	µg/m³	10.37	A	µg/m³	10.37	A	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	0.04	AA	spp.	0.03	AA	2018
Terrestrial spp. threatened, spillover	spp./million	7.03	CCC	spp.	4.25	AA	2018
Freshwater spp. threatened, domestic	spp./million	0.02	AA	spp.	0.01	AA	2018
Freshwater spp. threatened, spillover	spp./million	0.85	CCC	spp.	0.51	AA	2018
Marine spp. threatened, domestic	spp./million	0.00	AAA	spp.	0.00	AAA	2018
Marine spp. threatened, spillover	spp./million	0.65	BB	spp.	0.39	AA	2018
Red List Index	unitless	0.99	AA	unitless	0.99	AA	2019
Unprotected terrestrial sites	%	18.13	BBB	%	18.13	BBB	2019
Unprotected freshwater sites	%	62.87	CCC	%	62.87	CCC	2019
Unprotected marine sites	%	na	na	%	na	na	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	21.40	CCC	Pg CO_2e	0.01	AA	2014
GHG emissions, spillover	t CO_2e/capita	33.80	CCC	Pg CO_2e	0.02	AA	2014
Black carbon emissions	kg/capita	1.83	CCC	Gg	0.93	AA	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.00	AAA	t CO_2/capita	0.00	AAA	2018
Land							
NH_3 emissions, domestic	kg/capita	6.87	BBB	Tg	3.89	AA	2015
NH_3 emissions, spillover	kg/capita	29.87	CCC	kg	16.93	AA	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.74	CCC	unitless	0.74	CCC	2015
Non-Recycled Waste	kg/capita/day	0.84	CCC	Gg	0.51	AA	2018
Deforestation	%	0.04	AA	10^3 hectares	0.04	AA	2018
Human Trophic Level	unitless	2.33	BB	unitless	2.33	BB	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	na	na	%	na	na	2014
Fish caught by trawling	%	na	na	%	na	na	2014
Ocean Health Index: Clean Waters	unitless	na	na	unitless	na	na	2019
Water							
Untreated wastewater	%	1.50	AA	%	1.50	AA	2018
Nitrogen emissions, domestic	kg/capita	8.64	BBB	Tg	0.00	AA	2015
Nitrogen emissions, spillover	kg/capita	45.95	CCC	Gg	26.04	AA	2015
Scarce water consumption, domestic	10^3 m³/capita	0.00	AA	10^9 m³	0.02	AA	2015
Scarce water consumption, spillover	10^3 m³/capita	16.70	CCC	10^9 m³	9.47	AA	2015
Water stress	%	3.78	AA	10^9 m³	0.05	AA	2017

Mexico

OECD

Population [millions]	128.9	**GDP** [$, billions]	1,341.4
Land area [km^2, thousands]	1,960.8	**GDP** per capita	10,404

Country ratings on impacts to Global Commons



Mexico

OECD

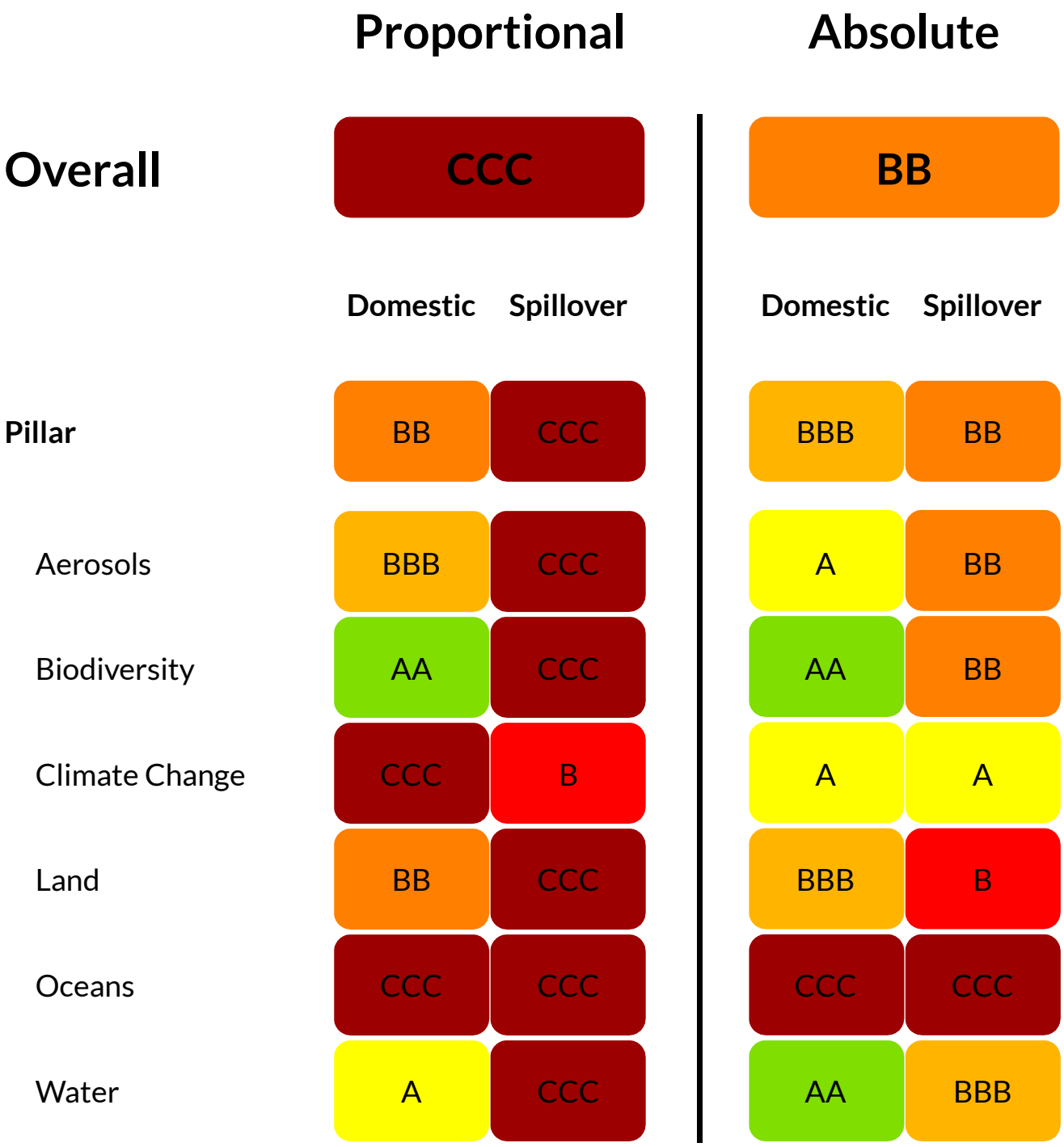
		Proportional			Absolute		
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	5.56	BBB	Gg	677.68	CCC	2015
NO_X emissions, spillover	kg/capita	1.03	A	Gg	125.28	BB	2015
SO_2 emissions, domestic	kg/capita	16.06	AA	Gg	1,956.54	CCC	2015
SO_2 emissions, spillover	kg/capita	5.05	A	Gg	615.25	BB	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	20.92	CCC	$\mu g/m^3$	20.92	CCC	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	9.13	BBB	spp.	1,151.70	CCC	2018
Terrestrial spp. threatened, spillover	spp./million	0.61	A	spp.	76.53	CCC	2018
Freshwater spp. threatened, domestic	spp./million	0.63	AA	spp.	78.92	BB	2018
Freshwater spp. threatened, spillover	spp./million	0.09	AA	spp.	11.48	B	2018
Marine spp. threatened, domestic	spp./million	1.41	A	spp.	177.67	CCC	2018
Marine spp. threatened, spillover	spp./million	0.05	AA	spp.	5.82	BBB	2018
Red List Index	unitless	0.67	CCC	unitless	0.67	CCC	2019
Unprotected terrestrial sites	%	62.93	CCC	%	62.93	CCC	2019
Unprotected freshwater sites	%	70.35	CCC	%	70.35	CCC	2019
Unprotected marine sites	%	34.17	CCC	%	34.17	CCC	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	6.30	BB	Pg CO_2e	0.76	CCC	2014
GHG emissions, spillover	t CO_2e/capita	1.50	A	Pg CO_2e	0.18	BB	2014
Black carbon emissions	kg/capita	0.27	BBB	Gg	31.59	BBB	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.70	AA	t CO_2/capita	0.65	AA	2019
Land							
NH_3 emissions, domestic	kg/capita	6.17	BBB	Tg	751.30	CCC	2015
NH_3 emissions, spillover	kg/capita	2.23	BBB	kg	271.66	CCC	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.82	CCC	unitless	0.82	CCC	2015
Non-Recycled Waste	kg/capita/day	0.93	CCC	Gg	109.60	CCC	2012
Deforestation	%	0.27	A	10^3 hectares	136.19	B	2018
Human Trophic Level	unitless	2.33	BB	unitless	2.33	BB	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	35.48	CCC	%	35.48	CCC	2014
Fish caught by trawling	%	32.73	CCC	%	32.73	CCC	2014
Ocean Health Index: Clean Waters	unitless	64.43	B	unitless	64.43	B	2019
Water							
Untreated wastewater	%	68.37	CCC	%	68.37	CCC	2018
Nitrogen emissions, domestic	kg/capita	10.02	BB	Tg	1.22	CCC	2015
Nitrogen emissions, spillover	kg/capita	4.47	BBB	Gg	544.60	B	2015
Scarce water consumption, domestic	10^3 m^3/capita	2.30	AA	10^9 m^3	279.96	A	2015
Scarce water consumption, spillover	10^3 m^3/capita	1.40	A	10^9 m^3	173.37	BBB	2015
Water stress	%	32.95	BB	10^9 m^3	87.84	CCC	2017

Netherlands

OECD

Population [millions]	17.1	**GDP** [$, billions]	830.6
Land area [km^2, thousands]	37.8	**GDP** per capita	48,473

Country ratings on impacts to Global Commons



Netherlands

OECD

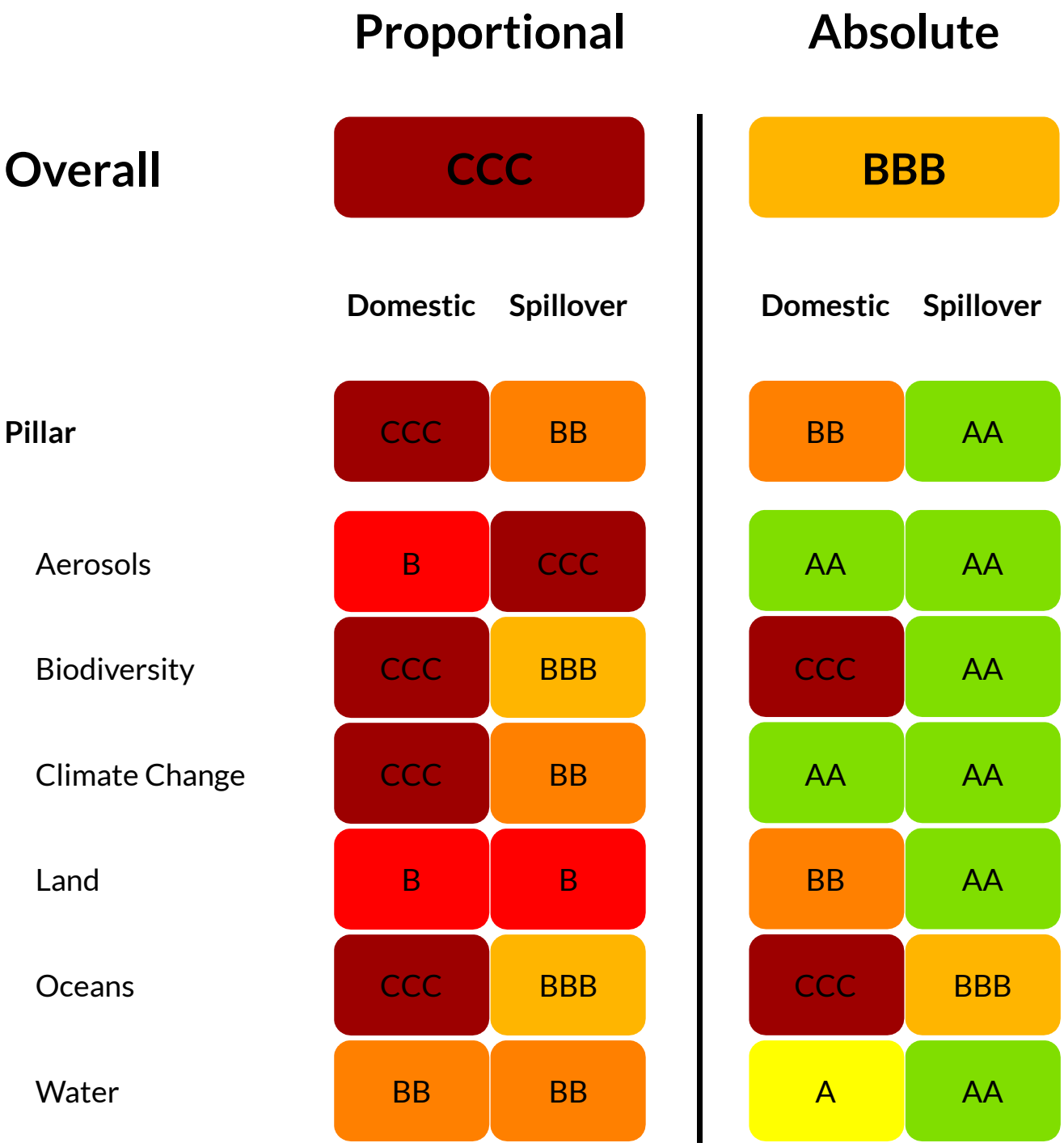
		Proportional			Absolute		
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	8.08	B	Gg	136.87	A	2015
NO_X emissions, spillover	kg/capita	6.48	CCC	Gg	109.70	BBB	2015
SO_2 emissions, domestic	kg/capita	22.72	A	Gg	384.90	A	2015
SO_2 emissions, spillover	kg/capita	35.99	CCC	Gg	609.65	BB	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	12.03	BBB	$\mu g/m^3$	12.03	BBB	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	0.01	AA	spp.	0.23	AA	2018
Terrestrial spp. threatened, spillover	spp./million	5.39	CCC	spp.	91.96	CCC	2018
Freshwater spp. threatened, domestic	spp./million	0.01	AA	spp.	0.10	AA	2018
Freshwater spp. threatened, spillover	spp./million	0.59	CCC	spp.	10.09	B	2018
Marine spp. threatened, domestic	spp./million	0.01	AA	spp.	0.24	AA	2018
Marine spp. threatened, spillover	spp./million	0.26	A	spp.	4.49	A	2018
Red List Index	unitless	0.94	A	unitless	0.94	A	2019
Unprotected terrestrial sites	%	2.10	AA	%	2.10	AA	2019
Unprotected freshwater sites	%	1.67	AA	%	1.67	AA	2019
Unprotected marine sites	%	2.60	AA	%	2.60	AA	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	11.00	CCC	Pg CO_2e	0.19	BBB	2014
GHG emissions, spillover	t CO_2e/capita	9.40	CCC	Pg CO_2e	0.16	BB	2014
Black carbon emissions	kg/capita	0.27	BBB	Gg	4.52	AA	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.00	AA	t CO_2/capita	0.04	AA	2018
Land							
NH_3 emissions, domestic	kg/capita	7.16	BBB	Tg	121.23	A	2015
NH_3 emissions, spillover	kg/capita	11.07	CCC	kg	187.52	B	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.76	CCC	unitless	0.76	CCC	2015
Non-Recycled Waste	kg/capita/day	0.62	B	Gg	10.65	AA	2018
Deforestation	%	0.00	AA	10^3 hectares	0.03	AA	2018
Human Trophic Level	unitless	2.52	CCC	unitless	2.52	CCC	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	31.72	CCC	%	31.72	CCC	2014
Fish caught by trawling	%	40.07	CCC	%	40.07	CCC	2014
Ocean Health Index: Clean Waters	unitless	45.39	CCC	unitless	45.39	CCC	2019
Water							
Untreated wastewater	%	0.00	AAA	%	0.00	AAA	2018
Nitrogen emissions, domestic	kg/capita	8.62	BBB	Tg	0.15	A	2015
Nitrogen emissions, spillover	kg/capita	18.18	CCC	Gg	307.87	BBB	2015
Scarce water consumption, domestic	10^3 m^3/capita	0.50	AA	10^9 m^3	8.07	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	7.90	CCC	10^9 m^3	134.31	BBB	2015
Water stress	%	15.17	A	10^9 m^3	7.99	AA	2016

New Zealand

OECD

Population [millions]	4.8	**GDP** [$, billions]	174.0
Land area [km^2, thousands]	278.5	**GDP** per capita	36,086

Country ratings on impacts to Global Commons



New Zealand

OECD

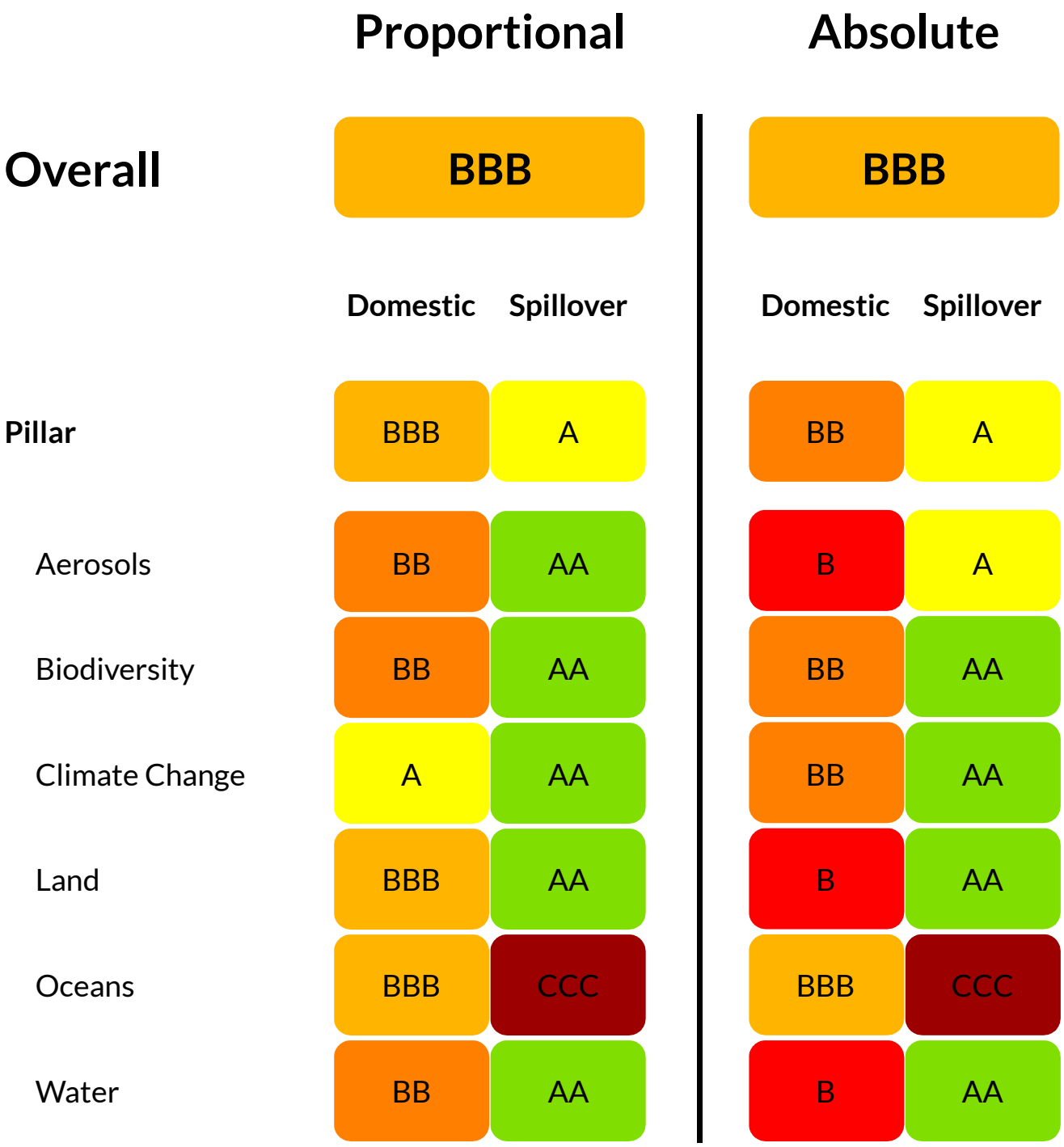
		Proportional			Absolute		
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	9.44	B	Gg	43.55	AA	2015
NO_X emissions, spillover	kg/capita	4.90	B	Gg	22.60	AA	2015
SO_2 emissions, domestic	kg/capita	146.07	CCC	Gg	674.03	A	2015
SO_2 emissions, spillover	kg/capita	37.56	CCC	Gg	173.30	A	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	5.96	AAA	$\mu g/m^3$	5.96	AAA	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	9.82	BBB	spp.	46.57	AA	2018
Terrestrial spp. threatened, spillover	spp./million	2.55	CCC	spp.	12.09	AA	2018
Freshwater spp. threatened, domestic	spp./million	10.42	CCC	spp.	49.40	BBB	2018
Freshwater spp. threatened, spillover	spp./million	0.09	AA	spp.	0.42	AA	2018
Marine spp. threatened, domestic	spp./million	12.85	CCC	spp.	60.96	B	2018
Marine spp. threatened, spillover	spp./million	0.38	A	spp.	1.82	AA	2018
Red List Index	unitless	0.62	CCC	unitless	0.62	CCC	2019
Unprotected terrestrial sites	%	53.56	CCC	%	53.56	CCC	2019
Unprotected freshwater sites	%	70.67	CCC	%	70.67	CCC	2019
Unprotected marine sites	%	55.89	CCC	%	55.89	CCC	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	18.00	CCC	Pg CO_2e	0.08	AA	2014
GHG emissions, spillover	t CO_2e/capita	6.90	CCC	Pg CO_2e	0.03	AA	2014
Black carbon emissions	kg/capita	0.55	B	Gg	2.38	AA	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.10	AA	t CO_2/capita	0.11	AA	2019
Land							
NH_3 emissions, domestic	kg/capita	56.44	CCC	Tg	260.42	BB	2015
NH_3 emissions, spillover	kg/capita	4.69	B	kg	21.65	AA	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.58	B	unitless	0.58	B	2015
Non-Recycled Waste	kg/capita/day	na	na	Gg	na	na	na
Deforestation	%	0.01	AA	10^3 hectares	1.66	AA	2018
Human Trophic Level	unitless	2.40	BB	unitless	2.40	BB	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	35.26	CCC	%	35.26	CCC	2014
Fish caught by trawling	%	46.26	CCC	%	46.26	CCC	2014
Ocean Health Index: Clean Waters	unitless	78.33	BBB	unitless	78.33	BBB	2019
Water							
Untreated wastewater	%	20.10	BBB	%	20.10	BBB	2018
Nitrogen emissions, domestic	kg/capita	85.21	CCC	Tg	0.39	BBB	2015
Nitrogen emissions, spillover	kg/capita	7.53	BB	Gg	34.75	AA	2015
Scarce water consumption, domestic	10^3 m^3/capita	0.70	AA	10^9 m^3	3.25	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	2.70	BB	10^9 m^3	12.68	AA	2015
Water stress	%	8.05	AA	10^9 m^3	9.88	AA	2014

Nigeria

Africa

Population [millions]	206.1	**GDP** [$, billions]	493.9
Land area [km^2, thousands]	913.8	**GDP** per capita	2,396

Country ratings on impacts to Global Commons



Nigeria

Africa

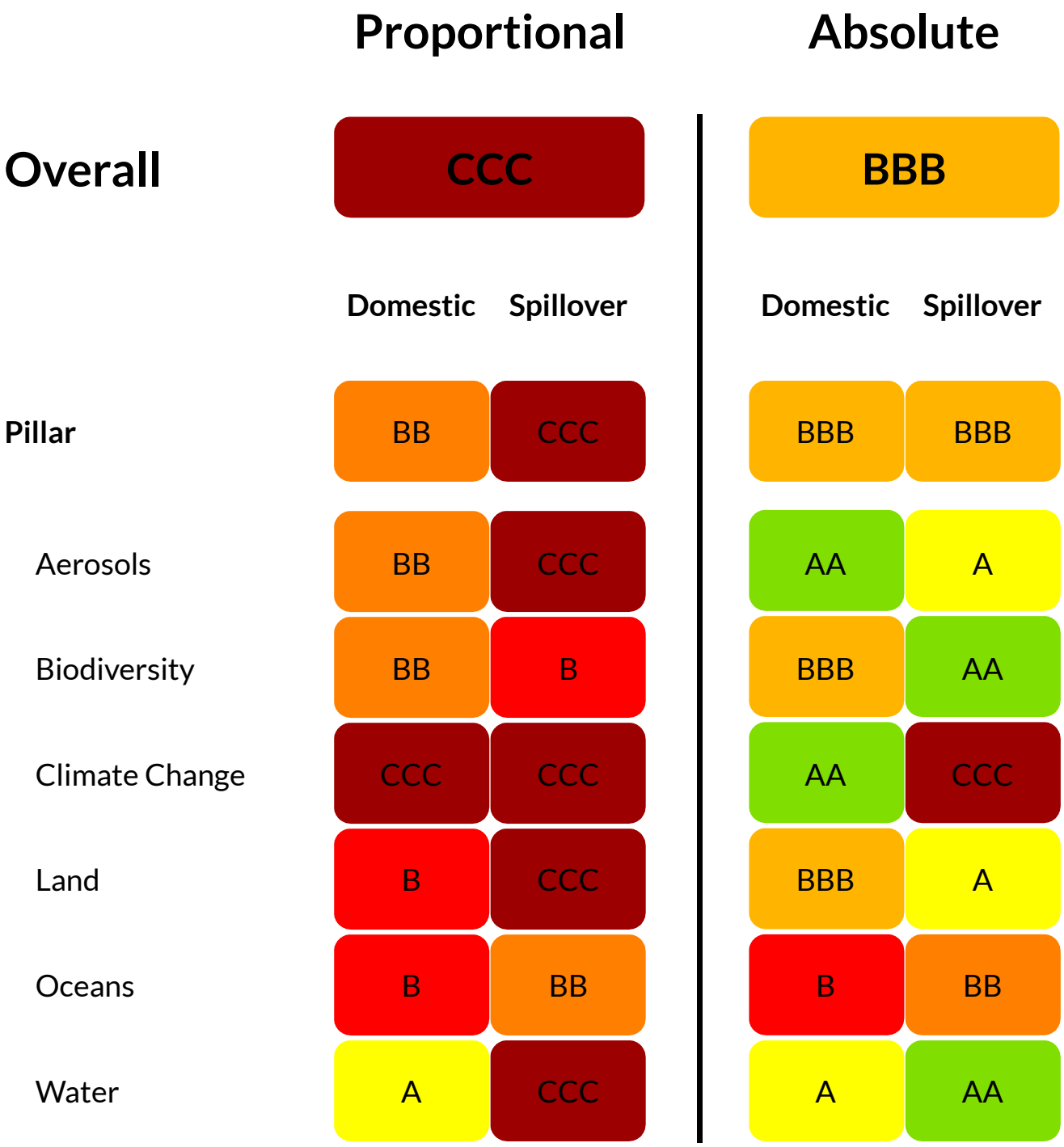
		Proportional			Absolute		
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	1.25	AA	Gg	226.33	BB	2015
NO_X emissions, spillover	kg/capita	0.22	AA	Gg	38.99	AA	2015
SO_2 emissions, domestic	kg/capita	1.79	AA	Gg	324.87	AA	2015
SO_2 emissions, spillover	kg/capita	1.04	AA	Gg	188.65	A	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	71.80	CCC	$\mu g/m^3$	71.80	CCC	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	0.98	AA	spp.	192.11	A	2018
Terrestrial spp. threatened, spillover	spp./million	0.02	AA	spp.	3.85	AA	2018
Freshwater spp. threatened, domestic	spp./million	0.31	AA	spp.	60.83	BB	2018
Freshwater spp. threatened, spillover	spp./million	0.00	AA	spp.	0.65	AA	2018
Marine spp. threatened, domestic	spp./million	0.11	AA	spp.	21.53	A	2018
Marine spp. threatened, spillover	spp./million	0.01	AA	spp.	1.67	AA	2018
Red List Index	unitless	0.87	BB	unitless	0.87	BB	2019
Unprotected terrestrial sites	%	19.59	BBB	%	19.59	BBB	2019
Unprotected freshwater sites	%	26.25	BB	%	26.25	BB	2019
Unprotected marine sites	%	100.00	CCC	%	100.00	CCC	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	1.40	AA	Pg CO_2e	0.25	BBB	2014
GHG emissions, spillover	t CO_2e/capita	0.30	AA	Pg CO_2e	0.04	AA	2014
Black carbon emissions	kg/capita	1.22	CCC	Gg	194.08	CCC	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.10	AA	t CO_2/capita	0.11	AA	2018
Land							
NH_3 emissions, domestic	kg/capita	3.83	A	Tg	694.23	CCC	2015
NH_3 emissions, spillover	kg/capita	0.15	AA	kg	27.34	AA	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.84	CCC	unitless	0.84	CCC	2015
Non-Recycled Waste	kg/capita/day	na	na	Gg	na	na	na
Deforestation	%	0.47	BB	10^3 hectares	50.99	A	2018
Human Trophic Level	unitless	2.05	AA	unitless	2.05	AA	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	14.19	BBB	%	14.19	BBB	2014
Fish caught by trawling	%	18.15	BB	%	18.15	BB	2014
Ocean Health Index: Clean Waters	unitless	37.07	CCC	unitless	37.07	CCC	2019
Water							
Untreated wastewater	%	99.85	CCC	%	99.85	CCC	2018
Nitrogen emissions, domestic	kg/capita	5.74	A	Tg	1.04	CCC	2015
Nitrogen emissions, spillover	kg/capita	0.24	AA	Gg	42.72	AA	2015
Scarce water consumption, domestic	10^3 m^3/capita	0.00	AA	10^9 m^3	7.53	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	0.10	AA	10^9 m^3	17.94	AA	2015
Water stress	%	9.67	AA	10^9 m^3	12.47	A	2010

Norway

OECD

Population [millions]	5.4	**GDP** [$, billions]	351.3
Land area [km^2, thousands]	323.0	**GDP** per capita	64,800

Country ratings on impacts to Global Commons



Norway

OECD

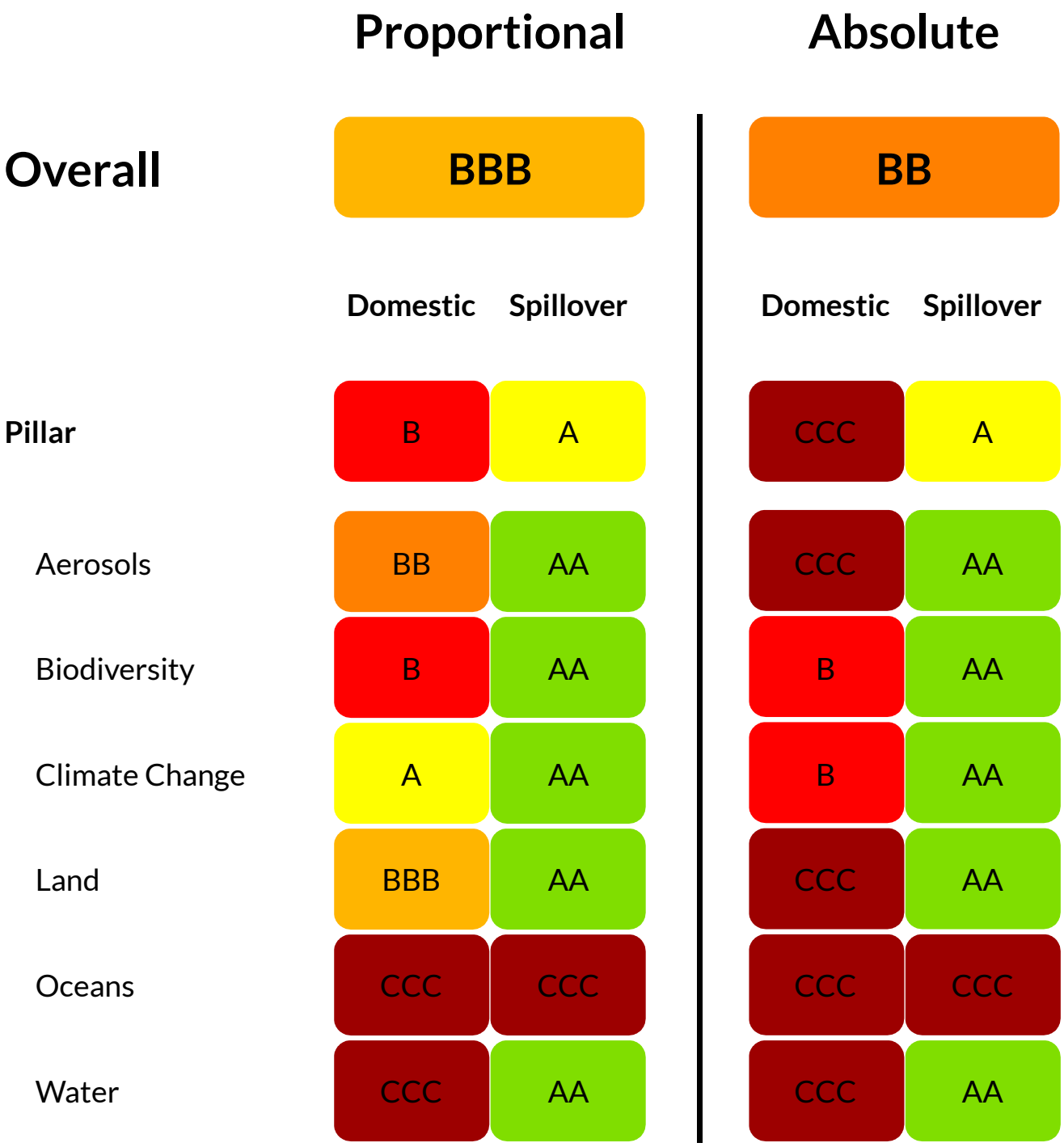
		Proportional			Absolute		
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	11.11	CCC	Gg	57.77	AA	2015
NO_X emissions, spillover	kg/capita	9.65	CCC	Gg	50.17	A	2015
SO_2 emissions, domestic	kg/capita	83.93	B	Gg	436.40	A	2015
SO_2 emissions, spillover	kg/capita	55.01	CCC	Gg	286.06	A	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	6.96	AA	$\mu g/m^3$	6.96	AA	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	1.15	AA	spp.	6.15	AA	2018
Terrestrial spp. threatened, spillover	spp./million	3.44	CCC	spp.	18.34	A	2018
Freshwater spp. threatened, domestic	spp./million	0.16	AA	spp.	0.83	AA	2018
Freshwater spp. threatened, spillover	spp./million	0.38	BB	spp.	2.01	AA	2018
Marine spp. threatened, domestic	spp./million	0.97	AA	spp.	5.20	AA	2018
Marine spp. threatened, spillover	spp./million	0.42	BBB	spp.	2.24	AA	2018
Red List Index	unitless	0.94	A	unitless	0.94	A	2019
Unprotected terrestrial sites	%	42.28	CCC	%	42.28	CCC	2019
Unprotected freshwater sites	%	35.87	CCC	%	35.87	CCC	2019
Unprotected marine sites	%	42.55	CCC	%	42.55	CCC	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	11.20	CCC	Pg CO_2e	0.06	AA	2014
GHG emissions, spillover	t CO_2e/capita	12.20	CCC	Pg CO_2e	0.06	A	2014
Black carbon emissions	kg/capita	1.06	CCC	Gg	5.20	AA	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	45.80	CCC	t CO_2/capita	45.78	CCC	2018
Land							
NH_3 emissions, domestic	kg/capita	5.18	BBB	Tg	26.92	AA	2015
NH_3 emissions, spillover	kg/capita	9.78	CCC	kg	50.87	A	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.84	CCC	unitless	0.84	CCC	2015
Non-Recycled Waste	kg/capita/day	1.20	CCC	Gg	6.38	AA	2018
Deforestation	%	0.01	AA	10^3 hectares	1.71	AA	2018
Human Trophic Level	unitless	2.53	CCC	unitless	2.53	CCC	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	21.15	B	%	21.15	B	2014
Fish caught by trawling	%	32.93	CCC	%	32.93	CCC	2014
Ocean Health Index: Clean Waters	unitless	76.99	BB	unitless	76.99	BB	2019
Water							
Untreated wastewater	%	35.71	BB	%	35.71	BB	2018
Nitrogen emissions, domestic	kg/capita	6.33	BBB	Tg	0.03	AA	2015
Nitrogen emissions, spillover	kg/capita	16.22	CCC	Gg	84.34	AA	2015
Scarce water consumption, domestic	10^3 m^3/capita	0.00	AA	10^9 m^3	0.11	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	8.20	CCC	10^9 m^3	42.86	AA	2015
Water stress	%	2.30	AA	10^9 m^3	3.03	AA	2007

Pakistan

East & South Asia

Population [millions]	220.9	**GDP** [$, billions]	264.6
Land area [km^2, thousands]	877.1	**GDP** per capita	1,198

Country ratings on impacts to Global Commons



Pakistan

East & South Asia

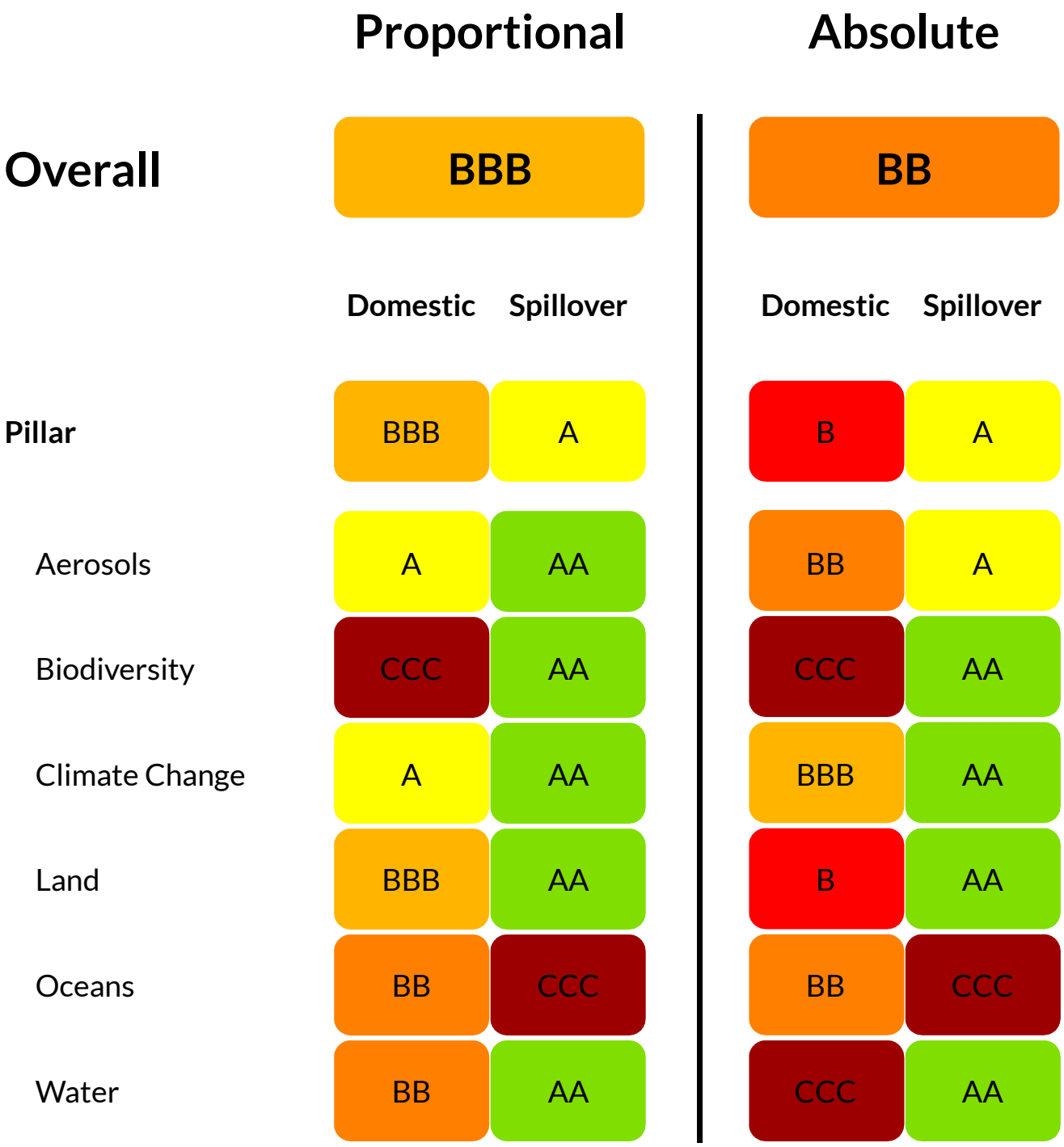
		Proportional			Absolute		
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	1.47	AA	Gg	293.21	B	2015
NO_X emissions, spillover	kg/capita	0.08	AA	Gg	15.93	AA	2015
SO_2 emissions, domestic	kg/capita	5.49	AA	Gg	1,094.17	BB	2015
SO_2 emissions, spillover	kg/capita	0.42	AA	Gg	83.90	AA	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	58.28	CCC	$\mu g/m^3$	58.28	CCC	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	0.11	AA	spp.	22.59	AA	2018
Terrestrial spp. threatened, spillover	spp./million	0.03	AA	spp.	7.41	AA	2018
Freshwater spp. threatened, domestic	spp./million	0.03	AA	spp.	5.76	AA	2018
Freshwater spp. threatened, spillover	spp./million	0.01	AA	spp.	1.16	AA	2018
Marine spp. threatened, domestic	spp./million	0.04	AA	spp.	7.94	AA	2018
Marine spp. threatened, spillover	spp./million	0.00	AA	spp.	0.06	AA	2018
Red List Index	unitless	0.85	B	unitless	0.85	B	2019
Unprotected terrestrial sites	%	65.21	CCC	%	65.21	CCC	2019
Unprotected freshwater sites	%	64.10	CCC	%	64.10	CCC	2019
Unprotected marine sites	%	85.42	CCC	%	85.42	CCC	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	2.10	A	Pg CO_2e	0.42	B	2014
GHG emissions, spillover	t CO_2e/capita	0.10	AA	Pg CO_2e	0.02	AA	2014
Black carbon emissions	kg/capita	0.55	B	Gg	93.65	CCC	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.00	AA	t CO_2/capita	0.00	AA	2018
Land							
NH_3 emissions, domestic	kg/capita	5.13	BBB	Tg	1,022.49	CCC	2015
NH_3 emissions, spillover	kg/capita	0.07	AA	kg	13.79	AA	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.89	CCC	unitless	0.89	CCC	2015
Non-Recycled Waste	kg/capita/day	na	na	Gg	na	na	na
Deforestation	%	0.00	AA	10^3 hectares	0.01	AA	2018
Human Trophic Level	unitless	2.45	B	unitless	2.45	B	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	40.25	CCC	%	40.25	CCC	2014
Fish caught by trawling	%	22.91	BB	%	22.91	BB	2014
Ocean Health Index: Clean Waters	unitless	45.52	CCC	unitless	45.52	CCC	2019
Water							
Untreated wastewater	%	99.90	CCC	%	99.90	CCC	2018
Nitrogen emissions, domestic	kg/capita	9.94	BB	Tg	1.98	CCC	2015
Nitrogen emissions, spillover	kg/capita	0.11	AA	Gg	22.34	AA	2015
Scarce water consumption, domestic	10^3 m^3/capita	30.00	CCC	10^9 m^3	5,988.64	CCC	2015
Scarce water consumption, spillover	10^3 m^3/capita	0.00	AA	10^9 m^3	7.63	AA	2015
Water stress	%	122.69	CCC	10^9 m^3	200.00	CCC	2017

Philippines

East & South Asia

Population [millions]	109.6	**GDP** [$, billions]	331.2
Land area [km^2, thousands]	297.7	**GDP** per capita	3,022

Country ratings on impacts to Global Commons



Philippines

East & South Asia

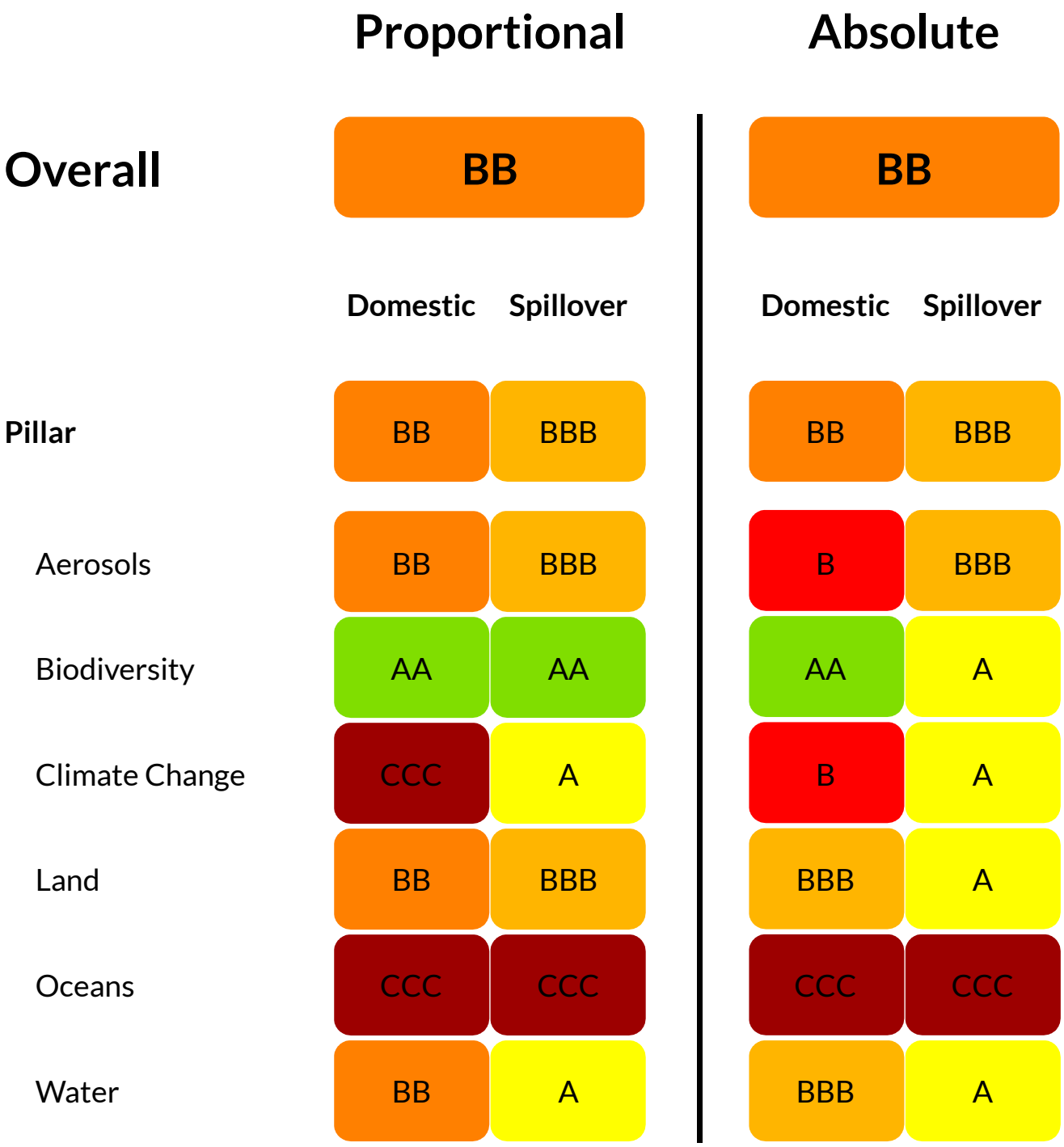
		Proportional			Absolute		
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	1.81	AA	Gg	184.91	BBB	2015
NO_X emissions, spillover	kg/capita	0.41	AA	Gg	42.21	A	2015
SO_2 emissions, domestic	kg/capita	10.78	AA	Gg	1,101.29	BB	2015
SO_2 emissions, spillover	kg/capita	2.09	AA	Gg	213.26	A	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	18.07	B	$\mu g/m^3$	18.07	B	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	4.43	AA	spp.	472.13	B	2018
Terrestrial spp. threatened, spillover	spp./million	0.09	AA	spp.	9.85	AA	2018
Freshwater spp. threatened, domestic	spp./million	0.21	AA	spp.	22.43	A	2018
Freshwater spp. threatened, spillover	spp./million	0.01	AA	spp.	0.95	AA	2018
Marine spp. threatened, domestic	spp./million	1.14	A	spp.	121.38	CCC	2018
Marine spp. threatened, spillover	spp./million	0.02	AA	spp.	2.25	AA	2018
Red List Index	unitless	0.64	CCC	unitless	0.64	CCC	2019
Unprotected terrestrial sites	%	59.87	CCC	%	59.87	CCC	2019
Unprotected freshwater sites	%	50.16	CCC	%	50.16	CCC	2019
Unprotected marine sites	%	62.00	CCC	%	62.00	CCC	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	1.90	AA	Pg CO_2e	0.19	BBB	2014
GHG emissions, spillover	t CO_2e/capita	0.60	AA	Pg CO_2e	0.06	A	2014
Black carbon emissions	kg/capita	0.36	BBB	Gg	33.47	BBB	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.10	AA	t CO_2/capita	0.10	AA	2018
Land							
NH_3 emissions, domestic	kg/capita	2.40	AA	Tg	245.47	BBB	2015
NH_3 emissions, spillover	kg/capita	0.39	AA	kg	39.52	AA	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.77	CCC	unitless	0.77	CCC	2015
Non-Recycled Waste	kg/capita/day	na	na	Gg	na	na	na
Deforestation	%	0.41	BBB	10^3 hectares	75.53	BBB	2018
Human Trophic Level	unitless	2.17	A	unitless	2.17	A	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	30.92	CCC	%	30.92	CCC	2014
Fish caught by trawling	%	4.45	AA	%	4.45	AA	2014
Ocean Health Index: Clean Waters	unitless	54.00	CCC	unitless	54.00	CCC	2019
Water							
Untreated wastewater	%	99.30	CCC	%	99.30	CCC	2018
Nitrogen emissions, domestic	kg/capita	2.97	AA	Tg	0.30	BBB	2015
Nitrogen emissions, spillover	kg/capita	0.67	AA	Gg	68.22	AA	2015
Scarce water consumption, domestic	10^3 m^3/capita	0.70	AA	10^9 m^3	71.07	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	0.30	AA	10^9 m^3	32.93	AA	2015
Water stress	%	28.36	BBB	10^9 m^3	92.75	CCC	2017

Poland

OECD

Population [millions]	37.8	**GDP** [$, billions]	630.5
Land area [km^2, thousands]	311.6	**GDP** per capita	16,659

Country ratings on impacts to Global Commons



Poland

OECD

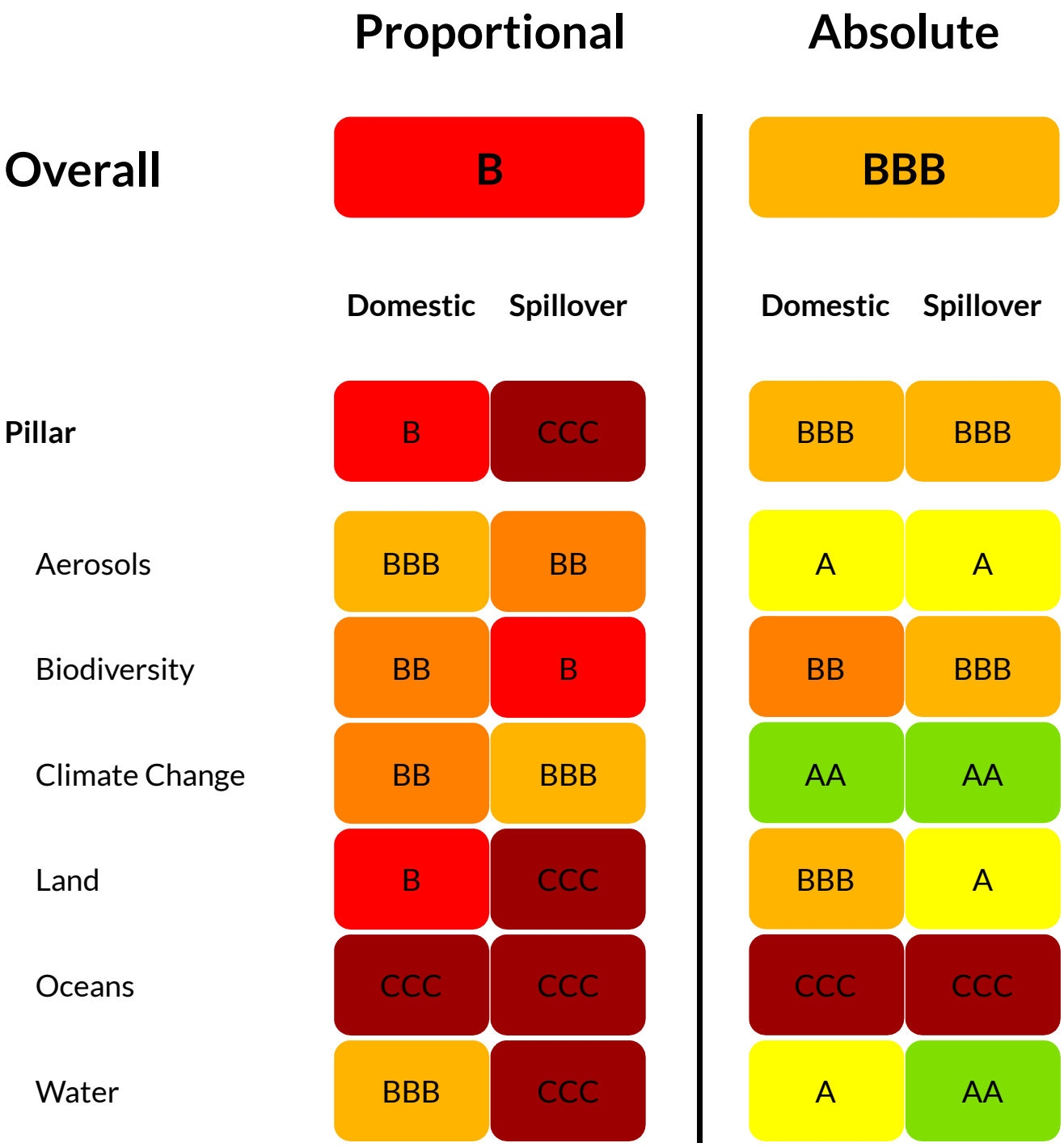
		Proportional		Absolute			
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	8.26	B	Gg	314.13	B	2015
NO_X emissions, spillover	kg/capita	2.37	BBB	Gg	90.00	BBB	2015
SO_2 emissions, domestic	kg/capita	30.88	A	Gg	1,174.38	BB	2015
SO_2 emissions, spillover	kg/capita	11.71	BBB	Gg	445.22	BBB	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	20.88	CCC	$\mu g/m^3$	20.88	CCC	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	0.48	AA	spp.	18.08	AA	2018
Terrestrial spp. threatened, spillover	spp./million	0.88	A	spp.	33.34	BBB	2018
Freshwater spp. threatened, domestic	spp./million	0.06	AA	spp.	2.29	AA	2018
Freshwater spp. threatened, spillover	spp./million	0.09	AA	spp.	3.23	A	2018
Marine spp. threatened, domestic	spp./million	0.01	AA	spp.	0.20	AA	2018
Marine spp. threatened, spillover	spp./million	0.02	AA	spp.	0.84	AA	2018
Red List Index	unitless	0.97	AA	unitless	0.97	AA	2019
Unprotected terrestrial sites	%	12.65	A	%	12.65	A	2019
Unprotected freshwater sites	%	8.84	A	%	8.84	A	2019
Unprotected marine sites	%	10.49	A	%	10.49	A	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	10.50	CCC	Pg CO_2e	0.40	B	2014
GHG emissions, spillover	t CO_2e/capita	2.80	BBB	Pg CO_2e	0.11	BBB	2014
Black carbon emissions	kg/capita	0.67	CCC	Gg	25.60	A	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.40	AA	t CO_2/capita	0.39	AA	2019
Land							
NH_3 emissions, domestic	kg/capita	7.96	BB	Tg	302.84	BB	2015
NH_3 emissions, spillover	kg/capita	2.05	BBB	kg	77.94	A	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.61	B	unitless	0.61	B	2015
Non-Recycled Waste	kg/capita/day	0.59	BB	Gg	22.48	A	2018
Deforestation	%	0.00	AA	10^3 hectares	0.38	AA	2018
Human Trophic Level	unitless	2.35	BB	unitless	2.35	BB	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	59.86	CCC	%	59.86	CCC	2014
Fish caught by trawling	%	35.76	CCC	%	35.76	CCC	2014
Ocean Health Index: Clean Waters	unitless	44.28	CCC	unitless	44.28	CCC	2019
Water							
Untreated wastewater	%	39.05	BB	%	39.05	BB	2018
Nitrogen emissions, domestic	kg/capita	14.73	B	Tg	0.56	B	2015
Nitrogen emissions, spillover	kg/capita	3.35	A	Gg	127.59	A	2015
Scarce water consumption, domestic	10^3 m^3/capita	0.50	AA	10^9 m^3	20.01	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	1.50	A	10^9 m^3	57.00	AA	2015
Water stress	%	34.89	BB	10^9 m^3	10.08	A	2017

Portugal

OECD

Population [millions]	10.2	**GDP** [$, billions]	284.9
Land area [km^2, thousands]	92.3	**GDP** per capita	27,937

Country ratings on impacts to Global Commons



Portugal

OECD

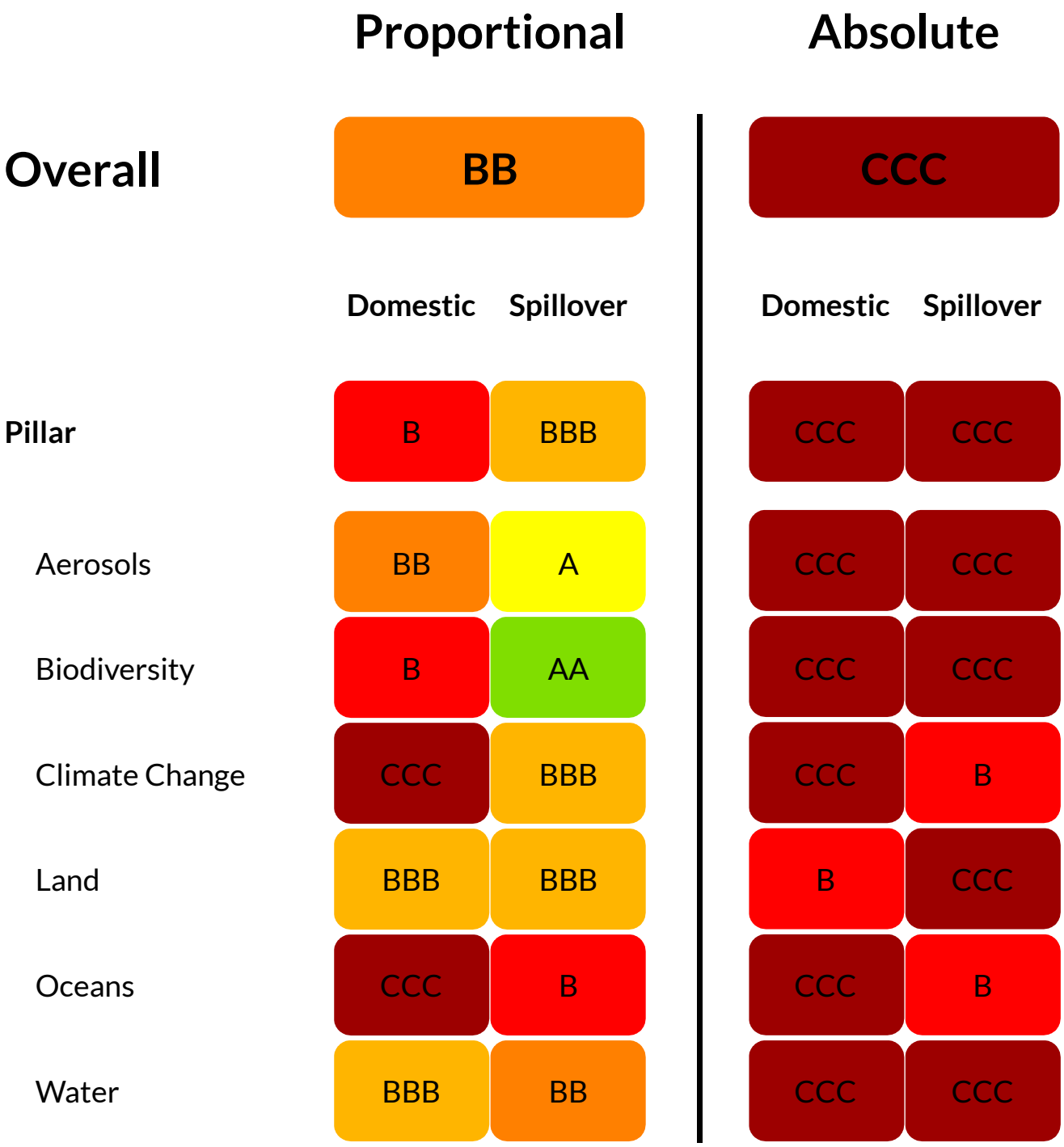
		Proportional			Absolute		
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	6.61	BB	Gg	68.52	AA	2015
NO_X emissions, spillover	kg/capita	3.80	BB	Gg	39.35	AA	2015
SO_2 emissions, domestic	kg/capita	61.89	BB	Gg	641.71	A	2015
SO_2 emissions, spillover	kg/capita	17.17	BB	Gg	178.04	A	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	8.16	AA	$\mu g/m^3$	8.16	AA	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	18.81	B	spp.	192.96	A	2018
Terrestrial spp. threatened, spillover	spp./million	3.48	CCC	spp.	35.69	BBB	2018
Freshwater spp. threatened, domestic	spp./million	0.72	AA	spp.	7.36	AA	2018
Freshwater spp. threatened, spillover	spp./million	0.51	CCC	spp.	5.21	BBB	2018
Marine spp. threatened, domestic	spp./million	1.43	A	spp.	14.62	A	2018
Marine spp. threatened, spillover	spp./million	0.58	BBB	spp.	5.93	BBB	2018
Red List Index	unitless	0.85	B	unitless	0.85	B	2019
Unprotected terrestrial sites	%	26.73	BB	%	26.73	BB	2019
Unprotected freshwater sites	%	36.01	CCC	%	36.01	CCC	2019
Unprotected marine sites	%	34.46	CCC	%	34.46	CCC	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	6.90	BB	Pg CO_2e	0.07	AA	2014
GHG emissions, spillover	t CO_2e/capita	4.70	B	Pg CO_2e	0.05	AA	2014
Black carbon emissions	kg/capita	0.44	BB	Gg	4.69	AA	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.00	AA	t CO_2/capita	0.00	AA	2019
Land							
NH_3 emissions, domestic	kg/capita	5.95	BBB	Tg	61.67	AA	2015
NH_3 emissions, spillover	kg/capita	7.29	CCC	kg	75.58	A	2015
Sustainable Nitrogen Mgmt. Index	unitless	1.07	CCC	unitless	1.07	CCC	2015
Non-Recycled Waste	kg/capita/day	0.97	CCC	Gg	9.97	AA	2018
Deforestation	%	0.02	AA	10^3 hectares	0.41	AA	2018
Human Trophic Level	unitless	2.45	B	unitless	2.45	B	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	67.20	CCC	%	67.20	CCC	2014
Fish caught by trawling	%	34.26	CCC	%	34.26	CCC	2014
Ocean Health Index: Clean Waters	unitless	52.30	CCC	unitless	52.30	CCC	2019
Water							
Untreated wastewater	%	45.02	B	%	45.02	B	2018
Nitrogen emissions, domestic	kg/capita	10.05	BB	Tg	0.10	AA	2015
Nitrogen emissions, spillover	kg/capita	11.76	CCC	Gg	121.94	A	2015
Scarce water consumption, domestic	10^3 m^3/capita	2.10	AA	10^9 m^3	21.43	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	5.20	CCC	10^9 m^3	54.00	AA	2015
Water stress	%	18.38	A	10^9 m^3	9.15	AA	2007

Russia

Eastern Europe & Central Asia

Population [millions]	145.9	**GDP** [$, billions]	1,711.7
Land area [km^2, thousands]	16,883.2	**GDP** per capita	11,729

Country ratings on impacts to Global Commons



Russia

Eastern Europe & Central Asia

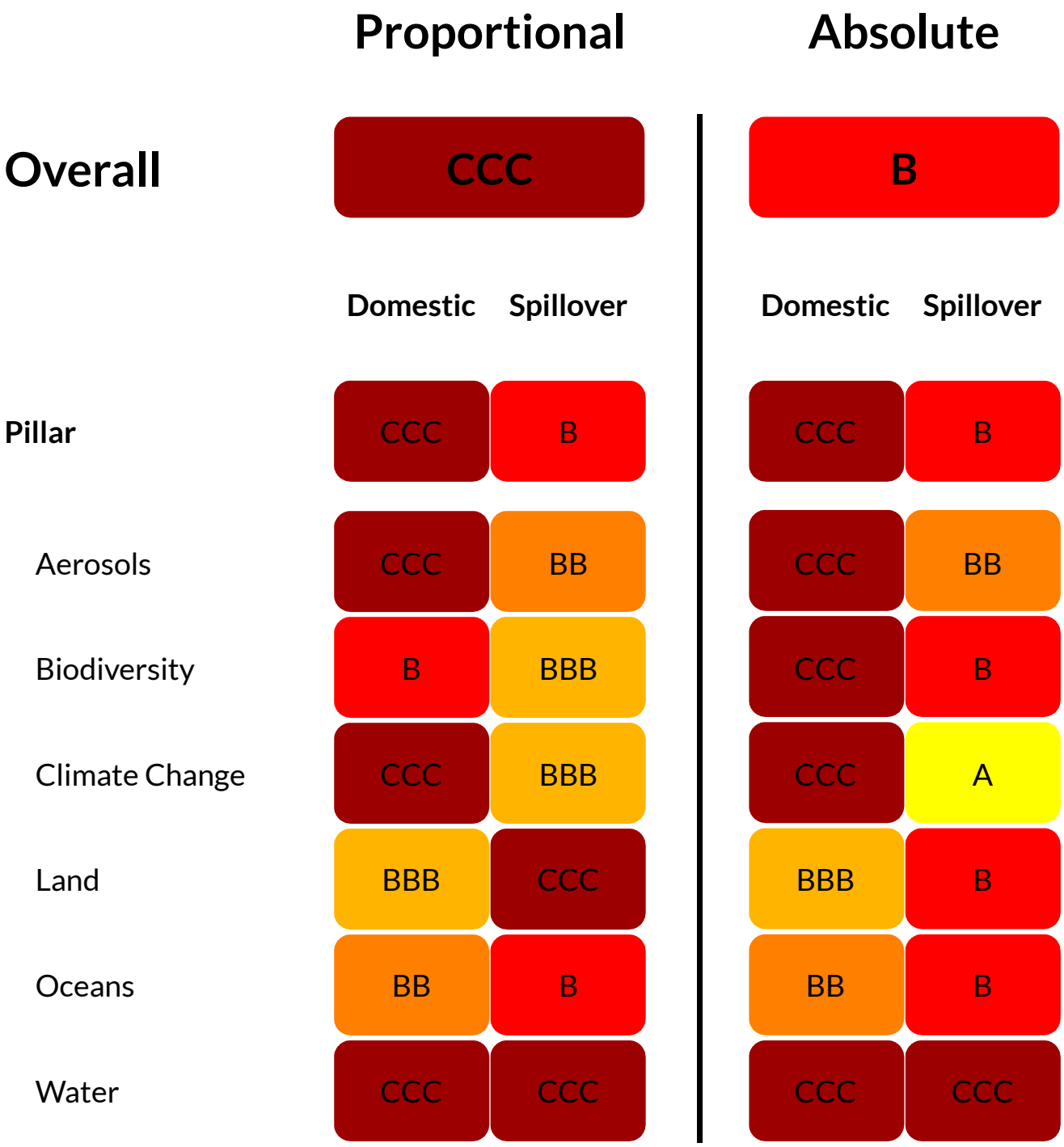
		Proportional			Absolute		
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	11.41	CCC	Gg	1,654.63	CCC	2015
NO_X emissions, spillover	kg/capita	1.47	A	Gg	212.76	CCC	2015
SO_2 emissions, domestic	kg/capita	41.19	BBB	Gg	5,972.02	CCC	2015
SO_2 emissions, spillover	kg/capita	11.39	BBB	Gg	1,651.51	CCC	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	16.16	BB	$\mu g/m^3$	16.16	BB	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	1.29	AA	spp.	188.57	A	2018
Terrestrial spp. threatened, spillover	spp./million	0.78	A	spp.	114.19	CCC	2018
Freshwater spp. threatened, domestic	spp./million	0.54	AA	spp.	78.65	BB	2018
Freshwater spp. threatened, spillover	spp./million	0.11	A	spp.	15.98	CCC	2018
Marine spp. threatened, domestic	spp./million	0.17	AA	spp.	25.01	BBB	2018
Marine spp. threatened, spillover	spp./million	0.05	AA	spp.	7.63	BB	2018
Red List Index	unitless	0.95	A	unitless	0.95	A	2019
Unprotected terrestrial sites	%	74.88	CCC	%	74.88	CCC	2019
Unprotected freshwater sites	%	73.78	CCC	%	73.78	CCC	2019
Unprotected marine sites	%	76.36	CCC	%	76.36	CCC	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	17.00	CCC	Pg CO_2e	2.46	CCC	2014
GHG emissions, spillover	t CO_2e/capita	2.30	BBB	Pg CO_2e	0.33	CCC	2014
Black carbon emissions	kg/capita	0.23	A	Gg	32.72	BBB	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	3.60	A	t CO_2/capita	3.63	A	2018
Land							
NH_3 emissions, domestic	kg/capita	5.47	BBB	Tg	793.45	CCC	2015
NH_3 emissions, spillover	kg/capita	2.55	BBB	kg	369.58	CCC	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.59	B	unitless	0.59	B	2015
Non-Recycled Waste	kg/capita/day	na	na	Gg	na	na	na
Deforestation	%	0.00	AA	10^3 hectares	0.63	AA	2018
Human Trophic Level	unitless	2.35	BB	unitless	2.35	BB	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	52.15	CCC	%	52.15	CCC	2014
Fish caught by trawling	%	5.35	AA	%	5.35	AA	2014
Ocean Health Index: Clean Waters	unitless	67.86	B	unitless	67.86	B	2019
Water							
Untreated wastewater	%	81.50	CCC	%	81.50	CCC	2018
Nitrogen emissions, domestic	kg/capita	8.42	BBB	Tg	1.22	CCC	2015
Nitrogen emissions, spillover	kg/capita	4.20	BBB	Gg	608.76	CCC	2015
Scarce water consumption, domestic	10^3 m^3/capita	0.10	AA	10^9 m^3	18.60	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	5.20	CCC	10^9 m^3	752.96	CCC	2015
Water stress	%	4.10	AA	10^9 m^3	64.41	CCC	2017

Saudi Arabia

Middle East & North Africa

Population [millions]	34.8	**GDP** [$, billions]	724.8
Land area [km^2, thousands]	1,917.1	**GDP** per capita	20,820

Country ratings on impacts to Global Commons



Saudi Arabia

Middle East & North Africa

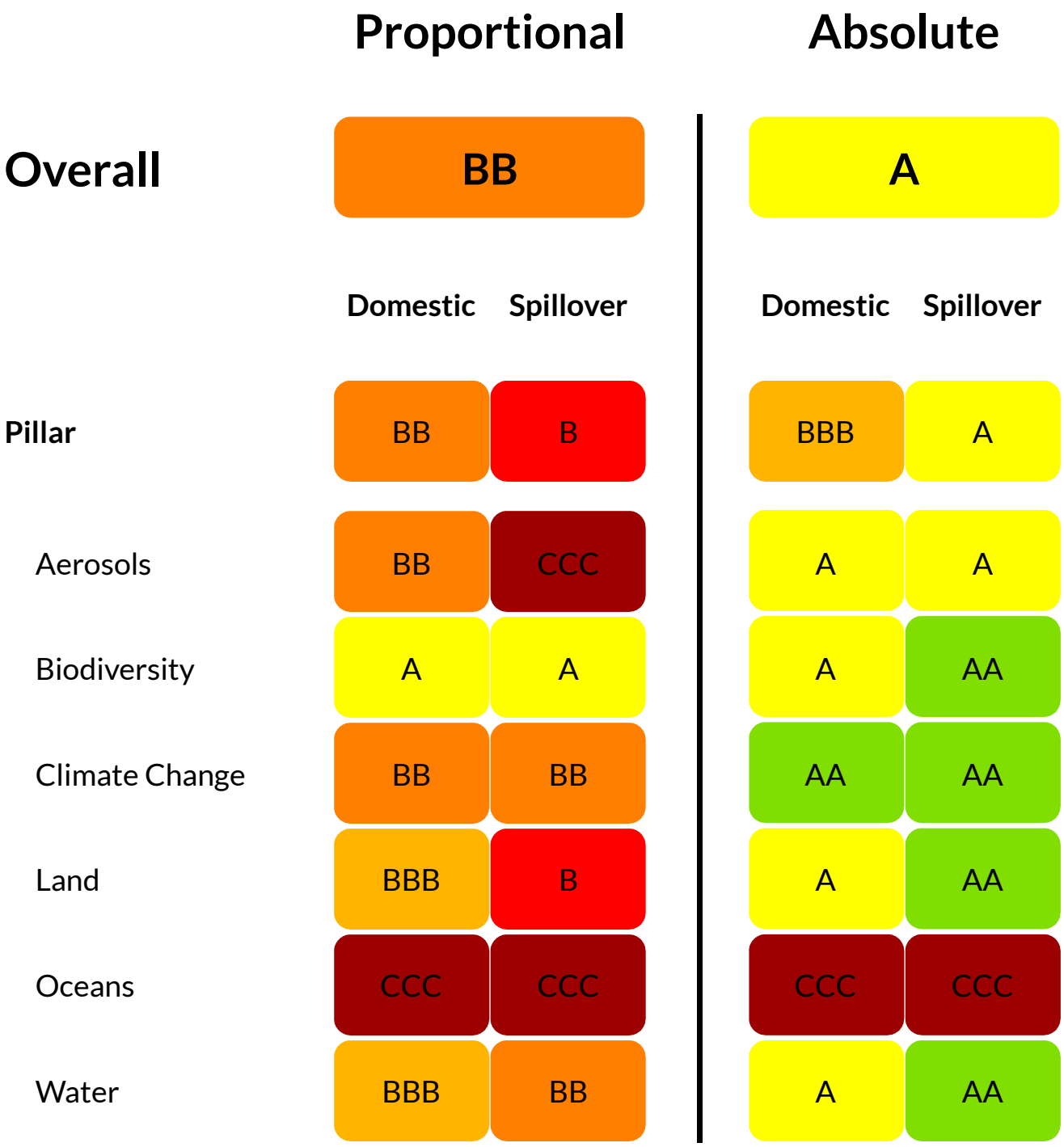
		Proportional		Absolute			
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	17.41	CCC	Gg	552.31	CCC	2015
NO_X emissions, spillover	kg/capita	3.70	BB	Gg	117.42	BBB	2015
SO_2 emissions, domestic	kg/capita	72.38	BB	Gg	2,295.58	CCC	2015
SO_2 emissions, spillover	kg/capita	17.31	BB	Gg	549.15	BB	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	87.94	CCC	$\mu g/m^3$	87.94	CCC	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	0.55	AA	spp.	18.68	AA	2018
Terrestrial spp. threatened, spillover	spp./million	1.58	BB	spp.	53.39	BB	2018
Freshwater spp. threatened, domestic	spp./million	0.12	AA	spp.	4.07	AA	2018
Freshwater spp. threatened, spillover	spp./million	0.23	BBB	spp.	7.63	BB	2018
Marine spp. threatened, domestic	spp./million	1.16	A	spp.	39.08	BB	2018
Marine spp. threatened, spillover	spp./million	0.52	BBB	spp.	17.61	CCC	2018
Red List Index	unitless	0.91	BBB	unitless	0.91	BBB	2019
Unprotected terrestrial sites	%	78.02	CCC	%	78.02	CCC	2019
Unprotected freshwater sites	%	82.32	CCC	%	82.32	CCC	2019
Unprotected marine sites	%	74.69	CCC	%	74.69	CCC	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	22.90	CCC	Pg CO_2e	0.71	CCC	2014
GHG emissions, spillover	t CO_2e/capita	4.70	B	Pg CO_2e	0.14	BBB	2014
Black carbon emissions	kg/capita	0.54	B	Gg	14.69	AA	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.20	AA	t CO_2/capita	0.21	AA	2018
Land							
NH_3 emissions, domestic	kg/capita	2.11	AA	Tg	66.89	AA	2015
NH_3 emissions, spillover	kg/capita	5.19	CCC	kg	164.48	B	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.60	B	unitless	0.60	B	2015
Non-Recycled Waste	kg/capita/day	na	na	Gg	na	na	na
Deforestation	%	na	na	10^3 hectares	na	na	2018
Human Trophic Level	unitless	2.29	BBB	unitless	2.29	BBB	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	20.36	B	%	20.36	B	2014
Fish caught by trawling	%	20.89	BB	%	20.89	BB	2014
Ocean Health Index: Clean Waters	unitless	62.52	B	unitless	62.52	B	2019
Water							
Untreated wastewater	%	88.25	CCC	%	88.25	CCC	2018
Nitrogen emissions, domestic	kg/capita	2.70	AA	Tg	0.09	AA	2015
Nitrogen emissions, spillover	kg/capita	9.06	B	Gg	287.34	BBB	2015
Scarce water consumption, domestic	10^3 m^3/capita	233.70	CCC	10^9 m^3	7,411.05	CCC	2015
Scarce water consumption, spillover	10^3 m^3/capita	17.80	CCC	10^9 m^3	564.36	CCC	2015
Water stress	%	883.33	CCC	10^9 m^3	21.20	BBB	2017

Slovakia

OECD

Population [millions]	5.5	**GDP** [$, billions]	164.6
Land area [km^2, thousands]	49.1	**GDP** per capita	30,155

Country ratings on impacts to Global Commons



Slovakia

OECD

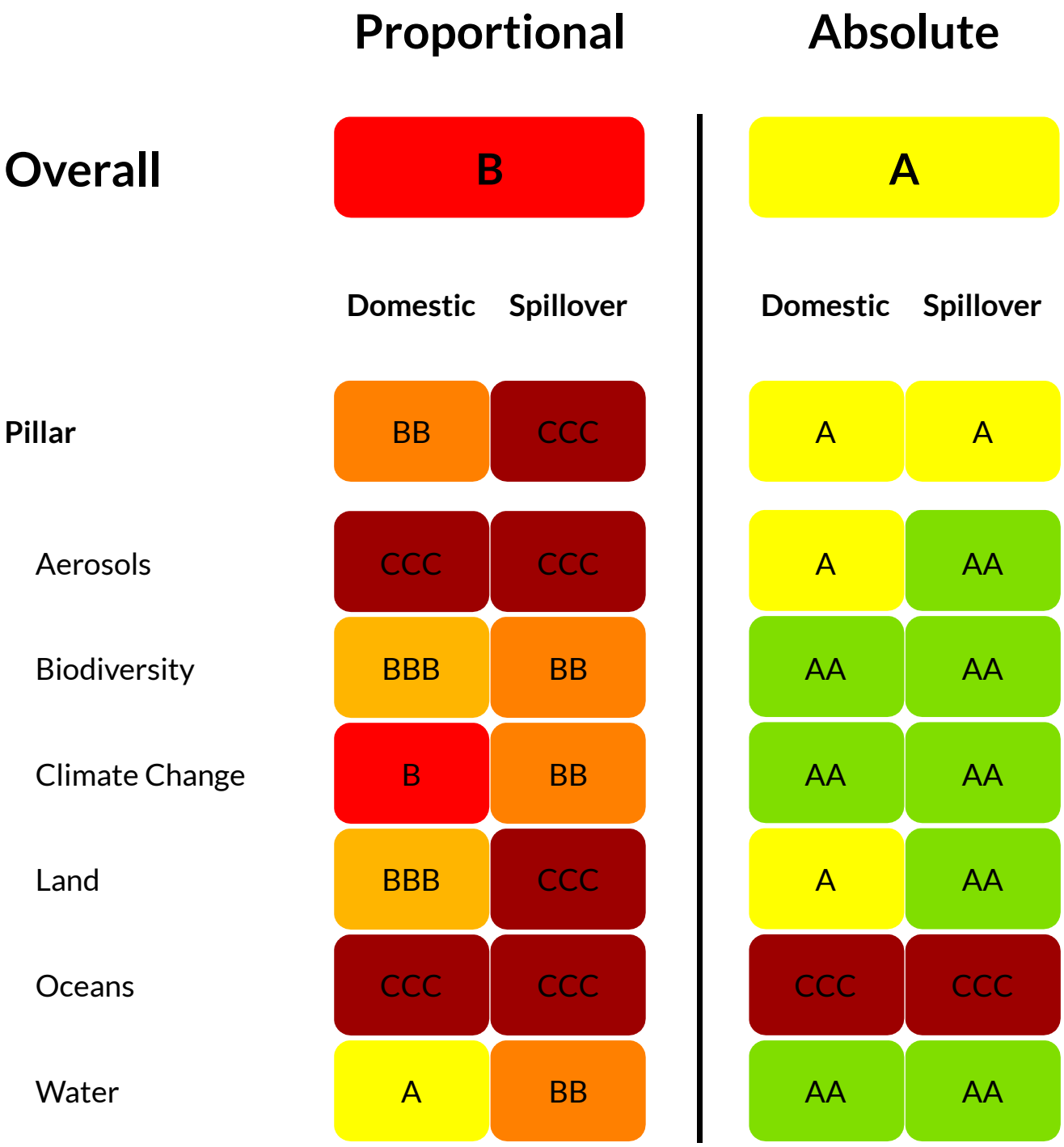
		Proportional		Absolute			
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	6.52	BB	Gg	35.45	AA	2015
NO_X emissions, spillover	kg/capita	9.49	CCC	Gg	51.61	A	2015
SO_2 emissions, domestic	kg/capita	74.22	BB	Gg	403.46	A	2015
SO_2 emissions, spillover	kg/capita	34.62	CCC	Gg	188.18	A	2015
$PM_{2.5}$ concentration	µg/m³	17.56	BB	µg/m³	17.56	BB	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	1.24	AA	spp.	6.76	AA	2018
Terrestrial spp. threatened, spillover	spp./million	1.17	BBB	spp.	6.38	AA	2018
Freshwater spp. threatened, domestic	spp./million	0.27	AA	spp.	1.47	AA	2018
Freshwater spp. threatened, spillover	spp./million	0.23	BBB	spp.	1.27	AA	2018
Marine spp. threatened, domestic	spp./million	0.00	AAA	spp.	0.00	AAA	2018
Marine spp. threatened, spillover	spp./million	0.12	AA	spp.	0.66	AA	2018
Red List Index	unitless	0.96	A	unitless	0.96	A	2019
Unprotected terrestrial sites	%	14.21	BBB	%	14.21	BBB	2019
Unprotected freshwater sites	%	13.73	BBB	%	13.73	BBB	2019
Unprotected marine sites	%	na	na	%	na	na	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	7.90	BB	Pg CO_2e	0.04	AA	2014
GHG emissions, spillover	t CO_2e/capita	7.20	CCC	Pg CO_2e	0.04	AA	2014
Black carbon emissions	kg/capita	0.28	BBB	Gg	1.52	AA	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.10	AA	t CO_2/capita	0.06	AA	2018
Land							
NH_3 emissions, domestic	kg/capita	5.30	BBB	Tg	28.80	AA	2015
NH_3 emissions, spillover	kg/capita	4.69	B	kg	25.50	AA	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.45	BB	unitless	0.45	BB	2015
Non-Recycled Waste	kg/capita/day	0.72	B	Gg	3.93	AA	2018
Deforestation	%	0.00	AA	10^3 hectares	0.05	AA	2018
Human Trophic Level	unitless	2.40	B	unitless	2.40	B	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	na	na	%	na	na	2014
Fish caught by trawling	%	na	na	%	na	na	2014
Ocean Health Index: Clean Waters	unitless	na	na	unitless	na	na	2019
Water							
Untreated wastewater	%	56.32	CCC	%	56.32	CCC	2018
Nitrogen emissions, domestic	kg/capita	10.38	BB	Tg	0.06	AA	2015
Nitrogen emissions, spillover	kg/capita	8.01	B	Gg	43.56	AA	2015
Scarce water consumption, domestic	10^3 m³/capita	0.00	AA	10^9 m³	0.24	AA	2015
Scarce water consumption, spillover	10^3 m³/capita	2.80	BB	10^9 m³	15.32	AA	2015
Water stress	%	2.39	AA	10^9 m³	0.56	AA	2017

Slovenia

OECD

Population [millions]	2.1	**GDP** [$, billions]	65.3
Land area [km^2, thousands]	20.3	**GDP** per capita	31,401

Country ratings on impacts to Global Commons



Slovenia

OECD

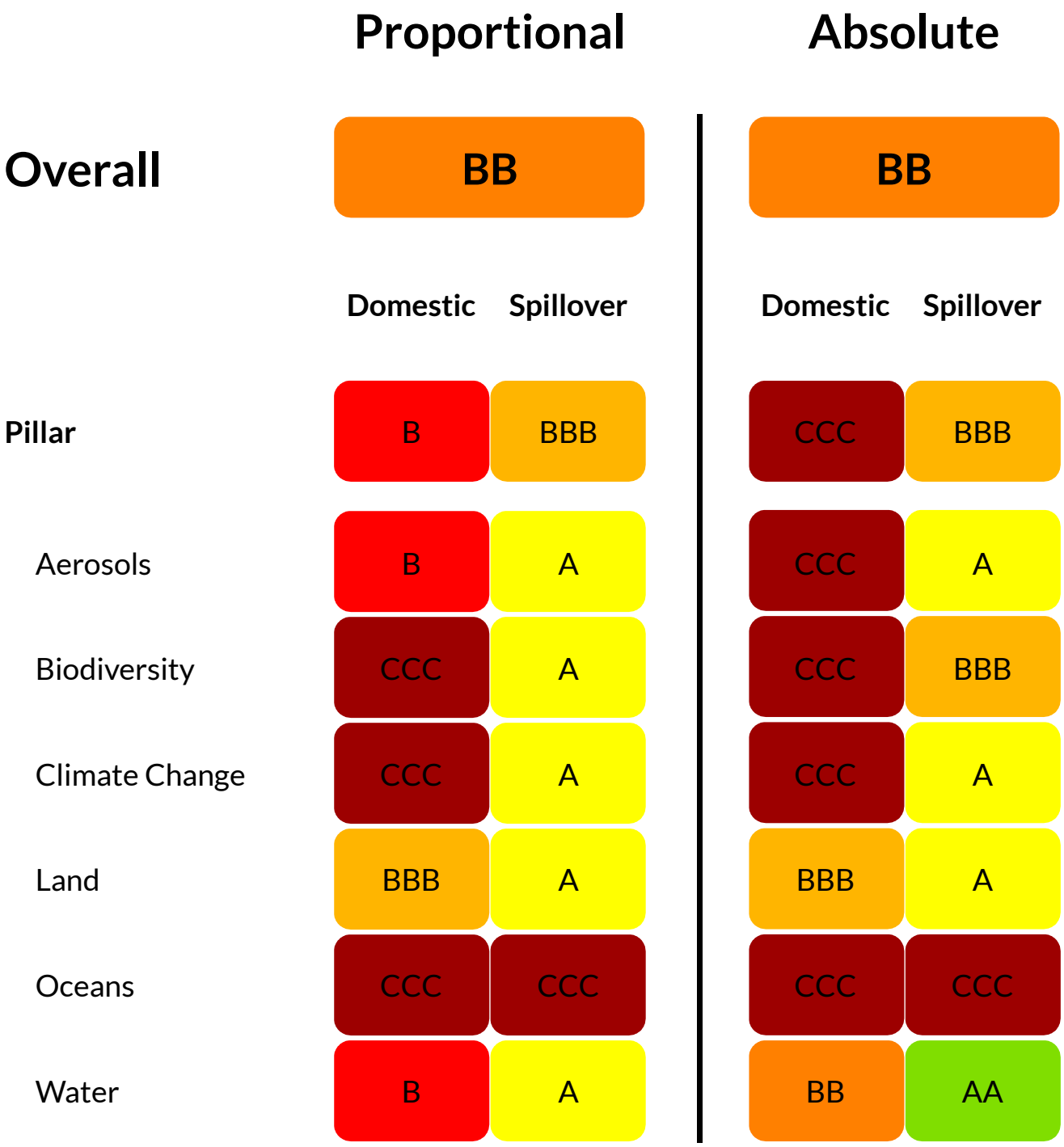
		Proportional		Absolute			
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	8.13	B	Gg	16.84	AA	2015
NO_X emissions, spillover	kg/capita	4.38	B	Gg	9.08	AA	2015
SO_2 emissions, domestic	kg/capita	168.02	CCC	Gg	348.00	AA	2015
SO_2 emissions, spillover	kg/capita	28.13	CCC	Gg	58.25	AA	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	16.02	BB	$\mu g/m^3$	16.02	BB	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	2.72	AA	spp.	5.66	AA	2018
Terrestrial spp. threatened, spillover	spp./million	1.61	BB	spp.	3.34	AA	2018
Freshwater spp. threatened, domestic	spp./million	9.16	CCC	spp.	19.03	AA	2018
Freshwater spp. threatened, spillover	spp./million	0.56	CCC	spp.	1.17	AA	2018
Marine spp. threatened, domestic	spp./million	0.03	AA	spp.	0.06	AA	2018
Marine spp. threatened, spillover	spp./million	0.08	AA	spp.	0.16	AA	2018
Red List Index	unitless	0.94	A	unitless	0.94	A	2019
Unprotected terrestrial sites	%	11.30	A	%	11.30	A	2019
Unprotected freshwater sites	%	6.95	A	%	6.95	A	2019
Unprotected marine sites	%	2.09	AA	%	2.09	AA	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	9.70	B	Pg CO_2e	0.02	AA	2014
GHG emissions, spillover	t CO_2e/capita	6.10	CCC	Pg CO_2e	0.01	AA	2014
Black carbon emissions	kg/capita	0.70	CCC	Gg	1.42	AA	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.10	AA	t CO_2/capita	0.05	AA	2018
Land							
NH_3 emissions, domestic	kg/capita	5.17	BBB	Tg	10.72	AA	2015
NH_3 emissions, spillover	kg/capita	5.53	CCC	kg	11.46	AA	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.73	CCC	unitless	0.73	CCC	2015
Non-Recycled Waste	kg/capita/day	0.34	BBB	Gg	0.70	AA	2018
Deforestation	%	0.00	AAA	10^3 hectares	0.00	AAA	2018
Human Trophic Level	unitless	2.40	B	unitless	2.40	B	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	na	na	%	na	na	2014
Fish caught by trawling	%	31.17	CCC	%	31.17	CCC	2014
Ocean Health Index: Clean Waters	unitless	28.35	CCC	unitless	28.35	CCC	2019
Water							
Untreated wastewater	%	10.91	A	%	10.91	A	2018
Nitrogen emissions, domestic	kg/capita	7.47	BBB	Tg	0.02	AA	2015
Nitrogen emissions, spillover	kg/capita	8.86	B	Gg	18.35	AA	2015
Scarce water consumption, domestic	10^3 m^3/capita	0.10	AA	10^9 m^3	0.18	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	3.10	BB	10^9 m^3	6.43	AA	2015
Water stress	%	6.30	AA	10^9 m^3	0.93	AA	2017

South Africa

Africa

Population [millions]	59.3	**GDP** [$, billions]	440.9
Land area [km^2, thousands]	1,224.5	**GDP** per capita	7,434

Country ratings on impacts to Global Commons



South Africa

Africa

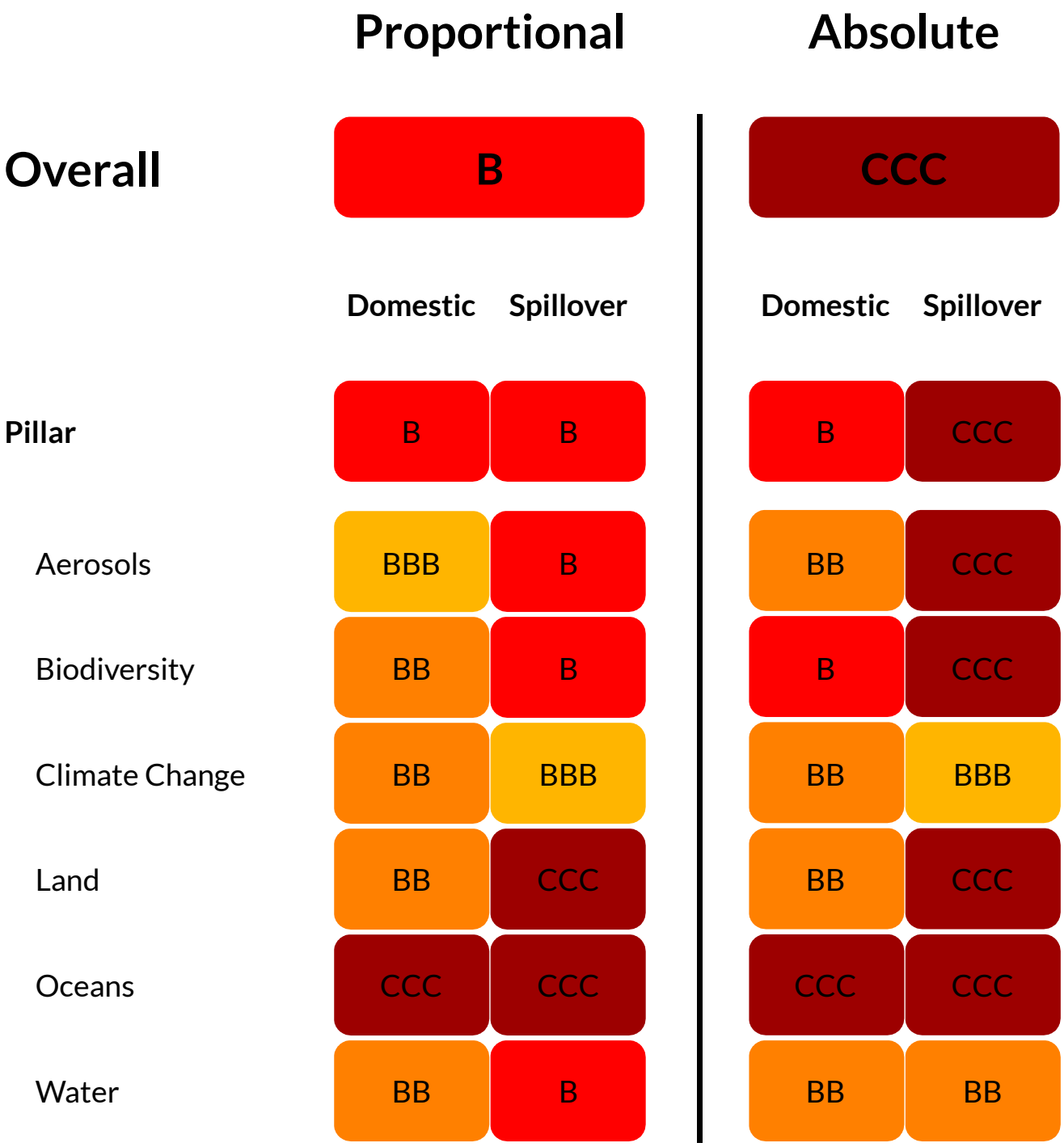
		Proportional			Absolute		
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	9.23	B	Gg	511.00	CCC	2015
NO_X emissions, spillover	kg/capita	1.36	A	Gg	75.37	A	2015
SO_2 emissions, domestic	kg/capita	49.60	BBB	Gg	2,747.04	CCC	2015
SO_2 emissions, spillover	kg/capita	5.70	A	Gg	315.48	A	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	25.10	CCC	$\mu g/m^3$	25.10	CCC	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	5.85	A	spp.	337.97	BB	2018
Terrestrial spp. threatened, spillover	spp./million	0.65	A	spp.	37.29	BBB	2018
Freshwater spp. threatened, domestic	spp./million	1.04	A	spp.	59.87	BBB	2018
Freshwater spp. threatened, spillover	spp./million	0.20	A	spp.	11.44	B	2018
Marine spp. threatened, domestic	spp./million	1.39	A	spp.	80.51	CCC	2018
Marine spp. threatened, spillover	spp./million	0.08	AA	spp.	4.65	A	2018
Red List Index	unitless	0.77	CCC	unitless	0.77	CCC	2019
Unprotected terrestrial sites	%	67.49	CCC	%	67.49	CCC	2019
Unprotected freshwater sites	%	63.67	CCC	%	63.67	CCC	2019
Unprotected marine sites	%	53.45	CCC	%	53.45	CCC	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	10.00	B	Pg CO_2e	0.55	CCC	2014
GHG emissions, spillover	t CO_2e/capita	1.20	A	Pg CO_2e	0.07	A	2014
Black carbon emissions	kg/capita	0.86	CCC	Gg	44.45	BBB	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	1.70	AA	t CO_2/capita	1.69	AA	2018
Land							
NH_3 emissions, domestic	kg/capita	6.09	BBB	Tg	337.29	BB	2015
NH_3 emissions, spillover	kg/capita	1.43	A	kg	79.14	A	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.55	BB	unitless	0.55	BB	2015
Non-Recycled Waste	kg/capita/day	na	na	Gg	na	na	na
Deforestation	%	0.14	AA	10^3 hectares	7.12	AA	2018
Human Trophic Level	unitless	2.26	BBB	unitless	2.26	BBB	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	33.60	CCC	%	33.60	CCC	2014
Fish caught by trawling	%	23.62	BB	%	23.62	BB	2014
Ocean Health Index: Clean Waters	unitless	55.58	CCC	unitless	55.58	CCC	2019
Water							
Untreated wastewater	%	78.34	CCC	%	78.34	CCC	2018
Nitrogen emissions, domestic	kg/capita	9.07	BB	Tg	0.50	BB	2015
Nitrogen emissions, spillover	kg/capita	2.23	A	Gg	123.60	A	2015
Scarce water consumption, domestic	10^3 m^3/capita	4.40	A	10^9 m^3	242.73	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	1.00	A	10^9 m^3	57.88	AA	2015
Water stress	%	62.06	CCC	10^9 m^3	19.38	A	2017

Spain

OECD

Population [millions]	46.8	**GDP** [$, billions]	1,540.6
Land area [km^2, thousands]	506.6	**GDP** per capita	32,950

Country ratings on impacts to Global Commons



Spain

OECD

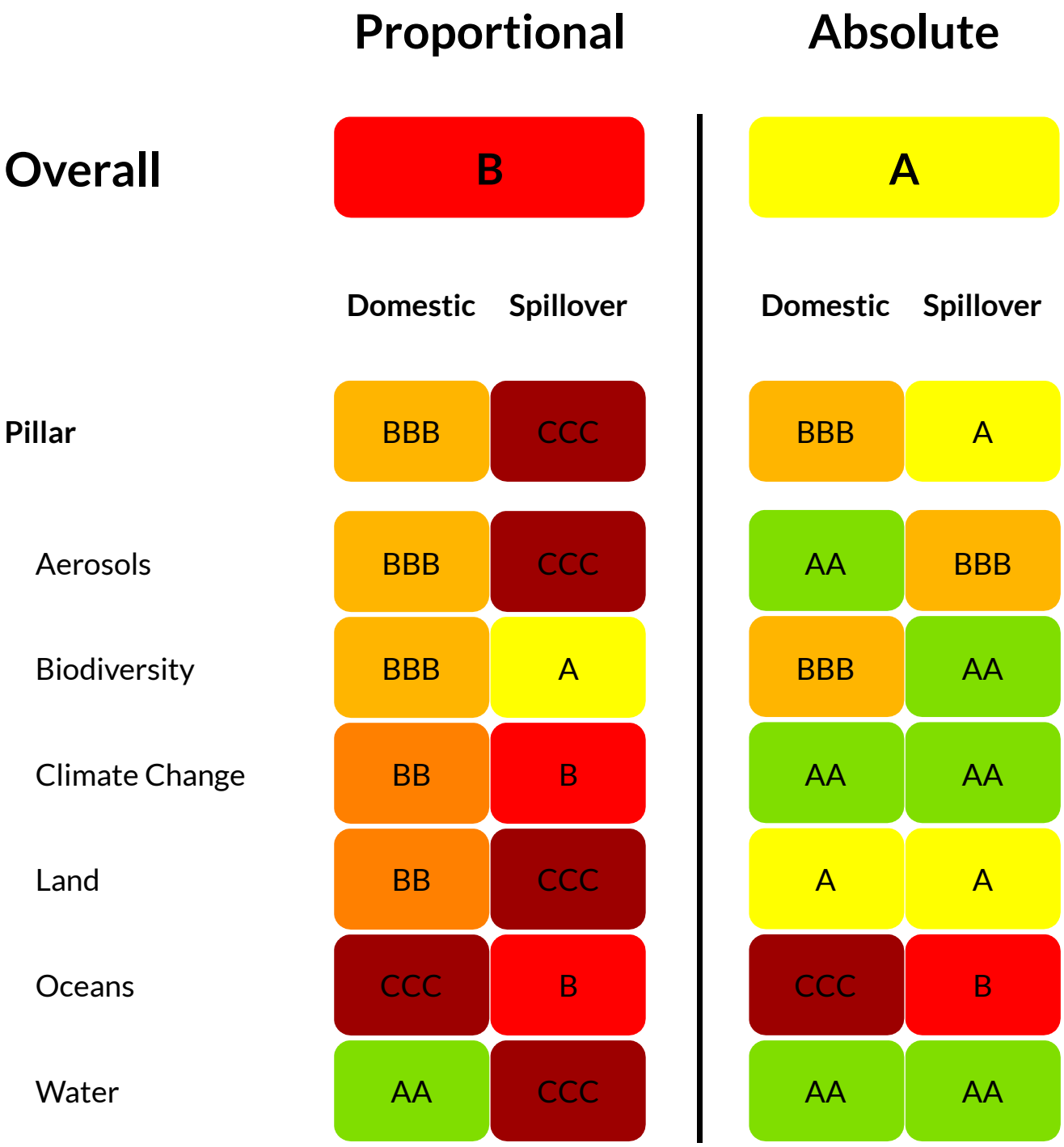
		Proportional			Absolute		
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	9.07	B	Gg	423.55	CCC	2015
NO_X emissions, spillover	kg/capita	4.08	B	Gg	190.47	B	2015
SO_2 emissions, domestic	kg/capita	26.74	A	Gg	1,247.79	BB	2015
SO_2 emissions, spillover	kg/capita	20.68	B	Gg	965.09	CCC	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	9.70	A	$\mu g/m^3$	9.70	A	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	11.58	BBB	spp.	540.55	CCC	2018
Terrestrial spp. threatened, spillover	spp./million	3.15	CCC	spp.	147.21	CCC	2018
Freshwater spp. threatened, domestic	spp./million	1.46	A	spp.	68.30	BB	2018
Freshwater spp. threatened, spillover	spp./million	0.49	B	spp.	22.77	CCC	2018
Marine spp. threatened, domestic	spp./million	0.68	AA	spp.	31.53	BBB	2018
Marine spp. threatened, spillover	spp./million	0.64	BB	spp.	29.79	CCC	2018
Red List Index	unitless	0.84	B	unitless	0.84	B	2019
Unprotected terrestrial sites	%	42.41	CCC	%	42.41	CCC	2019
Unprotected freshwater sites	%	51.60	CCC	%	51.60	CCC	2019
Unprotected marine sites	%	15.88	BBB	%	15.88	BBB	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	6.60	BB	Pg CO_2e	0.31	BB	2014
GHG emissions, spillover	t CO_2e/capita	5.50	CCC	Pg CO_2e	0.26	CCC	2014
Black carbon emissions	kg/capita	0.51	B	Gg	23.68	A	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.00	AA	t CO_2/capita	0.02	AA	2018
Land							
NH_3 emissions, domestic	kg/capita	9.59	BB	Tg	447.36	CCC	2015
NH_3 emissions, spillover	kg/capita	5.90	CCC	kg	275.24	CCC	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.83	CCC	unitless	0.83	CCC	2015
Non-Recycled Waste	kg/capita/day	0.83	CCC	Gg	38.97	BBB	2018
Deforestation	%	0.01	AA	10^3 hectares	0.70	AA	2018
Human Trophic Level	unitless	2.42	B	unitless	2.42	B	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	35.51	CCC	%	35.51	CCC	2014
Fish caught by trawling	%	50.27	CCC	%	50.27	CCC	2014
Ocean Health Index: Clean Waters	unitless	48.64	CCC	unitless	48.64	CCC	2019
Water							
Untreated wastewater	%	8.49	AA	%	8.49	AA	2018
Nitrogen emissions, domestic	kg/capita	18.81	CCC	Tg	0.88	CCC	2015
Nitrogen emissions, spillover	kg/capita	9.07	B	Gg	423.29	BB	2015
Scarce water consumption, domestic	10^3 m^3/capita	9.60	BBB	10^9 m^3	447.94	A	2015
Scarce water consumption, spillover	10^3 m^3/capita	4.50	CCC	10^9 m^3	210.82	BB	2015
Water stress	%	42.56	B	10^9 m^3	31.22	BB	2016

Sweden

OECD

Population [millions]	10.1	**GDP** [$, billions]	474.2
Land area [km^2, thousands]	448.2	**GDP** per capita	46,949

Country ratings on impacts to Global Commons



Sweden

OECD

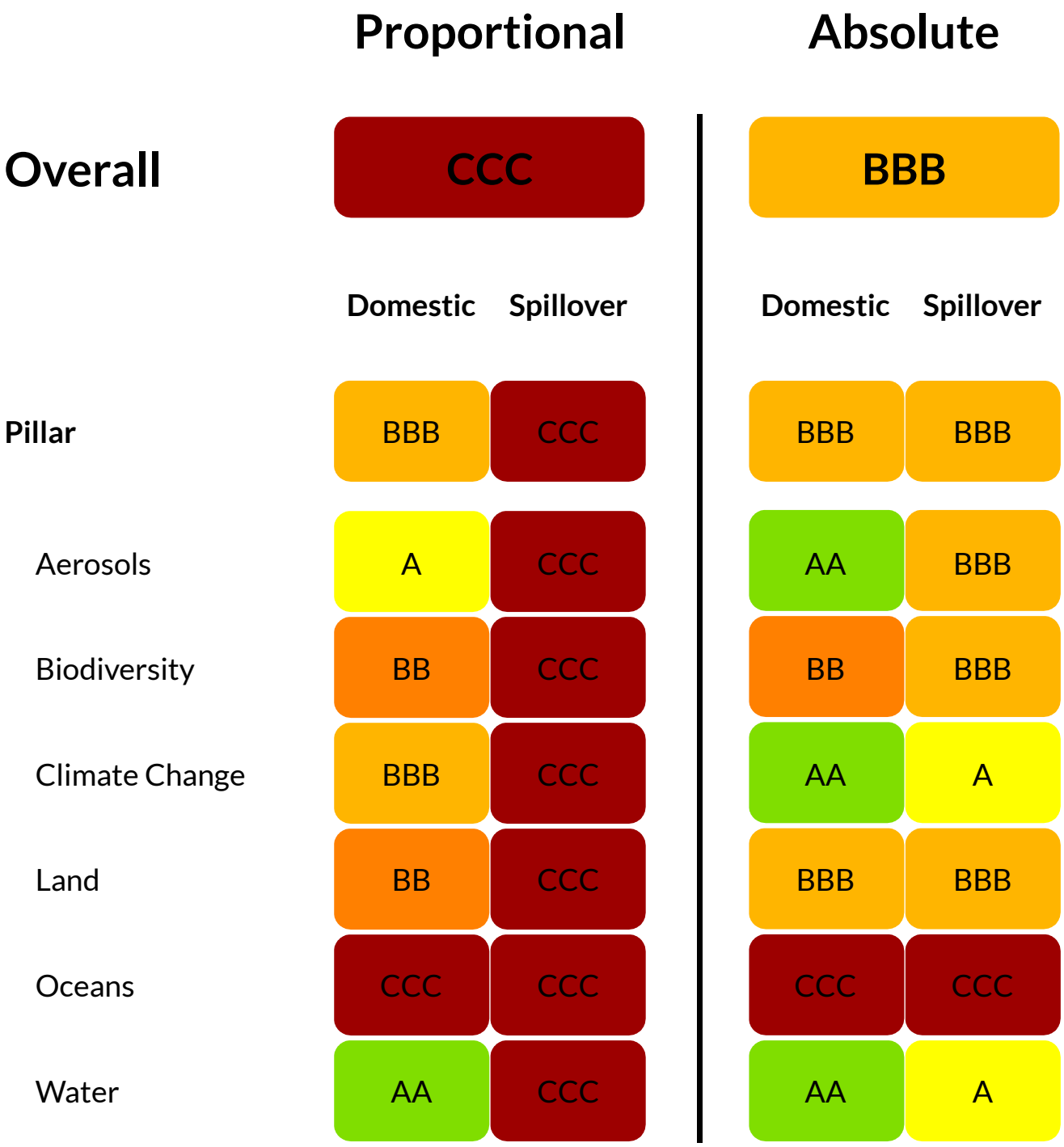
		Proportional			Absolute		
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	8.11	B	Gg	79.19	A	2015
NO_X emissions, spillover	kg/capita	7.28	CCC	Gg	71.11	A	2015
SO_2 emissions, domestic	kg/capita	46.34	BBB	Gg	452.54	A	2015
SO_2 emissions, spillover	kg/capita	42.18	CCC	Gg	411.88	BBB	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	6.18	AA	$\mu g/m^3$	6.18	AA	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	0.89	AA	spp.	8.89	AA	2018
Terrestrial spp. threatened, spillover	spp./million	1.41	BBB	spp.	14.10	AA	2018
Freshwater spp. threatened, domestic	spp./million	0.13	AA	spp.	1.27	AA	2018
Freshwater spp. threatened, spillover	spp./million	0.15	A	spp.	1.50	AA	2018
Marine spp. threatened, domestic	spp./million	0.12	AA	spp.	1.19	AA	2018
Marine spp. threatened, spillover	spp./million	0.08	AA	spp.	0.82	AA	2018
Red List Index	unitless	0.99	AA	unitless	0.99	AA	2019
Unprotected terrestrial sites	%	40.97	CCC	%	40.97	CCC	2019
Unprotected freshwater sites	%	41.80	CCC	%	41.80	CCC	2019
Unprotected marine sites	%	38.83	CCC	%	38.83	CCC	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	6.10	BB	Pg CO_2e	0.06	AA	2014
GHG emissions, spillover	t CO_2e/capita	8.30	CCC	Pg CO_2e	0.08	A	2014
Black carbon emissions	kg/capita	0.38	BB	Gg	3.61	AA	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.00	AA	t CO_2/capita	0.00	AA	2019
Land							
NH_3 emissions, domestic	kg/capita	5.85	BBB	Tg	57.08	AA	2015
NH_3 emissions, spillover	kg/capita	6.70	CCC	kg	65.44	A	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.49	BB	unitless	0.49	BB	2015
Non-Recycled Waste	kg/capita/day	0.66	B	Gg	6.55	AA	2018
Deforestation	%	0.00	AA	10^3 hectares	0.29	AA	2018
Human Trophic Level	unitless	2.53	CCC	unitless	2.53	CCC	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	41.35	CCC	%	41.35	CCC	2014
Fish caught by trawling	%	19.32	BB	%	19.32	BB	2014
Ocean Health Index: Clean Waters	unitless	63.38	B	unitless	63.38	B	2019
Water							
Untreated wastewater	%	0.00	AAA	%	0.00	AAA	2018
Nitrogen emissions, domestic	kg/capita	8.73	BBB	Tg	0.09	AA	2015
Nitrogen emissions, spillover	kg/capita	10.98	CCC	Gg	107.19	AA	2015
Scarce water consumption, domestic	10^3 m^3/capita	0.00	AA	10^9 m^3	0.27	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	4.60	CCC	10^9 m^3	44.90	AA	2015
Water stress	%	3.43	AA	10^9 m^3	2.38	AA	2015

Switzerland

OECD

Population [millions]	8.7	**GDP** [$, billions]	496.9
Land area [km^2, thousands]	41.7	**GDP** per capita	57,410

Country ratings on impacts to Global Commons



Switzerland

OECD

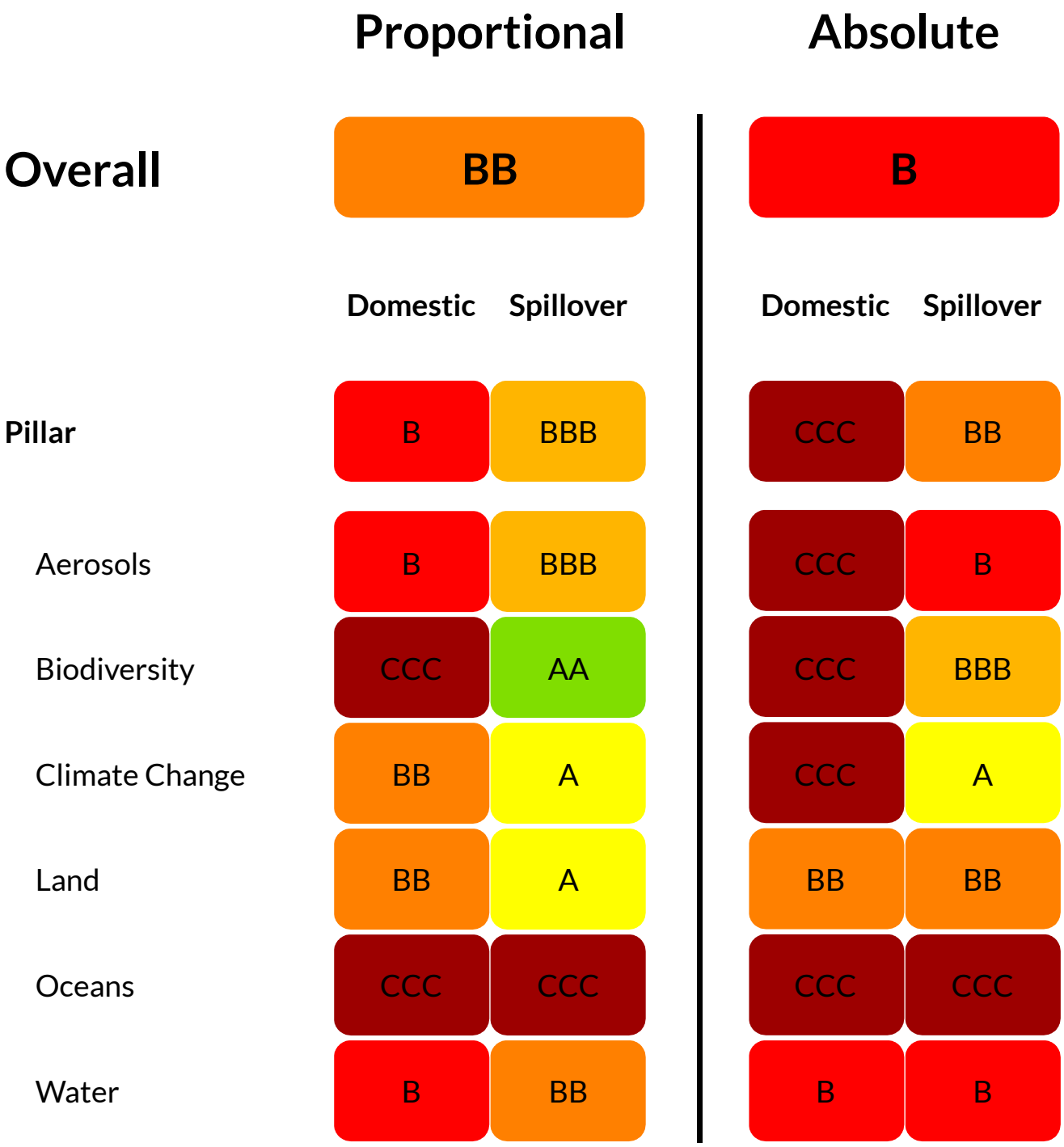
		Proportional			Absolute		
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	3.56	A	Gg	29.52	AA	2015
NO_X emissions, spillover	kg/capita	11.06	CCC	Gg	91.75	BBB	2015
SO_2 emissions, domestic	kg/capita	35.15	A	Gg	291.63	AA	2015
SO_2 emissions, spillover	kg/capita	51.98	CCC	Gg	431.25	BBB	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	10.30	A	$\mu g/m^3$	10.30	A	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	0.69	AA	spp.	5.86	AA	2018
Terrestrial spp. threatened, spillover	spp./million	5.12	CCC	spp.	43.68	BBB	2018
Freshwater spp. threatened, domestic	spp./million	0.38	AA	spp.	3.22	AA	2018
Freshwater spp. threatened, spillover	spp./million	0.67	CCC	spp.	5.72	BBB	2018
Marine spp. threatened, domestic	spp./million	0.00	AA	spp.	0.01	AA	2018
Marine spp. threatened, spillover	spp./million	0.54	BBB	spp.	4.59	A	2018
Red List Index	unitless	0.97	AA	unitless	0.97	AA	2019
Unprotected terrestrial sites	%	64.52	CCC	%	64.52	CCC	2019
Unprotected freshwater sites	%	39.79	CCC	%	39.79	CCC	2019
Unprotected marine sites	%	na	na	%	na	na	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	5.80	BBB	Pg CO_2e	0.05	AA	2014
GHG emissions, spillover	t CO_2e/capita	12.40	CCC	Pg CO_2e	0.10	BBB	2014
Black carbon emissions	kg/capita	0.32	BBB	Gg	2.49	AA	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.00	AA	t CO_2/capita	0.00	AA	2019
Land							
NH_3 emissions, domestic	kg/capita	4.36	A	Tg	36.21	AA	2015
NH_3 emissions, spillover	kg/capita	12.79	CCC	kg	106.16	BBB	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.69	B	unitless	0.69	B	2015
Non-Recycled Waste	kg/capita/day	0.92	CCC	Gg	7.82	AA	2018
Deforestation	%	0.01	AA	10^3 hectares	0.18	AA	2018
Human Trophic Level	unitless	2.47	B	unitless	2.47	B	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	na	na	%	na	na	2014
Fish caught by trawling	%	na	na	%	na	na	2014
Ocean Health Index: Clean Waters	unitless	na	na	unitless	na	na	2019
Water							
Untreated wastewater	%	3.29	AA	%	3.29	AA	2018
Nitrogen emissions, domestic	kg/capita	4.67	A	Tg	0.04	AA	2015
Nitrogen emissions, spillover	kg/capita	20.99	CCC	Gg	174.12	A	2015
Scarce water consumption, domestic	10^3 m^3/capita	0.10	AA	10^9 m^3	0.60	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	9.00	CCC	10^9 m^3	75.07	A	2015
Water stress	%	7.65	AA	10^9 m^3	2.00	AA	2012

Turkey

OECD

Population [millions]	84.3	**GDP** [$, billions]	1,270.9
Land area [km^2, thousands]	781.8	**GDP** per capita	15,069

Country ratings on impacts to Global Commons



Turkey

OECD

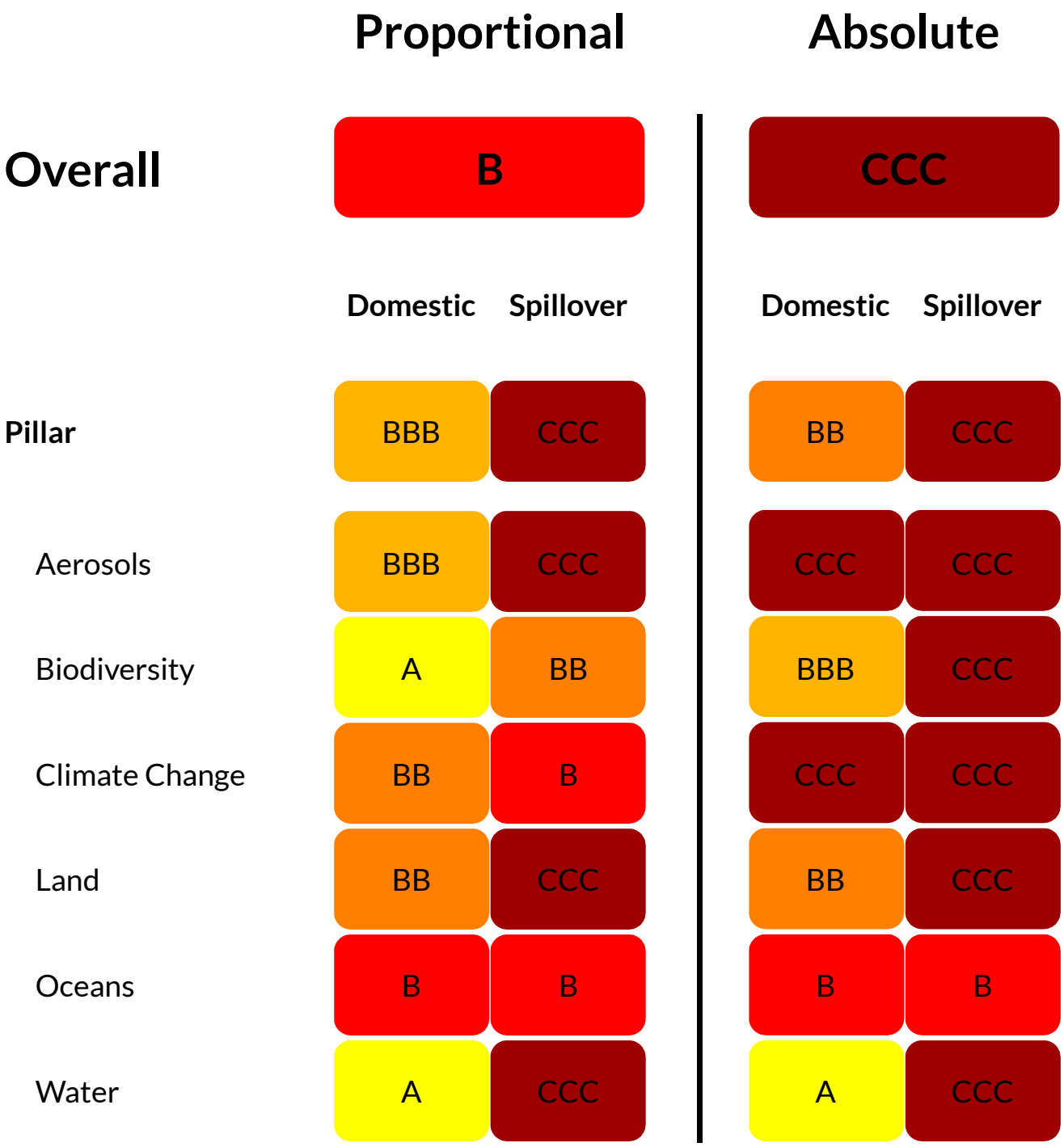
		Proportional			Absolute		
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	4.04	BBB	Gg	317.54	B	2015
NO_X emissions, spillover	kg/capita	2.13	BBB	Gg	167.06	B	2015
SO_2 emissions, domestic	kg/capita	21.42	A	Gg	1,682.37	B	2015
SO_2 emissions, spillover	kg/capita	10.00	BBB	Gg	785.66	B	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	44.31	CCC	$\mu g/m^3$	44.31	CCC	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	3.17	AA	spp.	261.11	BBB	2018
Terrestrial spp. threatened, spillover	spp./million	0.58	A	spp.	47.68	BB	2018
Freshwater spp. threatened, domestic	spp./million	1.41	A	spp.	115.92	CCC	2018
Freshwater spp. threatened, spillover	spp./million	0.10	AA	spp.	7.87	BB	2018
Marine spp. threatened, domestic	spp./million	0.17	AA	spp.	13.62	A	2018
Marine spp. threatened, spillover	spp./million	0.01	AA	spp.	0.98	AA	2018
Red List Index	unitless	0.88	BB	unitless	0.88	BB	2019
Unprotected terrestrial sites	%	97.66	CCC	%	97.66	CCC	2019
Unprotected freshwater sites	%	95.71	CCC	%	95.71	CCC	2019
Unprotected marine sites	%	96.21	CCC	%	96.21	CCC	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	6.40	BB	Pg CO_2e	0.49	CCC	2014
GHG emissions, spillover	t CO_2e/capita	2.10	BBB	Pg CO_2e	0.16	BB	2014
Black carbon emissions	kg/capita	0.50	B	Gg	36.27	BBB	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.00	AA	t CO_2/capita	0.00	AA	2018
Land							
NH_3 emissions, domestic	kg/capita	5.43	BBB	Tg	426.61	CCC	2015
NH_3 emissions, spillover	kg/capita	1.57	A	kg	123.66	BB	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.62	B	unitless	0.62	B	2015
Non-Recycled Waste	kg/capita/day	1.01	CCC	Gg	82.95	CCC	2018
Deforestation	%	0.03	AA	10^3 hectares	3.14	AA	2018
Human Trophic Level	unitless	2.25	BBB	unitless	2.25	BBB	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	61.58	CCC	%	61.58	CCC	2014
Fish caught by trawling	%	23.15	BB	%	23.15	BB	2014
Ocean Health Index: Clean Waters	unitless	50.47	CCC	unitless	50.47	CCC	2019
Water							
Untreated wastewater	%	69.60	CCC	%	69.60	CCC	2018
Nitrogen emissions, domestic	kg/capita	9.81	BB	Tg	0.77	CCC	2015
Nitrogen emissions, spillover	kg/capita	2.68	A	Gg	210.54	A	2015
Scarce water consumption, domestic	10^3 m^3/capita	5.20	A	10^9 m^3	407.81	A	2015
Scarce water consumption, spillover	10^3 m^3/capita	5.00	CCC	10^9 m^3	391.57	CCC	2015
Water stress	%	43.65	B	10^9 m^3	58.76	CCC	2017

United Kingdom

OECD

Population [millions]	67.9	**GDP** [$, billions]	2,941.2
Land area [km^2, thousands]	243.7	**GDP** per capita	43,325

Country ratings on impacts to Global Commons



United Kingdom

OECD

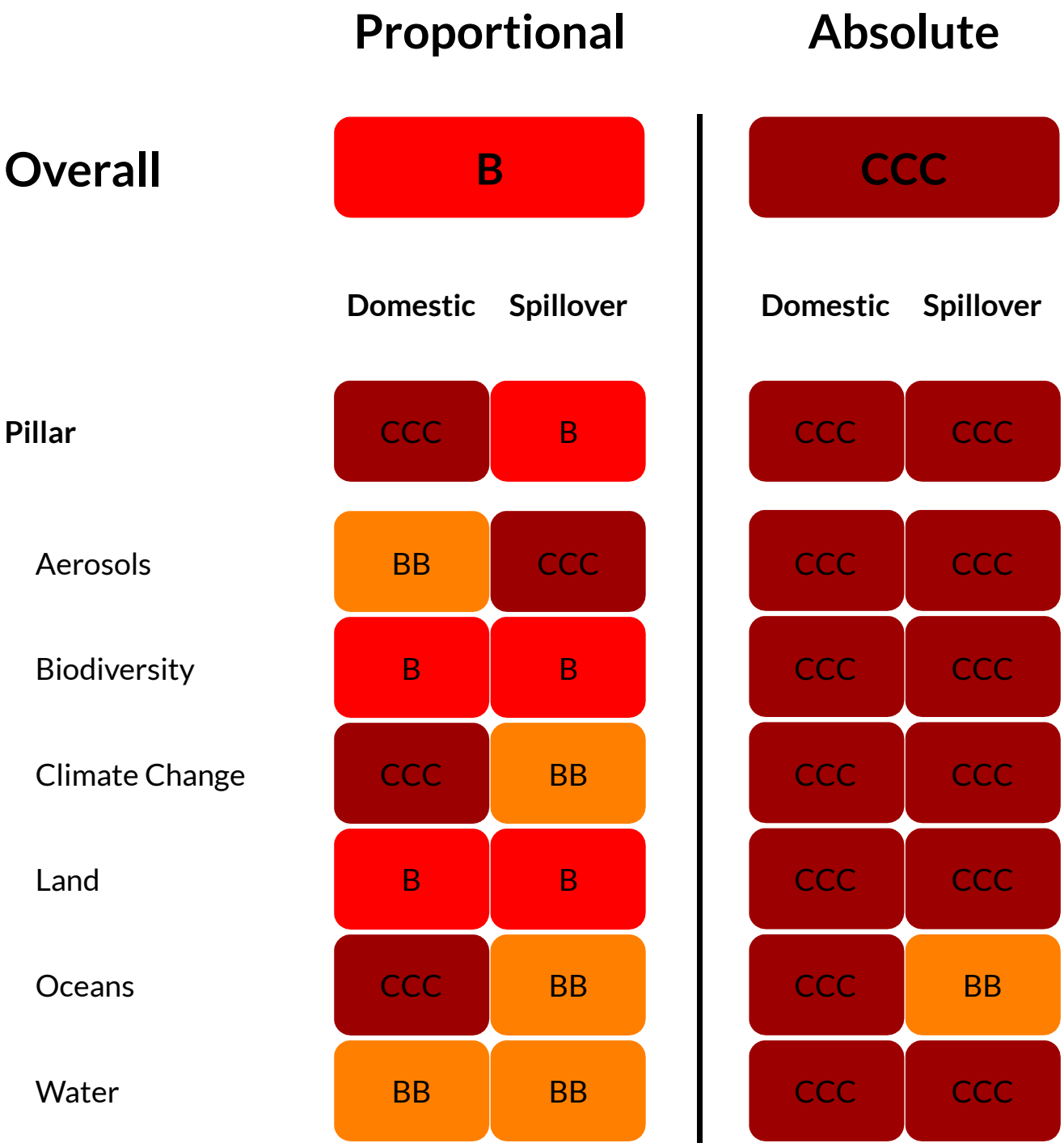
		Proportional		Absolute			
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	7.88	BB	Gg	519.24	CCC	2015
NO_X emissions, spillover	kg/capita	6.40	CCC	Gg	421.42	CCC	2015
SO_2 emissions, domestic	kg/capita	47.14	BBB	Gg	3,104.45	CCC	2015
SO_2 emissions, spillover	kg/capita	30.08	CCC	Gg	1,980.90	CCC	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	10.47	A	$\mu g/m^3$	10.47	A	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	0.13	AA	spp.	8.41	AA	2018
Terrestrial spp. threatened, spillover	spp./million	2.83	CCC	spp.	190.11	CCC	2018
Freshwater spp. threatened, domestic	spp./million	0.10	AA	spp.	6.73	AA	2018
Freshwater spp. threatened, spillover	spp./million	0.35	BB	spp.	23.28	CCC	2018
Marine spp. threatened, domestic	spp./million	0.11	AA	spp.	7.57	AA	2018
Marine spp. threatened, spillover	spp./million	0.22	A	spp.	14.46	CCC	2018
Red List Index	unitless	0.78	CCC	unitless	0.78	CCC	2019
Unprotected terrestrial sites	%	17.24	BBB	%	17.24	BBB	2019
Unprotected freshwater sites	%	11.45	A	%	11.45	A	2019
Unprotected marine sites	%	17.97	BBB	%	17.97	BBB	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	8.00	BB	Pg CO_2e	0.52	CCC	2014
GHG emissions, spillover	t CO_2e/capita	8.30	CCC	Pg CO_2e	0.54	CCC	2014
Black carbon emissions	kg/capita	0.28	BBB	Gg	17.49	A	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.30	AA	t CO_2/capita	0.33	AA	2019
Land							
NH_3 emissions, domestic	kg/capita	6.09	BBB	Tg	401.34	B	2015
NH_3 emissions, spillover	kg/capita	7.74	CCC	kg	509.48	CCC	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.58	B	unitless	0.58	B	2015
Non-Recycled Waste	kg/capita/day	0.70	B	Gg	47.31	BB	2018
Deforestation	%	0.00	AA	10^3 hectares	0.15	AA	2018
Human Trophic Level	unitless	2.41	B	unitless	2.41	B	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	18.62	BB	%	18.62	BB	2014
Fish caught by trawling	%	30.24	CCC	%	30.24	CCC	2014
Ocean Health Index: Clean Waters	unitless	64.15	B	unitless	64.15	B	2019
Water							
Untreated wastewater	%	1.50	AA	%	1.50	AA	2018
Nitrogen emissions, domestic	kg/capita	9.34	BB	Tg	0.62	B	2015
Nitrogen emissions, spillover	kg/capita	12.45	CCC	Gg	819.77	CCC	2015
Scarce water consumption, domestic	10^3 m^3/capita	0.10	AA	10^9 m^3	5.74	AA	2015
Scarce water consumption, spillover	10^3 m^3/capita	5.00	CCC	10^9 m^3	329.31	CCC	2015
Water stress	%	14.36	A	10^9 m^3	8.42	AA	2016

United States

OECD

Population [millions]	331.0	**GDP** [$, billions]	18,065.8
Land area [km^2, thousands]	9,498.6	**GDP** per capita	54,579

Country ratings on impacts to Global Commons



United States

OECD

		Proportional			Absolute		
Indicator	**Units**	**Value**	**Rating**	**Units**	**Value**	**Rating**	**Year**
Aerosols							
NO_X emissions, domestic	kg/capita	16.86	CCC	Gg	5,409.26	CCC	2015
NO_X emissions, spillover	kg/capita	4.93	B	Gg	1,582.15	CCC	2015
SO_2 emissions, domestic	kg/capita	35.53	A	Gg	11,400.05	CCC	2015
SO_2 emissions, spillover	kg/capita	26.58	CCC	Gg	8,529.06	CCC	2015
$PM_{2.5}$ concentration	$\mu g/m^3$	7.41	AA	$\mu g/m^3$	7.41	AA	2017
Biodiversity							
Terrestrial spp. threatened, domestic	spp./million	3.16	AA	spp.	1,033.84	CCC	2018
Terrestrial spp. threatened, spillover	spp./million	3.36	CCC	spp.	1,100.46	CCC	2018
Freshwater spp. threatened, domestic	spp./million	1.59	A	spp.	520.59	CCC	2018
Freshwater spp. threatened, spillover	spp./million	0.38	BB	spp.	123.29	CCC	2018
Marine spp. threatened, domestic	spp./million	0.83	AA	spp.	272.66	CCC	2018
Marine spp. threatened, spillover	spp./million	0.45	BBB	spp.	148.77	CCC	2018
Red List Index	unitless	0.84	B	unitless	0.84	B	2019
Unprotected terrestrial sites	%	48.79	CCC	%	48.79	CCC	2019
Unprotected freshwater sites	%	65.83	CCC	%	65.83	CCC	2019
Unprotected marine sites	%	38.96	CCC	%	38.96	CCC	2019
Climate Change							
GHG emissions, domestic	t CO_2e/capita	20.40	CCC	Pg CO_2e	6.49	CCC	2014
GHG emissions, spillover	t CO_2e/capita	6.40	CCC	Pg CO_2e	2.05	CCC	2014
Black carbon emissions	kg/capita	0.50	B	Gg	155.80	CCC	2010
CO_2 emissions, fossil fuel exports	t CO_2/capita	0.90	AA	t CO_2/capita	0.87	AA	2019
Land							
NH_3 emissions, domestic	kg/capita	11.54	B	Tg	3,703.88	CCC	2015
NH_3 emissions, spillover	kg/capita	4.27	B	kg	1,371.18	CCC	2015
Sustainable Nitrogen Mgmt. Index	unitless	0.32	BBB	unitless	0.32	BBB	2015
Non-Recycled Waste	kg/capita/day	1.33	CCC	Gg	431.52	CCC	2017
Deforestation	%	0.05	AA	10^3 hectares	123.18	B	2018
Human Trophic Level	unitless	2.45	B	unitless	2.45	B	2017
Oceans							
Fish stocks, collapsed or over-exploited	%	29.78	CCC	%	29.78	CCC	2014
Fish caught by trawling	%	27.75	B	%	27.75	B	2014
Ocean Health Index: Clean Waters	unitless	72.55	BB	unitless	72.55	BB	2019
Water							
Untreated wastewater	%	41.11	B	%	41.11	B	2018
Nitrogen emissions, domestic	kg/capita	21.24	CCC	Tg	6.81	CCC	2015
Nitrogen emissions, spillover	kg/capita	6.79	BB	Gg	2,179.46	CCC	2015
Scarce water consumption, domestic	10^3 m^3/capita	5.00	A	10^9 m^3	1,597.09	CCC	2015
Scarce water consumption, spillover	10^3 m^3/capita	2.70	BBB	10^9 m^3	858.07	CCC	2015
Water stress	%	28.16	BBB	10^9 m^3	444.30	CCC	2015

Appendix B: Methodology

This release of the Pilot GCS Index shows the way for future work on measuring progress toward a sustainable future. The data, calculations, methods, and assumptions behind the production of this Pilot Index represent a first step toward more sophisticated analyses to come. This section provides a methodology in the expectation that stakeholders around the world will find opportunities for providing constructive feedback to strengthen future iterations of the GCS Index. All results are provisional and open to critique, especially suggestions and recommendations that lead to improvements that make the GCS Index more accurate, useful, and credible.

1. Organizing Impacts

Measuring countries' impacts on the Global Commons requires many indicators, and building a coherent narrative requires organizing these indicators. The Pilot GSC Index is a composite index, with a hierarchy of indicators, sub-pillars, and pillars within the overall Index (see Figure 1). This section explains the logic of the Pilot Index hierarchy.

1.1 Sub-pillars

Grouping indicators into categories requires a balance between Earth system science and policymaking. Earth system science identifies nine Planetary Boundaries that identify well-functioning Global Commons, but measuring countries' impacts on these commons often entails crossing causal pathways. Emissions of carbon dioxide, for example, contribute to both climate change and ocean acidification. Policymakers, on the other hand, typically organize environmental ministries around media-specific offices or particular forms of natural resource management. Given the available data, the Pilot GCS Index attempts to organize the indicators in a way that will be recognizable to a broad audience. Here, we use six sub-pillars: aerosols, biodiversity, climate change, land, oceans, and water.

1.2 Pillars

Focusing on the Global Commons means contrasting domestic environmental impacts with the extra-territorial environmental impacts resulting from transboundary issues, due to impact embodied in traded goods and services, trans-boundary migration of pollutants, and other economic activities. We therefore divide the Pilot GCS Index into two pillars as shown in Figure 1: *domestic*, which covers impacts to the Global Commons that occur within countries' territorial boundaries, and *spillover*, which covers environmental impacts that occur beyond territorial boundaries.

Separating domestic and spillover impacts into two pillars is important for two reasons. First, spillover impacts are usually unmeasured and unnoticed. Second, because most spillover impacts are caused by economic activity and embedded in traded goods, wealthier countries create the largest high negative spillovers – even as these same wealthy countries perform well on most measures of domestic impacts. Combining domestic and spillover impacts risks obscuring the special role they play in the stewardship of the Global Commons, especially for a select group of countries with the greatest means for redressing environmental harms.

1.3 Impacts embodied in trade

Two major accounting methods (Kanemoto et al. 2012) exist for attributing environmental impacts across countries: production-based accounting (PBA) and consumption-based accounting (CBA).

> **Production** = domestic production for domestic final consumption + domestic production for exports + use phase
>
> **Consumption** = domestic production for domestic final consumption + imports embodied in domestic final consumption + use phase

As illustrated in Figure 2, both methods include use-phase emissions associated with households and government consumption, *e.g.*, tailpipe emissions from driving personal vehicles, or combustion emissions from home heating and cooking. The import dimension includes imports that are directly consumed as well as those that are purchased by domestic industries to create products that are consumed domestically, *e.g.*, tires that are imported from Mexico, installed on cars in the U.S., and then sold to American consumers.

Figure 2. Consumption-based accounting versus production-based accounting

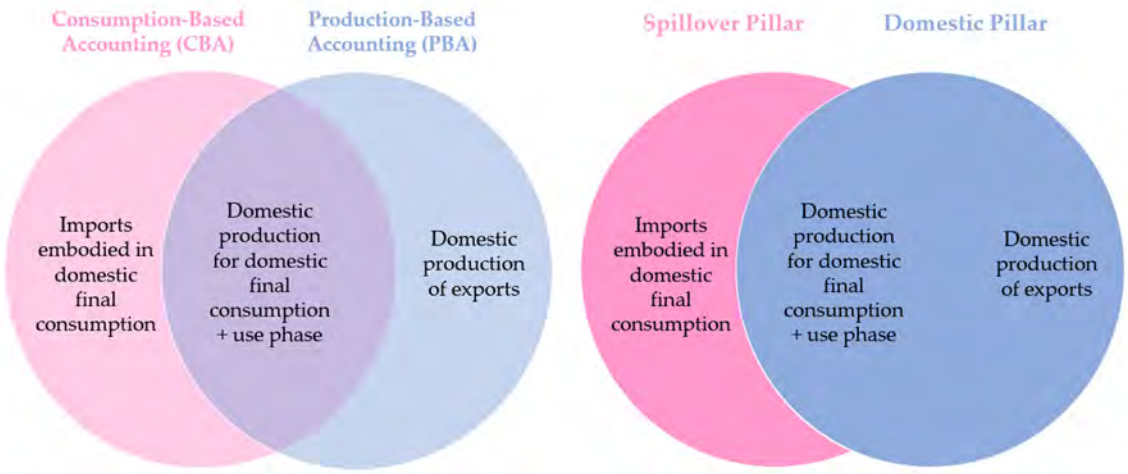


Figure 2 shows how the two accounting frameworks overlap, and there is typically a high level of correlation between impacts measured by PBA and CBA. To avoid double-counting domestic production for domestic final consumption and the use phase, the Pilot GCS Index does not use straightforward PBA and CBA estimates. Instead, the domestic pillar focuses on domestic production for domestic final consumption and exports, whereas the spillover pillar isolates "imports for domestic final consumption," hence making importing countries accountable for negative environmental impacts generated abroad. Overall, at the country-level, the most significant component is "domestic production for domestic final consumption," which accounted for roughly 66% of global GHG emissions in 2014 (Lenzen, Kanemoto, et al., 2012).

PBA is the most commonly used framework. Under the Paris Climate Change Agreement, the methods used to track the evolution of GHG emissions as part of the National Inventory Report of the Intergovernmental Panel on Climate Change (IPCC) and the UN Framework Convention on Climate Change (UNFCCC) focus, for practical reasons, on PBA (Afionis et al., 2017). Methods used to generate PBA estimates of CO_2 emissions (or other types of impacts) are rather straightforward and uncontested. By contrast, CBA relies on more complex input-output matrices and sophisticated modelling techniques, and, therefore, it is generally more subject to debates among experts than PBA.

Yet there is a crucial need to better integrate CBA within monitoring and policy frameworks, including in tracking and reducing GHG emissions (Kander et al., 2015). CBA has the advantage of incorporating the impacts generated by international transportation – but also tourism activities based on countries of residency (Kanemoto et al., 2012). CBA also incorporates carbon leakages and attributes them to the countries that externalize CO_2 emissions. While PBA rightfully emphasizes the principle of "product liability," which states that producers are responsible for the quality and safety of their products, CBA emphasizes the responsibility of consumers and international trade policies and agreements. In the contexts of the SDGs and Agenda 2030, domestic decarbonization should not be achieved by outsourcing certain high-emitting sectors to other countries, such as cement or steel, and then re-importing the final production (Sachs et al., 2017; Schmidt-Traub et al., 2019).

The Pilot GCS Index uses both accounting methods. The *domestic* pillar makes use of indicators calculated using PBA or related approaches. Doing so underlines the need for countries to take domestic actions in order to clean their industries and implement effective strategies to curb negative impacts on the Global Commons. By contrast, the *spillover* pillar makes extensive use of indicators calculated using CBA and attributes negative impacts to importing countries. Poor performance on the *spillover* pillar highlights areas where countries need to take further actions related to consumption but also to closely monitor existing and new trade agreements that might generate negative impacts abroad.

2. Data selection

2.1 Inclusion criteria

With a wide variety of environmental data on the states of the Global Commons, the Pilot GCS Index requires some criteria for focusing on only those indicators which provide useful information on keeping the Earth within a safe operating space. The data come from a variety of sources, including international agencies, academia, and non-governmental organizations. Where possible, we integrate indicators that are used to monitor international agreements like the SDGs, Agenda 2030, Paris Climate Change Agreement, and the UN Convention on Biological Diversity. The indicator selection will evolve over time as new data and statistics become available.

We selected data for inclusion based on five selection criteria:

1. **Global relevance and applicability to a broad range of country settings:** The indicators should be relevant and allow for direct comparison of impacts across countries. In particular, they should allow for the definition of quantitative performance thresholds that signify goal achievement.
2. **Statistical adequacy:** The indicators selected should represent valid and reliable measures.
3. **Timeliness:** The indicators selected should be up-to-date and published on a reasonably prompt schedule.
4. **Data quality:** Data series should represent the best available measure for a specific issue and be collected according to methods either peer-reviewed by the academic community or endorsed by an international organization or other reputable sources.
5. **Country coverage:** Data should be available for a large range of countries.

2.2 Indicators

Based on our initial research, we present an illustrative list of indicators that meet the criteria highlighted above, summarized in the Tables below. We also identify a preliminary list of missing data (Table 6).

For the *domestic* pillar (Table 4), we identify 23 preliminary indicators that meet our selection criteria. Aerosol indicators consist of emissions of NO_X and SO_2 as well as concentrations of $PM_{2.5}$. Due to the very limited international data available to track biodiversity threats and the strategic importance of protected areas, we include indicators of the share of countries' protected areas that are key to terrestrial, freshwater, and marine biodiversity. These indicators are the only measures in the current indicator set that track policy intentions and not outcomes. As complements to the protected habitat indicators, we also include indicators of biodiversity threats, such as the Red List Index and terrestrial, freshwater, and marine biodiversity threats

from PBA. On climate change, we include measures of emissions of GHGs (as CO_2-eq.) and black carbon, an important climate pollutant.

Tracking land-based indicators is challenging, as many terrestrial activities impact the Global Commons. In recognition of the role of agriculture, we include the Sustainable Nitrogen Management Index (Zhang & Davidson, 2019), and we also include emissions of reactive nitrogen (as ammonia) due to agricultural, industrial, and transportation activities. Likewise, the Human Trophic Level (Bonhommeau et al., 2013) provides some indication of how intensively land is farmed in order to feed a country's population. Sustainable management of municipal solid waste prevents land degradation by fugitive waste, unsanitary landfills, or other unsustainable disposal methods. Finally, while forests might be considered a biome worth tracking under biodiversity, we include permanent deforestation in this sub-pillar in recognition of the broad benefits of forest cover for terrestrial ecosystem services.

We divide disruptions to aquatic Earth systems between oceans and freshwater. Within oceans, fisheries, like forests, constitute a special case of biodiversity, and we include measures of fish caught from stocks that are overexploited and collapsed or by trawling. Within water, we include untreated wastewater, freshwater withdrawal, and scarce water consumption.

For the *spillover* pillar (Table 5), most of the 11 indicators are derived from CBA accounting (isolating the imported for final consumption dimension) and MRIO tables that link traded goods with environmental and biodiversity impacts. These indicators include imported emissions of GHGs, nitrogen, and other pollutants; biodiversity threats; and contributions to water scarcity. To capture ocean pollution, we include the Clean Waters component of the Ocean Health Index (Halpern et al., 2015).

Table 4. *Domestic* indicators in the Pilot Global Commons Stewardship Index

Indicator	Description	Source
Aerosols		
Domestic NOx emissions	Amount of nitrogen oxides (NOx) emissions embodied in domestic production of goods and commodities for domestic consumption and export. Nitrogen oxides stem mostly from the combustion of fossil fuels and are harmful air pollutants that also contribute to acid rain.	Oita et al. (2016)
Domestic SO_2 emissions	SO_2 emissions associated with the production of goods and services, which are then either exported or consumed domestically. The health impacts of outdoor air pollution are felt locally as well as in neighbouring regions, due to transboundary atmospheric transport of the pollutants.	Lenzen et al. (2020)
Annual mean concentration of $PM_{2.5}$	Air pollution measured as the population-weighted mean annual concentration of PM2.5 for the urban population in a country. PM2.5 is suspended particles measuring less than 2.5 microns in aerodynamic diameter, which are capable of penetrating deep into the respiratory tract and can cause severe health damage.	Stanaway et al. (2018)
Biodiversity		
Terrestrial biodiversity threats embodied in domestic production	Number of terrestrial species threatened as a result of domestic production for domestic consumption and exports of goods and commodities. A significant number of species are threatened as a result of imports of commodities, such as coffee, tea, sugar, textiles, fish, and other manufactured items.	Lenzen et al. (2012)
Freshwater biodiversity threats embodied in domestic production	Number of freshwater species threatened as a result of domestic production for domestic consumption and exports of goods and commodities. A significant number of species are threatened as a result of imports of commodities, such as coffee, tea, sugar, textiles, fish, and other manufactured items.	Lenzen et al. (2012)
Marine biodiversity threats embodied in domestic production	Number of marine species threatened as a result of domestic production for domestic consumption and exports of goods and commodities. A significant number of species are threatened as a result of imports of commodities, such as coffee, tea, sugar, textiles, fish, and other manufactured items.	Lenzen et al. (2012)
Red List Index of species survival	The change in aggregate extinction risk across groups of species. The index is based on genuine changes in the number of species in each category of extinction risk on The IUCN Red List of Threatened Species.	IUCN (2020)

Indicator	Description	Source
Mean area that is not protected in terrestrial sites important to biodiversity	The mean percentage area of terrestrial Key Biodiversity Areas (sites that are important for the global persistence of biodiversity) that is not covered by protected areas and remains at risk.	BirdLife International et al. (2019)
Mean area that is not protected in freshwater sites important to biodiversity	The mean percentage area of freshwater Key Biodiversity Areas (sites that are important for the global persistence of biodiversity) that is not covered by protected areas and remains at risk.	Birdlife International et al. (2019)
Mean area that is not protected in marine sites important to biodiversity	The mean percentage area of marine Key Biodiversity Areas (sites that are important for the global persistence of biodiversity) that is not covered by protected areas and remains at risk.	Birdlife International et al. (2019)
Climate		
Domestic greenhouse gas emissions	Greenhouse gas emissions (CO2, CH4, N20, F-Gasses (HFCs, PFCs, SF6)) in CO_2 equivalent embodied in domestic production for domestic consumption and exports.	Gütschow et al. (2016)
Domestic black carbon emissions	Black carbon is a sooty black material emitted from gas and diesel engines, coal-fired power plants, and other sources. It comprises a significant portion of particulate matter or PM, which is an air pollutant.	Joint Research Centre (2016)
Land		
Domestic ammonia emissions	Ammonia (NH3) emitted during the production of commodities, which are then either exported or consumed domestically.	Oita et al. (2016)
Sustainable Nitrogen Management Index	The Sustainable Nitrogen Management Index is a one-dimensional ranking score that combines two efficiency measures in crop production: Nitrogen Use Efficiency and land use efficiency (crop yield).	Zhang and Davidson (2019)
Non-Recycled Municipal Solid Waste	The amount of municipal solid waste, including household waste, that is neither recycled nor composted.	Kaza et al. (2018)
Permanent deforestation (5-year average)	Permanent deforestation as a 5-year average. Permanent deforestation refers to tree cover removal for urbanization, commodity production, and certain types of small-scale agriculture. It does not include temporary forest loss due to the forestry sector or wildfires.	Curtis et al. (2018)

Indicator	Description	Source
Human Trophic Level	Trophic levels are a measure of the energy intensity of diet composition and reflect the relative amounts of plants as opposed to animals eaten in a given country. A higher trophic level represents a greater level of consumption of energy-intensive animals.	Bonhommeau et al (2013)
Oceans		
Fish caught from overexploited or collapsed fish stocks by EEZ	The percentage of a country's total catch, within its exclusive economic zone (EEZ), that is comprised of species that are overexploited or collapsed, weighted by the quality of fish catch data.	Pauly et al. (2020)
Fish caught by trawling	The percentage of a country's total fish catch, in tonnes, caught by trawling, a method of fishing in which industrial fishing vessels drag large nets (trawls) along the seabed.	Pauly et al. (2020)
Water		
Anthropogenic wastewater that does not receive treatment	The inverse of the percentage of collected, generated, or produced wastewater that is treated, normalized by the population connected to centralized wastewater treatment facilities.	Wendling *et al*. (2020)
Nitrogen exportable to water bodies	Nitrogen exportable to water bodies emitted during the production of commodities, which are then either exported or consumed domestically.	Oita et al. (2016)
Domestic scarce water consumption	Volume of scarce water embodied in domestic production for domestic consumption and exports of goods and commodities.	Lenzen et al. (2013); updated for 2015
Freshwater withdrawal	The level of water stress: freshwater withdrawal as a proportion of available freshwater resources is the ratio between total freshwater withdrawn by all major sectors and total renewable freshwater resources, after taking into account environmental water requirements. Main sectors, as defined by ISIC standards, include agriculture; forestry and fishing; manufacturing; electricity industry; and services. This indicator is also known as water withdrawal intensity.	Food and Agriculture Organization (2016)

Table 5. *Spillover* indicators in the Pilot Global Commons Stewardship Index

Indicator	Description	Source
Aerosols		
NOx emissions embodied in imports	Amount of nitrogen oxides (NOx) emissions embodied in imports of goods and commodities for domestic final consumption. Nitrogen oxides stem mostly from the combustion of fossil fuels and are harmful air pollutants that also contribute to acid rain.	Oita et al. (2016)
SO_2 emissions embodied in imports	SO_2 emissions embodied in goods imported for domestic final consumption. These have severe health impacts and are a significant cause of premature mortality worldwide. Trade in goods mean that health impacts of air pollution occur far away from the point of consumption.	Lenzen et al. (2020)
Biodiversity		
Terrestrial biodiversity threats embodied in imports	Number of terrestrial species threatened as a result of imported goods and commodities. A significant number of species are threatened as a result of imports of commodities, such as coffee, tea, sugar, textiles, fish, and other manufactured items.	Lenzen et al. (2012)
Freshwater biodiversity threats embodied in imports	Number of freshwater species threatened as a result of imported goods and commodities. A significant number of species are threatened as a result of imports of commodities, such as coffee, tea, sugar, textiles, fish, and other manufactured items.	Lenzen et al. (2012)
Marine biodiversity threats embodied in imports	Number of marine species threatened as a result of imported goods and commodities. A significant number of species are threatened as a result of imports of commodities, such as coffee, tea, sugar, textiles, fish, and other manufactured items.	Lenzen et al. (2012)
Climate		
Greenhouse gas emissions embodied in imports	Greenhouse gas emissions (CO2, CH4, N20, F-Gasses (HFCs, PFCs, SF6)) in CO_2 equivalent embodied in goods imported for domestic final consumption.	Gütschow et al. (2017)
CO_2 emissions embodied in fossil fuel exports	CO_2 emissions embodied in the exports of coal, gas, and oil. Calculated using a 5-year average of fossil fuel exports and converting exports into their equivalent CO_2 emissions. Exports for each fossil fuel are capped at the country's level of production. We assumed a value of 0 for countries with unreported export data and no production across all three fossil fuel types (coal, gas, oil).	UN Comtrade (2020; EIA (2020)

Indicator	Description	Source
Land		
Ammonia emissions embodied in imports	Ammonia (NH3) emissions embodied in goods imported for domestic final consumption.	Oita et al. (2016)
Oceans		
Ocean Health Index: Clean Waters	The clean waters subgoal of the Ocean Health Index measures to what degree marine waters under national jurisdictions have been contaminated by chemicals, excessive nutrients (eutrophication), human pathogens, or trash.	Ocean Health Index (2019)
Water		
Nitrogen exportable to water bodies embodied in imports	Emissions of nitrogen exportable to water bodies embodied in goods imported for domestic final consumption.	Oita et al. (2016)
Scarce water consumption embodied in imports	Volume of scarce water embodied in imports of goods and commodities for domestic final consumption.	Lenzen et al. (2013); updated for 2015

Table 6. Illustrative list of missing indicators

Sub-pillar	Metric
Land	Phosphorus runoff
Land	Soil pollution
Land	Release of toxic chemicals
Land	Pesticides use
Climate	Ozone content in the atmosphere
Biodiversity	Loss of functional biodiversity
Biodiversity	Loss of intact areas and wilderness
Biodiversity	Trade of endangered species
Water	Water Use disaggregated at basin level
Land	Distinction of forest change by forest type
Land	Deforestation embedded in traded goods
Land	Food waste
Land	Food loss

3. Country coverage

While other global indices seek to include as many countries as possible, the Pilot GCS Index begins with a smaller set. First, the current state of data availability means indicators can only meaningfully be constructed for certain countries. Second, only certain countries will have economies and populations large enough to meaningfully impact the Global Commons. Our sample of countries include all members of the OECD and the G20. To this list, we also add the five next most-populous countries: Pakistan, Nigeria, Bangladesh, Ethiopia, Philippines. In total, the Pilot GCS Index includes indicators for 50 countries:

Argentina	Czechia	India	Netherlands	Slovakia
Australia	Denmark	Indonesia	New Zealand	Slovenia
Austria	Estonia	Ireland	Nigeria	South Africa
Bangladesh	Ethiopia	Israel	Norway	South Korea
Belgium	Finland	Italy	Pakistan	Spain
Brazil	France	Japan	Philippines	Sweden
Canada	Germany	Latvia	Poland	Switzerland
Chile	Greece	Lithuania	Portugal	Turkey
China	Hungary	Luxembourg	Russia	United Kingdom
Colombia	Iceland	Mexico	Saudi Arabia	United States

4. Indicator construction

4.1 Standardization

We present the indicators in two forms: proportional and absolute. *Proportional* indicators are standardized to allow cross-country comparison, regardless of country size. We standardize most metrics by population rather than GDP. Population sizes tend to be more stable over time, and the MRIO databases from which the CBA indicators are calculated with GDP as a denominator.

Absolute indicators present unstandardized metrics of environmental impacts. While the *proportional* indicators emphasize that governments and citizens in small countries can strengthen policies and actions for sustainable development, the *absolute* indicators emphasize the efforts and leadership needed from large countries who have the greatest global impacts. This two-track approach reflects the growing trend in the field of industrial ecology, where researchers tend to present both *per capita* and absolute results in peer-reviewed papers (e.g., Lenzen et al., 2018).

4.2 Rescaling

To make the data comparable across indicators, we rescale each variable between 0 and 100, with 0 being the lowest bound denoting very poor performance and 100 denoting targets fully achieved. We winsorize each dataset so that all countries exceeding the target score 100 and all falling below the lowest bound score 0.

We select the target, or upper bound, using a decision tree presented in Sachs et al. (2020). Optimally, indicator targets should be based on the SDGs or some other international agreement. When such a target is not available, we rely on scientific inputs and expert judgment. Finally, if none of these two options are available, the upper bound is based on current best global performers. Likewise, the lower bound is also based on current worst performance.

We rescale all indicators using a distance-to-target technique described by Eq. 1.

$$\textit{Indicator Score} = (X - L) / (U - L) \times 100 \qquad [1]$$

where X is a raw data value; U and L denote the upper and lower bounds, respectively. Our selection of bounds ensures that for all rescaled variables, higher values indicate better performance (Table 7). Thus, a country that scores 50 on an indicator is half-way towards achieving the optimum value; a country with a score of 75 has covered three quarters of the distance from the lower to the upper bound.

Table 7. Upper and lower bounds for rescaling indicators.

		Proportional			Absolute	
Indicator	**Units**	**Upper**	**Lower**	**Units**	**Upper**	**Lower**
Aerosols						
NO_X emissions, domestic	kg/capita	0[a]	20[c]	Gg	0[a]	700[c]
NO_X emissions, spillover	kg/capita	0[a]	10[c]	Gg	0[a]	400[c]
SO_2 emissions, domestic	kg/capita	0[a]	200[c]	Gg	0[a]	3,500[c]
SO_2 emissions, spillover	kg/capita	0[a]	45[c]	Gg	0[a]	1600[c]
$PM_{2.5}$ concentration	µg/m³	6[b]	35[d]	µg/m³	6[b]	35[d]
Biodiversity						
Terrestrial spp. threatened, domestic	per million people	0[a]	45[c]	number	0[a]	1000[c]
Terrestrial spp. threatened, spillover	per million people	0[a]	5[c]	number	0[a]	150[c]
Freshwater spp. threatened, domestic	per million people	0[a]	10[c]	number	0[a]	200[c]
Freshwater spp. threatened, spillover	per million people	0[a]	1[c]	number	0[a]	25[c]

Marine spp. threatened, domestic	per million people	0[a]	10[c]	number	0[a]	125[c]
Marine spp. threatened, spillover	per million people	0[a]	2[c]	number	0[a]	25[c]
Red List Index	scale 0 to 1	1[a]	0.65[c]	scale 0 to 1	1[a]	0.65[c]
Unprotected terrestrial sites	%	0[a]	67[d]	%	0[a]	67[d]
Unprotected freshwater sites	%	0[a]	67[d]	%	0[a]	67[d]
Unprotected marine sites	%	0[a]	67[d]	%	0[a]	67[d]
Climate Change						
GHG emissions, domestic	t CO_2e/ capita	0[a]	20[c]	Tg CO_2e	0[a]	900[c]
GHG emissions, spillover	t CO_2e/ capita	0[a]	10[c]	Tg CO_2e	0[a]	500[c]
Black carbon emissions	kg/capita	0[a]	1.2[c]	Gg	0[a]	150[c]
CO_2 emissions, fossil fuel exports	t CO_2/ capita	0[a]	20[c]	t CO_2/ capita	0[a]	20[c]
Land						
NH_3 emissions, domestic	kg/capita	0[a]	25[c]	Gg	0[a]	850[c]
NH_3 emissions, spillover	kg/capita	0[a]	10[c]	Gg	0[a]	400[c]
SNMI	scale 0–1.4	0[a]	1.4[e]	scale 0–1.4	0[a]	1.4[e]
Non-Recycled Waste	kg/capita/day	0[a]	1.5[c]	Gg	0[a]	150[c]
Deforestation	%	0[a]	1.5[c]	10^3 ha.	0[a]	300[c]
Human Trophic Level	scale 2 to 3	2[a]	3[e]	scale 2 to 3	2[a]	3[e]
Oceans						
Fish stocks, collapsed or overexploited	%	0[a]	50[f]	%	0[a]	50[f]
Fish caught by trawling	%	0[a]	60[f]	%	0[a]	60[f]
OHI: Clean Waters	scale 0–100	100[a]	25[c]	scale 0–100	100[a]	25[c]
Water						
Untreated wastewater	%	0[a]	100[e]	%	0[a]	100[e]
NH_3 emissions, domestic	kg/capita	0[a]	30[c]	Gg	0[a]	1400[c]
NH_3 emissions, spillover	kg/capita	0[a]	20[c]	Gg	0[a]	1200[c]
Scarce water, domestic	10^3 m^3/capita	0[a]	35[c]	trillion m^3	0[a]	2.5[c]
Scarce water, spillover	10^3 m^3/capita	0[a]	9[c]	billion m^3	0[a]	600[c]
Water stress	% renewable	0[a]	100[f]	billion m^3	0[a]	100[f]

Notes: Sources for Upper and Lower bounds noted as (a) technical optimum, (b) average of top 5 countries, (c) 2.5th-percentile, (d) expert-based, (e) worst performer, (f) SDG Index. OHI = Ocean Health Index, SNMI = Sustainable Nitrogen Management Index.

5. Weighting & aggregation

While there are several methods for weighting and aggregating individual indicator scores, we present our new framework in the simplest terms. We aggregate indicator scores into sub-pillar scores and sub-pillar scores into pillar scores. At each level of aggregation, indicators and sub-pillars are given equal weight – with the exception of the domestic Climate Change sub-pillar, wherein GHG emissions are given 95% weight and black carbon emissions 5%. Further exploration of data in future iterations – or the advice of experts – may argue for alternative methods, such as Principal Component Analysis, Factor Loadings, or subjective weights (Lafortune et al., 2018). Our current method, however, is the most transparent and easy to interpret.

6. Missing data

Aside from entire indicators mentioned in Table 6, data for our indicators may be missing for two major reasons. First, data may not be applicable for a country due to its geography. For example, landlocked countries will have no indicators on marine resources. In these cases, no score is recorded, and the indicator and sub-pillar will receive no weight in the aggregation step. Second, our data sources may fail to report relevant data. In these cases, missing values are imputed using the population-weighted mean of the other countries in a given region. We note here that there are some indicators for which we do not yet have absolute values; in these cases, the proportional version is used in *absolute* and *proportional* versions of the Pilot GCS Index.

7. Ratings

Unlike traditional composite indices, we plan to display our results with ratings instead of rankings and scores. Our primary motivation is that in a Pilot Index, our results will have large uncertainties due to sparse indicators, unvetted methods, low country coverage, and untested assumptions – especially regarding standardization, rescalings, and weightings. Full rankings would provide a false impression of the relative performance of each country. Future versions of the GCS Index, following further refinements and the addition of new indicators, may well provide a sufficient basis for ranks and scores. We wish to avoid the appearance of a conflict between the results provided by more mature versions of the GCS Index and those results shown in the pilot version. Large disparities that disagree with future work – or with the intuitions of readers – may reduce the credibility of the project and its broad uptake by diverse audiences.

Rating countries provides an ordinal scale on which performance can be measured without the danger of false precision. We use the following scale:

Table 8. Ratings categories as defined by score ranges in the Pilot GCS Index.

Rating	Score Range
AAA	100
AA	90–99
A	80–89
BBB	70–79
BB	60–69
B	50–59
CCC	0–49
no data	n/a

The ranges for each category may be further refined to better reflect the underlying distribution of each indicator.