2001 Environmental Sustainability Index

An Initiative of the
Global Leaders of Tomorrow Environment Task Force,
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In collaboration with:

Yale Center for Environmental Law and Policy (YCELP)
Yale University
Center for International Earth Science Information Network (CIESIN)
Columbia University

Global Leaders for Tomorrow
Environment Task Force
January, 2001

Chair:
Kim Samuel-Johnson
Samuel Group of Companies
Canada

Project Director:
Daniel C. Esty
Yale Center for Environmental Law and Policy
USA

Members:

Manny Amadi
Cause and Effect Marketing Limited
United Kingdom

Alicia Barcena Ibara
Economic Commission for Latin American and the Caribbean
Chile

Ugar Bayar
Privatization Administration
Turkey

Matthew Cadbury
Cadbury Schweppes PLC
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Pinault Printemps-Redoute
France

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Siemens
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Australia

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Australia

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Lombard,Odier et Cie
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Paul L. Saffo
Institute for the Future
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Member of the House of Representatives
Japan

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This report is available on-line at http://www.ciesin.columbia.edu/indicators/ESI

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The Environmental Sustainability Index (ESI) and this report are the result of collaboration among the World Economic Forum's Global Leaders for Tomorrow (GLT) Environment Task Force, the Yale Center for Environmental Law and Policy (YCELP), and the Columbia University Center for International Earth Science Information Network (CIESIN).

The GLT team was led by Kim Samuel- Johnson. The Environment Task Force members (listed on the inside cover) benefited from the participation of a number of outside experts in environmental sustainability and indicators who attended various ESI workshops or otherwise contributed to the ESI effort over the past two years. These include: Alan AtKisson, Christian P. Avérous, Steve Charnovitz, Peter Cornelius, Frank Dixon, André Dua, Raimundo Florin, Tom Graedel, Kirk Hamilton, Allen Hammond, Peter Hardi, Theodore Heintz, Jochen Jesinghaus, Kai Lee, Maria Leicher, Victor Lichtinger, Bedrich Moldan, William Nordhaus, Theo Panayotou, Tom Parris, Jose Luis Samaniego, Md. Rumi Shammin, Gus Speth, Andreas Sturm, Carla Tabossi, Simon Tay, Phillip Toyne, and Claas van der Linde.

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Global Leaders for Tomorrow
World Economic Forum
91-93 route de la Capite
1223 Cologny/Geneva
Switzerland
(41-22) 869-1212
Fax (41-22) 786-2744
contact@weforum.org
www.weforum.org

Center for International Earth Science Information Network (CIESIN)
Columbia University
P.O. Box 1000
Palisades, NY 10964 USA
Tel. (1-845) 365-8988
Fax (1-845) 365-8922
ciesin.info@ciesin.columbia.edu
www.ciesin.columbia.edu

Yale Center for Environmental Law and Policy
250 Prospect Street
New Haven, CT 06511 USA
Tel. (1-203) 432-3123
Fax (1-203) 432-3817
epcenter@pantheon.yale.edu
www.yale.edu/envirocenter

Executive Summary

The Environmental Sustainability Index (ESI) is a measure of overall progress towards environmental sustainability developed for 122 countries. The three highest ranking countries in the 2001 ESI are Finland, Norway, and Canada. The three lowest are Haiti, Saudi Arabia, and Burundi. Examples of countries scoring in the middle include Ghana and Honduras. A high ESI rank indicates that a country has achieved a higher level of environmental sustainability than most other countries; a low ESI rank signals that a country is facing substantial problems in achieving environmental sustainability along multiple dimensions.

The ESI scores are based upon a set of 22 core "indicators," each of which combines two to six variables for a total of 67 underlying variables. The indicators and variables were chosen through careful review of the environmental literature and available data combined with extensive consultation and analysis.

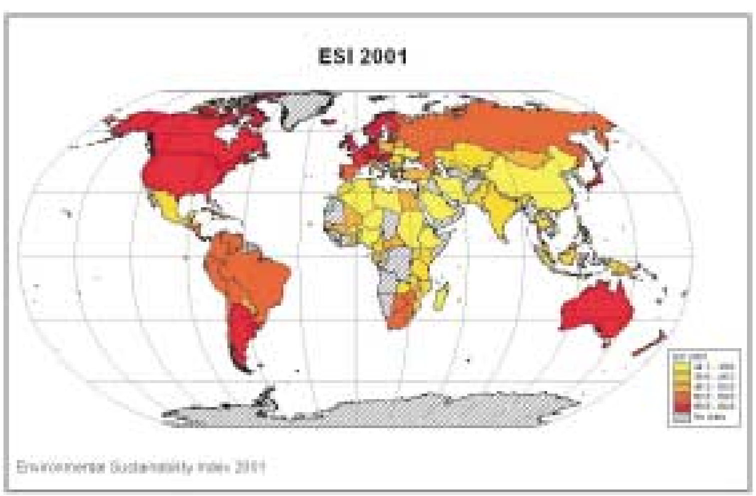
The ESI permits cross-national comparisons of environmental progress in a systematic and quantitative fashion. It represents a first step towards a more analytically driven approach to environmental decision making. The ESI enables:

- identification of issues where national environmental results are above or below expectations;
- policy tracking to identify areas of success or failure;
- benchmarking of environmental performance;
- identification of "best practices"; and
- investigation into interactions between environmental and economic performance.

Although in broad terms high income countries scored higher, among countries of similar levels of per-capita income no strong correlation exists between income and overall environmental sustainability.

The ESI has been developed through a transparent and interactive process, drawing on statistical, environmental, and analytic expertise from around the world. The ESI balances a range of dimensions, including both national and global perspectives, different types of environmental threats, and both environmental and socioeconomic aspects of sustainability. Since different individuals may balance these dimensions differently, this report provides detailed information on the ESI's elements to facilitate understanding of the ESI's assumptions and alternative analyses.

The ESI demonstrates the potential value of improvements in the world's capacity for data-driven environmental analysis and decision making. Investments in data creation and gathering mechanisms, development of better techniques to integrate information from different spatial scales, and creation of information systems that provide for long-term stability and flexible analysis are essential to better environmental management and rapid global progress towards a sustainable environment.



The Need for an Environmental Sustainability Index

Environmental sustainability has been increasingly embraced as an important goal. Especially since the 1992 Earth Summit, many environmental policy objectives have been formulated in terms of sustainability. The proliferation of these objectives has even spawned considerable discussion about how to measure sustainability. Yet actual measurements are exceedingly rare. And nowhere are they more rare than at the international level, where political suspicions and data gaps frequently conspire to derail even the most modest efforts to compare country environmental circumstances and performance.

Of course not just any measure will do. To be useful, an Environmental Sustainability Index must be created in a systematic, transparent, and reproducible manner. It should be faithful to the scientific literature as well as relevant to the major policy debates. It should be applicable to a wide range of situations and conditions. And it should make use of what can actually be measured today while leaving room for movement toward what ought to be measured tomorrow.

Key Results

Before elaborating our analytical approach, methods and analysis, let us summarize our key results and findings:

1. Environmental Sustainability can be measured. The Environmental Sustainability Index advanced in this report uses data on 67 variables rolled into 22 core "indicators" to create comprehensive environmental sustainability scores for 122 countries. While no measure of such a complex phenomenon can be perfect, the Index proved to be surprisingly powerful, useful and robust.

2. The Index creates a series of comparative benchmarks of environmental conditions in different countries and the possibility of shifting environmental decision-making onto a more fact-based and analytically rigorous foundation.

3. Economic conditions affect, but do not determine, environmental conditions. Comparisons of the ESI with measures of economic performance such as the World Economic Forum Current Competitiveness Index and per-capita income suggest that decisions of how vigorously to pursue environmental sustainability and how vigorously to pursue economic growth are in fact two separate choices.

4. Serious gaps in data availability limit the ability to measure environmental sustainability and precluded the analysis of nearly 100 nations. Filling these gaps should be a policy priority at the local, national and international scales.

Our Approach

The first challenge in measuring environmental sustainability is to define the scope in conceptual terms. What are we trying to measure? Unlike many efforts to think about indicators of "sustainable development," we have focused on environmental sustainability, which is a more narrow formulation. This choice was made deliberately, based on a conclusion that one reason efforts to measure sustainability fail is that they seek to fold too many disparate phenomena under the same conceptual umbrella. While we accept the premise that politics, economics, and social values are important factors worthy of being sustained, we do not think that there is a sufficient scientific, empirical or political basis for constructing metrics that combine all of them along with the environment. Moreover, the environment often gets overshadowed in "triple bottom line" analyses and other sweeping sustainability efforts.

Even within the confines of a more narrow focus of environmental sustainability, we are still dealing with a complicated, multi-dimensional concept. At the most basic level, we have concluded that environmental sustainability can be presented as a function of five phenomena: (1) the state of

Table 1. Components of Environmental Sustainability

Component	Logic
Environmental Systems	A country is environmentally sustainable to the extent that its vital environmental systems are maintained at healthy levels, and to the extent to which levels are improving rather than deteriorating.
Reducing Environmental Stresses	A country is environmentally sustainable if the levels of anthropogenic stress are low enough to engender no demonstrable harm to its environmental systems.
Reducing Human Vulnerability	A country is environmentally sustainable to the extent that people and social systems are not vulnerable (in the way of basic needs such as health and nutrition) to environmental disturbances; becoming less vulnerable is a sign that a society is on a track to greater sustainability.
Social and Institutional Capacity	A country is environmentally sustainable to the extent that it has in place institutions and underlying social patterns of skills, attitudes and networks that foster effective responses to environmental challenges.
Global Stewardship	A country is environmentally sustainable if it cooperates with other countries to manage common environmental problems, and if it reduces negative extra-territorial environmental impacts on other countries to levels that cause no serious harm.

the environmental *systems*, such as air, soil, ecosystems and water; (2) the *stresses* on those systems, in the form of pollution and exploitation levels; (3) the *human vulnerability* to environmental change in the form of loss of food resources or exposure to environmental diseases; (4) the *social and institutional capacity* to cope with environmental challenges; and finally (5) the ability to respond to the demands of *global stewardship* by cooperating in collective efforts to conserve international environmental resources such as the atmosphere. We define environmental sustainability as the ability to produce high levels of performance on each of these dimensions in a lasting manner. We refer to these five dimensions as the core "components" of environmental sustainability.

Scientific knowledge does not permit us to specify precisely what levels of performance are high enough to be truly sustainable, especially at a worldwide scale. Nor are we able to identify in advance whether any given level of performance is capable of being carried out in a lasting manner. Therefore we have built our index in a way that is primarily comparative. Establishing the thresholds of sustainability remains an important endeavor, albeit one that is complicated by the dynamic nature of such economic factors as changes in technology over time.

The basic unit of comparison is a set of 22 environmental sustainability *indicators* which were identified on the basis of a careful review of the environmental literature and substantiated by statistical analysis (see page 13). These indicators were deemed the most relevant constitutive elements of the five core components, and therefore are the central element of analysis. In turn, each of the indicators has associated with it a number of *variables* that are empirically measured. The relationship between these Index building blocks is specified in Table 2.

The choice of variables was driven by a consideration of the theoretical logic and relevance of the indicator in question, data quality, and country coverage. In general we sought variables with extensive country coverage but chose in some cases to make use of variables with narrow coverage if they measured critical aspects of environmental sustainability that would otherwise be lost. Air quality and water quality, for example, were especially disappointing in their poor country coverage but were included anyway because of their central role in environmental sustainability.

After building up the complete database, we selected countries for inclusion in the index based on the extent of their data coverage. We eliminated all countries for which the data were insufficient to

Table 2. Environmental Sustainability Index Building Blocks

Component	Indicator	Variable	Year	Counts*
Environmental Systems	Air Quality	Urban SO2 concentration	MRYA 1990-96	51
		Urban NO2 concentration	MRYA 1990-96	51
		Urban TSP concentration	MRYA 1990-96	51
	Water Quantity	Internal renewable water per capita	1995	122
		Water inflow from other countries per capita	1995	121
	Water Quality	Dissolved oxygen concentration	1994-96 or MRYA	35
		Phosphorus concentration	1994-96 or MRYA	28
		Suspended solids	1994-96 or MRYA	32
		Electrical conductivity	1994-96 or MRYA	42
	Biodiversity	Percentage of mammals threatened	1996	121
		Percentage of breeding birds threatened	1996	118
	Terrestrial Systems	Severity of human induced soil degradation	1990	103
		Land area affected by human activities as a % of total land area	1992-95	121
Reducing Stresses	Reducing Air Pollution	NOx emissions per populated land area	1990	121
		SO2 emissions per populated land area	1990	121
		VOCs emissions per populated land area	1990	121
		Coal consumption per populated land area	1998	100
		Vehicles per populated land area	MRYA 1996-98	115
	Reducing Water Stress	Fertilizer consumption per hectare of arable land	1997	122
		Pesticide use per hectare of crop land	1996	82
		Industrial organic pollutants per available fresh water	1996	57
		Percentage of country's territory under severe water stress	1995	121
	Reducing Ecosystem Stress	Percentage change in forest cover 1990-95	1995	121
		Percentage of country's territory in acidification exceedence	1990	122
	Reducing Waste & Consumption Pressures	Consumption pressure per capita	1996	119
		Radioactive waste	1996	45
	Reducing Population Pressure	Total fertility rate	2000	122
		% change in projected population between 2000 & 2050	2000	122
Reducing Human Vulnerability	Basic Human Sustenance	Daily per capita calorie supply as a % of total requirements	MRYA 1988-90	100
		% of population with access to improved drinking-water supply	2000	96
	Environmental Health	Child death rate from respiratory diseases	MRYA 1990-98	55
		Death rate from intestinal infectious diseases	MRYA 1990-99	63
		Under-5 mortality rate	1998	122

MRYA = Most Recent Year Available. * Number of of countries for which data are available. *Continued on next page.*

generate measures for at least 19 of the 22 indicators. We included all countries for which the data permitted measurements of at least 20 indicators (94 countries). For those countries where the data permitted measurements of no more than 19 indicators (54 countries), we applied an additional criterion. If their overall data coverage included at least as many variables as the lowest number for countries missing two indicators, we included them in the Index (28 countries met this criterion). We ended up with 122 countries in the Index, each of which has data for at least 62% of the variables in our analysis.

The median country in the Index is missing 17 of the 67 variables. A quarter are missing 22-26 variables, and quarter are missing 1-7. Altogether this means that 22 percent of the 8,174 data points in our database are missing.

Where we had a sound analytical basis for doing so, we estimated missing values. In total, we estimated just over 60 percent of the missing variables, using a variety of techniques explained in Annex 1, which also describes the techniques used to standardize and aggregate the variables. The estimation protocol permitted us to generate a full set of 22 indicators for each of the countries in the Index.

Table 2. Environmental Sustainability Index Building Blocks (cont'd)

Component	Indicator	Variable	Year	Count*
Social and Institutional Capacity	Science/Technology	R & D scientists and engineers per million population	MRYA 1980-97	94
		Expenditure for R & D as a percentage of GNP	MRYA 1980-1997	88
		Scientific and technical articles per million population	1995	44
	Capacity for Debate	IUCN member organizations per million population	2000	109
		Civil and political liberties	2000	122
	Regulation and Management	Stringency and consistency of environmental regulations	2000	56
		Degree to which environmental regulations promote innovation	2000	56
		Percentage of land area under protected status	1997	122
		Number of sectoral EIA guidelines	1998	122
	Private Sector Responsiveness	No. of ISO14001 certified companies per million dollars GDP	2000	118
		Dow Jones Sustainability Group Index membership	2000	32
		Average Innovest EcoValue'21 rating of firms	2000	20
		World Business Council for Sustainable Development members	2000	122
		Levels of environmental competitiveness	2000	56
	Environmental Information	Availability of sustainable development info. at the national level	1997	60
		Environmental strategies and action plans	1992-1996	122
		Number of ESI variables missing from selected data sets	2001	122
	Eco-Efficiency	Energy efficiency (total energy consumption per unit GDP)	1998	118
		Renewable energy prod. as a % of total energy consumption	1998	122
	Reducing Public Choice Distortions	Price of premium gasoline	1998	121
		Subsidies for energy or materials usage	2000	56
		Reducing corruption	2000	117
Global Stewardship	International Commitment	No. of memberships in environmental intergovernmental orgs.	1998	121
		Percentage of CITES reporting requirements met	2000	122
		Levels of participation in the Vienna Convention/Montreal Prot.	2000	122
		Compliance with environmental agreements	2000	56
	Global-Scale Funding/Participation	Montreal Protocol Multilateral Fund participation	2000	122
		Global Environmental Facility participation	2000	122
	Protecting International Commons	FSC accredited forest area as a % of total forest area	2000	122
		Ecological footprint "deficit"	1996	118
		CO2 emissions (total times per capita)	1997	122
		Historic cumulative CO2 emissions	1997	122
		CFC consumption (total times per capita)	MRYA 1996-98	100
		SO2 exports	1997-1998	51

MRYA = Most Recent Year Available. * Number of of countries for which data are available.

Main Findings

To calculate the Environmental Sustainability Index, we averaged the values of the 22 indicators and calculated a standard normal percentile for each country. The results are shown in Table 3. The numerical scores, ranging from 80.5 (Finland) to 24.7 (Haiti), represent the percentage of countries expected to have a lower level of environmental sustainability than that particular country, assuming a distribution of environmental sustainability scores that is "normal" (i.e., a bell curve).

Additional methodological details are elaborated in Annex 1. Annexes 4-6 provide a variety of more detailed reports, including measures of each of the 5 components and 22 indicators, profiles of each of the 122 countries, and descriptions and original data for each of the 67 variables.

Table 3. 2001 Environmental Sustainability Index

Finland	80.5
Norway	78.2
Canada	78.1
Sweden	77.1
Switzerland	74.6
New Zealand	71.3
Australia	70.7
Austria	67.8
Iceland	67.3
Denmark	67.0
United States	66.1
Netherlands	66.0
France	65.8
Uruguay	64.6
Germany	64.2
United Kingdom	64.1
Ireland	64.0
Slovak Republic	63.2
Argentina	62.5
Portugal	61.4
Hungary	61.0
Japan	60.6
Lithuania	60.3
Slovenia	59.9
Spain	59.5
Costa Rica	58.8
Estonia	57.7
Brazil	57.4
Czech Republic	57.2
Bolivia	56.9
Chile	56.6
Latvia	56.3
Russian Federation	56.2
Panama	55.9
Cuba	54.9
Colombia	54.8
Italy	54.3
Peru	54.3
Croatia	54.1
Botswana	53.6
Greece	53.1
Zimbabwe	52.0
Nicaragua	51.9
Ecuador	51.8
South Africa	51.3
Mauritius	51.2
Venezuela	50.8
Armenia	50.6
Gabon	50.5
Mongolia	50.3
Sri Lanka	49.8
Malaysia	49.7
Israel	49.5
Paraguay	48.9
Fiji	48.1
Central African Republic	48.0
Belarus	48.0
Poland	47.6
Moldova	47.4
Bulgaria	47.4
Guatemala	47.3
Papua New Guinea	47.3
Ghana	47.0
Honduras	46.9
Singapore	46.8
Nepal	46.7
Egypt	46.5
Trinidad and Tobago	46.4
Azerbaijan	46.4
Turkey	46.3
Mali	46.2
Dominican Republic	45.4
Mexico	45.3
Thailand	45.2
Bhutan	45.1
Cameroon	44.9
Mozambique	44.2
Albania	44.2
Belgium	44.1
Romania	44.1
Uganda	44.0
Kenya	43.9
Tunisia	43.7
El Salvador	43.7
Pakistan	43.6
Indonesia	42.6
Senegal	42.5
Jamaica	42.3
Morocco	41.9
Uzbekistan	41.6
Kazakhstan	41.6
Malawi	41.3
India	40.9
Tanzania	40.3
South Korea	40.3
Jordan	40.1
Zambia	39.8
Kyrgyz Republic	39.6
Bangladesh	39.5
Macedonia	39.2
Togo	39.1
Algeria	38.9
Benin	38.6
Burkina Faso	38.6
Iran	38.4
Syria	37.9
Sudan	37.7
China	37.6
Lebanon	37.5
Ukraine	36.8
Niger	36.5
Philippines	35.7
Madagascar	35.4
Vietnam	34.2
Rwanda	33.5
Kuwait	31.9
Nigeria	31.8
Libya	31.3
Ethiopia	31.2
Burundi	30.1
Saudi Arabia	29.8
Haiti	24.7

Analysis of Results

We first explored the extent to which the analytical categories we utilized were supported by the data we collected. Are the variables that we think are measures of the same phenomena correlated with each other? Are the indicators that we think are distinctly different aspects of environmental sustainability really distinct?

If the variables we used to serve as measures of the indicators were empirically related, then they ought to be more high correlated with each other than the average pair of variables in the overall data set. This turns out to be true. The average bivariate correlation for variable pairs within the same indicator is 0.36, whereas it is 0.09 for the data set as a whole.

For their part, the 22 indicators had an average bivariate correlation among themselves of only 0.11. Only 36 of the 231 possible pairs of indicators had correlation coefficients greater than 0.5. The highest such correlations are reported in Table 4.

This provides confirmation that we have successfully formulated analytical categories that are capable of measuring distinct aspects of environmental sustainability.

We also determined which individual variables had the highest correlation with the ESI, and report those in Table 5.

Table 4. Most Highly Correlated Indicator Pairs

		Correlation Coefficient
Basic Human Sustenance	Environmental Health	0.85
Environmental Health	Reducing Population Stress	0.82
Basic Human Sustenance	Reducing Population Stress	0.72
Environmental Health	Science/Technology	0.69
Science/Technology	Eco-efficiency	0.68
Science/Technology	Reducing Public Choice Distortions	0.66
Basic Human Sustenance	Science/Technology	0.66
Reducing Population Stress	Science/Technology	0.63
International Commitment	Private Sector Responsiveness	0.63
International Commitment	Eco-efficiency	0.62
Water Quality	Science/Technology	0.61
Regulation and Management	International Commitment	0.60
International Commitment	Regulation and Management	0.60
Reducing Public Choice Distortions	Eco-efficiency	0.60
Basic Human Sustenance	Protecting International Commons	-0.60
Reducing Air Pollution	Science/Technology	-0.63

Table 5. Variables with Highest Correlation to ESI

Variable	Correlation Coefficient	n
Reducing Corruption	0.75	122
Environmental Regulatory Stringency	0.74	56
Scientific and technical articles per million population	0.73	122
Average Innovest EcoValue'21 rating of firms	0.71	20
Urban TSP Concentration	0.70	122

The fact that Reducing Corruption is the variable that has the highest correlation with the ESI supports the view that good governance broadly conceived enhances environmental sustainability. Although the significance of the high correlation coefficient for the Innovest EcoValue'21 rating, which measures the quality of environmental management within firms, is diminished somewhat by the low number of countries for which that variable is available, it is noteworthy that in addition to being highly correlated with the ESI overall the EcoValue rating is the second most highly correlated variable with the Environmental Systems component. Among these 20 countries at least, it appears that good environmental management at the firm level is associated with environmental performance at the broader national level.

We were also eager to explore whether our measure of environmental sustainability was highly correlated with any other phenomena or measures. The results are presented in Table 6.

Although the relationship with GDP per capita is strong, other global indices, such as the Consumption Pressure Index and the Ecological Footprints, show higher correlations with per capita income. The factors that are not strongly correlated are equally interesting. Population density and economic growth rates, in spite of common complaints about their impacts on the environment, are in general not consistently associated with poor environmental performance. These results suggest that countries that are growing quickly need not degrade their environments, nor are densely populated countries doomed to pollution damage and natural resource shortages.

Finally, we wish to point out that the large amount of information contained in the data set that underlies the Environmental Sustainability Index is capable of being utilized for a variety of other purposes. For example, it could serve as the basis for a watch list of countries facing potential environment-driven crises.

Table 6. Correlations Between the ESI and Other Comparative Measures

Measure	Correlation with ESI
WWF Consumption Pressure Index	0.56**
Ecological Footprint	0.60**
Percent of GDP from agriculture	-0.48**
GDP per capita (PPP)	0.76**
1990-1998 GDP per capita growth	0.12
Human Development Index	0.67**
Population Density	-0.06
Percent of territory with population density greater than 5 persons per square km.	-0.19*
WEF Current Competitiveness Index	0.65**

** Correlation is significant at the .01 level,

* Correlation is significant at the .05 level

Relationship to Economic Performance

The precise relationship between economic growth and environmental sustainability deserves more detailed attention because of the significant debate centered on the degree to which environmental and economic values are in conflict. We explored the relationship between environmental and economic performance in a number of ways. We found that although per-capita income is significantly correlated with the Environmental Sustainability Index, measures of economic competitiveness are less strongly correlated and economic growth rates are correlated very weakly.

The relationship between the Environmental Sustainability Index and income is shown in Figure 1.

Clearly levels of per capita income exert a significant effect on environmental sustainability as measured by the ESI. The World Economic Forum's "Current Competitiveness Index" has a similar though slightly weaker correlation with the Environmental Sustainability Index. That relationship is shown in Figure 2.

Figure 1. Relationship Between the ESI and Per Capita Income

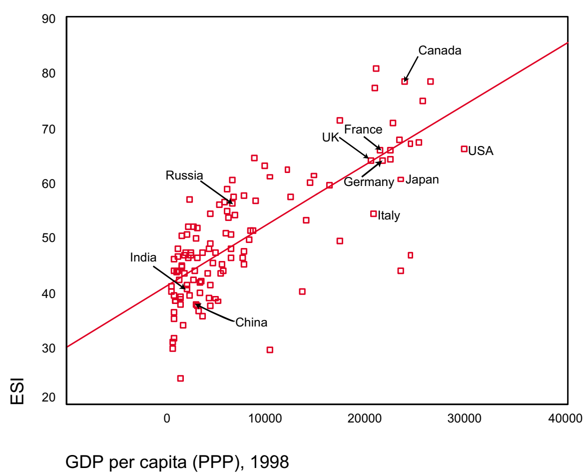


Figure 2. Relationship Between the ESI and WEF's Current Competitiveness Rank

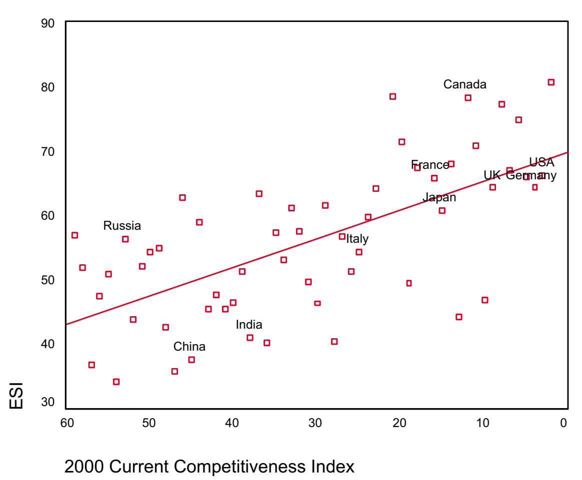


Figure 3. Relationship Between the ESI and Growth in Per Capita Income, 1990-1998

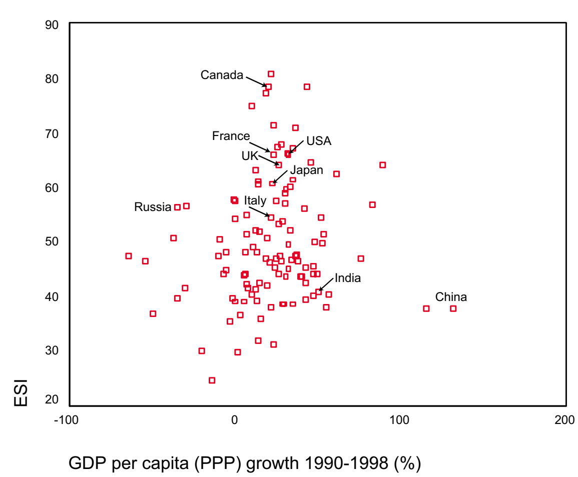


Table 7. Correlation Between ESI and GDP per capita, by Income Quintile

Income quintile	Correlation coefficient with ESI
1	0.21
2	0.07
3	0.58**
4	0.15
5	0.21
All countries	0.76**

** Statistically signicant at the .01 level

Table 8. Among Countries with Similar Levels of Income, Environmental Performance Varies

Country	ESI	GDP per capita (US$, PPP)
Italy	54.3	20,600
Sweden	77.1	20,700
Turkey	46.3	6,400
Lithuania	60.3	6,400
Iran	38.4	5,100
Panama	55.9	5,200
China	37.6	3,100
Ecuador	51.8	3,000
Haiti	24.7	1,400
Cameroon	44.9	1,500

If we compare to growth rates in per-capita income there is practically no relationship at all, as shown in Figure 3.

Given the way we have conceptualized environmental sustainability, it is not terribly surprising that at a broad structural level per capita income appears to exert a strong effect. A large number of the 22 indicators, especially those concerning social capacity, human vulnerability, and environmental stresses are significantly affected by economic development.

However, it is more surprising how weak the relationship between income and environmental sustainability is when we look only within income quintiles. As Table 7 shows, it is only in the middle-income countries that a strong correlation is found, and even this correlation is significantly lower than the global correlation. Among the other income groups the effect is extremely weak.

We draw an important conclusion from this analysis: for countries in similar economic circumstances, some manage their environmental challenges well; others do not. Table 8 illustrates this point with data drawn from our analysis. It would not make sense to expect Haiti to achieve levels of environmental performance on a par with Sweden, for example; but there is no economic factor preventing Haiti from achieving a level approaching that of Cameroon, and this difference is significant. Similarly, Belgium (GDP per capita of $23,200) should be on a par with Sweden (GDP per capita of $20,700) and yet it ranks 75 slots lower with an ESI score of 44.1 compared with Sweden's fourth-ranking score of 77.1.

This suggests that when it comes to making fundamental policy choices having to do with environmental and economic performance, there is no significant tradeoff. The choices appear to be distinct and separable. This is consistent with the "Porter Hypothesis" that suggests that high levels of environmental protection are compatible with high levels of economic growth, and may even encourage the innovation that supports growth (Porter and van der Linde 1995; Esty and Porter 2000).

Challenges to Measuring Environmental Sustainability

We encountered a number of severe and often discouraging difficulties in the course of seeking measures of the 22 indicators that comprise the Index. In this section of the report we identify these challenges and discuss the strategies we employed to cope with them.

One challenge had to do with issues of **scale**. Environmental sustainability is a phenomenon that rarely unfolds at the level of a nation-state as a whole. More typically it is observed at a smaller scale – a river basin, a forest, an urban center. Yet for the most part environmental data are reported at the level of the nation. This mismatch of scales can lead to systematic errors. If a country's freshwater withdrawals are about equal to its freshwater availability, for example, then using only national level data will lead one to an optimistic assessment. But if withdrawals are highly concentrated in one area and availability is concentrated in a different area, these national figures will be very misleading. We sought wherever feasible to incorporate data that were collected or reported at a more fine-grained resolution, and then to aggregate them up to national levels in a way that took into account the sustainability dynamics at the smallest relevant scale. We did this for measures of acidification damage, water stress, water quality, air quality, land degradation, and private sector responsiveness.

Another challenge had to do with **data gaps**. Many important variables had shockingly poor country coverage. It was extremely frustrating to experience the gulf between statements by global bodies about the high priority of water quality and air quality as critical environmental concerns, and the reality that very little systematic global monitoring of these factors is taking place. We urge a renewed global commitment to developing a worldwide database covering major environmental issues and providing quality information that is comparable across nations and time. Such an initiative would be a worthy focus for the United Nations "Rio+10" World Summit on Sustainable Development to take place in South Africa in 2002.

One strategy we employed to help deal with data gaps was utilization of modeled data. Increasingly global environmental phenomena are the focus of intensive modeling efforts that take the best available empirical observations as inputs, and add tested methods for generating global estimates either of individual variables or of the interaction among variables. For carefully constructed models the resulting data can be quite useful for the purposes of sustainability measurements. We used model data for water quantity, acidification damage, air pollution emissions, industrial organic pollution emissions, and population stress. We were selective in choosing modeled data; the models we drew from had all been subject to scientific peer review and/or endorsed by international organizations.

In a few select cases we constructed our own data sets. We did this for environmental health, land area affected by human activities, and membership in international environmental organizations. We also arranged with a few data holders to construct custom data sets for us; this was the case with our use of the Innovest EcoValue '21 and Dow Jones Sustainability Group Index variables.

In spite of these efforts, major gaps remain. We were unable to locate useful data, for example, on toxic waste contamination, on lead poisoning or exposure, on wetland loss, on compliance with domestic environmental regulations, on extent of natural resource subsidies, or on the number of dangerous nuclear power plants. All of these issues have important theoretical and practical links to environmental sustainability. Each deserves policymaker attention at the national and global scales.

In the following sections we report in more detail how we dealt with four sets of indicators that are often considered to be of high global priority: freshwater resources, biodiversity loss, terrestrial ecosystems, and environmental health.

Freshwater Resources

Water Availability

One of the problems we encountered with existing data sets on internal renewable water resources by country is that they are compiled from many different sources, and they sometimes include and sometimes exclude water flowing from and to other countries. This quote from the data appendix to the World Resource Institute's (WRI) *World Resources 2000-2001* report illustrates the dilemma: "When data for annual river flows *from* and *to* other countries are not shown, the internal renewable water resources figure *may* include these flows. When such data are shown, they are *not* included in a country's total internal renewable water resources." Although the WRI report is one of the best compilations of water availability figures, the ambiguity of the data definition, and the fact that the data come from eleven different sources, render them less useful for globally comparative analyses.

To address this problem, we worked with hydrological modelers at the Center for Environmental Systems Research at the University of Kassel in Germany to perform some special runs of their WaterGAP 2.1b model (WaterGAP stands for Water Global Assessment and Prognosis; Alcamo, *et al.*, 2000). WaterGAP belongs to a class of environmental models called "integrated" models that were first developed during the 1980s to study large-scale environmental problems. The advantage of the WaterGAP model is that it is based on a consistent set of methodologies utilizing actual hydrological data on precipitation, evaporation, and river flows from 1961-1990. These data were converted by the modelers to a 0.5° by 0.5° latitude-longitude grid (approximately 50km x 50 km at the equator, and 50km on the north-south side and 25km on the east-west side at a latitude of 60 degrees). The model estimates the impact of evaporation, which greatly affects water availability, as well as consumption in upstream nations. The internal renewable water resources data represent 1961-1990 average annual flow of rivers and recharge of groundwater generated from endogenous precipitation, taking into account evaporation losses from lakes and wetlands. The inflow data represent 1961-90 average annual inflow of rivers flowing from other countries, taking into account the loss due to consumptive water use in those countries.

The disadvantage of using WaterGAP is that, owing to the grid cell size (as described above), the model does not easily accommodate "micro-states" such as small islands or city-states. Where possible, we made use of alternative data for these countries.

Water Quality

We obtained original water quality data sets from the UNEP-Global Environmental Monitoring System/Water group (GEMS/Water). The GEMS system yields a consistent data set for 45 countries for a wide range of water quality indicators. We selected from the GEMS/Water data set a smaller sub-set of variables based on the extent of country coverage for each variable, and the degree to which the variable is recognized as an important measure of water quality. We arrived at the following four indicators:

Dissolved oxygen: This is a "headline" indicator for water. It tracks eutrophication levels, and is positively related with stream flow and inversely related to nitrogen and phosphorous levels. The U.S. National Research Council report (2000) listed dissolved oxygen as one of four indicators that provide crucial measures of ecosystem health.

Suspended solids: This is a measure of turbidity, and would be associated most closely with people's visual assessment of what clean water looks like. In heavily agricultural areas with high erosion levels, suspended solids levels can be quite high (e.g., the Ganges or the Yellow River). There is a fairly high natural component to suspended solids in rivers, and the concentration of suspended solids tends to increase in proportion to discharge levels. However, when aggregated across water bodies at the national level, this measure remains an important means of assessing water quality.

Phosphorus concentration: This is a measure of the level of eutrophication: phosphorous is a limiting nutrient for plant photosynthesis in fresh water environments. There is not much natural component measured by this indicator, so we can be reasonably certain that we are measuring anthropogenic impacts on water bodies.

Electrical conductivity: This is a bulk measure of the concentration of metals or salt in the water. Electrical conductivity is one of the most rapid and inexpensive measurements that can be made to assess water quality, and therefore its measurement is precise and widespread. Conductivity of water is affected by the presence of inorganic dissolved solids such as chloride, nitrate, sulfate and phosphate anions, or sodium, magnesium, calcium, iron and aluminum cations. It is important to note that geology can have a large impact of electrical conductivity. Streams that run through bedrock areas tend to have a lower conductivity whereas streams that run through soils tend to have a higher conductivity.

One limitation of the GEMS water quality data is that the participating countries provide data from monitoring stations that vary in number and which may be located in quite different locations with respect to water quality stressors (e.g., industry and agriculture) within the same country, and from country to country. This makes it challenging to aggregate station data within countries, and also makes it somewhat difficult to compare the resulting measures across countries. Because there is no alternative, however, the GEMS data are what we used. In the interest of developing a more comprehensive worldwide water database with a carefully constructed analytical protocol, support needs to be provided to the GEMS/Water program in order to expand its country coverage.

Biodiversity Loss

The objective of these variables is to derive a relative measure of how well a country is managing its biodiversity, as measured by percent of known species threatened. Biodiversity describes the complexity of life and includes the number, variety and variability of living organisms. Biological diversity is commonly defined in terms of at least three hierarchies: genes, species and ecosystems (WCMC, 1992). The species level was selected for this ESI variable. The logic behind this decision is that species data are readily available and for certain taxonomic groups (such as birds and mammals) and fairly reliable. This approach is, however, limited by the current state of knowledge of species numbers, differences in taxonomic classifications and the assumption that organisms that differ greatly from each other contribute more to the overall diversity than those which are very similar (WCMC, 1992).

Biodiversity loss occurs both directly and indirectly—directly through such activities as hunting and indirectly though activities such as habitat destruction and modification. At the species level, loss means extinction in the wild.

Two species-level variables were calculated, percentage of breeding birds threatened and percentage of mammals threatened. Bird species are well known (Collar *et al*., 1994) and mammals species relatively well known. There is less confidence in the reliability of the number of species of vascular plants, reptiles, amphibians and fishes, and so these data were not used in the ESI.

For the purposes of the ESI, it is not useful to compare the number of existing species in each country because countries obviously cannot make additions to their natural species diversity. Countries do, however, have control over how likely the species found in their country are to go extinct.

Dividing the number of threatened species in a country by the total number of known species gives an estimate of how well a country is managing different groups of species. Threatened is defined as taxa falling into one of three categories: Critically Endangered, Endangered or Vulnerable, all measures of likelihood of extinction in the wild.

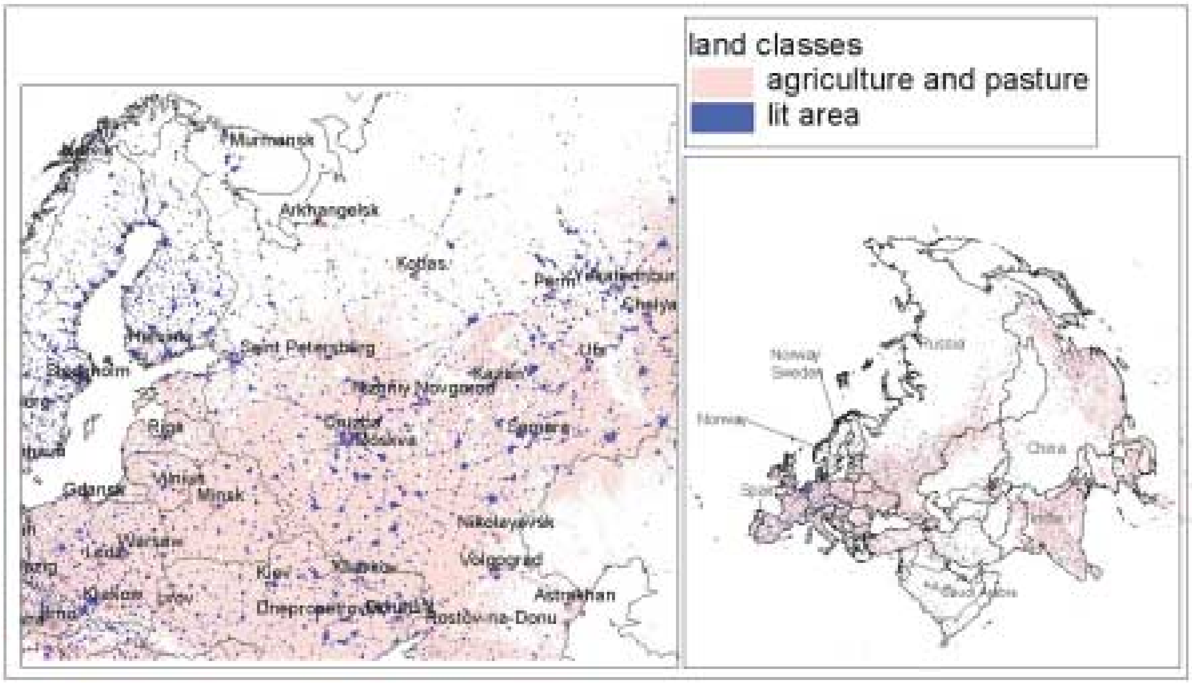
Terrestrial Ecosystems

Anthropogenic Impacts on Land

We created a new variable from selected global datasets that seeks to provide a measure of land affected by human activity within a country. The variable bundles several environmental stresses, including ecological impact of natural vegetation clearing, the environmental impact of specific land use activities and the efficiency of land resource use by a country. At present the variable is experimental and in a developmental stage.

Clearing of natural vegetation results in habitat fragmentation and degradation. If the land is converted to agriculture, there can also be economic and ecological costs from increased soil salinity. If the land is converted to urban area, the change is generally irreversible, resulting in increases in the extent of impermeable surfaces (pavement) and, potentially, pollution-generating activities. There is a direct relationship between cleared natural vegetation and biodiversity loss, including species extinction (Brooks *et al.*, 1999). The anthropogenic impact variable represents an inventory-based approach proxy measure of biodiversity loss to complement the current species based ESI biodiversity variable (see section on biodiversity

Figure 4. Map Depicting the Agricultural, Pasture and Lit Areas in Europe and Asia



loss above). To be useful, it is important to know the area and also type of natural vegetation cleared.

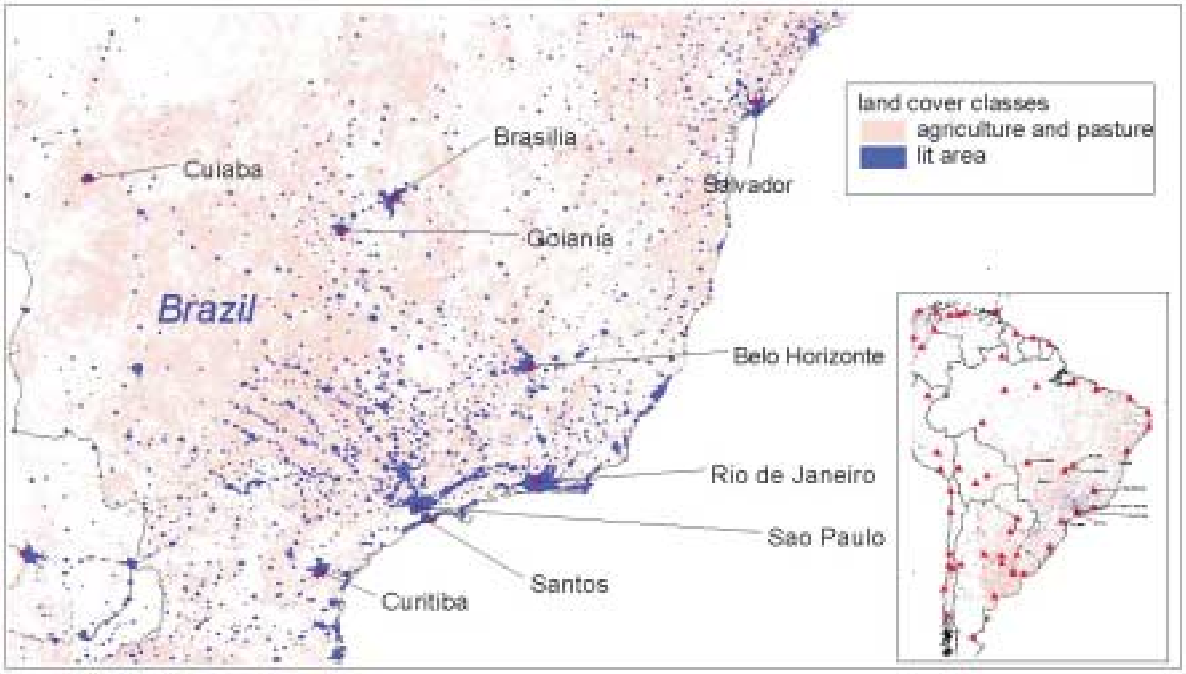
Two types of anthropogenic impacts were identified: the built environment and agricultural (including pasture) land. Two satellite-derived global datasets were combined to estimate the area of land in each country affected by anthropogenic activities. Estimates of built environment were derived from the Nighttime Lights data set and estimates of agricultural land from the Global Land Cover Characteristics (GLCC) database. An estimate of the percent of built environment and agricultural land provides a proxy for the amount of natural vegetation cleared. Two complications are immediately obvious: plantation style forested areas are not included, and some pastureland is natural grassland. Nonetheless, a relative measure of land cleared of its natural vegetation cover is possible.

The methodology was as follows. Version 2.0 of the Global Land Cover Characterization (GLCC) database was obtained for each region (North America, South America, Eurasia, Asia-Pacific and Africa) in Lambert Azimuthal Equal Area projection from an ftp site (edcftp.cr.usgs.gov). Land cover classes over 10% of the earth's surface were revised for version 2.0 based on user feedback (Brown *et al.*, 1999) and broad lessons learned from validation exercises (Scepan, 1999; Muchoney *et al.*, 1999). This version of the database is still based on the 1992-1993 satellite data, and therefore, represents the land cover patterns for that period. The USGS Land Use/Land Cover System Legend (Modified Level 2) was selected for this application.

Urban areas for the GLCC product were extracted from the Digital Chart of the World (Defense Mapping Agency, 1992). A visual inspection of the urban class indicated that not all built environment areas were represented, so the Lights at Night dataset was used as an alternative. The Lights at Night dataset captures a wider range of human activity including residential, commercial, industrial, public facilities and roadways (Elvidge *et al*., 1999).

Elvidge *et al*. (1997a, 1997b) have applied the time series data from the Defense Meteorological Satellite Program (DMSP) Operational Linescan System (OLS) as processed by the NOAA National Geophysical Data Center in Colorado to inventory human settlements. The data product selected for the ESI application was the stable lights for city areas. This data product has been fil-

Figure 5. Map Depicting the Agricultural, Pasture and Lit Areas in South America



tered for clouds, gas flares, fishing lights and fires and thresholded based on the frequency a particular grid cell is lit. This global data layer is at a nominal resolution of 1km and represents data for October 1994 to March 1995.

The two datasets were combined in the following fashion. A global binary version of the stable lights for city areas was created resulting in a grid of lit or not lit areas. The global data set was then cut and projected to match the GLCC database regions. The lit areas from the lights at night dataset were then "added" to the GLCC, replacing the previous classification.

To estimate anthropogenically affected areas, the areas for relevant classes in the composite dataset were tabulated by country. The USGS Land Use/Land Cover System Legend has five classes that include cropland and/or pasture. These are: Dryland Cropland and Pasture, Irrigated Cropland and Pasture, Mixed Dryland/Irrigated Cropland and Pasture, Cropland/Grassland Mosaic and Cropland/Woodland Mosaic. Areas for these five classes and the lights at night derived lit area class were combined resulting in the square kilometers of anthropogenic impact. The land area affected by human activity calculated from the composite dataset was divided by the land area of the country, as reported in the ESRI global country dataset, to calculate the percent of land area affected.

Acidification Exceedance

The objective of this variable was to assess the degree to which terrestrial ecosystems were affected by acidification due to sulfur deposition from industrial air pollution. We calculated the percentage of each country at risk of acidification, based on the "Exceedance of Critical Loads for Terrestrial Ecosystems" map obtained from the Stockholm Environment Institute (SEI) at York, United Kingdom. Critical loads are the maximum amount of deposition a given area can receive before suffering ecological damage. This map was produced as follows (Kuylenstierna *et al.*, 2000):

1. Creation of sulfur deposition map. The Global Emission Inventory Activity (GEIA) sulfur emission inventory for 1990 was used and integrated in the MOGUNTIA model to calculate sulfur deposition. In addition, a model for global emission, transfer and deposition of soil dust (*base cation deposition*) was used. The base cation deposition, and particularly the calcium content, is a measure of the ability of the ecosystem to neutralize the acidifying depositions. Two deposition ranges (10 % of calcium content and 100%) were used in the

model. The acidic deposition derived from sulfur emissions is calculated as sulfur deposition minus the base cation deposition rate.

2. Creation of sensitivity to acidic deposition map. A method that combines three classes of Cation Exchange Capacity with five classes of base saturation to define five classes of sensitivity was implemented and applied to the digital FAO Soil Map of the World.

3. Conversion of sensitivity map to critical loads map. The conversion was made based on the assumption that the critical load is equal to the buffering rate (weathering rate) of the soil.

4. Production of the exceedance of critical loads map. This was obtained by combining the acidic deposition (1) and critical loads (3) maps.

For 1990, Stockholm Environment Institute at York produced two maps of exceedance of critical loads:

- High Risk, obtained by using low critical loads and 10% calcium content of modeled dust
- Low Risk, obtained by using high critical loads and 100% calcium content in dust.

Given the small variability in exceedance values from the Low Risk map, we decided to use only the High Risk map for inclusion in the ESI. The areas at risk have been summed within each country and then the percentage of a country at risk of exceedance was calculated.

Environmental Health

The concept of environmentally related diseases has begun to gain currency, but to date nobody has produced indicators of diseases that are attributable to environmental conditions. The Global Burden of Disease (GBD) study was a step in this direction. It produced some measures of countries' burden of disease for 1990, and among the diseases included were a number that could be directly traced to environmental factors (see http://www.hsph.harvard.edu/organizations/bdu). Smith *et al.* (1999) analyzed the Global Burden of Disease numbers, and demonstrated that of all the diseases included in the GBD study, acute respiratory infections (ARI) and diarrheal diseases were most linked to environmental conditions. They conclude that "25-33% of the global burden of disease can be attributed to environmental risk factors. Children under 5 years of age seem to bear the largest environmental burden, and the portion of disease due to environmental risks seems to decrease with economic development."

Utilizing a large data set from the World Health Organization, we extracted age and sex specific deaths by country for the most recent years available (we utilized no data older than 1990) for the two classes of disease mentioned above: ARI and intestinal infectious diseases. In the first case, we produced an indicator called "Child Death Rate from Respiratory Diseases," which measures deaths from respiratory diseases (WHO classes B31 & B320 & B321) per 100,000 population aged 0-14 (utilizing UN population data broken down by age). The diseases in this category included acute tonsillitis, acute laryngitis and tracheitis, other acute upper respiratory infections, deflected nasal septum and nasal polyps, chronic pharyngitis, nasopharyngitis and sinusitis, chronic diseases of tonsils and adenoids, acute bronchitis and bronchiolitis, pneumonia, and other.

For the intestinal infectious diseases, we followed a similar procedure, except we calculated standardized death rates for each country's entire population that were comparable across countries. The diseases in this category included cholera, typhoid fever, shigellosis, food poisoning, amoebiasis, intestinal infections due to other specified organism, ill-defined intestinal infections, and other.

How Should the Index's Inputs be Weighted?

Nominally, all the inputs into the Environmental Sustainability Index receive equal weight. The 22 indicators are calculated by averaging the values of the appropriate variables. The Index score is calculated by averaging the 22 indicators. No variable or indicator gets more weight than any other.

In fact, however, there are implicit weights that derive from the structure we impose on the Environmental Sustainability Index. We identify seven separate indicators of social and institutional capacity, for example, but only two indicators of human vulnerability. Implicitly we are giving capacity measures more than three times the weight of vulnerability measures.

Not everyone will agree with the implicit weights reflected in this Index. Unfortunately, disputes over the appropriateness of our weights cannot be easily resolved. There is no agreed prioritization among competing environmental issues, and there are no independent measures of environmental sustainability to use as an empirical check. We took three separate steps to address the issue of weights.

First, we explored two techniques for assigning weights based on empirical relationships among the variables. Both these techniques proved to be unfruitful.

In the first instance we sought to construct a time series on a subset of the data that spanned the five components, in an effort to identify causal relationships that could be used as the basis for assigning differential weights. Variables with stronger causal impacts would receive stronger weights. In the end this effort failed for the simple reason that robust time series data across a relevant range of indicators were impossible to construct.

The other such technique we employed was "principal components analysis," in which we sought to identify statistically patterns of variation within the data that would allow us to assign differential weights to variables based on their ability to discriminate efficiently among the observations. This was also unsatisfying. The principal components identified using this technique failed to conform with any analytically or intuitively plausible set of expectations; fifteen components were identified but these included variables from disparate sets of indicators and, more problematically, assigned negative weights to many variables. The fact that we identified a relatively large number of principal components is confirmation of our assumption that environmental sustainability is a complex, highly heterogeneous phenomenon. But it does not help us determine the appropriate weights for variables.

Second, we conducted a survey of environmental experts and members of the business community to determine their views on the relative importance of the indicators used in the Index. The survey asked respondents to rank, on a scale of 1-5, the relative importance of the indicators that comprise the Index. A total of 254 surveys were received, representing 73 countries. One major set of respondents was identified at the October 2000 meeting of the World Conservation Congress in Amman, Jordan (n=158). The survey was circulated in person at that meeting. The other was the World Economic Forum Global Leaders of Tomorrow (GLT) membership (n=58); GLT members were sent the survey by the WEF. A smaller number of questionnaires (n=36) was circulated at other meetings of environmental experts during the fall of 2000 – each of these meetings was attended by recognized experts from a range of countries.

We drew two conclusions from this survey. First, we noted significantly lower importance scores for an indicator we had been developing on "exposure to environmental disasters." The opinion that this indicator should be lower in relative importance was observed across regions, across sectors, and across income levels of the respondents' home countries. In the end we dropped the environmental disasters indicator. In addition to being judged to be of lower importance it had weak variables available to measure it. Second, the other variables were close together – in virtually all cases occupying overlapping 95-percent confidence intervals. Although the Environmental Sustainability Index scores are different if we apply these weights, in the end we decided not to use them because we did not have confidence that they reflected a meaningful set of differences.

A sensitivity analysis suggests further that the weighting methodology developed would not have changed the rankings in any appreciable fashion. In particular, we calculated an Index score using the survey-generated weights (and applying the average weight for the two indicators that were not part of the survey). The average shift in rank was only 1.7 places out of 122.

Finally, to acknowledge the diversity of views as to the appropriate weights, we have experimented with an interactive version of the Index that operates on a desktop computer and permits users to alter weights and view the results.

Table 9. Results of ESI Indicator Weighting Survey

Indicator	Average Weight
Urban Air Quality	3.8
Water Quantity	3.6
Water Quality	3.9
Biodiversity	3.9
Land	3.7
Air Pollution	3.8
Water pollution and consumption	3.9
Ecosystem Stress	4.0
Waste Production & Consumption Pressure	3.6
Population	3.5
Basic Sustenance	3.5
Public Health	3.5
Disasters Exposure	2.8
Science and Technical Capacity	3.0
Capacity for Policy Debate	3.3
Environmental Regulation & Management	3.5
Tracking Environmental Conditions	3.3
Eco-efficiency	3.3
Public Choice Failures	3.6
Contribution to Int'l Cooperation	3.0
Impact on Global Commons	3.5

Conclusions and Next Steps

Societies are setting ambitious goals concerning sustainability. The Index reported here is intended to contribute to the success of these efforts by making it possible to quantify goals, measure progress and benchmark performance. The ESI will also facilitate more refined investigation into the drivers of environmental sustainability, and help to draw special attention to "best practices" and areas of success as well as lagging performance and potential disasters.

Notably, the ESI:

- provides tangible measures of environmental sustainability, filling a major gap in the environmental policy arena;
- creates a foundation for shifting environmental decision-making onto a more analytically rigorous foundation;
- contains a single measure of environmental sustainability as well as three additional levels of aggregation to meet a wide range of policy and research needs;
- strikes a useful balance between the need for broad country coverage and the need to rely on high-quality data that are often of more limited country coverage.
- builds on an easily understood database using a methodology that is transparent, reproducible, and capable of refinement over time.

The Index is not without its weaknesses. In particular, it:

- assumes a particular set of weights for the Index constituents that imply a set of priorities and values that may not be universally shared;
- relies in some instances on data sources of less than desirable quality;
- suffers substantive gaps attributable to a lack of comparable data on a number of high priority issues;
- lacks time series data, preventing any serious exercise in validation and limiting its value as a tool for identifying empirically the determinants of good environmental performance.

The ESI remains a "work in progress." A number of refinements of the analysis need to be undertaken to deepen our understanding of environmental sustainability and how to measure it:

1. A major investment in data gathering and data creation is clearly called for. We recommend a pluralistic approach to filling critical data gaps, making use of existing international organizations where they are capable, but filling in where they are not with strategies that draw upon networks of scientists, local and regional officials, industries, and non-governmental organizations. The world is sufficiently better connected, better skilled, and better equipped that we need not rely on the institutions of a century ago to meet the needs of the present.

2. Because there are a variety of value judgments and significant scientific uncertainties about causality, it is necessary to augment the Environmental Sustainability Index with a flexible information system that permits users to apply their own value judgments or to experiment with alternative causal hypotheses. We have tried to advance this objective by creating an interactive version of the Index that operates on a desktop computer and by making our data and methods as transparent as possible. More could be done along these lines, including tools to facilitate more powerful integration of environmental sustainability data from different sources.

3. We need more sophisticated methods for measuring and analyzing information that comes from different spatial scales. Environmental Sustainability is a function of the interaction of mechanisms that operate at the level of ecosystems, watersheds, firms, households, economic sectors and other phenomena that we are not well equipped to understand as parts of a whole. The modest efforts to integrate information from different spatial scales utilized in this Index need to be evaluated, improved and supplemented.

4. Consistent measurements over time are vital to create the ability to carry out robust investigations into cause-effect relationships. These measurements should evolve as data availability and aggregation techniques improve. But they must remain fully transparent and adequately archived for it to be possible to conduct meaningful scientific investigation. In addition to continuing measurements into the future, it is possible that retrospective measurements of certain variables could permit more rigorous causal analysis.

References

Alcamo, J., T. Henrichs, and T. Rosch, *World Water in 2025: Global Modeling and Scenario Analysis for the World Commission on Water for the 21st Century*, Kassel World Water Series Report No. 2, Center for Environmental Systems Research, University of Kassel, February 2000.

Brooks, T. M., S. L. Pimm, V. Kapos and C. Ravilious, “Threat from Deforestation to Montane and Lowland Birds and Mammals in Insular South-east Asia,” *Journal of Animal Ecology*, Vol. 68, 1999, pp. 1061-1078.

Elvidge, C. D., K. E. Baugh, J. B. Dietz, T. Bland, P. C. Sutton and H. W. Kroehl, “Radiance Calibration of DMSP-OLS Low-light Imaging Data of Human Settlements,” *Remote Sensing of the Environment*, Vol. 68, 1999, pp. 77-88.

Elvidge, C. D., K. E. Baugh, E. A. Kihn, H. W. Kroehl and E. R. David, “Mapping City Lights with Nighttime Data from the DMSP Operational Linescan System,” *Photogrammetric Engineering & Remote Sensing*, Vol. 63, No. 6, 1997a, pp. 727-734.

Elvidge, C. D., K. E. Baugh, V. R. Hobson, E. A. Kihn, H. W. Kroehl, E. R. Davis and D. Cocero, “Satellite Inventory of Human Settlements Using Nocturnal Radiation Emissions: A Contribution for the Global Toolchest,” *Global Change Biology*, Vol. 3, 1997b, pp. 387-395.

Esty, Daniel C. and Michael E. Porter, “Measuring National Environmental Performance and its Determinants," *The Global Competitiveness Report 2000*, Michael Porter and Jeffrey Sachs (eds.), New York: Oxford University Press, 2000.

Feshbach, M., *Ecological Disaster: Cleaning up the Hidden Legacy of the Soviet Regime*. Twentieth Century Fund, 1995.

Kuylenstierna, J., H. Rodhe, S. Cinderby and K. Hicks. “Acidification in developing countries: ecosystem sensitivity and the critical load approach at global scale.” *Ambio*, 30 (1), 2001, pp. 20-28.

Myers, N. , R. A. Mittermeier, C. G. Mittermeier, G. A. B. da Fonseca and J. Kent, “Biodiversity Hotspots for Conservation Priorities,” *Nature*, Vol. 403, 2000, pp. 853-858.

National Research Council, *Ecological Indicators for the Nation*. Washington, DC: National Research Council, 2000.

Pimm, S. L., and P. Raven, “Extinction by Numbers,” *Nature*, Vol. 403, 2000, pp. 843-844.

Porter, M. E. and C. van der Linde. “Green and Competitive: Ending the Stalemate.” *Harvard Business Review,* September-October 1995, pp. 120–134.

Smith, K.R., C.F. Corvalán, and T. Kjellstrom, “How Much Global Ill Health is Attributable to Environmental Factors?”, *Epidemiology*, Vol. 10, No. 5, September 1999, pp.573-584.

World Conservation Monitoring Center (WCMC), *Global Biodiversity: Status of Earth’s Living Resources*, Cambridge, UK: Chapman & Hall, 1992.

Annex 1. Data Aggregation Methology

This annex discusses in detail the data aggregation methodology underlying the construction of the Index.

After collecting data from appropriate sources, we sought to make the observations as comparable as possible across countries. Initially we divided most observed values by total population, income or land area. We quickly discovered, however, that dividing by total land area had the unintended consequence of rewarding countries with large land areas. We therefore constructed a measure of populated land area, by calculating the area within each country with a population density of 5 or more persons per square kilometer. For some densely populated countries this value was equal to the total area, but for others it was far lower. The values are shown in Table A1. The ESI has only a small correlation with total land area (0.14) that is not statistically significant. The correlation with population density is also small (-0.07) and not significant. The correlation with the percentage of area meeting our threshold cutoff of 5 persons per square kilometer is somewhat significant (-0.19, significant at .05 level).

Once we adjusted the data for population, income or land area, we sought to impute values for missing data. We excluded from the imputation process variables that were derived in a manner that deliberately excluded certain countries or otherwise made imputation untenable. We then calculated bivariate correlations among the variables in the data set, including a set of external benchmarks such as the Human Development Index and GDP per capita. Where correlations were high and there was a plausible justification for presuming the variables to be related, we estimated missing values using those variables. We estimated 574 missing values, for 21 variables, using this method. We then calculated predicted values for the remaining missing values using the three variables in the data set that on average had the strongest correlations with the variables – the Human Development Index, GDP per capita, and Graft. We compared these three predicted values and assigned the worst as the imputed value. We chose the worst value so as to avoid rewarding countries for failing to report data. We estimated 586 missing values for 47 variables using this second method. Altogether, then, we generated imputed values for 62 percent of the missing values in our data set.

Imputation permits us to generate a score for each of the 22 indicators for each country. Had we not imputed missing data some countries would lack values for up to three indicators. After generating the Index scores we explored whether our imputation procedure introduced any bias. We compared our ESI with a version of the ESI with no imputation; the correlation is 0.97. The correlation is lower, obvsiously, for countries with more missing data. Among the third of countries missing the most data the correlation is 0.85, while it is 0.99 for the third missing the least data. In general countries at lower income levels are missing more data (correlation = 0.68); therefore we looked for bias in the imputation process against low income countries. We found a slight correlation between the imputation effect and per capita income (0.16) that was not statistically significant.

Variables with highly skewed distributions were transformed by taking the base-10 log. This was done for the 14 variables having a skewness measure greater than 5.

We set substantive thresholds for two variables. Caloric intake as a percentage of daily requirements was assigned an upper threshold of 120%, so that countries exceeding this value did not receive additional credit. Projected population growth rates to 2050 were assigned a lower threshold of 0, so that countries whose populations are projected to decline were considered no more sustainable than countries that are projected to remain stable over the next 50 years.

We then truncated the observations to the 95 percent level. That is, for each variable we took values in the bottom 2.5 percentile and forced them to be equal to the 2.5 percentile level; we did the same for the 97.5 percentile. We did this for two reasons. First, we were less confident about the accuracy of data at the extreme tails of the distribution. And second, we intended the Index to be utilized as a primarily comparative measure, and we did not want very extreme outliers to become benchmarks for the entire population; truncation makes the variables more justifiably comparable.

Table A1. Percentage of Country's Territory Populated at 5 persons/Km2 or Higher

Country	%
Albania	100
Algeria	15
Argentina	32
Armenia	100
Australia	3
Austria	100
Azerbaijan	99
Bangladesh	100
Belarus	100
Belgium	93
Benin	100
Bhutan	84
Bolivia	24
Botswana	17
Brazil	40
Bulgaria	100
Burkina Faso	95
Burundi	100
Cameroon	83
Canada	4
Central African Republic	37
Chile	39
China	65
Colombia	50
Costa Rica	100
Croatia	100
Cuba	96
Czech Republic	100
Denmark	100
Dominican Republic	100
Ecuador	60
Egypt	18
El Salvador	99
Estonia	100
Ethiopia	90
Fiji	99
Finland	54
France	98
Gabon	9
Germany	100
Ghana	100
Greece	100
Guatemala	87
Haiti	99
Honduras	83
Hungary	100
Iceland	3
India	100
Indonesia	86
Iran	99
Ireland	100
Israel	100
Italy	100
Jamaica	100
Japan	98
Jordan	57
Kazakhstan	22
Kenya	48
Kuwait	94
Kyrgyz Republic	85
Latvia	100
Lebanon	100
Libya	6
Lithuania	100
Macedonia	99
Madagascar	78
Malawi	100
Malaysia	67
Mali	31
Mauritius	99
Mexico	70
Moldova	100
Mongolia	6
Morocco	76
Mozambique	71
Nepal	93
Netherlands	100
New Zealand	22
Nicaragua	78
Niger	21
Nigeria	100
Norway	40
Pakistan	100
Panama	77
Papua New Guinea	60
Paraguay	35
Peru	45
Philippines	97
Poland	100
Portugal	98
Romania	100
Russian Federation	19
Rwanda	100
Saudi Arabia	42
Senegal	86
Singapore	91
Slovak Republic	100
Slovenia	100
South Africa	50
South Korea	98
Spain	86
Sri Lanka	100
Sudan	53
Sweden	53
Switzerland	98
Syria	100
Tanzania	98
Thailand	99
Togo	100
Trinidad and Tobago	95
Tunisia	72
Turkey	100
Uganda	100
Ukraine	100
United Kingdom	94
United States	38
Uruguay	100
Uzbekistan	53
Venezuela	41
Vietnam	100
Zambia	54
Zimbabwe	93

Table A2. Summary of ESI Data Aggregation Methodology

1	Collect data.
2	Make variables comparable where necessary by dividing by population, income or populated land area.
3	Impute missing data where appropriate.
4	Take logs of highly skewed variables.
5	Set substantive thresholds where appropriate.
6	Truncate distributions to 95-percent range.
7	Standardize variables to permit aggregation.
8	Calculate 22 indicators by averaging underlying variables.
9	Calculate ESI averaging 22 indicators and calculating standard normal percentile (5 Components calculated in same way).

We standardized the variables to make aggregation possible. We calculated the Z score (value minus mean, divided by standard deviation) for those variables for which high observed values corresponded to high levels of environmental sustainability. For variables where high observed values corresponded to low levels of environmental sustainability (for example, pollution levels) we standardized by dividing mean minus value by the standard deviation. Annex 4 explains the properties of Z scores.

The 22 indicators were then calculated by taking the average of the constituent variables' Z scores.

The Environmental Sustainability Index was calculated by taking the average of the 22 indicators, and then converting this value to a standard normal percentile. We chose percentile so as to end up with a number with greater intuitive understanding than a z score. We use the standard normal percentile because we do not wish to assume that the highest and lowest observed average in our data set corresponds to maximum and minimum levels of environmental sustainability, respectively. Rather, we consider a more reasoned assumption to be that our figures represent a range of estimates of an actual distribution that is in fact wider – wherever minimum and maximum environmental sustainability might be, we are fairly confident that they are outside our measured range.

For the measures of the five components that we report in the country profiles, we also calculate the standard normal percentile of the underlying average scores, based on the same logic.

Table A2 summarizes these steps.

Annex 2. Relationship to 2000 Pilot ESI

The analysis in this report builds on the Pilot Environmental Sustainability Index (World Economic Forum, 2000) released in January 2000. The Pilot ESI represented our first pass at collecting the requisite data and designing an appropriate methodology to rank national environmental sustainability. The Pilot proved to be a valuable learning exercise, and has helped us to refine the ESI methodology applied here.

More than five thousand copies of the 2000 Pilot Index were distributed through web sites and in print versions, and dozens of personal presentations were made over the year in a range of developed and developing countries. This outreach generated a significant set of commentaries on the Index, some published and some communicated directly to us. In addition, we commissioned a set of focused peer reviews on the part of recognized international experts on environmental sustainability indicators. These critiques proved to be especially helpful in focusing the ESI team on the central methodological issues.

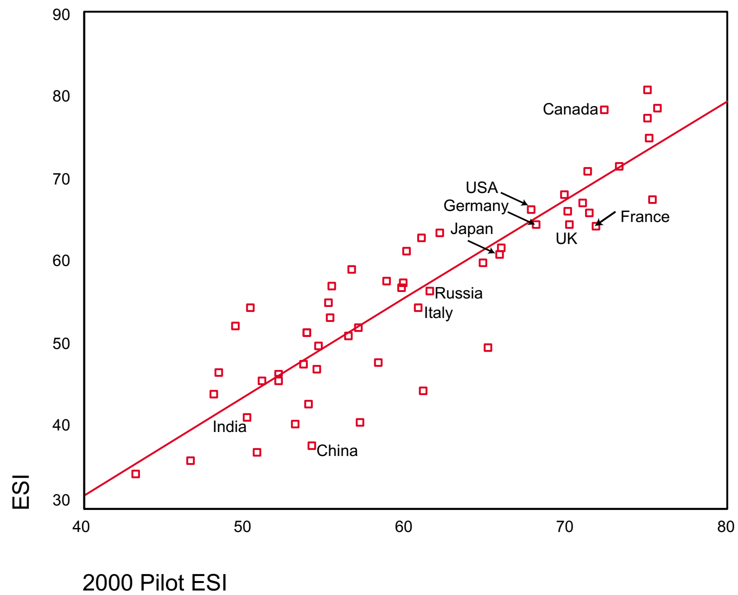
Based on the commentaries and criticisms, we made a number of changes in data and methods. Notably, we:

- dropped the indicator on Exposure to Environmental Disasters based on an assessment of its low importance relative to the other indicators, and concerns over the quality of the underlying variables;
- added indicators on Global-Scale Funding/Participation and on Private Sector Responsiveness to take into account the high importance associated with those factors;
- utilized a set of strategies to cope with gaps in data coverage, including reliance on global model data and selective imputation of missing data;
- created three new data sets from scratch to help fill gaps in high priority areas (Child Death Rates from Respiratory Diseases, Death Rate from Intestinal Infectious Diseases Deaths, and Land Area Affected by Human Activities);
- changed the aggregation scheme in important ways. We utilized standardized variable scores as the basic unit of aggregation as opposed to an arithmetic 0-100 scale; we truncated the extreme outliers; and we took the base 10 log of highly skewed variables. These steps all were designed to make the values for the individual variables more robustly comparable prior to the aggregation steps; and
- broadened the coverage from the 56 countries in the 2000 Pilot to the 122 covered here.

Although these differences are significant and, we think, markedly improve the Index, the core approach has not changed. Twenty of the twenty-two indicators remain the same; more than half of the variables remain in the index; and the basic methodological approach remains based on a comparative aggregation strategy. For the 56 countries that appear in both the 2000 Pilot and the current Index, the correlation is 0.89 (see Figure A1).

We did not adopt every change suggested, and some critics will continue to be disappointed with the assumptions and methodological choices we have made. We discuss some of the recurring criticisms and issues in the “Frequently Asked Questions” section of this report, found in Annex 3. Measuring environmental sustainability and performance is not an easy thing to do. We recognize that an such exercise must remain open to criticism and refinement. In this spirit, we see the ESI as a “work in progress” and intend to continue to refine it over time.

Figure A1. Relationship Between the 2001 ESI and the 2000 Pilot ESI



Annex 3. Frequently Asked Questions

Over the past year the 2000 Pilot Environmental Sustainability Index generated a number of criticisms, commentaries and suggestions, and has elicited a number of questions. We provide below some of the most common questions and criticisms, along with our responses.

1. Isn't Russia's score too high?

Russia received a score of 61.5 in the 2000 Pilot ESI (22nd of the 56 countries), which many commentators considered to be anomalously high given what we know about Russian environmental conditions. We agreed with this assessment, and discussed it in the Pilot report. We suspected that a combination of faulty data, inadequate mechanisms to control for countries with large uninhabited land areas, and a mismatch between the particular kinds of environmental problems Russia is suffering and the types of data collected through global efforts all combined to create this situation.

For the current index we sought to improve the quality of the data where possible and to more precisely apply our inhabited land area control. We also thought that the creation of two new environmental health measures would help address the problem, though that was not the primary motivation. Russia' score is lower in the current Index (56.2) but still probably too high. As Feshbach (1995) and others have documented, Russian environmental conditions are catastrophic.

Faulty and missing data are most likely driving this continuing anomaly, we believe. Consider the environmental health measures. Russia is one of the only industrial countries in history ever to experience a decline in life expectancy, and environmental health problems are rampant. Yet Russia reports to the World Health Organization a set of deaths from intestinal infections about equal to the World median (in between the United Kingdom and Norway), and does not report any information on deaths from acute respiratory diseases. Russia's self-reported water quality data are similarly out of sync with its well-documented water quality problems.

We could have adjusted these scores based on the individual studies that have been done on Russia's environmental conditions. We deliberately chose not to because we thought it would dilute the ability of the Environmental Sustainability Index to measure conditions in a comprehensive, global and consistent manner. For each country-specific change we might implement based on particular knowledge of that country, there would be an unknown number of equally compelling changes that we didn't know enough to make. Over time we are committed to strategies that will reduce anomalies across the board by improving the data and methods for all countries.

2. Isn't Singapore's score too low?

Singapore, widely considered to be a well-managed, prosperous country, received a relatively low score (46.8) in the 2000 Pilot Index. It was a clear outlier in explorations of the relationship between the Pilot Index and GDP per capita. Some commentators suggested that Singapore's unexpectedly low score reflected a flaw in the Index's methodology. They suggested that had we adequately taken into account Singapore's high population density, its existence as a city-state with virtually complete urbanization, and the fact that it occupies a small island, we would have arrived at a higher, more accurate, score for Singapore.

We do not agree with these suggestions. There are compelling analytical reasons to believe that small islands with large populations and considerable economic activity will approach, if not exceed, the limits of environmental sustainability. We do not wish to "control" for such factors; in fact we wish to do precisely the opposite: to illuminate cases where such limits are being approached.

This does not mean that we are critical, either implicitly or explicitly, of the choices Singapore has made. To the contrary, given its limited environmental endowments and many natural resource challenges, Singapore performs remarkably well. In a number of critical areas, especially ones that go to performance such as the eco-efficiency of the economy, Singapore's results are top-notch. In fact, if one estimates ESI as a function of income and population density, Singapore's observed ESI is higher than its estimated score. Singapore's data demonstrate that wise management can dramatically reduce a nation's exposure to environmental threats even where critical sustainability thresholds are close by. The fact remains, however, that any country experiencing the extreme levels of environmental stress (especially in terms of water) that one observes in Singapore is in danger of exceeding fundamental environmental limits. We believe the Environmental Sustainability Index as constructed accurately flags such danger points.

3. Isn't the ESI biased in favor of rich countries?

Environmental Sustainability Index scores correlate positively with per-capita wealth. Some other global sustainability metrics are negatively correlated with wealth, and advocates of those alternatives have suggested that our methods may reflect a rich country bias. The World Wildlife Fund's Consumption Pressure Index, for example, has a correlation of 0.56 with the ESI, and assigns bad scores to a number of countries with high ESI scores. Norway is rated as placing the highest pressure on the environment by the WWF, for example, yet is ranked second best in our Index. The Ecological Footprint has a similar relationship to the ESI.

Our Index does correlate differently with wealth than do these other indexes, but that does not reflect an inherent bias in favor of wealthy countries, any more than these other indexes reflect a bias in favor of poor countries. Rather, these indexes differ because of different emphases they place on competing aspects of environmental sustainability.

The Consumption Pressure Index and the Ecological Footprint place all their emphasis on extraction of natural resources and emissions of greenhouse gases. We share the belief that these are both important features to measure and to which attention should be drawn. In fact, both the Consumption Pressure Index and the Ecological Footprint are inputs into the ESI. But we believe that environmental sustainability is a broader concept. Thus, the ESI includes data on a much wider set of issues. The ESI, for example, measures environmental threats to human health, and captures local-level environmental dynamics (such as air and water quality). For many of these local-level environmental issues wealthy countries exhibit superior results. Water quality is better in Norway than it is in Bangladesh.

If one examines the graphs on the country profile pages, one can see that there is a distinct pattern among the wealthiest countries in which relatively good scores on most of the dimensions are contrasted with comparably poorer scores on the environmental stresses. We think this is an accurate portrayal of the environmental sustainability conditions in the rich countries of the world. We don't believe that the rich countries' good scores on some measures get them "off the hook" for their poor scores on other measures, any more than the consumption-based indexes imply that low levels of consumption pressure make up for poor sanitation or water quality. The Environmental Sustainability Index permits us to track relevant conditions and actions in an objective and useful manner.

4. Isn't the Index biased in favor of countries with large land areas?

In part because countries with large expanses of relatively uninhabited land areas scored notably high in the 2000 Pilot Index, some observers concluded that there was a systematic bias in favor of such countries. However, this is not the case.

For the countries in the 2001 Environmental Sustainability Index, the relevant correlations are found in Table A3.

These weak correlations are not entirely due to coincidence. As discussed in detail in the methodology section of this report in Annex 1, we were

Table A3. Correlation between 2001 ESI and select density and land area indicators

	Correlation
Population Density	-0.06
Percent of territory with population density greater than 5 persons per square km.	-0.19*
Total Land Area	-0.08
Land Area inhabited at greater than 5 persons per square km	0.14

* Statistically significant at .05 level

careful not to assume that pollution would be spread across total land areas. Instead, precisely because we wished to avoid biasing results toward large countries, we divided environmental stress variables by populated land area, using a specially constructed measure of land area inhabited at greater than 5 persons per square kilometer.

The modest significant correlation with percent of land area populated at greater than 5 persons per square kilometer reflects not a bias, but rather an empirical relationship. The more of a country's territory that is populated at this level, the more likely it is to be stressing the environment in measurable ways.

5. Why don't we assign different weights to the indicators?

A large number of critics have pointed out that it is highly unlikely that our approach of assigning equal weights to the indicators in the Environmental Sustainability Index reflects a defensible conclusion about the actual proportional contributions that these indicators make to environmental sustainability. We agree. But, as we discuss in the main body of this report, no viable strategies for determining robust differential weights currently exist.

If there were an independent, accepted measure of environmental sustainability we could assign weights based on their ability to match that measure efficiently and accurately. But environmental priorities and values vary widely based on development status, existing pollution levels, population density, and other factors. If principle components analysis generated a set of components that both discriminated efficiently among the observations in our data set and comported with accepted understandings of environmental sustainability, we could use such analysis to assign different weights. But the data do not generate principle components with these characteristics. If there were reliable time series data for a meaningful cross-section of our data, we could use causal analysis to assign differential weights based on an assessment of differences in predictive power. But there are no adequate time series data on most environmental variables.

Under the circumstances we think we have taken a sensible approach. We have arrived at five broad categories of indicators based on analytical judgments that are defensible. Within these broad categories we have identified a set of 22 indicators based on a combination of analytical judgments about their causal role in environmental sustainability dynamics, on their overall substantive importance to environmental sustainability, and on the viability of available measurements. Lacking any other basis, we assign these 22 indicators equal weight.

To help make this approach more rigorous we conducted a survey of environmental experts and activists, which is described in more detail in the main body of this report. We dropped the indicator that was considered to be of lowest importance; the others revealed roughly comparable levels of importance as measured by the survey.

We have been very open and transparent in identifying the weighting issue as an ongoing question. In fact, we have developed an interactive version of the ESI (available at http://www.ciesin.columbia.edu/indicators/ESI) to permit users to apply their own weights.

Annex 4. Component & Indicator Scores

This section provides tables summarizing the country scores for each of the ESI components and indicators, sorted in order from highest to lowest scores. Note that the component scores are presented as standardized normal distributions ranging from a theoretical low of 0 to a high of 100. The indicator scores are presented as averages of the constituent variable values. These variable values, as described in Annex 1, are in the form of Z scores, with zero indicating the mean for the 122 countries, +1 and -1 respectively representing one standard deviation above and below the mean, +2 and -2 respectively representing two standard deviations above and below the mean, and so on. In a "normal," bell-shaped distribution, 68 percent of the scores will fall between +1 and -1, 95 percent between +2 and -2, and 99.7 percent between +3 and -3. The actual distributions vary from variable to variable.

Component: Environmental Systems

This component includes the following indicators:

- Air Quality
- Water Quantity
- Water Quality
- Biodiversity
- Terrestrial Systems

High numbers represent higher sustainability.

Canada	91.2
Norway	87.4
Finland	85.3
Sweden	79.3
Iceland	79.1
Gabon	78.0
Venezuela	72.6
Argentina	71.2
Colombia	70.5
Bolivia	70.1
Ireland	69.7
Uruguay	69.7
Central African Republic	67.7
Botswana	66.3
Nicaragua	66.2
Peru	66.1
Austria	65.8
Australia	65.7
Paraguay	65.6
Russian Federation	65.4
Mali	64.6
Papua New Guinea	64.4
Slovenia	63.8
United States	63.1
Ecuador	62.6
Mongolia	61.3
Slovak Republic	60.9
Switzerland	60.3
Estonia	59.1
France	58.8
Portugal	58.8
Latvia	58.3
Ghana	58.2
Zimbabwe	58.1
United Kingdom	58.1
Brazil	58.0
Netherlands	58.0
Lithuania	57.9
New Zealand	57.6
Croatia	57.0
Denmark	57.0
Trinidad and Tobago	56.6
Cameroon	56.5
Bhutan	55.8
Benin	55.0
Honduras	54.5
Zambia	53.7
Belarus	53.6
Chile	53.3
Czech Republic	53.3
Malaysia	52.9
Germany	51.6
Costa Rica	51.2
El Salvador	51.0
Panama	50.8
Guatemala	50.7
Togo	50.6
Hungary	50.4
Mozambique	50.4
Japan	50.3
Armenia	50.3
Malawi	50.2
Kenya	49.9
Moldova	49.4
Kazakhstan	48.8
Sudan	48.0
Libya	47.7
Senegal	47.1
Uzbekistan	46.9
Spain	46.8
Israel	46.1
Nepal	46.0
Cuba	45.8
Egypt	45.6
Niger	45.0
Singapore	44.6
Albania	44.6
Greece	44.2
Tanzania	44.2
Syria	43.9
Pakistan	43.4
South Africa	43.4
Kyrgyz Republic	42.8
Uganda	42.7
Nigeria	41.6
Algeria	40.7
Bangladesh	40.1
Fiji	40.1
Tunisia	39.9
Kuwait	39.8
Saudi Arabia	39.0
Azerbaijan	38.8
Lebanon	38.8
Macedonia	38.7
Mauritius	38.3
Turkey	38.1
Burkina Faso	37.4
Jordan	37.1
Romania	36.8
Italy	36.8
Thailand	36.3
South Korea	35.1
Iran	34.9
Rwanda	34.8
Poland	34.2
Jamaica	33.8
Indonesia	33.5
Vietnam	33.2
Ukraine	32.8
Dominican Republic	32.2
Burundi	31.5
Ethiopia	31.5
Sri Lanka	29.5
Morocco	29.5
Bulgaria	25.7
Belgium	25.5
Mexico	25.0
India	24.0
Madagascar	23.4
Philippines	22.0
China	20.8
Haiti	12.2

Component: Reducing Stresses

This component includes the following indicators:

- Reducing Air Pollution
- Reducing Water Stress
- Reducing Ecosystem Stress
- Reducing Waste and Consumption Pressures
- Reducing Population Pressure

High numbers represent higher sustainability.

Kazakhstan	76.8
Armenia	74.2
Mongolia	73.8
Mozambique	71.2
Russian Federation	69.8
Cuba	68.9
Zimbabwe	68.8
Moldova	68.7
Kyrgyz Republic	67.8
Argentina	67.5
Estonia	66.5
Belarus	66.0
Central African Republic	65.6
Albania	65.4
Azerbaijan	65.2
Uzbekistan	64.8
Peru	64.5
Lithuania	64.4
Hungary	64.1
Bolivia	64.0
Bhutan	62.9
Brazil	62.6
Romania	62.1
Uruguay	62.0
Kenya	60.9
Rwanda	60.4
Colombia	60.4
Panama	60.1
Morocco	59.9
Bulgaria	59.2
Botswana	59.1
Croatia	59.1
Venezuela	58.9
Cameroon	58.9
Chile	58.6
Madagascar	58.4
Turkey	58.1
Finland	58.0
Dominican Republic	57.8
Indonesia	57.8
South Africa	57.7

Niger	57.5
Mexico	57.2
India	57.0
Sri Lanka	57.0
Sudan	56.4
Iran	56.4
New Zealand	56.3
Bangladesh	56.3
Ethiopia	55.5
Greece	55.3
Latvia	55.2
Gabon	55.2
Malawi	54.9
Ecuador	54.2
Mali	54.1
Fiji	54.1
Nicaragua	54.0
Sweden	53.9
Algeria	53.6
Ghana	53.5
Burkina Faso	52.6
Spain	52.6
China	52.6
Norway	52.3
Portugal	52.2
Papua New Guinea	52.2
Tunisia	52.1
Tanzania	51.9
Togo	51.9
Uganda	51.8
Senegal	51.5
Canada	51.2
Thailand	50.8
Australia	50.4
Nepal	50.3
Slovak Republic	49.5
Honduras	49.5
Haiti	49.3
Nigeria	49.3
Zambia	48.5
Egypt	48.3

Pakistan	47.9
Vietnam	45.8
Ukraine	45.7
Poland	45.5
Trinidad and Tobago	44.8
Switzerland	44.8
Jamaica	44.5
Syria	44.3
Burundi	44.3
Ireland	44.2
Slovenia	43.4
El Salvador	43.3
Guatemala	42.8
Benin	42.4
Libya	41.6
Mauritius	41.3
France	40.9
Italy	40.7
Paraguay	40.0
Macedonia	37.8
Austria	37.1
United States	37.0
Philippines	36.8
Germany	35.2
Saudi Arabia	35.0
Costa Rica	34.5
Malaysia	31.9
Jordan	31.8
Czech Republic	31.0
Denmark	30.6
Iceland	27.9
Japan	25.4
Netherlands	23.7
United Kingdom	23.7
Lebanon	21.3
Kuwait	20.0
Israel	17.8
Singapore	16.8
South Korea	14.2
Belgium	10.0

Component: Reducing Human Vulnerability

This component includes the following indicators:

- Basic Human Sustenance
- Environmental Health

High numbers represent higher sustainability.

Japan	83.0
Denmark	82.9
Switzerland	82.9
Germany	82.8
France	82.8
Iceland	82.7
Canada	82.6
Slovenia	82.6
Italy	82.6
Ireland	82.4
Norway	82.4
United Kingdom	82.3
New Zealand	82.3
Spain	82.3
United States	82.3
Singapore	82.1
Israel	81.7
Hungary	81.6
Greece	81.5
Slovak Republic	81.5
Australia	81.3
Belgium	81.2
Portugal	81.0
Mauritius	80.5
Austria	80.5
Czech Republic	80.3
Bulgaria	80.0
Kuwait	79.5
Netherlands	79.4
Poland	79.0
Finland	78.5
South Korea	78.4
Croatia	78.4
Sweden	77.6
Estonia	77.5
Lithuania	77.2
Costa Rica	77.2
Cuba	76.4
Russian Federation	76.0
Belarus	75.4
Moldova	73.4

Latvia	72.4
Lebanon	72.2
Malaysia	70.7
Saudi Arabia	70.4
Trinidad and Tobago	69.1
Kazakhstan	68.4
Ukraine	68.0
Iran	67.9
Argentina	66.3
Macedonia	65.9
Uruguay	65.6
Chile	65.2
Colombia	63.3
Mexico	62.7
Armenia	62.4
Turkey	62.4
Paraguay	61.8
Jordan	61.8
Brazil	61.1
Tunisia	59.5
Azerbaijan	58.7
Syria	56.5
Libya	56.2
South Africa	56.1
Uzbekistan	55.8
Jamaica	53.7
Kyrgyz Republic	53.0
Indonesia	52.7
Egypt	51.1
Romania	50.6
Panama	50.0
Philippines	49.5
Sri Lanka	49.4
China	49.1
Morocco	49.1
Thailand	48.5
Albania	48.3
Algeria	46.2
Venezuela	45.9
Guatemala	45.0
Fiji	44.8

Dominican Republic	43.9
Ecuador	43.1
Honduras	43.0
Botswana	40.5
Nicaragua	37.9
Vietnam	36.0
Zimbabwe	33.8
El Salvador	33.6
India	32.7
Peru	32.3
Pakistan	26.3
Gabon	24.5
Nepal	23.5
Papua New Guinea	18.0
Senegal	16.8
Ghana	16.4
Bhutan	16.2
Mongolia	15.5
Bangladesh	13.8
Sudan	13.5
Bolivia	13.1
Cameroon	13.0
Togo	10.6
Kenya	8.1
Tanzania	7.7
Benin	7.7
Madagascar	7.5
Nigeria	6.9
Uganda	6.4
Mali	6.4
Zambia	5.8
Haiti	5.5
Burkina Faso	4.3
Burundi	4.1
Malawi	4.1
Central African Republic	4.0
Niger	3.1
Mozambique	3.0
Rwanda	2.3
Ethiopia	1.7

Component: Social and Institutional Capacity

This component includes the following indicators:

- Science/Technology
- Capacity for Debate
- Regulation and Management
- Private Sector Responsiveness
- Environmental Information
- Eco-Efficiency
- Reducing Public Choice Distortions

High numbers represent higher sustainability.

Switzerland	92.3
Finland	91.2
Denmark	87.4
Netherlands	87.1
United Kingdom	86.6
Sweden	86.3
Norway	85.3
Iceland	84.1
United States	83.4
New Zealand	83.3
Austria	83.2
Australia	82.8
Japan	82.8
Germany	82.5
Canada	82.5
France	80.7
Israel	72.9
Ireland	72.5
Costa Rica	68.8
Belgium	68.2
Spain	66.9
Italy	66.7
Portugal	66.5
Slovenia	66.2
Singapore	65.2
Chile	60.6
South Korea	60.2
Slovak Republic	60.0
Czech Republic	60.0
Uruguay	59.9
Fiji	57.1
Hungary	56.6
Argentina	56.2
Estonia	54.0
Sri Lanka	53.9
Panama	53.7
Brazil	53.1
Bolivia	51.7
Latvia	50.7
Nepal	49.7
South Africa	49.7

Botswana	49.5
Croatia	49.3
Lithuania	49.1
Mauritius	48.0
Thailand	47.6
Malaysia	47.1
Greece	46.6
Uganda	46.2
Cuba	46.2
Ecuador	45.8
Poland	45.8
Dominican Republic	45.6
Guatemala	45.1
Mexico	44.6
El Salvador	44.5
Paraguay	43.8
India	43.7
Peru	43.7
Honduras	43.1
Russian Federation	42.5
Turkey	42.4
Pakistan	42.1
Egypt	41.7
Tanzania	41.1
Colombia	41.0
Zimbabwe	40.8
China	40.4
Nicaragua	40.4
Jordan	40.4
Malawi	39.9
Ghana	39.8
Albania	39.6
Armenia	39.3
Burkina Faso	38.7
Macedonia	38.4
Jamaica	38.4
Romania	38.4
Bhutan	38.3
Morocco	37.9
Kenya	37.8
Philippines	37.8

Zambia	37.8
Lebanon	37.6
Mali	37.5
Central African Republic	36.2
Moldova	36.0
Rwanda	35.4
Senegal	34.4
Indonesia	34.3
Mongolia	34.3
Madagascar	34.2
Gabon	34.1
Mozambique	34.0
Trinidad and Tobago	34.0
Bulgaria	33.5
Bangladesh	33.2
Papua New Guinea	33.1
Venezuela	32.8
Burundi	32.7
Togo	32.1
Tunisia	31.6
Cameroon	31.4
Benin	30.6
Ethiopia	29.6
Kuwait	29.4
Belarus	28.6
Haiti	28.5
Ukraine	28.2
Nigeria	28.2
Azerbaijan	27.8
Iran	27.2
Kyrgyz Republic	26.8
Algeria	25.5
Sudan	25.4
Niger	25.2
Syria	24.9
Vietnam	23.9
Kazakhstan	21.5
Uzbekistan	20.5
Saudi Arabia	18.1
Libya	18.1

Component: Global Stewardship

This component includes the following indicators:

- International Commitment
- Global Scale Funding/Participation
- Protecting International Commons

High numbers represent higher sustainability.

Czech Republic	80.6
Sweden	80.5
Slovak Republic	80.0
Netherlands	75.6
Switzerland	75.3
New Zealand	74.9
Bulgaria	74.3
Norway	73.9
Mauritius	73.8
Costa Rica	72.7
Canada	72.1
Finland	69.9
Uruguay	69.8
Lithuania	69.8
Australia	69.5
Denmark	68.4
Austria	67.6
Belgium	67.4
Bolivia	67.3
Hungary	67.3
Malaysia	66.3
Papua New Guinea	66.1
Panama	66.0
Germany	66.0
Azerbaijan	64.7
Uganda	64.2
Sri Lanka	63.9
France	63.7
United Kingdom	61.8
Cameroon	61.5
Nicaragua	60.6
Mali	60.1
Senegal	59.9
Ghana	58.3
Japan	58.3
Mozambique	57.9
Central African Republic	57.6
Greece	57.6
Latvia	56.5
United States	56.4
Peru	56.3

Niger	56.1
Spain	55.9
Guatemala	55.9
Tunisia	55.5
Mongolia	55.4
Jamaica	55.4
Poland	55.3
Brazil	55.2
Benin	54.9
Italy	54.8
South Africa	54.6
Burkina Faso	54.2
Kenya	53.0
Egypt	52.9
Portugal	52.9
Pakistan	52.5
Mexico	52.2
Nepal	51.6
Zimbabwe	51.3
Madagascar	50.4
Gabon	50.1
Argentina	50.1
Cuba	50.0
Ireland	49.8
Ecuador	49.5
Iceland	48.3
Dominican Republic	48.1
Malawi	47.4
Bangladesh	47.4
Slovenia	47.3
Trinidad and Tobago	46.6
Indonesia	46.4
Philippines	45.6
Venezuela	45.2
Jordan	44.9
India	44.3
Colombia	44.1
Tanzania	43.7
Thailand	43.3
Chile	43.2
Lebanon	42.6

Vietnam	42.4
Sudan	42.2
Honduras	41.6
Togo	41.5
Zambia	41.4
Algeria	41.3
Botswana	41.0
Uzbekistan	40.9
Turkey	39.2
Morocco	39.0
Singapore	39.0
Paraguay	38.6
Syria	38.1
El Salvador	37.4
Bhutan	36.7
Ethiopia	36.4
Belarus	36.3
Romania	35.9
Croatia	34.4
Israel	34.1
Estonia	33.8
Russian Federation	33.8
Fiji	33.1
China	31.0
South Korea	30.7
Ukraine	30.2
Armenia	28.6
Burundi	27.9
Macedonia	27.5
Haiti	25.8
Iran	24.9
Rwanda	23.5
Nigeria	22.7
Moldova	20.1
Albania	19.3
Kuwait	18.4
Saudi Arabia	15.8
Kyrgyz Republic	15.7
Libya	13.7
Kazakhstan	11.4

Indicator: Air Quality

This indicator includes the following variables:

- Urban Sulfur Dioxide (SO2) Concentration
- Urban Nitrogen Dioxide (NO2) Concentration
- Urban Total Suspended Particulates (TSP) Concentration

High numbers represent higher sustainability; zero represents the mean.

New Zealand	1.62
Cuba	1.58
Sweden	1.45
Australia	1.45
Malaysia	1.36
Finland	1.28
Iceland	1.13
Lithuania	1.10
Spain	1.03
Norway	1.02
Slovak Republic	1.00
Switzerland	0.99
Canada	0.98
Germany	0.95
Austria	0.94
Belarus	0.93
Singapore	0.91
Czech Republic	0.88
Portugal	0.78
Argentina	0.76
France	0.70
Denmark	0.69
Netherlands	0.63
United States	0.61
Thailand	0.60
Ireland	0.58
Belgium	0.52
Slovenia	0.52
Israel	0.48
Turkey	0.41
United Kingdom	0.41
Bangladesh	0.40
Kuwait	0.36
Latvia	0.35
Hungary	0.32
Estonia	0.32
South Africa	0.29
Croatia	0.28
Japan	0.28
Macedonia	0.22
Sri Lanka	0.21

Ecuador	0.20
Venezuela	0.19
Romania	0.18
Mongolia	0.17
Kenya	0.17
Moldova	0.16
Vietnam	0.15
Armenia	0.14
Uruguay	0.12
Nicaragua	0.11
Mauritius	0.11
Trinidad and Tobago	0.07
Albania	0.06
Panama	0.05
Morocco	0.02
Bhutan	0.00
Jordan	0.00
Colombia	0.00
Nepal	-0.03
Russian Federation	-0.03
Tunisia	-0.03
India	-0.06
Ghana	-0.06
Fiji	-0.08
Peru	-0.10
Jamaica	-0.13
Lebanon	-0.14
Pakistan	-0.14
Mali	-0.14
Botswana	-0.16
South Korea	-0.19
Saudi Arabia	-0.20
Bolivia	-0.21
Ukraine	-0.27
Philippines	-0.28
Zimbabwe	-0.29
Kyrgyz Republic	-0.29
Dominican Republic	-0.29
Syria	-0.30
Poland	-0.32
Honduras	-0.33

Kazakhstan	-0.34
Algeria	-0.34
Libya	-0.34
Paraguay	-0.38
Uzbekistan	-0.38
Azerbaijan	-0.40
Indonesia	-0.40
Gabon	-0.41
Papua New Guinea	-0.42
Madagascar	-0.44
Togo	-0.45
Costa Rica	-0.47
Rwanda	-0.49
Greece	-0.49
Cameroon	-0.50
Sudan	-0.53
Haiti	-0.53
El Salvador	-0.55
Senegal	-0.56
Zambia	-0.58
Uganda	-0.59
Nigeria	-0.60
Benin	-0.61
Malawi	-0.63
Tanzania	-0.63
Central African Republic	-0.64
Brazil	-0.67
Chile	-0.69
Mozambique	-0.74
Italy	-0.74
Burundi	-0.75
Egypt	-0.79
Ethiopia	-0.80
Burkina Faso	-0.81
Niger	-0.98
Guatemala	-1.08
Iran	-1.65
Bulgaria	-1.87
China	-2.24
Mexico	-2.58

Indicator: Water Quantity

This indicator includes the following variables:

- Internal Renewable Water Per Capita
- Water Inflow from Other Countries Per Capita

High numbers represent higher sustainability; zero represents the mean.

Gabon	2.37
Bolivia	1.75
Colombia	1.74
Papua New Guinea	1.73
Canada	1.70
Peru	1.62
Central African Republic	1.50
Venezuela	1.49
Brazil	1.45
Uruguay	1.38
Norway	1.33
Paraguay	0.99
Nicaragua	0.94
Iceland	0.86
Ecuador	0.81
Costa Rica	0.79
Bhutan	0.73
Argentina	0.72
Croatia	0.72
Honduras	0.69
Russian Federation	0.69
Cameroon	0.68
Finland	0.66
Mongolia	0.62
Zambia	0.58
Chile	0.56
Slovenia	0.52
Mozambique	0.48
Latvia	0.46
Estonia	0.46
New Zealand	0.45
Guatemala	0.44
Bulgaria	0.42
Sweden	0.41
Malaysia	0.41
Ireland	0.39
Austria	0.38
Slovak Republic	0.33
Botswana	0.25
Thailand	0.23
Vietnam	0.22

Lithuania	0.22
Hungary	0.21
Benin	0.21
Kazakhstan	0.21
Romania	0.17
Zimbabwe	0.17
United States	0.16
Albania	0.15
Bangladesh	0.14
Nepal	0.08
Portugal	0.06
Moldova	0.05
Netherlands	0.04
Indonesia	0.04
Mali	0.03
Belarus	0.00
Niger	-0.03
Tanzania	-0.05
Greece	-0.09
Sudan	-0.10
Panama	-0.12
Azerbaijan	-0.13
El Salvador	-0.13
Uzbekistan	-0.15
Togo	-0.15
France	-0.16
Senegal	-0.17
Australia	-0.17
Mexico	-0.18
Ghana	-0.20
Germany	-0.21
Syria	-0.21
Fiji	-0.21
Nigeria	-0.22
Uganda	-0.24
Kenya	-0.28
Madagascar	-0.29
Rwanda	-0.29
Burundi	-0.31
Egypt	-0.34
Czech Republic	-0.35

Belgium	-0.36
Ukraine	-0.37
Armenia	-0.38
Malawi	-0.41
India	-0.42
Pakistan	-0.42
Iran	-0.48
Turkey	-0.50
Poland	-0.53
Dominican Republic	-0.62
Libya	-0.63
China	-0.64
Tunisia	-0.64
Haiti	-0.69
South Africa	-0.70
Jordan	-0.71
South Korea	-0.75
Burkina Faso	-0.76
Spain	-0.77
Italy	-0.79
United Kingdom	-0.80
Ethiopia	-0.85
Switzerland	-0.86
Singapore	-0.87
Kyrgyz Republic	-0.87
Philippines	-0.97
Algeria	-1.00
Jamaica	-1.00
Japan	-1.05
Macedonia	-1.05
Denmark	-1.05
Cuba	-1.09
Sri Lanka	-1.12
Trinidad and Tobago	-1.12
Lebanon	-1.19
Mauritius	-1.21
Morocco	-1.21
Israel	-1.22
Saudi Arabia	-1.23
Kuwait	-1.27

Indicator: Water Quality

This indicator includes the following variables:

- Dissolved Oxygen Concentration
- Phosphorus Concentration
- Suspended Solids
- Electrical Conductivity

High numbers represent higher sustainability; zero represents the mean.

Finland	1.85
Canada	1.54
New Zealand	1.53
United Kingdom	1.42
Japan	1.32
Norway	1.31
Russian Federation	1.30
South Korea	1.27
Sweden	1.19
France	1.13
Portugal	1.09
United States	1.04
Argentina	1.03
Hungary	0.93
Philippines	0.91
Switzerland	0.87
Ireland	0.86
Austria	0.85
Iceland	0.74
Australia	0.73
Netherlands	0.70
Mali	0.66
Brazil	0.64
Slovenia	0.63
Singapore	0.62
Greece	0.61
Cuba	0.60
Spain	0.58
Denmark	0.55
Iran	0.52
Italy	0.47
Uruguay	0.39
Kuwait	0.39
Poland	0.37
Colombia	0.27
Czech Republic	0.27
Ghana	0.23
Costa Rica	0.23
Chile	0.19
Bangladesh	0.18
Latvia	0.15

Estonia	0.11
Panama	0.11
Slovak Republic	0.10
Turkey	0.10
Trinidad and Tobago	0.10
South Africa	0.09
Croatia	0.09
El Salvador	0.08
Fiji	0.06
Bulgaria	0.04
Botswana	0.04
Venezuela	-0.01
Lithuania	-0.02
Jamaica	-0.04
Ecuador	-0.06
Germany	-0.06
Zimbabwe	-0.08
Peru	-0.08
Lebanon	-0.11
Romania	-0.13
Albania	-0.14
Egypt	-0.15
Sri Lanka	-0.16
Saudi Arabia	-0.18
Armenia	-0.19
Bolivia	-0.20
Cameroon	-0.20
Moldova	-0.22
Tanzania	-0.22
Belarus	-0.22
Macedonia	-0.23
Vietnam	-0.23
Mongolia	-0.24
Kenya	-0.26
Dominican Republic	-0.28
Kyrgyz Republic	-0.28
Nepal	-0.28
Syria	-0.29
Pakistan	-0.30
Guatemala	-0.30
Nicaragua	-0.32

Kazakhstan	-0.33
China	-0.33
Libya	-0.33
Papua New Guinea	-0.35
Malaysia	-0.35
Israel	-0.35
Honduras	-0.36
Paraguay	-0.37
Uzbekistan	-0.37
Azerbaijan	-0.39
Gabon	-0.40
Senegal	-0.42
Ukraine	-0.47
Bhutan	-0.49
Madagascar	-0.49
Togo	-0.53
Tunisia	-0.54
Thailand	-0.59
Haiti	-0.61
Nigeria	-0.62
Mozambique	-0.64
Algeria	-0.64
Zambia	-0.67
Mexico	-0.69
Benin	-0.70
Uganda	-0.70
Ethiopia	-0.74
Indonesia	-0.77
Malawi	-0.77
Mauritius	-0.77
Rwanda	-0.78
Central African Republic	-0.81
Burundi	-0.95
Burkina Faso	-1.00
Niger	-1.04
Sudan	-1.06
Jordan	-1.26
India	-1.31
Morocco	-1.36
Belgium	-2.25

Indicator: Biodiversity

This indicator includes the following variables:

- Percentage of Mammals Threatened
- Percentage of Breeding Birds Threatened

High numbers represent higher sustainability; zero represents the mean.

El Salvador	1.65
Nicaragua	1.60
Trinidad and Tobago	1.53
Guatemala	1.25
Togo	1.16
Botswana	1.15
Burkina Faso	1.15
Canada	1.12
Zimbabwe	1.11
Honduras	1.07
Malawi	1.05
Benin	1.03
Albania	1.01
Central African Republic	0.96
Burundi	0.91
Moldova	0.89
Zambia	0.86
Uganda	0.83
Armenia	0.80
Estonia	0.76
Gabon	0.76
Rwanda	0.76
Belarus	0.74
Paraguay	0.71
Latvia	0.69
Ghana	0.67
Denmark	0.66
Finland	0.61
Senegal	0.61
Ireland	0.61
Norway	0.59
United Kingdom	0.58
Niger	0.58
Iceland	0.58
Panama	0.53
Sudan	0.53
Venezuela	0.53
Costa Rica	0.52
Lithuania	0.49
Sweden	0.45
Cameroon	0.44

Switzerland	0.42
Syria	0.40
Nigeria	0.40
Mozambique	0.39
Mali	0.37
Uzbekistan	0.35
Kyrgyz Republic	0.35
Austria	0.34
Slovak Republic	0.32
Bolivia	0.30
Belgium	0.29
Netherlands	0.26
Uruguay	0.26
Czech Republic	0.23
Germany	0.22
Lebanon	0.19
Mongolia	0.17
Macedonia	0.17
Jordan	0.16
Kazakhstan	0.15
Slovenia	0.13
Croatia	0.10
Ecuador	0.07
Italy	0.06
Poland	0.05
Colombia	0.04
Argentina	0.04
Azerbaijan	0.02
Kenya	0.02
Tanzania	0.01
South Africa	-0.01
Peru	-0.03
Libya	-0.03
France	-0.06
Hungary	-0.10
Ethiopia	-0.13
Israel	-0.15
Tunisia	-0.18
Ukraine	-0.22
Greece	-0.23
Singapore	-0.25

Pakistan	-0.26
Turkey	-0.28
Mauritius	-0.29
Mexico	-0.29
Iran	-0.31
United States	-0.36
Nepal	-0.38
Algeria	-0.38
Russian Federation	-0.39
Bhutan	-0.40
Sri Lanka	-0.40
Portugal	-0.45
Bulgaria	-0.49
Romania	-0.53
Saudi Arabia	-0.54
Spain	-0.56
Morocco	-0.57
Malaysia	-0.62
Thailand	-0.64
Jamaica	-0.68
Chile	-0.70
Egypt	-0.75
Brazil	-0.78
Papua New Guinea	-0.79
Kuwait	-0.97
Australia	-0.99
China	-1.03
Dominican Republic	-1.07
Vietnam	-1.08
Indonesia	-1.14
India	-1.16
Bangladesh	-1.21
Cuba	-1.53
Japan	-1.58
South Korea	-1.91
Madagascar	-2.21
Philippines	-2.58
Fiji	-2.73
Haiti	-3.07
New Zealand	-3.37

Indicator: Terrestrial Systems

This indicator includes the following variables:

- Severity of Human Induced Soil Degradation
- Land Area Affected by Human Activities as a Percentage of Total Land Area

High numbers represent higher sustainability; zero represents the mean.

Fiji	1.70
Papua New Guinea	1.67
Gabon	1.54
Egypt	1.48
Norway	1.47
Canada	1.45
Central African Republic	1.29
Algeria	1.19
Japan	1.07
Chile	1.06
Paraguay	1.06
Libya	1.04
Australia	1.00
Bolivia	0.98
Mali	0.95
Sudan	0.90
Bhutan	0.88
Niger	0.85
Finland	0.84
Botswana	0.82
Venezuela	0.81
Malawi	0.78
Saudi Arabia	0.77
Israel	0.76
Iceland	0.75
New Zealand	0.72
Mongolia	0.71
Benin	0.69
Mauritius	0.67
Peru	0.67
Colombia	0.65
Ecuador	0.59
Sweden	0.59
Mozambique	0.56
Morocco	0.43
Uruguay	0.42
Russian Federation	0.41
Cameroon	0.41
Ghana	0.40
Brazil	0.39
Mexico	0.36

Kenya	0.33
Pakistan	0.29
Zambia	0.27
Trinidad and Tobago	0.26
Argentina	0.25
United States	0.22
Kuwait	0.20
Kyrgyz Republic	0.19
Senegal	0.18
China	0.18
Tanzania	0.16
Uzbekistan	0.16
Jordan	0.15
Kazakhstan	0.15
Ireland	0.15
Indonesia	0.14
Tunisia	0.12
Nepal	0.11
Zimbabwe	0.11
Ethiopia	0.10
Togo	0.04
Denmark	0.04
Iran	-0.02
Nigeria	-0.02
Slovenia	-0.04
Dominican Republic	-0.05
Cuba	-0.09
Switzerland	-0.12
Lebanon	-0.18
Burkina Faso	-0.20
Madagascar	-0.20
Uganda	-0.22
Guatemala	-0.22
Jamaica	-0.23
Nicaragua	-0.25
Croatia	-0.30
Armenia	-0.33
South Korea	-0.33
Syria	-0.37
Slovak Republic	-0.37
Portugal	-0.37

Malaysia	-0.44
Panama	-0.47
Austria	-0.48
Estonia	-0.50
South Africa	-0.50
Honduras	-0.50
France	-0.50
Greece	-0.52
Azerbaijan	-0.52
Macedonia	-0.55
India	-0.58
United Kingdom	-0.60
Latvia	-0.60
Czech Republic	-0.62
Netherlands	-0.62
Spain	-0.67
Italy	-0.68
Germany	-0.70
Bangladesh	-0.77
Lithuania	-0.79
Ukraine	-0.90
El Salvador	-0.91
Costa Rica	-0.92
Haiti	-0.93
Philippines	-0.94
Moldova	-0.96
Belarus	-0.99
Singapore	-1.08
Rwanda	-1.16
Sri Lanka	-1.23
Vietnam	-1.23
Turkey	-1.25
Burundi	-1.31
Hungary	-1.32
Thailand	-1.36
Bulgaria	-1.37
Romania	-1.39
Belgium	-1.48
Poland	-1.60
Albania	-1.75

Indicator: Reducing Air Pollution

This indicator includes the following variables:

- Nitrogen Oxide (NOx) Emissions Per Populated Land Area
- Sulfur Dioxide (SO2) Emissions Per Populated Land Area
- Volatile Organic Compound (VOCs) Emissions Per Populated Land Area
- Coal Consumption Per Populated Land Area
- Vehicles Per Populated Land Area

High numbers represent higher sustainability; zero represents the mean.

Bhutan	1.36
Madagascar	1.29
Papua New Guinea	1.25
Mali	1.20
Mozambique	1.11
Niger	1.11
Peru	1.08
Ethiopia	1.06
Burkina Faso	0.99
Sudan	0.95
Fiji	0.92
Argentina	0.86
Tanzania	0.86
Bolivia	0.82
Mongolia	0.82
Nicaragua	0.80
Gabon	0.80
Morocco	0.79
Iran	0.79
Kazakhstan	0.78
Cameroon	0.77
Zimbabwe	0.75
Honduras	0.64
Panama	0.63
Central African Republic	0.60
Uruguay	0.60
Senegal	0.59
Zambia	0.57
Cuba	0.57
Pakistan	0.57
Ghana	0.55
Kyrgyz Republic	0.55
Chile	0.54
Costa Rica	0.52
Uganda	0.52
Kenya	0.52
Algeria	0.49
Tunisia	0.48
Colombia	0.48
Brazil	0.48
Paraguay	0.46

Dominican Republic	0.42
Malawi	0.39
Benin	0.38
Syria	0.36
Guatemala	0.34
New Zealand	0.34
Haiti	0.33
Nigeria	0.32
Saudi Arabia	0.32
Ecuador	0.27
Mexico	0.24
Sri Lanka	0.23
Indonesia	0.23
Togo	0.22
Russian Federation	0.22
Turkey	0.20
Belarus	0.19
Venezuela	0.19
Estonia	0.18
Sweden	0.18
Nepal	0.17
Uzbekistan	0.17
Latvia	0.15
China	0.09
Jordan	0.08
Thailand	0.08
Norway	0.08
India	0.07
Finland	0.06
El Salvador	0.04
Ireland	0.03
Malaysia	0.02
Albania	-0.06
Azerbaijan	-0.09
Vietnam	-0.09
Spain	-0.09
Philippines	-0.10
Lithuania	-0.13
South Africa	-0.13
Romania	-0.17
Botswana	-0.20

Singapore	-0.24
Portugal	-0.26
Ukraine	-0.28
Jamaica	-0.29
Armenia	-0.31
Egypt	-0.35
Macedonia	-0.36
Bangladesh	-0.41
Rwanda	-0.44
Mauritius	-0.45
Libya	-0.49
Moldova	-0.51
Canada	-0.51
France	-0.51
Hungary	-0.59
Iceland	-0.60
Bulgaria	-0.61
Italy	-0.61
United States	-0.64
Greece	-0.66
Burundi	-0.66
Switzerland	-0.69
Austria	-0.70
Croatia	-0.76
Poland	-0.76
Trinidad and Tobago	-0.81
Lebanon	-0.90
Slovenia	-0.99
Australia	-1.02
Kuwait	-1.06
Slovak Republic	-1.19
Germany	-1.44
United Kingdom	-1.45
Japan	-1.49
Denmark	-1.54
Israel	-1.72
Czech Republic	-2.42
South Korea	-2.48
Belgium	-2.88
Netherlands	-2.92

Indicator: Reducing Water Stresses

This indicator includes the following variables:

- Fertilizer Consumption Per Hectare of Arable Land
- Pesticide Use Per Hectare of Crop Land
- Industrial Organic Pollutants Per Available Fresh Water
- Percentage of Country's Territory Under Severe Water Stress

High numbers represent higher sustainability; zero represents the mean.

Central African Republic	1.06
Rwanda	1.05
Uganda	1.05
Gabon	0.98
Bhutan	0.96
Mozambique	0.93
Cameroon	0.90
Mongolia	0.79
Senegal	0.74
Madagascar	0.74
Russian Federation	0.71
Botswana	0.70
Burundi	0.68
Albania	0.67
Mali	0.66
Latvia	0.66
Togo	0.66
Ethiopia	0.60
Burkina Faso	0.57
Zambia	0.57
Nigeria	0.55
Lithuania	0.53
Haiti	0.52
Niger	0.52
Canada	0.52
Ghana	0.50
Nicaragua	0.48
Tanzania	0.47
Bolivia	0.47
Estonia	0.46
Paraguay	0.44
Panama	0.44
Indonesia	0.42
Uruguay	0.41
Argentina	0.41
Benin	0.41
Sweden	0.41
Zimbabwe	0.40
Venezuela	0.37
Brazil	0.37
Ecuador	0.37

Finland	0.36
Kenya	0.35
Malawi	0.35
Cuba	0.31
Romania	0.31
Norway	0.30
Hungary	0.26
Kazakhstan	0.25
Croatia	0.20
El Salvador	0.20
Bulgaria	0.20
Austria	0.20
Moldova	0.19
Czech Republic	0.17
Guatemala	0.17
Jamaica	0.13
New Zealand	0.13
Australia	0.13
Fiji	0.12
Peru	0.12
Thailand	0.11
Dominican Republic	0.10
Philippines	0.09
United States	0.07
Belarus	0.07
Bangladesh	0.05
Papua New Guinea	0.05
Poland	0.05
Ukraine	0.03
Slovak Republic	0.03
Turkey	-0.04
Colombia	-0.04
Armenia	-0.05
Nepal	-0.08
Mexico	-0.10
Honduras	-0.10
Germany	-0.12
Chile	-0.13
Switzerland	-0.13
Slovenia	-0.15
South Africa	-0.17

India	-0.17
Azerbaijan	-0.18
Malaysia	-0.19
Denmark	-0.19
Portugal	-0.25
Vietnam	-0.26
Libya	-0.26
Kyrgyz Republic	-0.31
Pakistan	-0.32
France	-0.32
Greece	-0.34
United Kingdom	-0.38
Algeria	-0.38
Ireland	-0.40
Iran	-0.43
Saudi Arabia	-0.51
Spain	-0.53
Syria	-0.54
Sri Lanka	-0.54
Morocco	-0.56
Japan	-0.57
Uzbekistan	-0.57
Sudan	-0.57
China	-0.58
Egypt	-0.64
Kuwait	-0.82
Netherlands	-0.84
Tunisia	-0.87
Lebanon	-0.93
Macedonia	-0.94
Costa Rica	-1.00
Trinidad and Tobago	-1.25
Jordan	-1.27
Italy	-1.28
Iceland	-1.30
South Korea	-1.39
Mauritius	-1.39
Singapore	-1.98
Israel	-2.13
Belgium	-2.20

Indicator: Reducing Ecosystem Stresses

This indicator includes the following variables:

- Percentage Change in Forest Cover 1990-1995
- Percentage of Country's Territory with Acidification Exceedence

High numbers represent higher sustainability; zero represents the mean.

Armenia	1.33
Uzbekistan	1.33
Greece	1.16
Kazakhstan	1.12
Hungary	0.83
Portugal	0.68
Lithuania	0.67
New Zealand	0.67
Belarus	0.67
Estonia	0.63
Australia	0.48
India	0.47
Azerbaijan	0.46
Egypt	0.46
Iceland	0.46
Israel	0.46
Kuwait	0.46
Kyrgyz Republic	0.46
Libya	0.46
Mauritius	0.46
Moldova	0.46
Mongolia	0.46
Niger	0.46
Singapore	0.46
Turkey	0.46
Russian Federation	0.46
Uruguay	0.45
Latvia	0.41
Rwanda	0.40
Finland	0.40
South Africa	0.40
Albania	0.39
Ukraine	0.37
Kenya	0.37
Argentina	0.37
Spain	0.36
Morocco	0.35
Peru	0.34
Canada	0.34
Croatia	0.34
Bhutan	0.34

Papua New Guinea	0.33
Chile	0.33
France	0.32
Central African Republic	0.30
Fiji	0.30
Burundi	0.30
Ethiopia	0.29
Brazil	0.29
Colombia	0.28
Botswana	0.27
Gabon	0.27
Tunisia	0.26
Zimbabwe	0.25
Cameroon	0.21
Senegal	0.21
Mozambique	0.20
United States	0.18
Burkina Faso	0.18
Saudi Arabia	0.16
Sudan	0.14
Norway	0.14
Madagascar	0.14
Japan	0.14
Bangladesh	0.13
Nigeria	0.13
Mexico	0.10
Uganda	0.09
Mali	0.09
Tanzania	0.09
Bulgaria	0.08
Sri Lanka	0.03
Nepal	0.03
Venezuela	0.03
Bolivia	0.00
China	0.00
Zambia	0.00
Italy	-0.01
Algeria	-0.02
Cuba	-0.03
Benin	-0.03
Ghana	-0.04

Romania	-0.08
Togo	-0.12
Indonesia	-0.14
Trinidad and Tobago	-0.16
Malawi	-0.17
Dominican Republic	-0.19
Ireland	-0.19
Ecuador	-0.20
Slovak Republic	-0.25
Iran	-0.26
Guatemala	-0.39
Panama	-0.44
Syria	-0.49
Sweden	-0.50
Honduras	-0.53
Switzerland	-0.57
Malaysia	-0.58
Jordan	-0.61
United Kingdom	-0.62
Nicaragua	-0.64
Slovenia	-0.66
Paraguay	-0.69
Thailand	-0.70
Netherlands	-0.76
Pakistan	-0.83
Costa Rica	-0.92
Austria	-0.96
Poland	-0.98
Germany	-0.99
Vietnam	-1.01
El Salvador	-1.06
Denmark	-1.07
Haiti	-1.16
Jamaica	-1.19
Lebanon	-1.19
Philippines	-1.19
South Korea	-1.25
Czech Republic	-1.36
Belgium	-1.52
Macedonia	-1.63

Indicator: Reducing Waste and Consumption Pressures

This indicator includes the following variables:

- Consumption Pressure Per Capita
- Radioactive Waste

High numbers represent higher sustainability; the mean is 0.07.

Azerbaijan	1.31
Moldova	1.31
Pakistan	1.31
Armenia	1.25
Kyrgyz Republic	1.23
Bangladesh	1.12
Sudan	1.08
Bolivia	1.08
Mongolia	1.05
Niger	1.02
Rwanda	0.98
Ethiopia	0.97
Mozambique	0.94
Madagascar	0.92
Haiti	0.92
Syria	0.91
Burundi	0.90
Nicaragua	0.85
Uganda	0.82
Dominican Republic	0.81
Central African Republic	0.81
Trinidad and Tobago	0.81
Burkina Faso	0.80
Zimbabwe	0.80
Algeria	0.79
Colombia	0.79
Nepal	0.78
Malawi	0.71
Uzbekistan	0.71
Morocco	0.69
Mali	0.68
Togo	0.66
Albania	0.64
Sri Lanka	0.64
Vietnam	0.64
Cuba	0.64
El Salvador	0.63
Venezuela	0.62
India	0.62
Iran	0.60
Kazakhstan	0.58
Peru	0.57
Macedonia	0.56
Nigeria	0.53
Jordan	0.50
Egypt	0.49
Honduras	0.49
Mexico	0.49
Romania	0.45
Cameroon	0.43
Panama	0.43
Bulgaria	0.42
Argentina	0.40
Jamaica	0.40
Guatemala	0.37
Croatia	0.37
Tanzania	0.37
Bhutan	0.36
Slovak Republic	0.34
Kenya	0.34
Benin	0.31
South Africa	0.30
Tunisia	0.29
Indonesia	0.28
Hungary	0.27
Ecuador	0.23
Turkey	0.18
Senegal	0.15
Botswana	0.14
Russian Federation	0.13
Brazil	0.13
Poland	0.12
Belarus	0.09
Netherlands	0.07
Chile	0.05
Czech Republic	0.05
Zambia	0.00
China	-0.01
Libya	-0.03
Slovenia	-0.08
Saudi Arabia	-0.12
Thailand	-0.12
Ghana	-0.13
Philippines	-0.18
Australia	-0.20
Gabon	-0.20
Estonia	-0.21
Switzerland	-0.22
Costa Rica	-0.24
Lithuania	-0.25
Mauritius	-0.35
Italy	-0.35
Germany	-0.39
Uruguay	-0.44
Spain	-0.50
Papua New Guinea	-0.50
Paraguay	-0.51
Denmark	-0.51
Greece	-0.54
Sweden	-0.54
Finland	-0.73
Fiji	-0.75
Belgium	-0.79
Ireland	-0.86
Portugal	-0.88
Canada	-0.92
Norway	-1.01
New Zealand	-1.03
Malaysia	-1.14
South Korea	-1.15
Lebanon	-1.21
Austria	-1.22
Israel	-1.34
France	-1.47
Latvia	-1.64
United States	-1.68
Ukraine	-1.70
United Kingdom	-1.99
Iceland	-2.14
Kuwait	-2.39
Japan	-2.42
Singapore	-2.63

Indicator: Reducing Population Pressure

This indicator includes the following variables:

- Total Fertility Rate
- Percentage Change in Projected Population Between 2000 and 2050

High numbers represent higher sustainability; zero represents the mean.

Bulgaria	1.08
Czech Republic	1.08
Spain	1.08
Latvia	1.08
Russian Federation	1.07
Italy	1.07
Estonia	1.07
Slovenia	1.06
Belarus	1.05
Ukraine	1.05
Greece	1.04
Armenia	1.04
Hungary	1.04
Germany	1.03
Romania	1.03
Austria	1.03
Lithuania	1.03
Japan	1.03
Slovak Republic	1.02
Poland	1.01
Croatia	1.00
Portugal	0.99
Moldova	0.98
Cuba	0.97
Switzerland	0.97
Belgium	0.96
Sweden	0.95
Kazakhstan	0.92
Finland	0.92
South Korea	0.92
Netherlands	0.88
United Kingdom	0.86
Macedonia	0.83
China	0.82
France	0.82
Denmark	0.78
Norway	0.78
Trinidad and Tobago	0.76
Thailand	0.73
Canada	0.72
New Zealand	0.70

Ireland	0.69
Australia	0.66
Iceland	0.65
Mauritius	0.62
South Africa	0.58
Uruguay	0.52
Sri Lanka	0.51
Azerbaijan	0.44
United States	0.40
Kyrgyz Republic	0.38
Albania	0.33
Brazil	0.32
Chile	0.30
Uzbekistan	0.27
Zimbabwe	0.26
Lebanon	0.25
Jamaica	0.25
Argentina	0.24
Botswana	0.23
Panama	0.23
Turkey	0.22
Indonesia	0.20
Vietnam	0.19
Mexico	0.18
Israel	0.11
Iran	0.10
Tunisia	0.10
Mongolia	0.06
Morocco	-0.01
Venezuela	-0.08
Fiji	-0.08
Bangladesh	-0.10
India	-0.10
Ecuador	-0.14
Dominican Republic	-0.16
Egypt	-0.17
Kenya	-0.19
Colombia	-0.19
Peru	-0.25
Philippines	-0.31
Costa Rica	-0.36

Mozambique	-0.39
Kuwait	-0.40
Singapore	-0.42
Algeria	-0.43
Ghana	-0.44
Malaysia	-0.46
Honduras	-0.56
Bolivia	-0.57
El Salvador	-0.66
Malawi	-0.66
Rwanda	-0.67
Haiti	-0.70
Libya	-0.74
Central African Republic	-0.77
Sudan	-0.80
Papua New Guinea	-0.85
Nepal	-0.86
Syria	-0.95
Paraguay	-0.96
Pakistan	-1.00
Nicaragua	-1.00
Jordan	-1.06
Togo	-1.19
Cameroon	-1.19
Gabon	-1.20
Zambia	-1.33
Bhutan	-1.37
Guatemala	-1.40
Senegal	-1.51
Tanzania	-1.54
Nigeria	-1.61
Saudi Arabia	-1.77
Burundi	-1.93
Madagascar	-2.02
Benin	-2.03
Mali	-2.11
Niger	-2.17
Burkina Faso	-2.21
Ethiopia	-2.23
Uganda	-2.26

Indicator: Basic Human Sustenance

This indicator includes the following variables:

- Daily Per Capita Calorie Supply as a Percentage of Total Requirements
- Percentage of Population with Access to Improved Drinking-Water Supply

High numbers represent higher sustainability; zero represents the mean.

Belgium	0.97
Iceland	0.97
Japan	0.97
France	0.95
Germany	0.94
Ireland	0.93
Australia	0.92
Austria	0.92
Belarus	0.92
Bulgaria	0.92
Canada	0.92
Denmark	0.92
Lebanon	0.92
Mauritius	0.92
Norway	0.92
Singapore	0.92
Slovak Republic	0.92
Slovenia	0.92
Switzerland	0.92
United Kingdom	0.92
United States	0.92
Italy	0.92
New Zealand	0.92
Spain	0.91
Hungary	0.89
Russian Federation	0.87
Israel	0.87
Costa Rica	0.87
Greece	0.85
Portugal	0.82
Cuba	0.78
Egypt	0.78
Iran	0.78
Saudi Arabia	0.78
Czech Republic	0.77
Kuwait	0.75
Algeria	0.75
Poland	0.69
South Korea	0.69
Moldova	0.68
Netherlands	0.68
Estonia	0.66
Croatia	0.65
Finland	0.64
Lithuania	0.63
Malaysia	0.59
Kazakhstan	0.58
Latvia	0.56
Sweden	0.56
Macedonia	0.52
Mexico	0.51
South Africa	0.51
Turkey	0.42
Ukraine	0.41
Jordan	0.40
Morocco	0.39
Paraguay	0.34
Syria	0.33
Tunisia	0.33
Argentina	0.30
Brazil	0.30
Azerbaijan	0.29
Armenia	0.28
Trinidad and Tobago	0.27
Indonesia	0.21
Uzbekistan	0.20
Libya	0.10
Uruguay	0.09
Colombia	0.09
Kyrgyz Republic	0.02
Chile	0.02
Guatemala	0.00
Albania	-0.09
Philippines	-0.11
China	-0.14
Botswana	-0.16
Jamaica	-0.18
Bhutan	-0.20
India	-0.20
Honduras	-0.26
Pakistan	-0.28
Sri Lanka	-0.35
Panama	-0.35
Thailand	-0.36
Venezuela	-0.40
Dominican Republic	-0.43
Nepal	-0.45
Bangladesh	-0.46
Romania	-0.48
Ecuador	-0.54
Nicaragua	-0.55
Zimbabwe	-0.57
El Salvador	-0.58
Gabon	-0.61
Senegal	-0.62
Fiji	-0.68
Vietnam	-0.70
Benin	-0.82
Papua New Guinea	-1.03
Mali	-1.09
Peru	-1.10
Sudan	-1.15
Bolivia	-1.16
Mongolia	-1.19
Cameroon	-1.21
Ghana	-1.24
Togo	-1.29
Niger	-1.30
Nigeria	-1.44
Tanzania	-1.45
Zambia	-1.48
Burkina Faso	-1.52
Burundi	-1.57
Malawi	-1.65
Uganda	-1.65
Madagascar	-1.66
Central African Republic	-1.80
Mozambique	-1.80
Kenya	-1.84
Haiti	-1.93
Ethiopia	-2.33
Rwanda	-2.33

Indicator: Environmental Health

This indicator includes the following variables:

- Child Death Rate from Respiratory Diseases
- Death Rate from Intestinal Infectious Diseases
- Under-5 Mortality Rate

High numbers represent higher sustainability; zero represents the mean.

Denmark	0.97
Switzerland	0.97
Italy	0.96
Germany	0.96
Netherlands	0.96
Sweden	0.96
Canada	0.95
Slovenia	0.95
Greece	0.95
Spain	0.95
Israel	0.94
Finland	0.94
Japan	0.94
New Zealand	0.94
France	0.94
Czech Republic	0.94
Norway	0.94
Ireland	0.94
Portugal	0.93
United Kingdom	0.93
United States	0.93
Croatia	0.92
Poland	0.92
Iceland	0.92
Singapore	0.91
Hungary	0.91
Kuwait	0.90
South Korea	0.88
Slovak Republic	0.87
Australia	0.86
Lithuania	0.86
Estonia	0.85
Belgium	0.80
Mauritius	0.80
Austria	0.79
Chile	0.77
Bulgaria	0.76
Trinidad and Tobago	0.73
Uruguay	0.71
Cuba	0.66
Latvia	0.63

Costa Rica	0.62
Colombia	0.59
Moldova	0.57
Russian Federation	0.54
Argentina	0.54
Ukraine	0.52
Romania	0.51
Malaysia	0.50
Belarus	0.45
Fiji	0.41
Kazakhstan	0.38
Jamaica	0.36
Panama	0.35
Armenia	0.35
Sri Lanka	0.32
Macedonia	0.30
Saudi Arabia	0.29
Thailand	0.28
Brazil	0.27
Paraguay	0.26
Lebanon	0.25
Libya	0.22
Turkey	0.21
Jordan	0.20
Venezuela	0.20
Ecuador	0.19
Peru	0.17
Iran	0.15
Tunisia	0.15
Azerbaijan	0.15
Mexico	0.14
Kyrgyz Republic	0.13
Dominican Republic	0.12
China	0.09
Uzbekistan	0.09
Philippines	0.09
Albania	0.00
Syria	-0.01
Vietnam	-0.01
Nicaragua	-0.07
Indonesia	-0.08

Honduras	-0.09
South Africa	-0.20
Guatemala	-0.25
Zimbabwe	-0.26
El Salvador	-0.27
Botswana	-0.32
Morocco	-0.44
India	-0.69
Ghana	-0.72
Egypt	-0.72
Gabon	-0.77
Papua New Guinea	-0.80
Mongolia	-0.84
Algeria	-0.94
Kenya	-0.95
Pakistan	-0.98
Nepal	-1.00
Cameroon	-1.04
Sudan	-1.05
Bolivia	-1.09
Togo	-1.21
Madagascar	-1.22
Haiti	-1.26
Senegal	-1.30
Uganda	-1.39
Tanzania	-1.40
Nigeria	-1.52
Rwanda	-1.65
Zambia	-1.66
Central African Republic	-1.70
Bangladesh	-1.71
Bhutan	-1.77
Malawi	-1.84
Burundi	-1.90
Burkina Faso	-1.90
Ethiopia	-1.93
Mali	-1.96
Mozambique	-1.96
Benin	-2.04
Niger	-2.42

Indicator: Science/Technology

This indicator includes the following variables:

- Research & Development Scientists and Engineers Per Million Population
- Expenditure for Research and Development as a Percentage of GNP
- Scientific and Technical Articles Per Million Population

High numbers represent higher sustainability; zero represents the mean.

Sweden	2.61
Israel	2.50
Switzerland	2.30
United States	2.27
Japan	2.17
Finland	2.04
Denmark	1.92
Australia	1.92
Canada	1.80
Germany	1.79
France	1.72
Iceland	1.72
Norway	1.68
Netherlands	1.63
United Kingdom	1.62
South Korea	1.20
Belgium	1.18
New Zealand	1.09
Singapore	0.97
Italy	0.97
Ireland	0.92
Russian Federation	0.91
Slovenia	0.90
Austria	0.85
Belarus	0.85
Azerbaijan	0.76
Uzbekistan	0.64
Lithuania	0.58
Slovak Republic	0.56
Ukraine	0.55
Estonia	0.51
Czech Republic	0.45
Armenia	0.43
Spain	0.42
Cuba	0.42
Croatia	0.41
Romania	0.25
Poland	0.20
Bulgaria	0.19
El Salvador	0.18
Hungary	0.14

Trinidad and Tobago	0.05
Macedonia	0.05
Bolivia	0.03
Mongolia	0.01
Portugal	-0.03
Greece	-0.03
Latvia	-0.05
South Africa	-0.12
Uruguay	-0.17
Moldova	-0.22
Lebanon	-0.25
Fiji	-0.26
Iran	-0.28
Chile	-0.30
Saudi Arabia	-0.32
Pakistan	-0.34
Argentina	-0.36
Kazakhstan	-0.36
Brazil	-0.37
China	-0.38
Benin	-0.39
Kyrgyz Republic	-0.39
Costa Rica	-0.41
Vietnam	-0.42
India	-0.42
Botswana	-0.43
Morocco	-0.45
Dominican Republic	-0.45
Mauritius	-0.45
Venezuela	-0.46
Turkey	-0.49
Libya	-0.50
Nicaragua	-0.52
Togo	-0.52
Uganda	-0.52
Algeria	-0.53
Egypt	-0.53
Peru	-0.55
Mexico	-0.57
Honduras	-0.57
Paraguay	-0.58

Tunisia	-0.59
Ghana	-0.59
Zimbabwe	-0.59
Kuwait	-0.59
Sri Lanka	-0.60
Albania	-0.60
Philippines	-0.60
Jordan	-0.62
Malaysia	-0.63
Burundi	-0.63
Central African Republic	-0.64
Papua New Guinea	-0.64
Panama	-0.64
Gabon	-0.65
Indonesia	-0.66
Guatemala	-0.66
Thailand	-0.67
Syria	-0.68
Burkina Faso	-0.69
Ecuador	-0.70
Madagascar	-0.70
Colombia	-0.71
Cameroon	-0.73
Bangladesh	-0.74
Rwanda	-0.74
Kenya	-0.75
Nigeria	-0.75
Jamaica	-0.76
Senegal	-0.77
Bhutan	-0.89
Sudan	-0.91
Nepal	-0.92
Haiti	-1.06
Zambia	-1.15
Tanzania	-1.17
Malawi	-1.29
Mali	-1.31
Ethiopia	-1.46
Mozambique	-1.46
Niger	-1.46

Indicator: Capacity for Debate

This indicator includes the following variables:

- IUCN Member Organizations Per Million Population
- Civil and Political Liberties

High numbers represent higher sustainability; zero represents the mean.

Iceland	2.41
Panama	2.27
Botswana	2.14
Costa Rica	1.82
Australia	1.66
Fiji	1.63
New Zealand	1.59
Mauritius	1.32
Norway	1.13
Uruguay	1.13
Denmark	1.10
Netherlands	1.08
Jordan	0.97
Switzerland	0.97
Canada	0.90
Estonia	0.90
Finland	0.85
Trinidad and Tobago	0.82
Lebanon	0.80
Jamaica	0.76
Ecuador	0.75
Ireland	0.75
Sweden	0.73
Bolivia	0.72
Austria	0.70
El Salvador	0.69
Israel	0.62
United Kingdom	0.55
Spain	0.52
Belgium	0.51
South Africa	0.47
Slovak Republic	0.42
France	0.42
Lithuania	0.40
Slovenia	0.39
Portugal	0.38
Czech Republic	0.36
Guatemala	0.34
Honduras	0.32
Zimbabwe	0.32
United States	0.31

Hungary	0.30
Greece	0.30
Latvia	0.29
Italy	0.26
Argentina	0.22
Germany	0.18
Poland	0.18
Kuwait	0.16
Japan	0.15
Paraguay	0.13
Benin	0.10
Mali	0.08
Mongolia	0.07
Chile	0.05
Dominican Republic	0.05
South Korea	-0.01
Romania	-0.02
Macedonia	-0.02
Nicaragua	-0.02
Singapore	-0.02
Sri Lanka	-0.03
Papua New Guinea	-0.06
Moldova	-0.07
Bulgaria	-0.08
Zambia	-0.13
Malawi	-0.16
Nepal	-0.19
Croatia	-0.20
Thailand	-0.20
Central African Republic	-0.20
Philippines	-0.21
India	-0.23
Ghana	-0.24
Senegal	-0.28
Madagascar	-0.32
Armenia	-0.32
Mozambique	-0.37
Venezuela	-0.41
Colombia	-0.42
Burkina Faso	-0.43
Bangladesh	-0.43

Mexico	-0.44
Brazil	-0.44
Ukraine	-0.47
Nigeria	-0.49
Haiti	-0.50
Albania	-0.52
Gabon	-0.53
Peru	-0.54
Tanzania	-0.57
Morocco	-0.62
Indonesia	-0.64
Tunisia	-0.64
Azerbaijan	-0.66
Malaysia	-0.70
Uganda	-0.72
Togo	-0.73
Turkey	-0.74
Niger	-0.75
Russian Federation	-0.75
Cuba	-0.76
Kyrgyz Republic	-0.77
Bhutan	-0.81
Belarus	-0.81
Kenya	-0.86
Kazakhstan	-0.90
Ethiopia	-0.91
Algeria	-0.98
Burundi	-0.98
Rwanda	-1.00
Egypt	-1.02
Pakistan	-1.07
Iran	-1.19
Cameroon	-1.28
Uzbekistan	-1.30
Libya	-1.32
China	-1.32
Saudi Arabia	-1.34
Syria	-1.42
Vietnam	-1.44
Sudan	-1.44

Indicator: Regulation and Management

This indicator includes the following variables:

- Stringency and Consistency of Environmental Regulations
- Degree to which Environmental Regulations Promote Innovation
- Percentage of Land Area Under Protected Status
- Number of Sectoral Environmental Impact Assessment Guidelines

High numbers represent higher sustainability; zero represents the mean.

United Kingdom	1.54
Denmark	1.54
Switzerland	1.46
Germany	1.34
United States	1.30
Austria	1.26
Dominican Republic	1.24
Finland	1.21
Canada	1.21
New Zealand	1.10
Slovak Republic	0.89
Sweden	0.84
France	0.82
Pakistan	0.78
Netherlands	0.75
Belgium	0.72
Singapore	0.68
Chile	0.66
Nepal	0.65
Bhutan	0.55
Costa Rica	0.53
Malaysia	0.43
Spain	0.43
Norway	0.42
Australia	0.40
Panama	0.40
Botswana	0.36
South Africa	0.36
Portugal	0.35
Japan	0.35
Sri Lanka	0.35
Tanzania	0.34
Cuba	0.29
Venezuela	0.28
Guatemala	0.25
Malawi	0.21
Iceland	0.19
Czech Republic	0.17
Thailand	0.12
Zimbabwe	0.12
Egypt	0.11

Rwanda	0.10
Italy	0.08
Ireland	0.07
Israel	0.05
Paraguay	0.03
India	0.01
Latvia	-0.04
Bolivia	-0.05
Ecuador	-0.06
Estonia	-0.08
Senegal	-0.12
Burkina Faso	-0.18
Mongolia	-0.19
Niger	-0.20
Lithuania	-0.21
Honduras	-0.21
Indonesia	-0.23
Uganda	-0.24
South Korea	-0.28
Brazil	-0.29
Kenya	-0.30
Colombia	-0.30
Mozambique	-0.31
Peru	-0.31
Zambia	-0.31
Bangladesh	-0.33
Central African Republic	-0.33
Togo	-0.35
Hungary	-0.36
Argentina	-0.36
Armenia	-0.37
Nicaragua	-0.38
Ghana	-0.39
Russian Federation	-0.39
Jordan	-0.40
Macedonia	-0.41
Benin	-0.41
Croatia	-0.43
Poland	-0.44
Kuwait	-0.45
Mexico	-0.45

Greece	-0.45
Nigeria	-0.49
Slovenia	-0.50
Burundi	-0.51
Turkey	-0.51
China	-0.51
Ethiopia	-0.51
Azerbaijan	-0.51
Iran	-0.54
Romania	-0.57
Cameroon	-0.58
Belarus	-0.60
Mali	-0.63
Sudan	-0.64
Mauritius	-0.64
Kyrgyz Republic	-0.64
Trinidad and Tobago	-0.68
Gabon	-0.69
Albania	-0.70
Kazakhstan	-0.70
Bulgaria	-0.71
Algeria	-0.72
Philippines	-0.72
Saudi Arabia	-0.73
Uzbekistan	-0.75
Madagascar	-0.75
Moldova	-0.80
Vietnam	-0.81
Fiji	-0.81
Morocco	-0.84
Haiti	-0.86
Lebanon	-0.86
Tunisia	-0.86
Uruguay	-0.87
Jamaica	-0.87
Libya	-0.88
Papua New Guinea	-0.88
Syria	-0.88
Ukraine	-0.93
El Salvador	-1.32

Indicator: Private Sector Responsiveness

This indicator includes the following variables:

- Number of ISO 14001 Certified Companies Per Million Dollars GDP
- Dow Jones Sustainbility Group Index
- Average Innovest EcoValue'21 Rating of Firms
- World Business Council for Sustainable Development Members
- Levels of Environmental Competitiveness

High numbers represent higher sustainability; mean is -0.13.

Switzerland	2.12
Japan	1.83
Germany	1.09
United Kingdom	1.02
New Zealand	0.93
Finland	0.89
Czech Republic	0.86
United States	0.84
Hungary	0.83
Costa Rica	0.82
Australia	0.78
Denmark	0.72
Canada	0.71
Brazil	0.68
Slovenia	0.68
Sweden	0.67
South Korea	0.62
Russian Federation	0.61
Singapore	0.58
Thailand	0.46
Austria	0.42
China	0.40
Croatia	0.38
Paraguay	0.38
Netherlands	0.37
Slovak Republic	0.25
Algeria	0.22
Mexico	0.20
Lebanon	0.15
France	0.14
Israel	0.05
Zambia	0.05
Uruguay	0.04
Norway	0.03
Jordan	0.03
Belgium	0.02
Ireland	0.00
Estonia	-0.02
Egypt	-0.03
Fiji	-0.03
Iceland	-0.03

South Africa	-0.07
Malaysia	-0.10
Spain	-0.12
Portugal	-0.18
Chile	-0.20
Honduras	-0.24
Argentina	-0.26
Turkey	-0.28
Trinidad and Tobago	-0.33
Italy	-0.35
Mauritius	-0.37
Latvia	-0.39
Morocco	-0.39
Zimbabwe	-0.39
Syria	-0.40
Iran	-0.41
Ecuador	-0.42
Lithuania	-0.42
Sri Lanka	-0.42
Cuba	-0.43
Kuwait	-0.43
Libya	-0.43
Rwanda	-0.43
Guatemala	-0.43
Saudi Arabia	-0.43
Dominican Republic	-0.43
Peru	-0.44
India	-0.44
Tunisia	-0.45
Nigeria	-0.46
Poland	-0.46
Pakistan	-0.46
Romania	-0.47
Albania	-0.48
Armenia	-0.48
Azerbaijan	-0.48
Bangladesh	-0.48
Belarus	-0.48
Benin	-0.48
Bhutan	-0.48
Botswana	-0.48

Burkina Faso	-0.48
Burundi	-0.48
Cameroon	-0.48
Central African Republic	-0.48
Ethiopia	-0.48
Gabon	-0.48
Ghana	-0.48
Haiti	-0.48
Jamaica	-0.48
Kazakhstan	-0.48
Kenya	-0.48
Kyrgyz Republic	-0.48
Macedonia	-0.48
Madagascar	-0.48
Malawi	-0.48
Mali	-0.48
Moldova	-0.48
Mongolia	-0.48
Mozambique	-0.48
Nepal	-0.48
Nicaragua	-0.48
Niger	-0.48
Panama	-0.48
Papua New Guinea	-0.48
Senegal	-0.48
Sudan	-0.48
Tanzania	-0.48
Togo	-0.48
Uganda	-0.48
Uzbekistan	-0.48
Philippines	-0.49
Colombia	-0.50
Greece	-0.50
Vietnam	-0.70
Indonesia	-0.73
Bulgaria	-0.73
Bolivia	-0.77
Venezuela	-0.79
El Salvador	-0.87
Ukraine	-0.89

Indicator: Environmental Information

This indicator includes the following variables:

- Availability of Sustainable Development Information at the National Level
- Environmental Strategies and Action Plans
- Number of ESI Variables Missing from Selected Data Sets

High numbers represent higher sustainability; zero represents the mean.

Netherlands	2.25
Norway	1.88
United States	1.57
Finland	1.54
United Kingdom	1.31
Austria	1.30
France	1.12
China	1.12
Slovak Republic	1.04
Indonesia	1.01
Portugal	0.97
Switzerland	0.89
Malaysia	0.84
Hungary	0.83
India	0.83
Ecuador	0.81
Japan	0.79
Germany	0.79
Poland	0.79
Australia	0.79
Egypt	0.77
Ireland	0.73
Czech Republic	0.70
Argentina	0.69
Canada	0.68
Chile	0.66
Mexico	0.64
Denmark	0.63
Colombia	0.62
Spain	0.61
Italy	0.58
Thailand	0.56
Israel	0.56
Lithuania	0.56
Sweden	0.51
Nepal	0.46
Singapore	0.39
Sri Lanka	0.38
Ukraine	0.36
Pakistan	0.30
Iceland	0.30

Nicaragua	0.29
Estonia	0.27
Slovenia	0.26
Cuba	0.24
Russian Federation	0.23
Latvia	0.23
South Korea	0.23
Moldova	0.21
South Africa	0.20
Mongolia	0.20
El Salvador	0.19
Albania	0.16
Costa Rica	0.12
Jamaica	0.12
Uganda	0.08
Turkey	-0.01
Uruguay	-0.02
Tanzania	-0.04
Philippines	-0.05
Belgium	-0.07
Brazil	-0.08
Bulgaria	-0.12
New Zealand	-0.18
Macedonia	-0.18
Benin	-0.18
Vietnam	-0.18
Bolivia	-0.19
Fiji	-0.21
Guatemala	-0.22
Romania	-0.23
Iran	-0.23
Kenya	-0.26
Ghana	-0.27
Croatia	-0.29
Zimbabwe	-0.30
Tunisia	-0.30
Peru	-0.34
Venezuela	-0.35
Greece	-0.35
Senegal	-0.46
Jordan	-0.51

Trinidad and Tobago	-0.52
Nigeria	-0.56
Honduras	-0.58
Gabon	-0.59
Belarus	-0.60
Botswana	-0.62
Mozambique	-0.62
Morocco	-0.63
Mauritius	-0.64
Togo	-0.65
Malawi	-0.67
Ethiopia	-0.67
Kuwait	-0.68
Kazakhstan	-0.70
Cameroon	-0.71
Zambia	-0.72
Algeria	-0.75
Dominican Republic	-0.75
Niger	-0.76
Papua New Guinea	-0.76
Bangladesh	-0.77
Mali	-0.78
Azerbaijan	-0.80
Panama	-0.81
Burkina Faso	-0.82
Sudan	-0.85
Central African Republic	-0.86
Uzbekistan	-0.87
Kyrgyz Republic	-0.89
Rwanda	-0.90
Bhutan	-0.91
Libya	-0.91
Madagascar	-0.91
Burundi	-0.92
Syria	-0.95
Lebanon	-0.95
Armenia	-0.96
Saudi Arabia	-0.98
Paraguay	-1.15
Haiti	-1.44

Indicator: Eco-Efficiency

This indicator includes the following variables:

- Energy Efficiency (Total Energy Consumption Per Unit GDP)
- Renewable Energy Production as a Percentage of Total Energy Consumption

High numbers represent higher sustainability; zero represents the mean.

Uganda	0.95
Ethiopia	0.93
Cameroon	0.88
Switzerland	0.86
Norway	0.85
Malawi	0.84
Uruguay	0.83
Bhutan	0.83
Paraguay	0.83
Nepal	0.82
Austria	0.82
Sweden	0.80
Mali	0.80
Iceland	0.80
Ghana	0.80
Madagascar	0.77
Tanzania	0.77
Honduras	0.74
Burundi	0.72
Sudan	0.71
Mozambique	0.71
Peru	0.70
Brazil	0.70
Costa Rica	0.69
Finland	0.69
Rwanda	0.67
New Zealand	0.66
Fiji	0.64
Haiti	0.63
Guatemala	0.61
Sri Lanka	0.60
El Salvador	0.60
Kenya	0.60
Burkina Faso	0.60
Portugal	0.56
Canada	0.55
Papua New Guinea	0.55
Gabon	0.54
Argentina	0.52
Italy	0.51
Slovenia	0.51

Turkey	0.50
Zambia	0.50
Spain	0.49
France	0.49
Denmark	0.48
Panama	0.48
Japan	0.48
Chile	0.47
Philippines	0.40
Armenia	0.40
Colombia	0.36
Bolivia	0.35
Dominican Republic	0.34
Morocco	0.32
Australia	0.31
Albania	0.31
Latvia	0.29
Ireland	0.28
Mauritius	0.27
United States	0.26
Syria	0.25
Germany	0.24
Mexico	0.22
Ecuador	0.22
Central African Republic	0.20
Greece	0.19
Zimbabwe	0.13
Croatia	0.10
United Kingdom	0.10
Nigeria	0.07
Nicaragua	0.07
Bangladesh	0.06
Pakistan	0.05
Thailand	0.04
Netherlands	0.02
India	-0.03
Indonesia	-0.05
Togo	-0.09
Egypt	-0.09
Belgium	-0.15
Malaysia	-0.17

Venezuela	-0.18
South Korea	-0.27
Iran	-0.29
China	-0.31
Jamaica	-0.37
Cuba	-0.41
Lebanon	-0.45
Kyrgyz Republic	-0.54
Tunisia	-0.56
Israel	-0.61
Vietnam	-0.65
Romania	-0.69
Moldova	-0.70
Niger	-0.77
Poland	-0.77
Senegal	-0.81
Botswana	-0.84
Algeria	-0.88
South Africa	-0.88
Hungary	-0.93
Lithuania	-0.94
Estonia	-0.95
Macedonia	-0.96
Slovak Republic	-0.97
Bulgaria	-0.98
Jordan	-0.99
Czech Republic	-1.04
Singapore	-1.12
Russian Federation	-1.19
Libya	-1.20
Kuwait	-1.38
Kazakhstan	-1.39
Benin	-1.42
Saudi Arabia	-1.48
Belarus	-1.51
Uzbekistan	-1.64
Azerbaijan	-1.67
Mongolia	-1.71
Ukraine	-1.77
Trinidad and Tobago	-2.16

Indicator: Reducing Public Choice Failures

This indicator includes the following variables:

- Price of Premium Gasoline
- Subsidies for Energy or Materials Usage
- Reducing Corruption

High numbers represent higher sustainability; the mean is -0.07.

Finland	2.25
Netherlands	1.80
Denmark	1.62
Iceland	1.61
United Kingdom	1.60
New Zealand	1.57
Sweden	1.48
Ireland	1.44
Austria	1.38
Switzerland	1.38
France	1.36
Norway	1.35
Singapore	1.25
Germany	1.11
Belgium	1.10
Israel	1.09
Italy	0.98
Portugal	0.95
Japan	0.86
Uruguay	0.82
Australia	0.76
Spain	0.72
Slovenia	0.70
Canada	0.68
Argentina	0.63
Chile	0.54
Morocco	0.45
Sri Lanka	0.41
Peru	0.36
Hungary	0.36
Brazil	0.35
South Korea	0.31
Fiji	0.28
Czech Republic	0.27
Uganda	0.26
Greece	0.25
United States	0.24
Bolivia	0.20
Turkey	0.17
Mauritius	0.15
Senegal	0.11

Mali	0.09
Estonia	0.07
Tunisia	0.04
Cuba	-0.01
Burkina Faso	-0.02
Albania	-0.02
South Africa	-0.02
Macedonia	-0.06
Trinidad and Tobago	-0.08
Croatia	-0.09
Lithuania	-0.12
Costa Rica	-0.13
Kenya	-0.14
Central African Republic	-0.17
Malaysia	-0.18
Jordan	-0.19
Latvia	-0.20
Botswana	-0.22
Poland	-0.23
Malawi	-0.24
Niger	-0.27
Haiti	-0.28
Rwanda	-0.32
Burundi	-0.34
Romania	-0.35
Mozambique	-0.35
Bangladesh	-0.37
Bhutan	-0.37
Nepal	-0.39
Slovak Republic	-0.40
Tanzania	-0.41
Zambia	-0.43
Kuwait	-0.43
Togo	-0.43
El Salvador	-0.45
Moldova	-0.46
Jamaica	-0.46
Gabon	-0.46
Madagascar	-0.46
Cameroon	-0.49
Philippines	-0.51

Mexico	-0.55
Bulgaria	-0.55
Panama	-0.57
Armenia	-0.61
Kyrgyz Republic	-0.62
Colombia	-0.64
Pakistan	-0.65
Lebanon	-0.65
Ethiopia	-0.65
Ghana	-0.65
Honduras	-0.66
Nicaragua	-0.66
Syria	-0.67
Egypt	-0.68
China	-0.70
Thailand	-0.72
Russian Federation	-0.73
Paraguay	-0.73
Mongolia	-0.73
Dominican Republic	-0.76
Vietnam	-0.77
Guatemala	-0.77
Azerbaijan	-0.77
Benin	-0.78
Papua New Guinea	-0.78
Belarus	-0.81
India	-0.82
Ukraine	-0.89
Zimbabwe	-0.92
Algeria	-0.98
Kazakhstan	-1.00
Sudan	-1.02
Saudi Arabia	-1.10
Libya	-1.15
Venezuela	-1.21
Iran	-1.30
Ecuador	-1.35
Nigeria	-1.36
Uzbekistan	-1.36
Indonesia	-1.54

Indicator: International Commitment

This indicator includes the following variables:

- Number of Memberships in Environmental Intergovernmental Organizations
- Percentage of Convention on International Trade in Endangered Species (CITES) Reporting Requirements Met
- Levels of Participation in the Vienna Convention and the Montreal Protocol on Ozone Depleting Substances
- Compliance with Environmental Agreements

High numbers represent higher sustainability; the mean -0.06.

Netherlands	1.58
Germany	1.53
Sweden	1.50
Norway	1.29
Denmark	1.28
Austria	1.20
France	1.19
United Kingdom	1.12
Finland	1.11
Switzerland	1.09
Spain	1.01
Japan	0.91
Belgium	0.91
Canada	0.91
Australia	0.88
Italy	0.81
Tunisia	0.80
United States	0.78
New Zealand	0.68
Greece	0.62
Singapore	0.58
South Korea	0.56
Czech Republic	0.53
Senegal	0.53
Panama	0.52
Hungary	0.47
Portugal	0.44
Sri Lanka	0.42
Cameroon	0.39
India	0.30
Slovak Republic	0.30
Cuba	0.29
Morocco	0.29
Trinidad and Tobago	0.28
Colombia	0.27
Poland	0.27
Kenya	0.27
Nicaragua	0.26
Pakistan	0.24
Malaysia	0.24
Uruguay	0.19

Uganda	0.17
Mexico	0.16
Togo	0.16
Tanzania	0.15
Brazil	0.15
Costa Rica	0.14
Latvia	0.13
Malawi	0.13
China	0.12
Chile	0.12
Egypt	0.10
Mali	0.09
Indonesia	0.09
Russian Federation	0.08
Algeria	0.07
Bulgaria	0.04
Ghana	0.02
Niger	0.02
Iran	0.00
Estonia	0.00
Argentina	-0.01
South Africa	-0.02
Mongolia	-0.02
Turkey	-0.02
Mauritius	-0.03
Ecuador	-0.06
Thailand	-0.06
Botswana	-0.06
Iceland	-0.06
Ireland	-0.10
Bolivia	-0.10
Israel	-0.13
Jordan	-0.15
Venezuela	-0.16
Mozambique	-0.18
Peru	-0.18
Zimbabwe	-0.19
Syria	-0.20
Papua New Guinea	-0.21
Burkina Faso	-0.23
Jamaica	-0.24

Philippines	-0.25
Zambia	-0.28
Paraguay	-0.37
Slovenia	-0.40
Vietnam	-0.42
Romania	-0.43
Bangladesh	-0.45
Benin	-0.46
Lebanon	-0.46
Nepal	-0.46
Guatemala	-0.46
Uzbekistan	-0.50
Croatia	-0.51
Dominican Republic	-0.52
Gabon	-0.65
Macedonia	-0.66
Ethiopia	-0.67
Nigeria	-0.67
Sudan	-0.67
Madagascar	-0.69
Kuwait	-0.71
Azerbaijan	-0.72
Belarus	-0.75
Fiji	-0.81
Lithuania	-0.81
Saudi Arabia	-0.81
Ukraine	-1.03
Haiti	-1.07
Central African Republic	-1.17
El Salvador	-1.27
Honduras	-1.32
Libya	-1.47
Burundi	-1.47
Rwanda	-1.57
Albania	-1.68
Kazakhstan	-1.73
Moldova	-1.73
Armenia	-1.78
Bhutan	-1.78
Kyrgyz Republic	-1.78

Indicator: Global-Scale Funding/Participation

This indicator includes the following variables:

- Montreal Protocol Multilateral Fund Participation
- Global Environmental Facility Participation

High numbers represent higher sustainability; zero represents the mean.

Lithuania	2.34
Bulgaria	2.28
Azerbaijan	2.12
Slovak Republic	1.97
Czech Republic	1.85
Mauritius	1.56
Uruguay	1.27
Malaysia	1.11
Costa Rica	1.05
Jamaica	0.84
Hungary	0.79
Sweden	0.75
Canada	0.73
Finland	0.71
New Zealand	0.69
Denmark	0.68
Panama	0.67
Switzerland	0.63
Norway	0.63
Greece	0.63
Australia	0.62
Egypt	0.62
Belgium	0.61
Netherlands	0.56
Austria	0.53
United States	0.49
Ireland	0.49
Poland	0.49
Dominican Republic	0.45
Germany	0.44
Spain	0.44
Argentina	0.44
United Kingdom	0.43
France	0.40
Mexico	0.40
Japan	0.39
Venezuela	0.39
South Africa	0.34
Thailand	0.31
Lebanon	0.29
Peru	0.28

Italy	0.28
Portugal	0.25
Philippines	0.21
El Salvador	0.20
Guatemala	0.16
Bangladesh	0.14
Brazil	0.14
Bhutan	0.13
Sri Lanka	0.12
Slovenia	0.12
Ghana	0.11
Pakistan	0.11
Jordan	0.07
Bolivia	0.06
India	0.06
Latvia	0.04
Uzbekistan	0.04
Mongolia	0.04
Papua New Guinea	0.02
China	0.02
Cuba	0.02
Central African Republic	0.01
Ecuador	0.01
Zimbabwe	-0.01
Belarus	-0.03
Turkey	-0.03
Ukraine	-0.04
Benin	-0.04
Nicaragua	-0.06
Uganda	-0.07
Madagascar	-0.08
Honduras	-0.08
Cameroon	-0.10
Mozambique	-0.10
Armenia	-0.12
Senegal	-0.12
Tunisia	-0.13
Mali	-0.14
Romania	-0.14
Nepal	-0.14
Algeria	-0.15

Trinidad and Tobago	-0.15
Syria	-0.17
Vietnam	-0.17
Russian Federation	-0.17
Chile	-0.18
Niger	-0.20
Burkina Faso	-0.23
Indonesia	-0.25
Kenya	-0.27
Sudan	-0.31
Gabon	-0.52
Colombia	-0.58
Iceland	-0.59
Israel	-0.77
Morocco	-0.87
Paraguay	-0.93
Moldova	-1.00
Singapore	-1.03
Nigeria	-1.06
Kuwait	-1.07
Estonia	-1.07
Malawi	-1.09
Burundi	-1.12
Zambia	-1.13
Botswana	-1.13
Tanzania	-1.15
Iran	-1.15
Albania	-1.17
Croatia	-1.17
Ethiopia	-1.17
Fiji	-1.17
Haiti	-1.17
Kazakhstan	-1.17
South Korea	-1.17
Kyrgyz Republic	-1.17
Libya	-1.17
Macedonia	-1.17
Rwanda	-1.17
Saudi Arabia	-1.17
Togo	-1.17

Indicator: Protecting International Commons

This indicator includes the following variables:

- Forest Stewardship Council (FSC) Accredited Forest Area as a Percentage of Total Forest Area
- Ecological Footprint "Deficit"
- Carbon-Dioxide (CO_2) Emissions (Total times Per Capita)
- Historic Cumulative Carbon-Dioxide (CO_2) Emissions
- Cluorofluorocarbon (CFC) Consumption (Total times Per Capita)
- Sulfur Dioxide (SO_2) Exports

High numbers represent higher sustainability; the mean is 0.02.

Central African Republic	1.74
Papua New Guinea	1.43
Bolivia	1.38
Gabon	1.17
Uganda	0.99
Mozambique	0.87
Benin	0.87
Burundi	0.83
Mali	0.82
Madagascar	0.80
Ethiopia	0.79
Burkina Faso	0.78
Honduras	0.76
Malawi	0.76
Zambia	0.75
Guatemala	0.74
Nepal	0.72
Fiji	0.67
New Zealand	0.65
Niger	0.65
Bhutan	0.62
Costa Rica	0.62
Nicaragua	0.61
Cameroon	0.58
Rwanda	0.57
Sri Lanka	0.53
Iceland	0.53
Tanzania	0.52
Botswana	0.51
Ghana	0.50
Croatia	0.47
Paraguay	0.43
Mongolia	0.40
Sudan	0.39
Mauritius	0.38
Peru	0.37
Togo	0.37
Senegal	0.35
Sweden	0.34
Switzerland	0.33
Latvia	0.31
Zimbabwe	0.30
Haiti	0.28
Slovak Republic	0.26
Albania	0.24
Kenya	0.22
Czech Republic	0.22
Moldova	0.22
Armenia	0.19
Canada	0.11
Bangladesh	0.11
El Salvador	0.11
Brazil	0.10
Uruguay	0.10
Hungary	0.08
Slovenia	0.08
Panama	0.05
Macedonia	0.04
Australia	0.03
South Africa	0.03
Lithuania	0.02
Vietnam	0.02
Ecuador	0.01
Norway	0.00
Netherlands	-0.07
Dominican Republic	-0.07
Kyrgyz Republic	-0.07
Malaysia	-0.09
Indonesia	-0.11
Colombia	-0.15
Pakistan	-0.17
Belgium	-0.17
Estonia	-0.18
Jamaica	-0.19
Uzbekistan	-0.24
Finland	-0.25
Morocco	-0.25
Tunisia	-0.26
Azerbaijan	-0.27
Belarus	-0.27
Philippines	-0.30
Jordan	-0.30
Cuba	-0.30
Israel	-0.33
Poland	-0.36
Austria	-0.36
Bulgaria	-0.37
Singapore	-0.38
Trinidad and Tobago	-0.38
Lebanon	-0.39
Mexico	-0.39
Ireland	-0.41
Argentina	-0.43
Chile	-0.46
Portugal	-0.48
Ukraine	-0.49
Egypt	-0.49
Romania	-0.51
Nigeria	-0.52
Denmark	-0.53
France	-0.54
Syria	-0.55
Algeria	-0.57
Venezuela	-0.59
Libya	-0.64
United Kingdom	-0.65
Greece	-0.67
Japan	-0.68
Italy	-0.73
Kazakhstan	-0.73
Germany	-0.74
Thailand	-0.76
Turkey	-0.76
India	-0.79
United States	-0.79
Iran	-0.88
South Korea	-0.90
Kuwait	-0.93
Spain	-1.00
Saudi Arabia	-1.03
Russian Federation	-1.16
China	-1.63