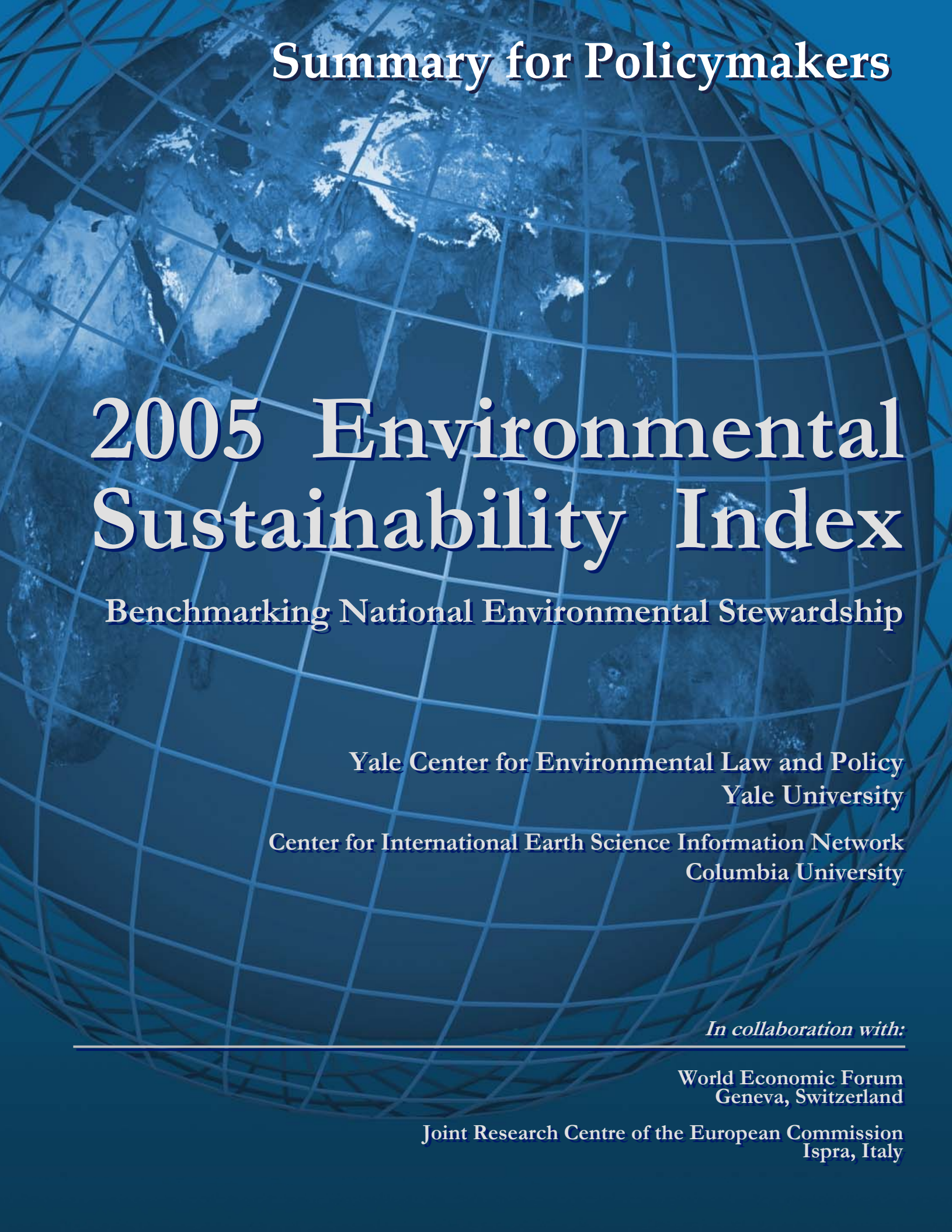

Summary for Policymakers

2005 Environmental Sustainability Index

Benchmarking National Environmental Stewardship

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Yale University

Center for International Earth Science Information Network
Columbia University

In collaboration with:

World Economic Forum
Geneva, Switzerland

Joint Research Centre of the European Commission
Ispra, Italy

The 2005 Environmental Sustainability Index (ESI) benchmarks the ability of nations to protect the environment over the next several decades. It does so by integrating 76 data sets – tracking natural resource endowments, past and present pollution levels, environmental management efforts, and a society's capacity to improve its environmental performance – into 21 indicators of environmental sustainability.

These indicators permit comparison across the following five fundamental components of sustainability: Environmental Systems; Environmental Stresses; Human Vulnerability to Environmental Stresses; Societal Capacity to Respond to Environmental Challenges; and Global Stewardship.

The issues reflected in the indicators and the underlying variables were chosen through an extensive review of the environmental literature, assessment of available data, rigorous analysis, and broad-based consultation with policymakers, scientists, and indicator experts.

The ESI provides a powerful environmental decisionmaking tool tracking national environmental performance and facilitating comparative policy analysis. It enables a more data-driven and empirical approach to policymaking.

While absolute measures of sustainability remain elusive, many aspects of environmental sustainability can be measured on a relative basis with results that provide a context for policy evaluations and judgments. Such comparisons are especially important in the new context of worldwide efforts to advance the environment-rated aspects of the Millennium Development Goals.

Higher ESI scores suggest better environmental stewardship. The five highest-ranking countries are Finland, Norway, Uruguay, Sweden, and Iceland – all countries that have substantial natural resource endowments, low population density, and have managed the challenges of development with some success.

The lowest ranking countries are North Korea, Iraq, Taiwan, Turkmenistan, and Uzbekistan. These countries face numerous issues, both natural and manmade, and have not managed their policy choices well.

A number of core policy conclusions emerge from the ESI analysis:

- The ESI provides a valuable tool for benchmarking environmental stewardship and permits comparative policy analysis.
- Environmental stewardship demands attention to a wide range of pollution control and natural resource management issues.
- Developing and developed countries face distinct environmental challenges – the pollution pressures of industrialization on one hand and the stresses of poverty and incapacity on the other.
- Economic success contributes to the potential of environmental success but does not guarantee it. Environmental stewardship depends on both policy efforts and a society's over-arching social, political, and economic systems.
- While it appears that no country is on a fully sustainable trajectory, at every level of development, some countries are managing their environmental challenges better than others.
- Measures of governance, including the rigor of regulation and the degree of cooperation with international policy efforts, correlate highly with overall environmental success. This result suggests that emphasis on good governance may be justified.
- The lack of reliable data to measure performance on a number of issues and across many countries hinders attempts to move toward more data-driven and empirical decisionmaking.

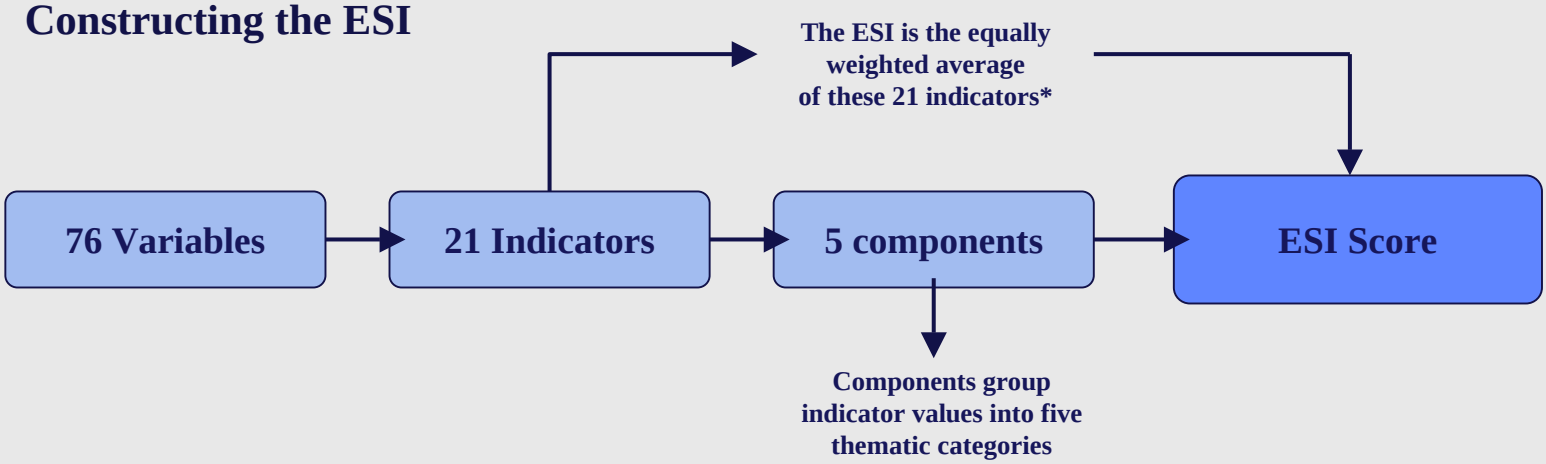
Environmental Sustainability Index – Rankings and Scores

ESI Rank	Country Name	ESI Score	OECD Rank	Non-OECD Rank
1	Finland	75.1	1	
2	Norway	73.4	2	
3	Uruguay	71.8		1
4	Sweden	71.7	3	
5	Iceland	70.8	4	
6	Canada	64.4	5	
7	Switzerland	63.7	6	
8	Guyana	62.9		2
9	Argentina	62.7		3
10	Austria	62.7	7	
11	Brazil	62.2		4
12	Gabon	61.7		5
13	Australia	61.0	8	
14	New Zealand	60.9	9	
15	Latvia	60.4		6
16	Peru	60.4		7
17	Paraguay	59.7		8
18	Costa Rica	59.6		9
19	Croatia	59.5		10
20	Bolivia	59.5		11
21	Ireland	59.2	10	
22	Lithuania	58.9		12
23	Colombia	58.9		13
24	Albania	58.8		14
25	Central Afr. Rep.	58.7		15
26	Denmark	58.2	11	
27	Estonia	58.2		16
28	Panama	57.7		17
29	Slovenia	57.5		18
30	Japan	57.3	12	
31	Germany	56.9	13	
32	Namibia	56.7		19
33	Russia	56.1		20
34	Botswana	55.9		21
35	P. N. Guinea	55.2		22
36	France	55.2	14	
37	Portugal	54.2	15	
38	Malaysia	54.0		23
39	Congo	53.8		24
40	Mali	53.7		25
41	Netherlands	53.7	16	
42	Chile	53.6		26
43	Bhutan	53.5		27
44	Armenia	53.2		28
45	United States	52.9	17	
46	Myanmar	52.8		29
47	Belarus	52.8		30
48	Slovakia	52.8	18	
49	Ghana	52.8		31
50	Cameroon	52.5		32
51	Ecuador	52.4		33
52	Laos	52.4		34
53	Cuba	52.3		35
54	Hungary	52.0	19	
55	Tunisia	51.8		36
56	Georgia	51.5		37
57	Uganda	51.3		38
58	Moldova	51.2		39
59	Senegal	51.1		40
60	Zambia	51.1		41
61	Bosnia & Herze.	51.0		42
62	Israel	50.9		43
63	Tanzania	50.3		44
64	Madagascar	50.2		45
65	Nicaragua	50.2		46
66	United Kingdom	50.2	20	
67	Greece	50.1	21	
68	Cambodia	50.1		47
69	Italy	50.1	22	
70	Bulgaria	50.0		48
71	Mongolia	50.0		49
72	Gambia	50.0		50
73	Thailand	49.7		51
74	Malawi	49.3		52
75	Indonesia	48.8		53
76	Spain	48.8	23	
77	Guinea-Bissau	48.6		54
78	Kazakhstan	48.6		55
79	Sri Lanka	48.5		56
80	Kyrgyzstan	48.4		57
81	Guinea	48.1		58
82	Venezuela	48.1		59
83	Oman	47.9		60
84	Jordan	47.8		61
85	Nepal	47.7		62
86	Benin	47.5		63
87	Honduras	47.4		64
88	Côte d'Ivoire	47.3		65
89	Serbia & Mont.	47.3		66
90	Macedonia	47.2		67
91	Turkey	46.6	24	
92	Czech Rep.	46.6	25	
93	South Africa	46.2		68
94	Romania	46.2		69
95	Mexico	46.2	26	
96	Algeria	46.0		70
97	Burkina Faso	45.7		71
98	Nigeria	45.4		72
99	Azerbaijan	45.4		73
100	Kenya	45.3		74
101	India	45.2		75
102	Poland	45.0	27	
103	Niger	45.0		76
104	Chad	45.0		77
105	Morocco	44.8		78
106	Rwanda	44.8		79
107	Mozambique	44.8		80
108	Ukraine	44.7		81
109	Jamaica	44.7		82
110	United Arab Em.	44.6		83
111	Togo	44.5		84
112	Belgium	44.4	28	
113	Dem. Rep. Congo	44.1		85
114	Bangladesh	44.1		86
115	Egypt	44.0		87
116	Guatemala	44.0		88
117	Syria	43.8		89
118	El Salvador	43.8		90
119	Dominican Rep.	43.7		91
120	Sierra Leone	43.4		92
121	Liberia	43.4		93
122	South Korea	43.0	29	
123	Angola	42.9		94
124	Mauritania	42.6		95
125	Libya	42.3		96
126	Philippines	42.3		97
127	Viet Nam	42.3		98
128	Zimbabwe	41.2		99
129	Lebanon	40.5		100
130	Burundi	40.0		101
131	Pakistan	39.9		102
132	Iran	39.8		103
133	China	38.6		104
134	Tajikistan	38.6		105
135	Ethiopia	37.9		106
136	Saudi Arabia	37.8		107
137	Yemen	37.3		108
138	Kuwait	36.6		109
139	Trinidad & Tob.	36.3		110
140	Sudan	35.9		111
141	Haiti	34.8		112
142	Uzbekistan	34.4		113
143	Iraq	33.6		114
144	Turkmenistan	33.1		115
145	Taiwan	32.7		116
146	North Korea	29.2		117

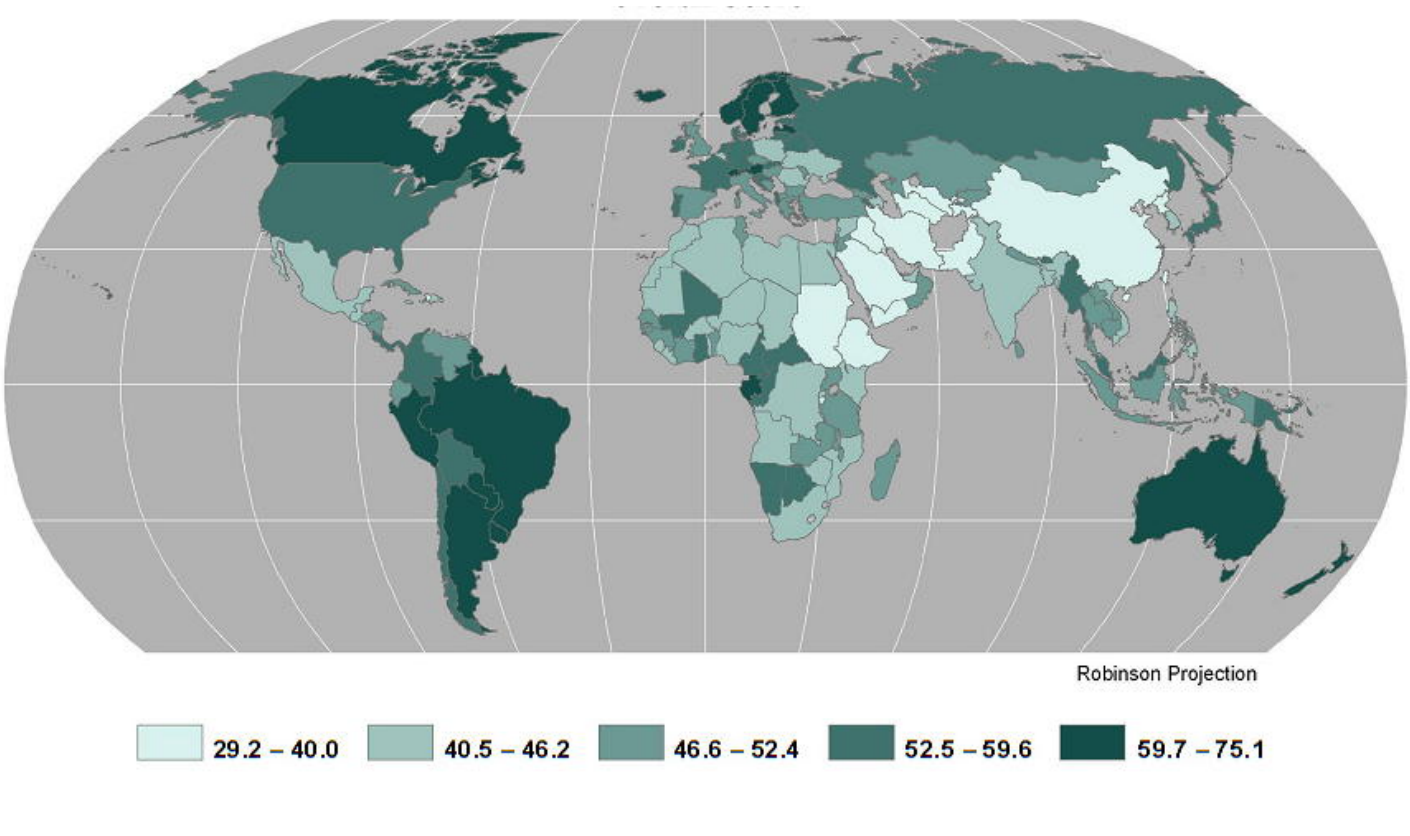
Note: The 2005 ESI scores are not directly comparable to the 2002 ESI scores. See Appendix A for details on methodological changes.




Constructing the ESI



Environmental Sustainability Index
Country Scores by Quintile



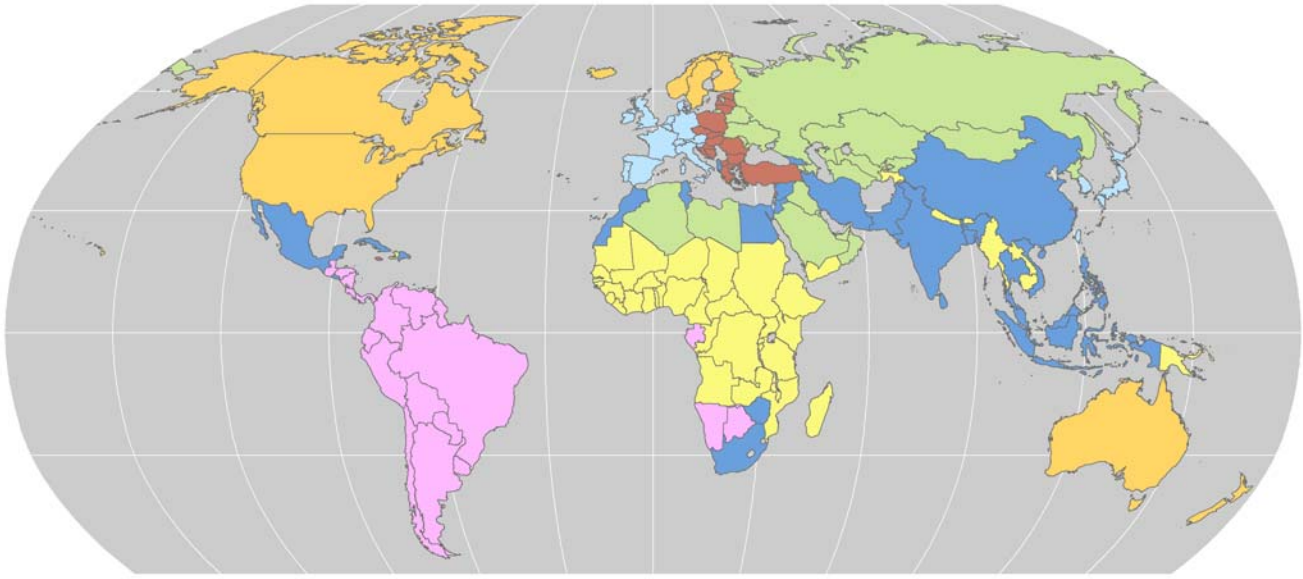
*Note: While the equal weighting of the indicators has some affect on ESI Scores, sensitivity analysis demonstrates the relative robustness of the ESI structure.




76 Variables		21 Indicators	5 Components
•Nitrogen dioxide concentration •Sulfur dioxide concentration	•Particulates concentration •Indoor air quality	Air Quality	Environmental Systems
•Ecoregions at risk •Threatened birds •Threatened mammals	•Threatened amphibians •National Biodiversity Index	Biodiversity	
•Wilderness area	•Developed area	Land	
•Dissolved oxygen •Electrical conductivity	•Suspended solids •Phosphorus concentration	Water Quality	
•Surface water availability	•Groundwater availability	Water Quantity	
•Coal consumption •Nitrogen oxide emissions •Sulfur dioxide emissions	•VOC emissions •Vehicles in use	Reducing Air Pollution	Reducing Stresses
•Forest cover change	•Acidification	Reducing Ecosystem Stress	
•Population growth	•Total Fertility Rate	Reducing Population Pressures	
•Ecological Footprint •Waste recycling rates	•Hazardous waste	Reducing Waste & Consumption Pressures	
•Industrial organic effluents •Fertilizer consumption	•Pesticide consumption •Water stress	Reducing Water Stress	
•Overfishing •Sustainably managed forests •Market distortions	•Salinization due to irrigation •Agricultural subsidies	Natural Resource Management	
•Deaths from waterborne diseases •Child mortality rate	•Deaths from respiratory infections in children	Environmental Health	Reducing Human Vulnerability
•Malnutrition	•Safe drinking water supply	Basic Human Sustenance	
•Deaths from environmental disaster vulnerability	•Natural hazard exposure	Environment-related natural disaster exposure	
•Gasoline price •Corruption •Government effectiveness •Protected area •Environmental governance •Strength of rule of law •Local Agenda 21 initiatives	•Civil and political liberties •Sustainable development data gaps •International environmental engagement •Environmental knowledge creation •Democratic institutions	Environmental Governance	Social and Institutional Capacity
•Energy consumption/ GDP	•Renewable energy production	Eco-efficiency	
•Corporate sustainability (Dow Jones) •Corporate sustainability (Innovest) •ISO 14001 certified companies	•ISO 14001 certified companies •Private sector environmental innovation •Responsible Care participation	Private Sector Responsiveness	
•Innovation capacity •Digital Access •Female primary education	•University enrollments •Research scientists	Science and Technology	
•Intergovernmental environmental activities •Role in international environmental aid	•Participation in international environmental agreements	Participation in International Collaborative Efforts	Global Stewardship
•Greenhouse gas emissions / GDP	•Greenhouse gas emissions / capita	Greenhouse Gas Emissions	
•Transboundary sulfur dioxide spillovers	•Polluting-goods imports	Reducing Transboundary Environmental Pressures	




Cluster Analysis
ESI Characteristic-Based Country Groupings



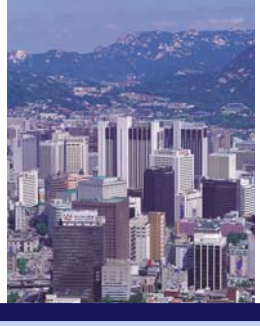
Robinson Projection

Cluster Component Characteristics

- 1 Low system and stress scores; low vulnerability and high capacity; moderate stewardship
- 2 Moderate system and stress scores; high vulnerability and low capacity; above average stewardship
- 3 Above average system score; low vulnerability; high capacity; moderate stresses and stewardship
- 4 Moderate system, stresses, and capacity scores; low vulnerability and stewardship
- 5 Above average system score, moderate stresses, vulnerability, capacity, and stewardship
- 6 Moderate system, stresses, and vulnerability scores; low capacity and stewardship
- 7 Low system score; moderate stresses, vulnerability, capacity, and stewardship

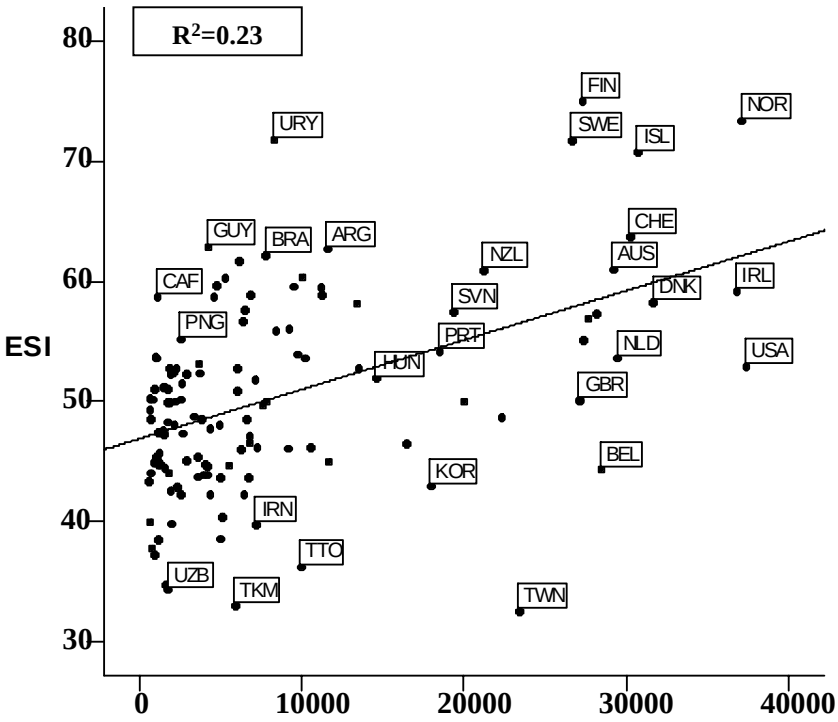
The ESI offers a mechanism for establishing "peer groups" of countries for the purpose of benchmarking environmental performance. The cluster analysis provides a statistically derived set of seven groupings that links countries based on their environmental characteristics. The clusters facilitate comparative analysis that helps to highlight leaders and laggards on an issue-by-issue basis and permits countries to gauge relative performance and identify best practices.






ESI – GDP Relationship

At every level of development some countries handle their pollution control and natural resource management issues better than others. Countries above the regression line show results that exceed income-based expectations; those below the line are underperforming given their level of development.



ARG: Argentina
AUS: Australia
BEL: Belgium
BRA: Brazil
CAF: Central Afr. Rep
CHE: Switzerland
DNK: Denmark
FIN: Finland
GBR: United Kingdom
GUY: Guyana
HUN: Hungary
IRL: Ireland
IRN: Iran
ISL: Iceland
KOR: South Korea
NLD: Netherlands
NOR: Norway
NZL: New Zealand
PNG: P. N. Guinea
PRT: Portugal
SWE: Sweden
SVN: Slovenia
TKM: Turkmenistan
TTO: Trinidad & Tobago
TWN: Taiwan
URY: Uruguay
USA: United States
UZB: Uzbekistan
Not Labeled: 107 countries

Critical Role of Governance

Variables Most Highly Correlated with the ESI	Correlation Coefficient
Civil and political liberties	0.59
World Economic Forum Survey on environmental governance	0.54
Government effectiveness	0.51
Political institutions	0.50
Participation in international environmental agreements	0.49

The top five correlations all reflect elements of governance, including variables related to domestic political structure, regulatory effectiveness, and engagement in global-scale environmental efforts. Although these results do not prove a causal relationship, they suggest that the recent policy emphasis placed on good governance may be justified.

The full ESI Report, including methodological appendices and all data, is available at:

www.yale.edu/esi

An interactive version of the ESI permitting the user to adjust the weighting of the indicators is under development.

The ESI in action…

"As a conceptual framework and analytic tool, the Environmental Sustainability Index has now been introduced to the policymaking discourse in the Philippines. As Chair of the Committee on Ecology in the House of Representatives, I have called on the government to be more serious about measuring the efficacy of programs and policies -- and the ESI provides a way to benchmark our performance and identify successful strategies."

Neric Acosta
Congressman and Chair of the Committee on Ecology
Manila, The Philippines

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For a copy of the complete 2005 ESI Report, visit:

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