Tapping into the Power of Communication :

Japan for Sustainability
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Game Plan for 4 Sessions

- My Goal:
  - What is sustainability? Explain it with your own terms.
  - Hold "World Summit on Sustainable Development" in this room, and you should be able to present your vision/strategies/policies for sustainability.
- Game Plan:

	Day1	Day 2	Day 3	Day 4
Lecture	What is Sustainability?	Power of Communication	Vision and Indicators	Full workshop
Workshop	Communication Breaking up into teams	World Summit - country briefing	World Summit - visions and indicators	World Summit - strategy/policy session
Prepare (Home Work)		3 Sustainability related-news	3 points for Sustainable XX in 2050	3 policy ideas in your fields

1st lecture -- Lessons

1) What is Sustainability?

- Variety of definitions

- Conditions + Values (participation, equity, wellbeing, etc.)

2) How are countries/int'l organizations responding?

-National/EU indicators and strategies

3) How can we measure and track it?

- Variety of indicators

What do we do today?

- Goal:
  - "How can we make communication effective so that we can drive a movement towards sustainability/equity?"
- Measures:
  - Exercise (news on sustainability)
  - Some notes
  - Experimental workshop
    - Learning what communication can do through actually trying to communicate one's own country's stance toward sustainability/equity.
- Environmental Sustainability Indicators

Communication and You

- As …
  - An Engineer
    - Research Proposal / Budget
  - A Policy Maker
    - Different countries and interests
  - A Business Person
    - 80-90% of the time

Communication Exercise

"Date Game"

Your name/ country/ study field	News on sustainability in your country
Your "personal" eco-policy	What you would write about on JFS newsletter

Prep: 5 minutes
Communicate: 15 minutes

What is Sustainability?

Our Common Future

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

Page 8, *World Commission on Environment and Development. Our Common Future*. (Oxford, Great Britain: Oxford University Press, 1987). (Frequently referred to as the Brundtland report after Gro Harlem Brundtland, Chairman of the Commission)

What is Sustainability?

World Business Council on Sustainable Development

"Sustainable development involves the simultaneous pursuit of economic prosperity, environmental quality and social equity. Companies aiming for sustainability need to perform not against a single, financial bottom line but against the triple bottom line."

Global Communication: a key for global environmental policies

- Environmental issues know no border.
- Different cultural/social contexts – case of Iraq hostages
- Conflict of National Interests

  (See the United States!)

> •Thank you for strongly promoting sustainability with your fine newsletter. Please email it to President Bush, who needs to be educated on the importance of sustainability. Senator Kerry is already a strong supporter of sustainability efforts like yours.
> -Citizen, San Francisco (U.S.A) 30 Apr 2004

⇒Can we reach out to each other?

When Communication Fails Case1:

- North – South Issue "Distrust"
  - World Summit on Sustainable Development in Johannesburg (2002)
  - North:
    - "You, the South, should reform corruption and stop illegal logging first."
  - South:
    - "You, the North, should change excessively consumptive market first."

⇒Distrust to each other leads to inaction.

When Communication Fails : Case 2

- Japan – China
  - Japan
    - "We aim for recycling-oriented society."
    - "We cut CO2 emissions."
  - China
    - "We have a right to enjoy economic growth."
    - "Japan consumes more than we do."

⇒Efforts are almost meaningless without cooperation.

⇒How would you communicate?

JFS on the potential of communication

"Works to develop special partnerships with people in Asia, in order to cooperate to find paths toward sustainability in this region."

"Welcomes feedback and comments from overseas and shares them in Japan and with partners in Asia, so that we can improve efforts and activities in this region by learning from each other."

Keywords:

- Sharing feedbacks
- Improve efforts and activities

How would you respond? Feedback at work

- Thank you very much for your Sustainability Newsletter. It is full of interesting materials.

  My project in Cornwall, **South West England**, is concerned with many of the same issues. In particular I would be interested to know if you have access to any **successful work in Japan on reducing the amount of domestic waste** that is created.

  In this part of the world **household waste is increasing at 3% per year**. Although we are working hard on recycling, reusing, and creating new markets for the recycled materials, it is essential we also find some practical and successful methods to cut the amount of waste that is created in the first place. So I would be grateful if you can direct me to the best experience that Japan has to share in this regard.

- Business person, U.K.
- 30 Apr 2004

⇒ Introduced the following cases;
http://www.japanfs.org/en/newsletter/200303.html
(Aya town)

http://www.japanfs.org/en/newsletter/200304.html
(Hino city)

How would you respond? Feedback at work

- Country：Indonesia
  Comment：Can you please advise if your organisation can advise any possible uses for **used golf balls**. Can they be recycled into other products? Any information would be greatly appreciated.

- => Question referred to Global Sports Alliance (NPO) http://www.gsa.or.jp/
- => Info on recycling of sports goods through Art exhibition
  http://www.g-forse.com/top/news184_e.html

How would you respond? Feedback at work

"I am seeking more information on the sterling engine and especially in its hook-up with power gen-sets. Any information would be greatly appreciated. We are trying to find ways to both produce electricity without using petroleum products and also distill drinking water for small villages in the tropics of Central America. Any information will be greatly appreciated."

All the best, Bruce Campbell
Pollution Prevention and Sustainable Business
LLNL

How would you respond? Feedback at work

"Dear jfs friends,
Greetings from Kathmandu

I found the article on bicycles very informative and an inducement for thinking and acting on simple but sustainable solutions to the current problems. "using rather than owning" idea applies to other vehicles also.

--Dr. NS Jodha
ICIMOD, Kathmandu, Nepal

Workshop: How would you communicate ?

World Summit – Country Briefing

<Mission>

After working as an environmental policy maker in your country, you just became a Communication Officer of Sustainable Development. In the World Summit on Sustainable Development which will be held on 2007, please **present where your country stands in the movement towards sustainability**, using the Johari Window framework (explained in the following slides.)

<Group work>

- 4 persons * 5 teams (Japan, China,Turkey, USA, France.)
- How would you communicate your country's stance towards sustainability / sustainable Development? Discuss each other and **fill in the Johari Window** (25 minutes).
- Present your country's stance to the other group – and vice versa. (3 minutes * 5 teams)

Framework: The Johari Window

- Developed by Joseph Luft and Harry Ingham
- One of the most useful models describing the process of human interaction

The Johari Window

	Known to Self	Not Known to Self
Known to Others	1. OPEN	2. BLIND
Not Known to Others	3. HIDDEN	4. UNKNOWN

The Johari Window (personal level)

Eg. Kazunori Kobayashi

	Known to Self	Not Known to Self
Known to Others	1. OPEN "My name is Kazunori Kobayashi."	2. BLIND "When I get cold, I become bad-tempered."
Not Known to Others	3. HIDDEN "I like Cinnabon roll more than anybody else."	4. UNKNOWN "Maybe if I eat Cinnabon roll when I have a cold, everybody is happy."

The Johari Window (country level)

Eg. Japan (in regards to sustainability)

	Known to Self	Not Known to Self
Known to Others	1. OPEN "Environmental high-tech" "lack of resources"	2. BLIND "very materialistic" "If everybody lives like Japanese does, we need 3 planets."
Not Known to Others	3. HIDDEN "Extremely high energy efficiency" "Motta-nai spirit"	4. UNKNOWN "Maybe Edo is a model of sustainable society." "Maybe a long shoreline can be a source of energy."

The Johari Window

	Known to Self	Not Known to Self
Known to Others	1. OPEN	2. BLIND
Not Known to Others	3. HIDDEN	4. UNKNOWN

↓ Opening windows by information disclosure

→ Opening windows by feedbacks

The Johari Window (country level)

France / USA/ Turkey /China

	Known to Self	Not Known to Self
Known to Others	1. OPEN	2. BLIND
Not Known to Others	3. HIDDEN	4. UNKNOWN

Lessons

- "How can we reach out and understand each other?"
- "How can we make communication effective so that we can drive a movement for sustainability?"

⇒Opening Windows through Disclosure and Feedbacks

Day 3: Workshop
World Summit -Vision & Indicators

<Mission>

Let's suppose the next World Summit on Sustainable Development will be held in 2007, and there each country is required to present its vision and indicators for 2050. We are just commissioned by Prime Minister to present a draft.

<Process>

- 3-4 persons * 6 teams
- Area: Energy (& global warming), food, waste, bio-diversity, resource-productivity, equity, satisfaction…
- Individual work (10 minutes) – Post It
- Group work (30 minutes) – Flip chart
- Presentation & Discussion (25 minutes)

Homework

- 3 points for Sustainable XX in 2050

In 2050, Japan/USA/China/Turkey should have achieved …

1. XXX
2. XXX
3. XXX

<Reference>

JFS Sustainability Indicator
http://www.japanfs.org/en/view/index.html
Sustainable Sweden 2020
http://www.scb.se/statistik/MI/MI1103/2003M00/Preface1to52.pdf
National Strategy for Sustainable Germany
http://www.nachhaltigkeitsrat.de/service/download_e/pdf/Perspectives_for_Germany.pdf

The Environmental Sustainability Index (ESI)

- World Economic Forum, The Yale Center for Environmental Law and Policy, and the Columbia University
- a measure of overall progress towards environmental sustainability.
- 5 components
- Permits cross-national comparisons of environmental progress in a systematic and quantitative fashion.
- Published in 2002, updated in 2005.

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

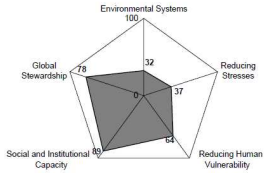
How Sustainable is Japan?

5 components

- Environmental Systems NEGATIVE
  - Air Quality/water/biodiversity/land
- Reducing Environmental Stresses NEGATIVE
  - Reducing air pollution/water stress/ecosystem stress…
- Reducing Human Vulnerability Mixed
  - Basic human sustenance/environmental health
- Social and Institutional Capacity POSITIVE
  - Env. Governance/Eco Efficiency/ Private Sec. Responsiveness/Science&Tech
- Global Stewardship POSITIVE
  - Participation in int'l cooperative efforts/reducing greenhouse gas emissions/transboundary environmental pressures

Japan

ESI:	57.3
Ranking:	30
GDP/Capita:	$24,491
Peer group ESI:	55.4
Variable coverage:	72
Missing variables imputed:	3

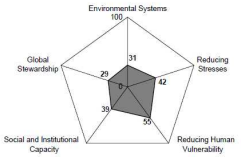


	Indicator value	Reference
Air Quality	0.03	0.43
Biodiversity	-0.80	-0.23
Land	-1.74	-0.68
Water Quality	1.06	0.57
Water Quantity	-0.62	-0.14
Reducing Air Pollution	-1.55	-1.08
Reducing Ecosystem Stress	0.14	-0.20
Reducing Population Stress	1.14	0.76
Reducing Waste & Consumption Pressures	0.24	-0.25
Reducing Water Stress	-0.89	-0.71
Natural Resource Management	-1.05	-0.55
Environmental Health	0.94	0.83
Basic Human Sustenance	0.97	0.93
Reducing Env.-Related Natural Disaster Vulnerability	-0.80	0.19
Environmental Governance	0.99	0.99
Eco-Efficiency	-0.10	-0.13
Private Sector Responsiveness	2.04	0.92
Science and Technology	1.93	1.28
International Collaborative Efforts	1.43	0.62
Greenhouse Gas Emissions	0.24	-0.15
Reducing Transboundary Environmental Pressures	0.67	-0.36

= Indicator value
= Reference (average value for peer group)

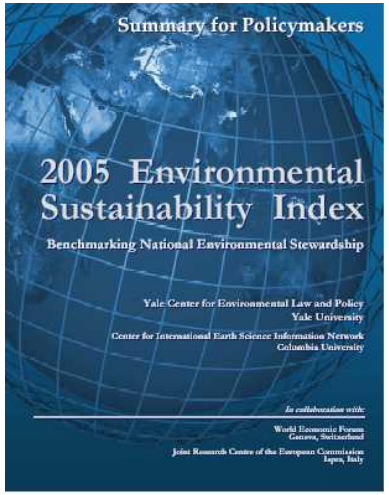
China

ESI:	38.6
Ranking:	133
GDP/Capita:	$4,344
Peer group ESI:	48.9
Variable coverage:	72
Missing variables imputed:	1



	Indicator value	Reference
Air Quality	-1.58	-0.01
Biodiversity		-0.04
Land	0.02	0.46
Water Quality		0.21
Water Quantity	-0.66	-0.21
Reducing Air Pollution	-0.64	0.07
Reducing Ecosystem Stress	-0.39	0.07
Reducing Population Stress	0.14	0.18
Reducing Waste & Consumption Pressures	0.79	0.28
Reducing Water Stress	-0.58	0.08
Natural Resource Management	-0.57	-0.14
Environmental Health	-0.59	0.05
Basic Human Sustenance	0.60	0.02
Reducing Env.-Related Natural Disaster Vulnerability		0.24
Environmental Governance	-0.23	-0.05
Eco-Efficiency	-0.56	-0.30
Private Sector Responsiveness	-0.11	-0.20
Science and Technology	-0.29	-0.44
International Collaborative Efforts	-0.14	-0.03
Greenhouse Gas Emissions	0.52	-0.03
Reducing Transboundary Environmental Pressures	-0.68	-0.38
	-1.50	0.07

= Indicator value
= Reference (average value for peer group)



Environmental Sustainability Index – Rankings and Scores

ESI Rank	Country Name	ESI Score	OECD Rank	Non-OECD Rank
1	Finland	73.1	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 AR 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	Netherlands	53.7	16	
41	Mali	53.7		25
42	Chile	53.6		26
43	Bhutan	53.5		27
44	Amenia	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	50.8		43
63	Tanzania	50.3		44
64	Madagascar	50.2		45
65	United Kingdom	50.2	20	
66	Nicaragua	50.2		46
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	Guinea	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	Greece	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	Philippines	42.3		96
126	Libya	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.

Executive Summary

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-related aspects of the Millennium Development Goals.

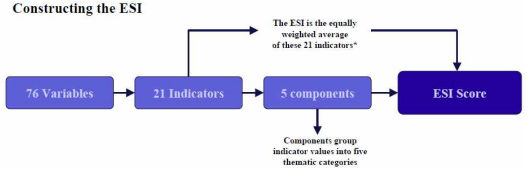
Higher ESI scores suggest better environmental stewardship. The five highest-ranking countries are Finland, Norway, Uruguay, Sweden, and Iceland – all countries that have substantial natural resource endowments, low population density, and have managed the challenges of development with some success.

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.

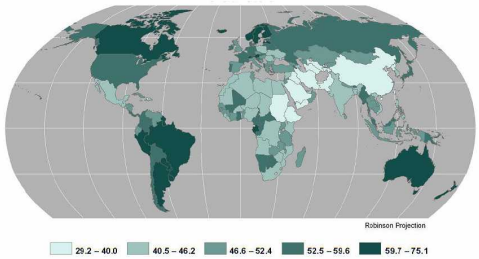
A number of core policy conclusions emerge from the ESI analysis:

- 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.

Constructing the ESI



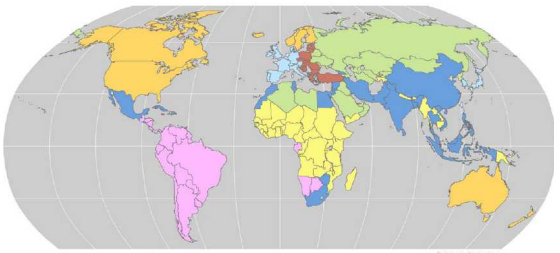
Environmental Sustainability Index
Country Scores by Quintile



*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	•Particulate 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 Environmental Stresses
•Forest cover change	•Acidification	Reducing Ecosystem Stresses	
•Population growth	•Total fertility rate	Reducing Population Growth	
•Ecological Footprint •Waste recycling rates	•Hazardous waste generation	Reducing Waste & Consumption Pressures	
•Industrial organic effluents •Fertilizer consumption	•Pesticide consumption •Area under water stress	Reducing Water Stress	
•Overfishing •Sustainably managed forests •Market distortions	•Salinization due to irrigation •Agricultural subsidies	Natural Resource Management	
•Deaths from intestinal infectious diseases •Child mortality rate	•Child mortality due to respiratory infections	Environmental Health	Reducing Human Vulnerability
•Malnutrition	•Safe drinking water supply	Basic Human Sustenance	
•Casualties due to environmental disasters	•Environmental Hazard Exposure Index	Reducing Environment-Related Natural Disaster Vulnerability	
•Gasoline price •Corruption •Government effectiveness •Protected land 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 •Participation in Responsible Care Program	Private Sector Responsiveness	
•Innovation capacity •Digital Access Index •Female primary education	•University enrollment •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	

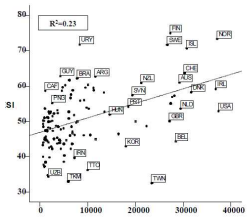
Cluster Analysis
ESI Characteristic-Based Country Groupings



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.

Table A.21: Cluster Membership for k Means Clustering

Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6	Cluster 7
Low system and stress scores; low vulnerability and high capacity; moderate stewardship	Moderate system and stress scores; high vulnerability and low capacity; above average stewardship	Above average system scores; low vulnerability; high capacity; moderate stresses and stewardship	Moderate system, stresses, and capacity scores; low vulnerability and stewardship	Above average system score, moderate stresses, vulnerability, capacity, and stewardship	Moderate system, stresses, and vulnerability scores; low capacity and stewardship	Low system score; moderate stresses, vulnerability, capacity, and stewardship
Austria	Angola	Australia	Bosnia & Herze.	Argentina	Algeria	Albania
Belgium	Benin	Canada	Bulgaria	Bolivia	Armenia	Bangladesh
Denmark	Bhutan	Finland	Croatia	Botswana	Azerbaijan	China
France	Burkina Faso	Iceland	Czech Rep.	Brazil	Belarus	Cuba
Germany	Burundi	New Zealand	Estonia	Chile	Iraq	Dominican Rep.
Ireland	Cambodia	Norway	Greece	Colombia	Kazakhstan	Egypt
Israel	Cameroon	Sweden	Hungary	Costa Rica	Kuwait	El Salvador
Italy	Central Afr. Rep.	United States	Jamaica	Ecuador	Kyrgyzstan	Georgia
Japan	Chad		Latvia	Gabon	Libya	India
Netherlands	Congo		Lebanon	Guatemala	Moldova	Indonesia
Portugal	Côte d'Ivoire		Lithuania	Guyana	Mongolia	Iran
Slovenia	Dem. Rep. Congo		Macedonia	Honduras	North Korea	Jordan
South Korea	Ethiopia		Poland	Namibia	Oman	Malaysia
Spain	Gambia		Romania	Nicaragua	Russia	Mexico
Switzerland	Ghana		Serbia & Montenegro	Panama	Saudi Arabia	Morocco
Taiwan	Guinea		Slovakia	Paraguay	Turkmenistan	Pakistan
United Kingdom	Guinea-Bissau		Trinidad & Tobago	Peru	Ukraine	Philippines
	Haiti		Turkey	Uruguay	United Arab Em.	South Africa
	Kenya			Venezuela	Uzbekistan	Sri Lanka
	Laos					Syria
	Liberia					Thailand
	Madagascar					Tunisia
	Malawi					Viet Nam
	Mali					Zimbabwe
	Mauritania					
	Mozambique					
	Myanmar					
	Nepal					
	Niger					
	Nigeria					
	P. N. Guinea					
	Rwanda					
	Senegal					
	Sierra Leone					
	Sudan					
	Tajikistan					
	Tanzania					
	Togo					
	Uganda					
	Yemen					
	Zambia					

Table A.22: Additional Characteristics of Clusters

		Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6	Cluster 7
	Number of countries	17	41	8	18	19	19	24
	Average ESI scores	52.9	47.1	66.3	49.6	57.1	44.0	46.2
Average values of ESI components	Environmental Systems	39.1	50.8	75.6	43.4	66.9	51.5	37.4
	Reducing Environmental Stresses	33.9	54.7	44.0	50.9	55.7	52.6	50.9
	Reducing Human Vulnerability	71.3	26.6	78.0	72.2	51.0	54.2	49.4
	Social and Institutional Capacity	77.7	36.1	83.5	52.3	52.1	29.6	44.4
	Global Stewardship	57.5	63.6	49.4	31.4	54.5	26.8	52.2
Average values of other characteristics	GDP/capita	$27,480	$420	$29,860	$4,390	$2,980	$3,810	$1,730
	Population (million)	33.6	19.0	46.1	11.8	21.2	20.7	149
	Total Area (thousand square kilometers)	171	539	3,466	123	1,026	1,561	1,010
	Population Density (per square kilometer)	238	70.3	13.5	122	32.1	56.0	174
	Environmental Governance Indicator (z-score)	1.0	-0.5	1.0	0.2	0.1	-0.6	-0.2

The cluster analysis reveals clear linkages between group membership and the average performance along the five ESI components. It also suggests the existence of relationships between cluster membership and additional characteristics such as average income per capita, population density, and area size.

The geographic pattern of the clusters is striking, especially since no geographical data was used in the analysis. We interpret this feature as a result of the many similarities of countries in close geographical proximity in regard to environmental conditions and pressures, economic and trade linkages, as well as with respect to social and cultural communalities.

Cluster 1 and 3 represent the developed countries with 24 of 29 OECD countries present (Luxembourg is too small to be included in the ESI). Interestingly, Taiwan is a member of cluster 1, which is characterized by high population density and industrialization combined with high social and institutional capacity. With the exception of South Korea and Taiwan, these countries share high to moderately high ESI scores. Although Taiwan is likely to be seen as an outlier in the group, its cluster membership suggests that its indicator values are more similar to this group of countries than to any of the remaining six clusters.

The differentiation between cluster 1 and 3 appears to follow characteristics captured in the distribution of ESI scores between developed and developing countries and further fine-grains the results of the analysis into the relationships between economic development and environmental sustainability. Despite comparable per capita incomes and good environmental governance, the average ESI scores for cluster 1 and 3 are markedly different (excluding the low scores of South Korea and Taiwan from cluster 1 only lifts the average ESI score by 2 points). The most

Report

<Mission>

Let's suppose the next World Summit on Sustainable Development will be held in 2007, and there each country is required to present its vision and indicators for 2050. We are just commissioned by Prime Minister to present a draft.

Please discuss the followings;

1) Definition : what is sustainability?
2) Choose one area (e.g. energy and global warming, resources productivity and waste), and describe your vision for 2050, targets, and strategies to achieve them.