

# Sustainability

- Explain it with your own terms

2009/10/26

Kazunori Kobayashi

Japan for Sustainability

EcoNetworks, Co.

# Exercise

Imagine that we are holding “World Summit on Sustainable Development” in this room.

You should be able to present the followings;

- what is sustainability (with your own terms)
- what is your vision/strategies/policies for sustainability (with your own logic)

# ESI

## 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.

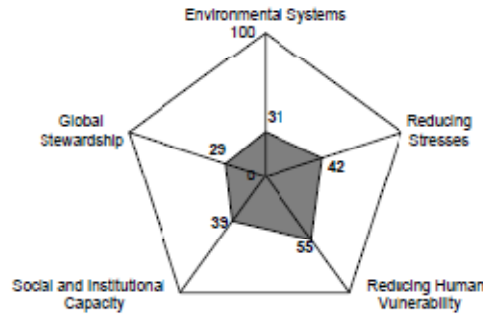
The lowest ranking countries are North Korea, Iraq, Taiwan, Turkmenistan, and Uzbekistan. These countries face numerous issues, both natural and manmade, and have not managed their policy choices well.

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.

# China

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



Air Quality	-1.58	-0.01
Biodiversity	-0.04	-0.04
Land	0.02	0.46
Water Quality	-0.66	-0.21
Water Quantity	-0.64	0.07
Reducing Air Pollution	-0.39	0.07
Reducing Ecosystem Stress	0.14	-0.18
Reducing Population Stress	0.79	0.26
Reducing Waste & Consumption Pressures	-0.58	0.08
Reducing Water Stress	-0.57	-0.14
Natural Resource Management	-0.59	0.05
Environmental Health	-0.05	0.60
Basic Human Sustenance	0.02	0.24
Reducing Env.-Related Natural Disaster Vulnerability	-0.23	-0.05
Environmental Governance	-0.58	-0.30
Eco-Efficiency	-0.11	-0.20
Private Sector Responsiveness	-0.29	-0.44
Science and Technology	-0.14	-0.03
International Collaborative Efforts	-0.03	0.62
Greenhouse Gas Emissions	-0.68	-0.38
Reducing Transboundary Environmental Pressures	-1.50	0.07

■ Indicator value  
 □ Reference (average value for peer group)

2008 Environmental Performance Index

# China

EAST ASIA AND THE PACIFIC

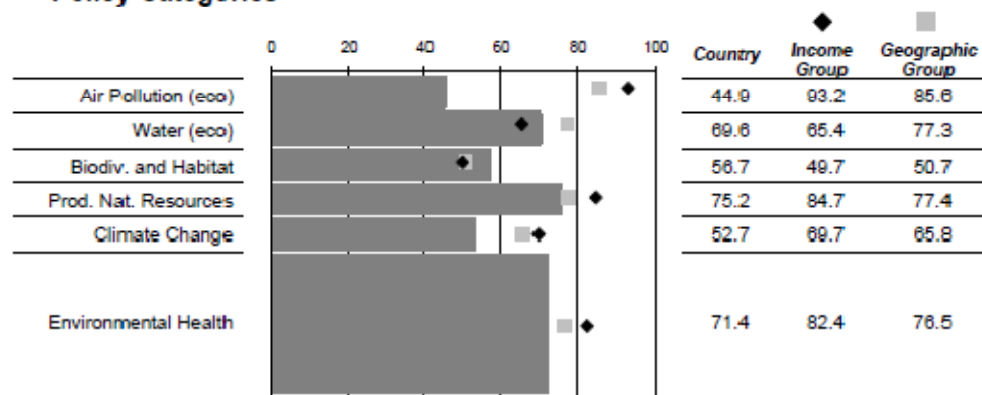
GDP/capita 2005 est. (PPP) \$6,621

Income Decile 5 (1=high, 10=low)

## 2008 EPI

Rank:	105
Score:	65.1
Income Group Avg.	75.9
Geographic Group Avg.	72.2

## Policy Categories

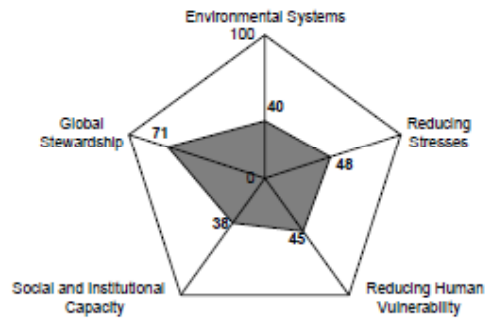


## Indicator Data

Indicator	Description	Value	Target	Proximity to Target
DALY	Environmental Burden of Disease (life years lost)	3.0	0	94.6
ACSAT	Adequate Sanitation (%)	44.0	100	34.5
WATSUP	Drinking Water (%)	77.0	100	61.0
PM10	Urban Particulates (µg/m <sup>3</sup> )	72,17892	20	56.1
INDOOR	Indoor Air Pollution (%)	80.0	0	15.8
OZONE_H	Local Ozone (ppb)	18.0	85	99.0
OZONE_E	Regional Ozone (tons SO <sub>2</sub> / populated land)	397,710,008.3	3,000	3.0
SO2	Sulfur Dioxide Emissions (ppb)	5.6	0	86.8
WATQI	Water Quality (GEMS Water Quality Index score)	76.4	100	60.7
WATSTR	Water Stress (%)	19.6	0	96.7
CRI	Conservation Risk Index (ratio)	0.4	0.5	74.7
EFFCON	Effective Conservation (The Nature Conservancy, %)	6.5	10	65.5
AZE	Critical Habitat Protection (Alliance for Zero Extinction, %)	45.7	100	45.7
MPAEEZ	Marine Protected Areas (Sea Around Us Project, Fisheries Centre, UBC, %)	0.3	10	3.0
FORGRO	Growing Stock Change (cubic meters/hectare)	1.1	0	100.0
MTI	Marine Trophic Index (UBC, Sea Around Us Project)	-0.0	0	74.9
EEZTD	Trawling Intensity (UBC, Sea Around Us Project, %)	0.9	0	13.1
IRRSTR	Irrigation Stress (CIESIN, %)	16.1	0	81.0
AGSUB	Agricultural Subsidies (% border agricultural prices)	0.9	0	98.1
AGINT	Intensive Cropland (CIESIN, %)	10.7	0	83.2
BURNED	Burned Land Area (%)	1.9	0	86.0
PEST	Pesticide Regulation (points)	13.0	22	59.1
GHGCAP	Emissions Per Capita (Mt CO <sub>2</sub> eq.)	5.7	2.24	93.3
CO2KWH	Emissions Per Electricity Generation (g CO <sub>2</sub> per kWh)	788.0	0	15.0
CO2IND	Industrial Carbon Intensity (CO <sub>2</sub> per \$1000, USD 1995 PPP)	4.3	0.85	49.7

# Benin

ESI:	47.5
Ranking:	86
GDP/Capita:	\$978
Peer group ESI:	46.4
Variable coverage:	58
Missing variables imputed:	15



Air Quality	-0.56	0.43
Biodiversity	-0.29	0.23
Land	-0.07	0.30
Water Quality	-0.48	-0.19
Water Quantity	-0.53	0.02
Reducing Air Pollution	0.33	0.67
Reducing Ecosystem Stress	-0.43	-0.16
Reducing Population Stress	-1.31	-1.22
Reducing Waste & Consumption Pressures	0.40	0.40
Reducing Water Stress	0.84	0.68
Natural Resource Management	-0.10	0.22
Environmental Health	-0.46	-0.96
Basic Human Sustenance	-0.39	-1.17
Reducing Env.-Related Natural Disaster Vulnerability	-0.05	0.50
Environmental Governance	-0.11	-0.47
Eco-Efficiency	0.15	0.47
Private Sector Responsiveness	-0.50	-0.62
Science and Technology	-0.71	-0.95
International Collaborative Efforts	0.37	-0.27
Greenhouse Gas Emissions	0.73	0.82
Reducing Transboundary Environmental Pressures	0.59	0.55

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

2008 Environmental Performance Index

# Benin

SUB-SAHARAN AFRICA

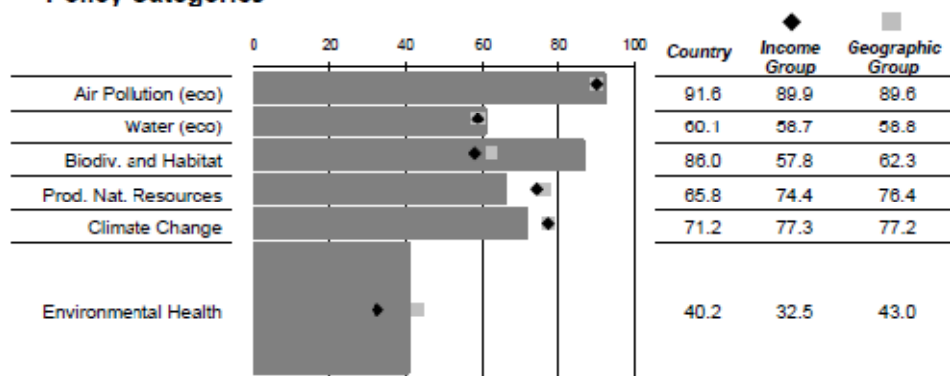
GDP/capita 2005 est. (PPP) \$1,016

Income Decile 10 (1=High, 10=Low)

## 2008 EPI

Rank:	127
Score:	56.1
Income Group Avg.	52.1
Geographic Group Avg.	57.9

## Policy Categories

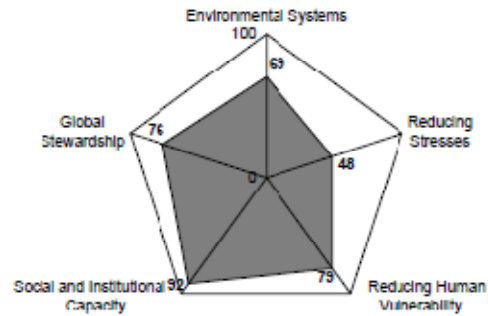


## Indicator Data

Indicator	Description	Value	Target	Proximity to Target
DALY	Environmental Burden of Disease (life years lost)	33.0	0	40.5
ACSAT	Adequate Sanitation (%)	33.0	100	21.6
WATSUP	Drinking Water (%)	67.0	100	44.0
PM10	Urban Particulates (µg/m <sup>3</sup> )	42,861.47	20	80.7
INDOOR	Indoor Air Pollution (%)	94.6	0	0.4
OZONE_H	Local Ozone (ppb)	500.7	85	73.0
OZONE_E	Regional Ozone (tons SO <sub>2</sub> / populated land)	66,388,500.5	3,000	83.8
SO2	Sulfur Dioxide Emissions (ppb)	0.2	0	99.4
WATQI	Water Quality (GEMS Water Quality Index score)	52.0	100	20.1
WATSTR	Water Stress (%)	0.0	0	45.0
CRI	Conservation Risk Index (ratio)	0.5	0.5	98.9
FFFCON	Effective Conservation (The Nature Conservancy, %)	9.9	10	98.7
AZE	Critical Habitat Protection (Alliance for Zero Extinction, %)		100	
MPAEEZ	Marine Protected Areas (Sea Around Us Project, Fisheries Centre, UBC, %)	0.0	10	0.0
FORGRO	Growing Stock Change (cubic meters/hectare)	0.8	0	17.8
MTI	Marine Trophic Index (UBC, Sea Around Us Project)	0.0	0	100.0
EEZTD	Trawling Intensity (UBC, Sea Around Us Project, %)	0.2	0	83.0
IRRSTR	Irrigation Stress (CIESIN, %)	0.0	0	100.0
AGSUB	Agricultural Subsidies (% border agricultural prices)	0.0	0	100.0
AGINT	Intensive Cropland (CIESIN, %)	7.7	0	87.9
BURNED	Burned Land Area (%)	5.7	0	57.9
PEST	Pesticide Regulation (points)	21.0	22	95.5
GHGCAP	Emissions Per Capita (Mt CO <sub>2</sub> eq.)	5.5	2.24	93.7
CO2KWH	Emissions Per Electricity Generation (g CO <sub>2</sub> per kWh)	710.0	0	23.5
CO2IND	Industrial Carbon Intensity (CO <sub>2</sub> per \$1000, USD 1995 PPP)	1.1	0.85	96.3

# Sweden

ESI:	71.7
Ranking:	4
GDP/Capita:	\$23,181
Peer group ESI:	55.4
Variable coverage:	72
Missing variables imputed:	1



Air Quality	0.86	0.43
Biodiversity	0.14	-0.23
Land	0.39	-0.68
Water Quality	0.87	0.57
Water Quantity	0.29	-0.14
Reducing Air Pollution	-0.11	-1.08
Reducing Ecosystem Stress	0.20	-0.67
Reducing Population Stress	0.73	0.76
Reducing Waste & Consumption Pressures	0.17	-0.11
Reducing Water Stress	0.17	-0.25
Natural Resource Management	-0.55	-0.71
Environmental Health	0.95	0.83
Basic Human Subsistence	0.97	0.93
Reducing Env.-Related Natural Disaster Vulnerability	0.45	0.19
Environmental Governance	1.26	0.99
Eco-Efficiency	0.39	-0.13
Private Sector Responsiveness	1.71	0.92
Science and Technology	2.15	1.28
International Collaborative Efforts	1.52	1.02
Greenhouse Gas Emissions	0.50	-0.15
Reducing Transboundary Environmental Pressures	1.06	-0.36

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



2008 Environmental Performance Index

# Sweden

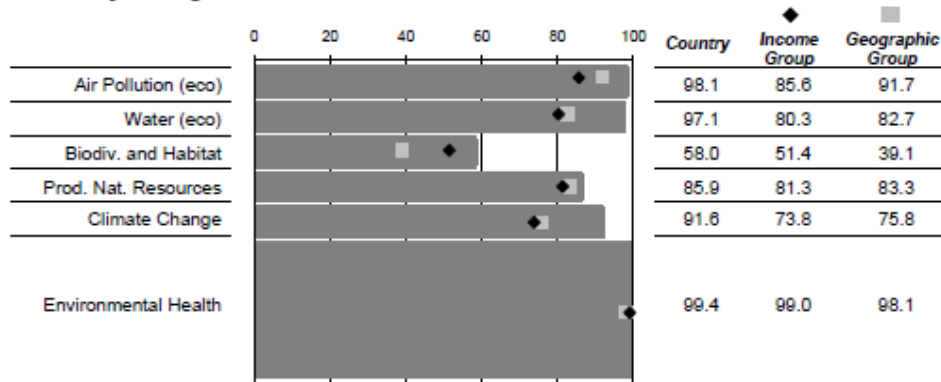
EUROPE

GDP/capita 2005 est. (PPP) \$30,393  
Income Decile 1 (1-high, 10-low)

## 2008 EPI

Rank: 2  
Score: 93.1  
Income Group Avg. 86.0  
Geographic Group Avg. 85.7

## Policy Categories

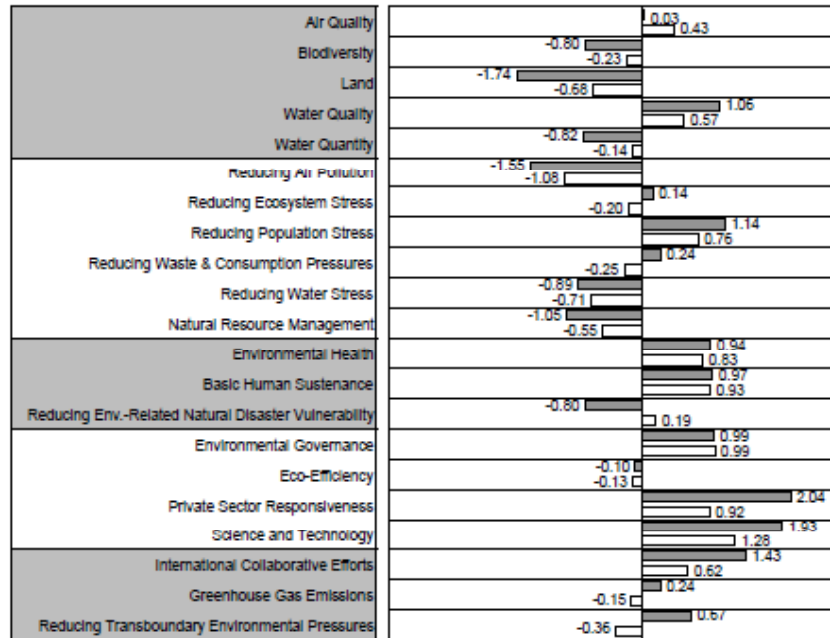
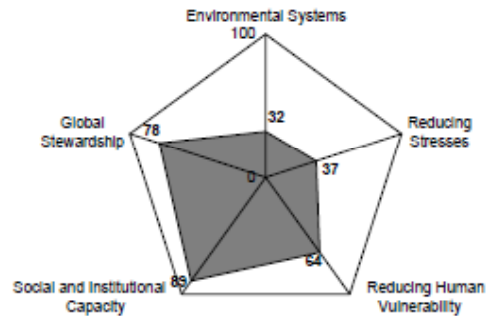


## Indicator Data

Indicator	Value	Target	Proximity to Target	
DALY	Environmental Burden of Disease (life years lost)	0.1	0	99.8
ACSAT	Adequate Sanitation (%)	100.0	100	100.0
WATSUP	Drinking Water (%)	100.0	100	100.0
PM10	Urban Particulates ( $\mu\text{g}/\text{m}^3$ )	12,24485	20	100.0
INDOOR	Indoor Air Pollution (%)	5.0	0	94.7
OZONE_H	Local Ozone (ppb)	3.5	85	99.8
OZONE_E	Regional Ozone (tons $\text{SO}_2$ / populated land)	321,529.0	3,000	99.9
SO2	Sulfur Dioxide Emissions (ppb)	1.6	0	96.3
WATQI	Water Quality (GEMS Water Quality Index score)	96.7	100	94.6
WATSTR	Water Stress (%)	0.4	0	58.6
CRI	Conservation Risk Index (ratio)	0.4	0.5	75.8
EFFCON	Effective Conservation (The Nature Conservancy, %)	5.2	10	52.3
AZE	Critical Habitat Protection (Alliance for Zero Extinction, %)		100	
MPAEEZ	Marine Protected Areas (Sea Around Us Project, Fisheries Centre, UBC, %)	2.6	10	26.0
FORGRO	Growing Stock Change (cubic meters/hectare)	1.0	0	100.0
MTI	Marine Trophic Index (UBC, Sea Around Us Project)	-0.0	0	80.0
EEZTD	Trawling Intensity (UBC, Sea Around Us Project, %)	0.2	0	76.8
IRRSTR	Irrigation Stress (CIESIN, %)	0.0	0	100.0
AGSUB	Agricultural Subsidies (% border agricultural prices)	36.0	0	22.8
AGINT	Intensive Cropland (CIESIN, %)	15.8	0	75.0
BURNED	Burned Land Area (%)	0.1	0	98.9
PEST	Pesticide Regulation (points)	22.0	22	100.0
GHGCAP	Emissions Per Capita (Mt $\text{CO}_2$ eq.)	7.5	2.24	89.8
CO2KWH	Emissions Per Electricity Generation (g $\text{CO}_2$ per kWh)	45.0	0	95.1
CO2IND	Industrial Carbon Intensity ( $\text{CO}_2$ per \$1000, USD 1995 PPP)	1.5	0.85	89.9

# 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 (average value for peer group)

2008 Environmental Performance Index

# Japan

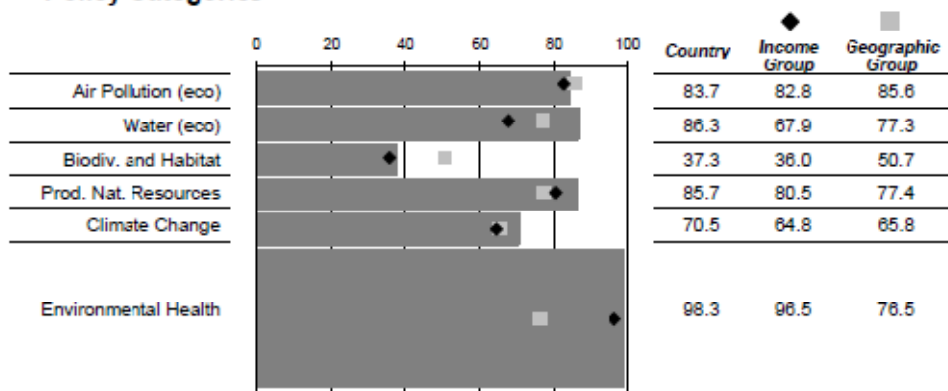
## EAST ASIA AND THE PACIFIC

GDP/capita 2005 est. (PPP) \$27,992  
 Income Decile 2 (1=high, 10=low)

### 2008 EPI

Rank:	21
Score:	84.5
Income Group Avg.	80.4
Geographic Group Avg.	72.2

### Policy Categories



### Indicator Data

Indicator	Description	Value	Target	Proximity to Target
DALY	Environmental Burden of Disease (life years lost)	0.2	0	99.6
ACSAT	Adequate Sanitation (%)	100.0	100	100.0
WATSUP	Drinking Water (%)	100.0	100	100.0
PM10	Urban Particulates (µg/m³)	31.17055	20	98.6
INDOOR	Indoor Air Pollution (%)	5.0	0	94.7
OZONE_H	Local Ozone (ppb)	31.7	85	96.3
OZONE_E	Regional Ozone (tons SO <sub>2</sub> / populated land)	64,317,701.1	3,000	84.3
SO2	Sulfur Dioxide Emissions (ppb)	7.1	0	83.1
WATQI	Water Quality (GEMS Water Quality Index score)	87.2	100	78.7
WATSTR	Water Stress (%)	5.6	0	100.0
CRI	Conservation Risk Index (ratio)	0.5	0.5	93.8
EFFCON	Effective Conservation (The Nature Conservancy, %)	2.6	10	25.6
AZE	Critical Habitat Protection (Alliance for Zero Extinction, %)	27.8	100	27.8
MPAEZ	Marine Protected Areas (Sea Around Us Project, Fisheries Centre, UBC, %)	0.2	10	2.0
FORGRO	Growing Stock Change (cubic meters/hectare)	1.1	0	100.0
MTI	Marine Trophic Index (UBC, Sea Around Us Project)	-0.0	0	81.6
EEZTD	Trawling Intensity (UBC, Sea Around Us Project, %)	0.2	0	75.3
IRRSTR	Irrigation Stress (CIESIN, %)	0.0	0	100.0
AGSUB	Agricultural Subsidies (% border agricultural prices)	56.0	0	-0.0
AGINT	Intensive Cropland (CIESIN, %)	1.7	0	97.4
BURNED	Burned Land Area (%)	0.5	0	96.2
PEST	Pesticide Regulation (points)	22.0	22	100.0
GHGCAP	Emissions Per Capita (Mt CO <sub>2</sub> eq.)	11.0	2.24	83.1
CO2KWH	Emissions Per Electricity Generation (g CO <sub>2</sub> per kWh)	429.0	0	53.8
CO2IND	Industrial Carbon Intensity (CO <sub>2</sub> per \$1000, USD 1995 PPP)	2.6	0.85	74.6

# Latest Policy Measures (for Climate Change)

-70% of the reductions needed by 2020 can be achieved by investing in three areas:

- increasing energy efficiency,

- reducing deforestation, and

- use of lower-carbon energy sources, including nuclear and renewables.

-Implementing just seven proven policies can deliver these reductions – but need scaling up

- renewable energy standards (e.g., feed-in tariffs or renewable portfolio standards);

- industry efficiency measures;

- building codes;

- vehicle efficiency standards;

- fuel carbon content standards;

- appliance standards, and

- policies for reduced emissions from deforestation and forest degradation (REDD)

-In the longer term, we need technologies such as

- Carbon capture and storage (CCS)

- Expanded nuclear power, new generations of solar energy, etc.

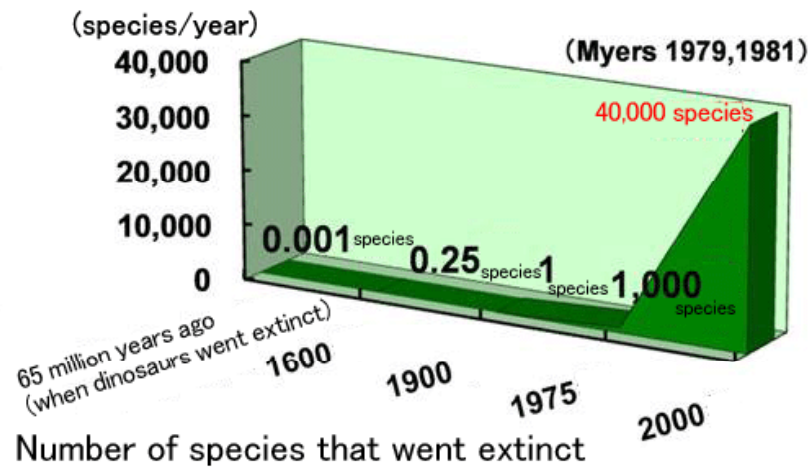
Reference: The Climate Group, “Breaking the Climate Deadlock” project

[http://www.theclimategroup.org/what\\_we\\_do/breaking\\_the\\_climate\\_deadlock/](http://www.theclimategroup.org/what_we_do/breaking_the_climate_deadlock/)

## Latest Policy Measures (for Biodiversity)

- Convention on Biological Diversity

- Status: "about 40,000 species go extinct every year."



- Target: "significantly reduce the rate of loss of biological diversity by 2010."

- Japan's proposal

- by 2050: stop the loss of biodiversity

- by 2020: monitor the status on a global scale, expand conservation

- target: expand conservation areas, rate of sustainable agriculture, forestry, fishing industry

Reference: COP10 2010

<http://cop10.jp/aichi-nagoya/english/cop/cop.html>