Sustainability

- Explain it with your own terms

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My Brief Background

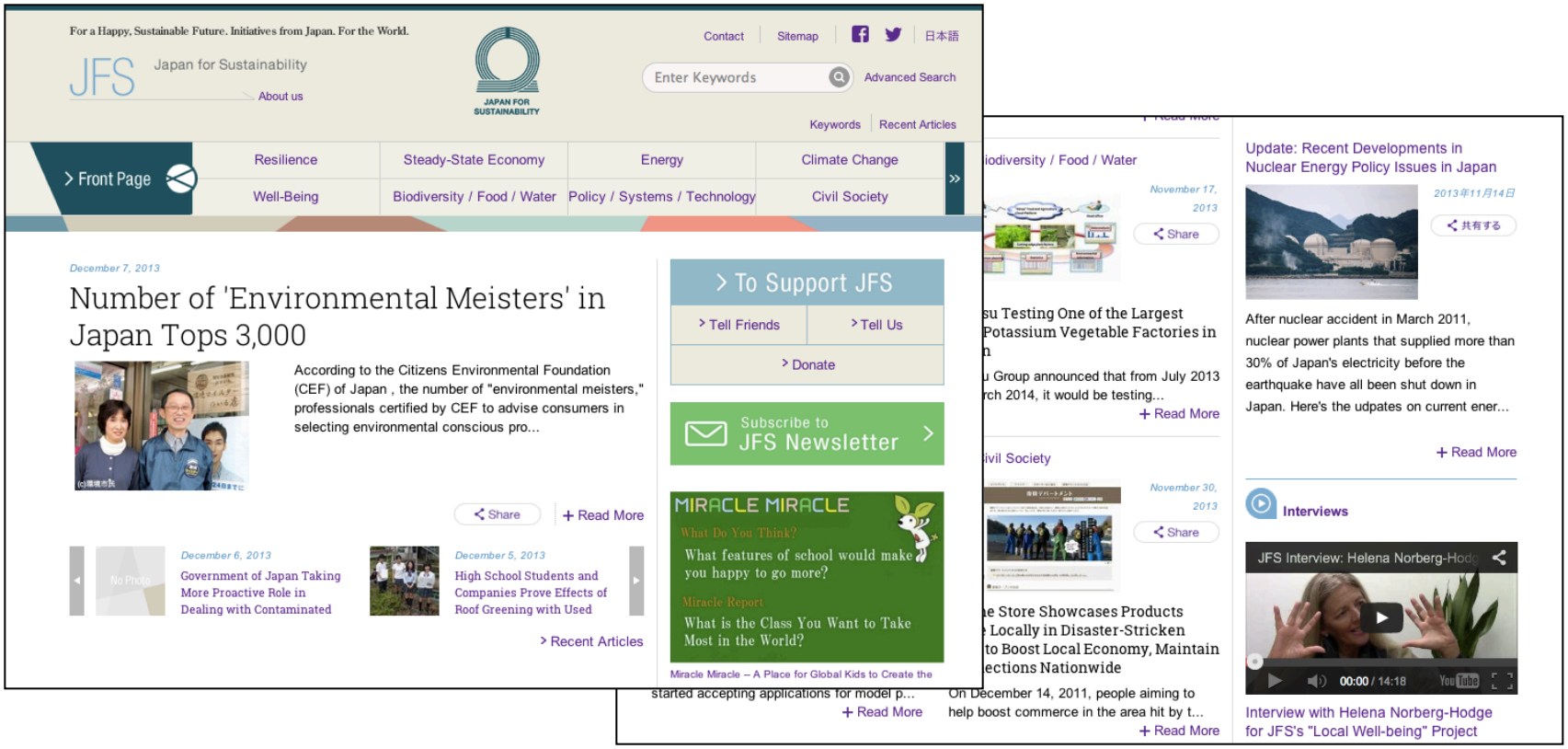
- Management/Social Responsibility (Massey University, NZ)
  - Thesis: Human Sustainability and Value Creation (Ph.D in progress)
- Environmental Economics & Policies (UC Berkeley, US)
  - Thesis: Community currency and game theory (BSc)
  - Book translation “Future of Money”
- EcoNetworks, Co. (Sustainability Consulting Firm)
  - Language / Research & Analysis / Contents/ Engagement
    - Visions/targets/strategy
    - Disclosure/dialogue/social networking
- Japan for Sustainability (Communication Platform)

  JFS Sustainability Index

  Asia for Sustainability

Japan for Sustainability - www.japanfs.org

For a Happy, Sustainable Future. Initiatives from Japan. For the World.



Japan for Sustainability (JFS) carefully tracks efforts and signs of positive change in Japan, and provides its findings to people everywhere who share an interest in change for the better.

Network

- Subscribers from 191 countries
- Website access 100,000+, articles 2000+
- More than 700 volunteers around the world

Policy/Systems/Technology

September 16, 2013

Japanese Ministry to Subsidize Local Governments for Introduction of LED Streetlights

Keywords: Energy Conservation Government Policy / Systems

Ministry of the Environment (MOE) announced on March 29, 2013, that it has selected 38 local governments in 18 prefectures for subsidies to conduct preliminary surveys and supplementary work for introducing LED exterior lighting, such as streetlights. MOE made the decision upon reviewing work proposals submitted by small local governments.

The subsidy program aims to support small local governments with populations of less than 150,000 in order to economically and effectively replace streetlights with LEDs using a lease system. The local governments will receive financial assistance for conducting surveys and installing lighting, thereby reducing greenhouse gas emissions.

The number of local governments selected from each region is: two from Tohoku, 10 from Kanto, 11 from Chubu, eight from Kinki, one from Chugoku/Shikoku and six from Kyushu.

EcoNetworks, Co.

- A team of specialists in the environment, business, and languages
- Networks spreads over 100 countries

Goal

Imagine that we are holding
"SDGs (Sustainable Development Goals) Dialogue"
in this room.

You should be able to present the followings;

1. define "sustainable X" (X=country/region)
2. propose
   a. your own vision and goals
   b. key indicators
   c. key policies for country/region/global society

Plan

1/19

Session 1. - What is sustainability?
- countries and int'l communities
- measurement and tracking

Session 2. - vision
- indicators and policy => Workshop

1/26

Session 1. - Group work & Presentation

Session 2. - Discussion
- Latest policy framework

Session 1

- Communication exercise

1) What is Sustainability?
   (Background and Definitions)

2) How are we responding?
   (National/International strategies and indicators)

3) How do we measure and track it?

Communication First

- Why communication first?
- 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"

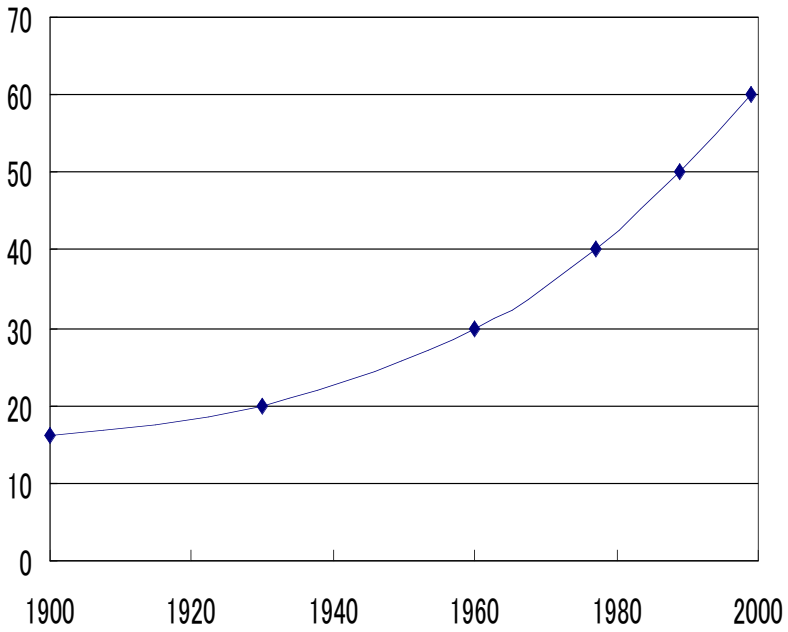
Your name/ country/ home town	Research interest (eco/sustainability link)
Your "personal" eco/sustainability policy	What you would write about on JFS newsletter (or about your country)

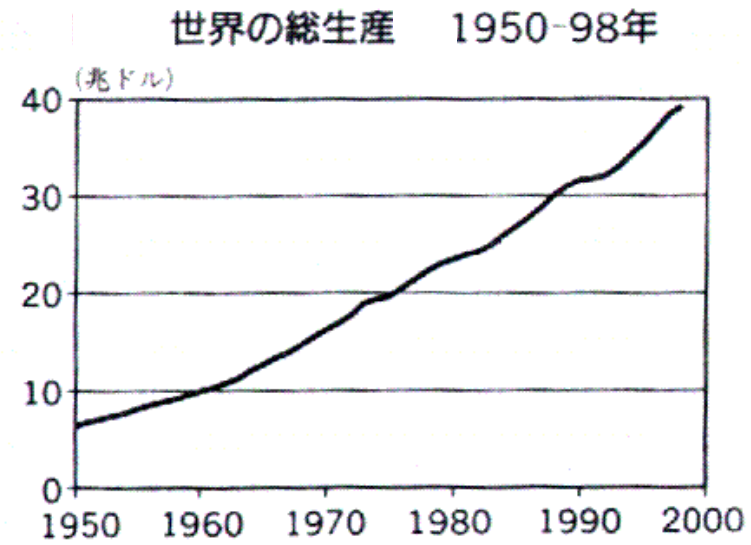
Prep: 5 minutes
Communicate: 10 minutes

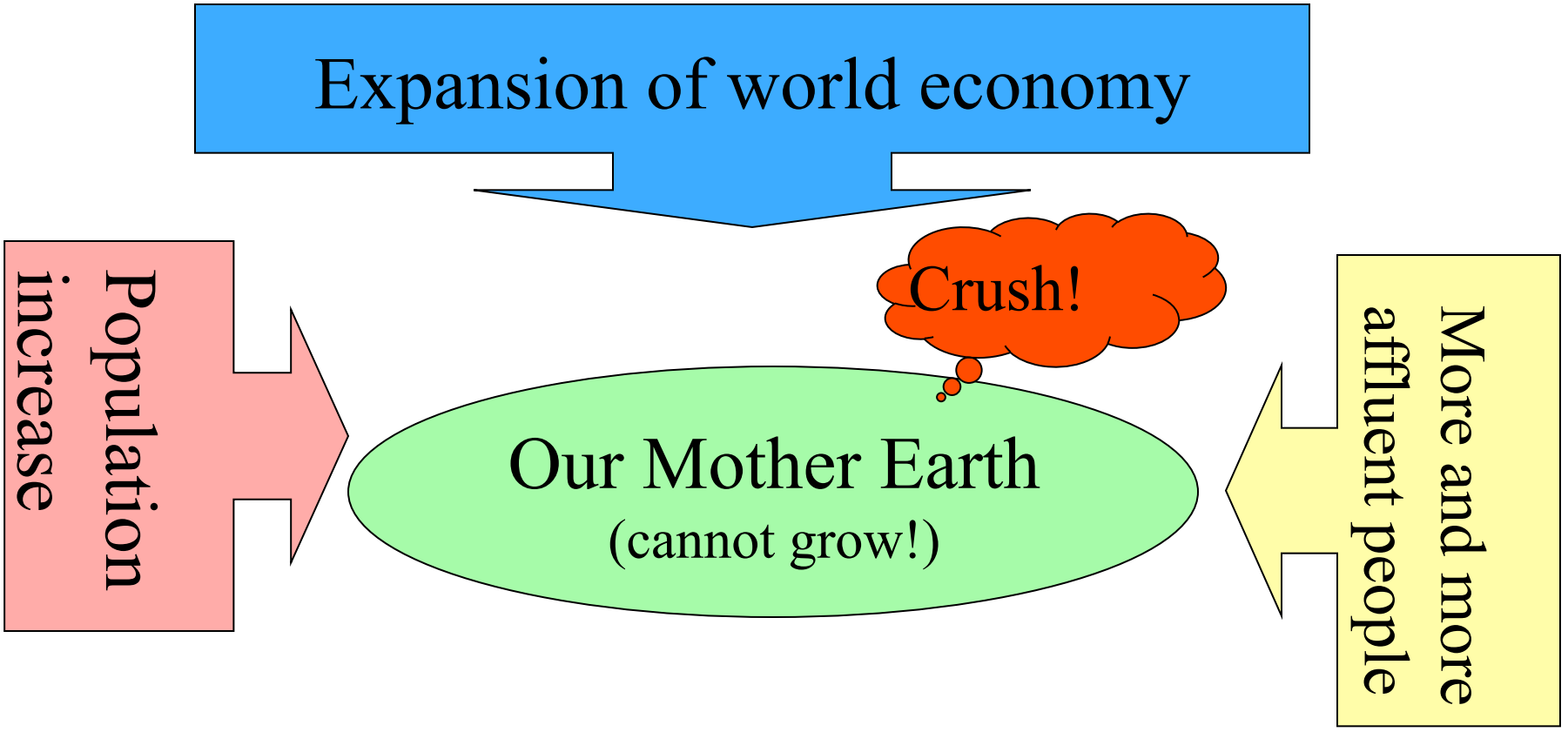
1) What is sustainability? (Background and definitions)

Background: Root causes of global environmental crisis

Population × World Economy





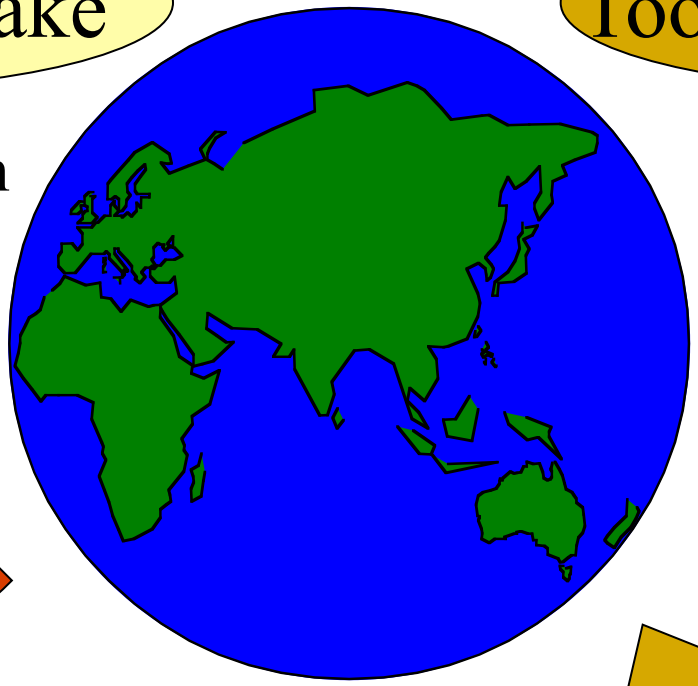


Impact = Population x Affluence x Technology

Root causes are…

Too much intake

- Resource depletion
- Lowing aquifers
- Shrinking forests



Too much emission

- CO2/ GHGs
- Wastes
- Toxic Substances
- NOx, SOx…

"If everyone lived as we do in the UK we'd need three planets to support us."

What is Sustainability?

Webster's New International Dictionary

"Sustain - to cause to continue (as in existence or a certain state, or in force or intensity); to keep up, especially without interruption, diminution, flagging, etc.; to prolong."

Webster's New International Dictionary. (Springfield, Mass.: Merriam-Webster Inc., 1986)

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."

What is Sustainability?

World Business Council on Sustainable Development (cont.)

"Over time, human and social values change. Concepts that once seemed extraordinary (e.g. emancipating slaves, enfranchising women) are now taken for granted. New concepts (e.g. responsible consumerism, environmental justice, intra- and inter-generational equity) are now coming up the curve."
http://www.wbcsd.ch/

What is Sustainability?

Interfaith Center on Corporate Responsibility (ICCR)

"Sustainable development...[is] the process of building equitable, productive and participatory structures to increase the economic empowerment of communities and their surrounding regions.

What is Sustainability?

Management scholar (Szekely and Knirch)

"Sustaining and expanding economic growth, shareholder value, prestige, corporate reputation, customer relationships, and the quality of products and services. It also means adopting and pursuing ethical business practices, creating sustainable jobs, building value for all company's stakeholders and attending to the needs of the underserved."

What is Sustainability?

Jerry Sturmer

Santa Barbara South Coast Community Indicators

"Sustainability is meeting the needs of all humans, being able to do so on a finite planet for generations to come while ensuring some degree of openness and flexibility to adapt to changing circumstances."

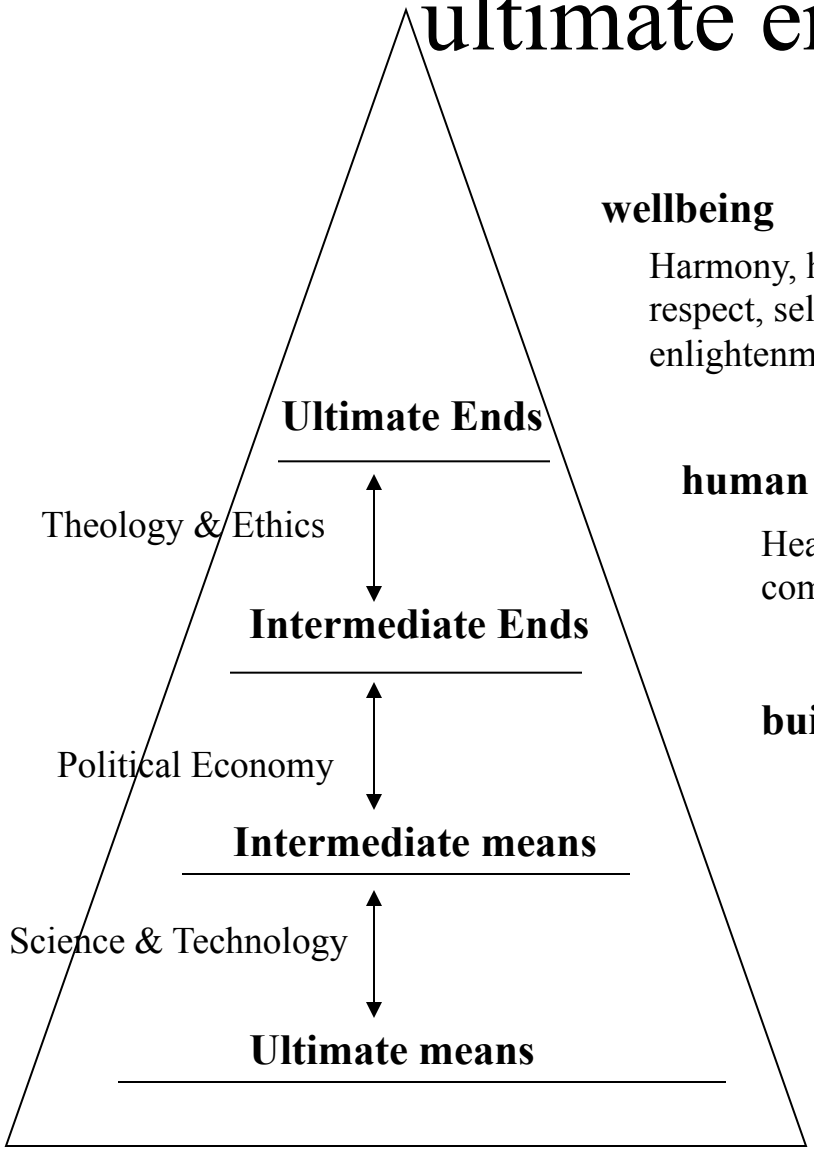
What is Sustainability?

The Native American Iroquois Confederacy

“Seventh generation" philosophy mandates that chiefs always consider the effects of their actions on their descendants through the seventh generation in the future.

Hierarchy from ultimate means to ultimate ends

By Donella Meadows



wellbeing

Harmony, happiness, identity, fulfillment, self-respect, self-realization, community, transcendence, enlightenment

human capital & social capital

Health, wealth, leisure, mobility, knowledge, communication, consumer goods

built capital & human capital

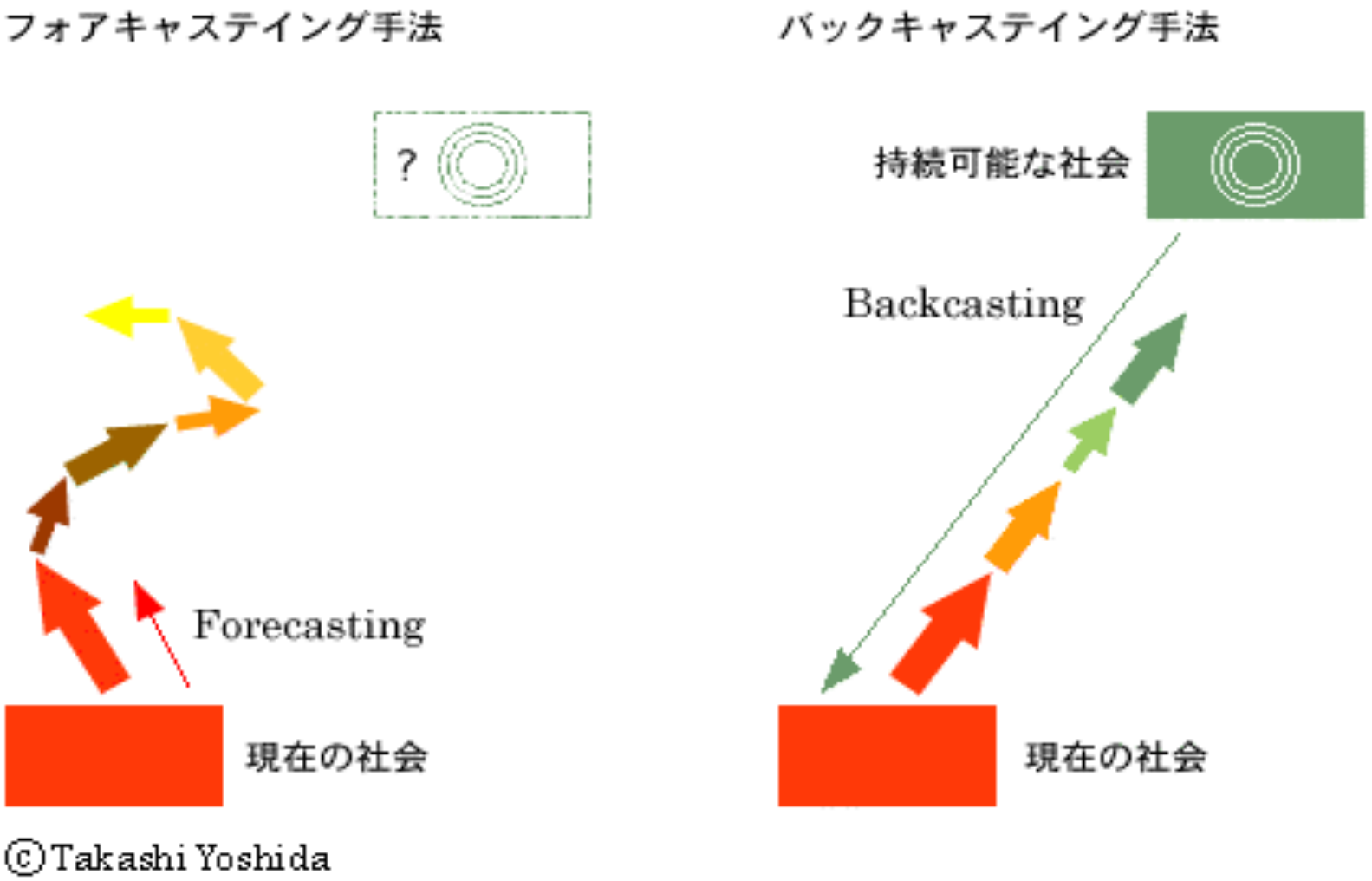
Labor, tools, factories, processed raw materials

natural capital

Solar energy, the biosphere, earth materials, the biogeochemical cycles

Source: http://www.sustainabilityinstitute.org/pubs/Indicators&Information.pdf

Now what?
Vision and Backcasting



Rio+20 UN Conference on Sustainable Development (2012/6)

- Global environment summit – once a decade
- Non-binding declaration

Set out

- Green Economy : definition left to each country
- Sustainable Development Goals

Left out

- Specific details and goals
- Universal energy access and doubling renewable energy by 2030

pledges

- Scandinavian leaders
  pledged support for systems that would place an economic value on clean waterways, intact forests and other important ecosystems
- Grenada
  transport and electricity sectors will only use clean energy sources by 2030
- Unilever
  cut its greenhouse gas emissions in half by 2020 and find sustainable sources of beef, soy and palm oil to prevent the deforestation now stemming from production of these three major crops.

Copenhagen Accord (2009/12)

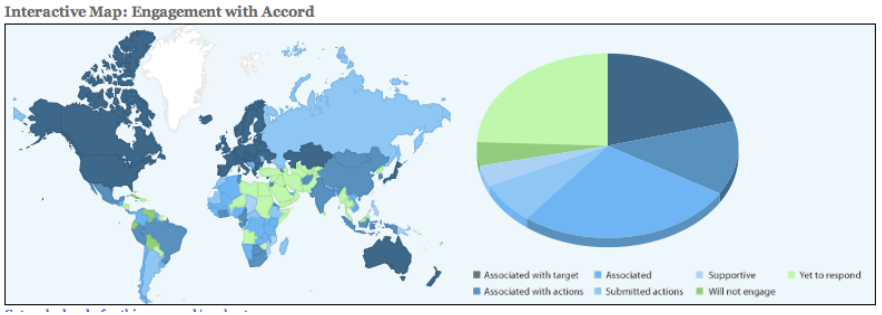
- not legally binding
- agrees cooperation in peaking (stopping from rising) global and national greenhouse gas emissions "as soon as possible" and that "a low-emission development strategy is indispensable to sustainable development"

Different responsibilities

Developed Countries:

- "commit to economy-wide emissions targets for 2020”

- raise funds of $30 billion from 2010-2012 of new and additional resources



Developing Countries:

- "implement mitigation actions" (Nationally Appropriate Mitigation Actions) to slow growth in their carbon emissions

- report those actions once every two years

- specially these with low-emitting economies should be provided incentives to continue to develop on a low-emission pathway

Examples of "commitment"

	Country	Date	Reported Statements	Engagement with Accord	Reduction by 2020	Reduction Base Year	Reduction Type	On 1990 Scale (+/-)	Share of World's Total GHGs[1]	CO_2 Emissions per capita (tCO_2eq)[1]	Source
	China	1/29 2010	nationally appropriate mitigation actions and a letter indicating association. Also submitted additional information saying "China highly commends and supports the Copenhagen Accord." Read more	Associated with actions	40 to 45%	N/A		See Note[9]	16.64%	5.5	UNFCCC
	United States	1/28 2010	Formally submitted letter to the United Nations indicating association and submitted an economy-wide emissions reduction target. Read more	Associated with target	17%	2005		-3.67%[8]	15.78%	23.1	UNFCCC
	European Union (EU-27)	1/27 2010	Formally submitted letter to the United Nations indicating association and submitted an economy-wide emissions reduction target. Read more	Associated with target	20% / 30%	1990		-20% / -30%	11.69%	10.3	UNFCCC
	Brazil	12/29 2009	Formally submitted letter to the United Nations indicating association and submitted nationally appropriate mitigation actions. Read more	Associated with actions	36.1 to 38.9%	N/A		+6.4 to +1.7%[2]	6.6%	15.3	UNFCCC
	Russian Federation	2/1 2010	Submitted an economy-wide emissions reduction target. Read more	Submitted target	15 to 25%	1990		-15 to -25%	4.64%	14.0	UNFCCC
	India	1/29 2010	Formally submitted letter to the United Nations indicating association and submitted nationally appropriate mitigation actions. Read more	Associated with actions	20% to 25%	2005		See Note[10]	4.32%	1.7	UNFCCC
	Japan	1/26 2010	Formally submitted letter to the United Nations indicating association and submitted an economy-wide emissions reduction target. Read more	Associated with target	25%	1990		-25%	3.14%	10.6	UNFCCC
	Maldives	1/29 2010	Formally submitted letter to the United Nations indicating association and submitted nationally appropriate mitigation actions. Read more	Associated with actions	100%	2009		-100%	0.00%	2.5	UNFCCC

http://www.usclimatenetwork.org/policy/copenhagen-accord-commitments

Update

・EU (2014 Oct)

– target to cut GHG emissions by 40% by 2030 (below 1990)
- at least 27% for the share of renewable energy consumed in the EU in 2030

・US and China (2014 Nov)

– U.S.–China Joint Announcement on Climate Change and Clean Energy Cooperation
(Not–binding)
– account for 1/3

・US: cut by 26–28% by 2025 (below 2005)

– target to cut net greenhouse gas emissions 26–28 percent below 2005 levels by 2025
(to achieve deep economy–wide reductions on the order of 80 percent by 2050.)
– The new U.S. goal will double the pace of carbon pollution reduction from 1.2 percent per year on average during the 2005–2020 period to 2.3–2.8 percent per year on average between 2020 and 2025

・China: peak around 2030 / non–fossil fuel share 20% by 2030

–target to peak CO2 emissions around 2030, with the intention to try to peak early, and to increase the non–fossil fuel share of all energy to around 20 percent by 2030
–It will require China to deploy an additional 800–1,000 gigawatts of nuclear, wind, solar and other zero emission generation capacity by 2030

Source:
EU Agrees 40% Greenhouse Gas Cut by 2030
http://newsroom.unfccc.int/unfccc-newsroom/eu-agrees-40-greenhouse-gas-cut-by-2030/

FACT SHEET: U.S.–China Joint Announcement on Climate Change and Clean Energy Cooperation
http://www.whitehouse.gov/the-press-office/2014/11/11/fact-sheet-us-china-joint-announcement-climate-change-and-clean-energy-c

Sustainable Development - How wide are the issues ?

各エリア別社会課題一覧

作成：小林一紀 (Feb, 2012)

Area	出典	環境の持続可能性	教育	雇用・労働	貧困・格差	医療・健康	少子高齢化	ジェンダー・人権
North America	OECD "US Country Reviews"	(欧州と同様の課題あり)	(欧州と同様の課題あり)	雇用	経済格差	肥満 健康支出	(人口増加)	(ダイバーシティは課題)
Europe	欧州委員会"欧州2020"	気候変動 エネルギー	教育 (退学、高等教育)	雇用	貧困・社会的排除		(課題あり)	(ダイバーシティは課題)
China	UNDP "中国におけるMDGsの進捗状況(2010)"	環境の持続可能性	(小学校は普及)			HIV/AIDSほか疾病 妊産婦の健康		(「東アジア」は課題あり)
	中国政府 "第12次5カ年計画"	資源節約・環境保護型社会への転換		労働争議	均衡のとれた開発 分配の公平性	(栄養不足と肥満)		(進捗あり)
	(参照) 三井物産研究所 "第12次5カ年計画が始動した中国"	エネルギー問題					少子高齢化	
South East Asia	国連 "Millennium Development Goals: 2011 Progress Chart"	環境の持続可能性	初等教育の普及	(課題あり)	貧困と飢餓	HIV/AIDSほか疾病乳幼児死亡率 妊産婦の健康	(国による)	ジェンダー平等

Strategies for sustainability? – state level

国・機関等	担当機関名	典拠資料名	発行年	言語
Argentina	Secretar_a de Ambiente y Desarrollo Sustentable	Sistema de Indicadores de Desarrolleo Sostenible	2006	Spanish
Australia	Australian Bureau of Statistics	Measures of Australia's Progress 2006	2006	English
Austria	Federal government of Austria	The Austrian Strategy for Sustainable Development	2002	English
Belgium	"Task Force developpement durable, Bureau deferal du Plan"	Tableau d'indicateurs de developpement durable	2005	English
Canada	National Round Table on the Environment and the Economy (NRTEE)	Environment and Sustainable Development Indicators for Canada	2003	English
Czech Republic	Czech Republic	The Czech Republic Strategy for Sustainable Development (draft) 2004	2004	English
Denmark	Danish Environment Protection Agency	Denmark's National Strategy for Sustainable Development : a Shared Future - Balanced Development, Indicator report	2002	English
East Asia	"SARCS project 91/01/SDI Sustainable Development Indicators for Southeast Asia, 2002-2003."	Nguyen Hoang Tri, INITIATING AND TESTING THE PROPOSED SET OF NATIONAL SUSTAINABLE DEVELOPMENT INDICATORS (SDI). (Unpublished)	2003	English
EU	Commission of the European Communities	Commission Staff Working Document, Accompanying document to the Communication from the Commission to the Council and the European Parliament, Progress Report on the European Union Sustainable Development Strategy 2007, COM(2007) 642 final. SEC (2007) 1416	2007	English
Finland	Finnish Environment Institute	Sustainable Development Indicators 2006	2006	English
France	Minist_re de l'_cologie	Indicateurs nationaux du d_veloppement durable: lesquels retenir	2004	French

nany		Perspectives for Germany - Our Strategy for Sustainable Development	2002	English
		Briefing on the Sustainability Assessment System	2005	English
al		National progress indicators for sustainable Economic, Social and Environmental Development, 2002	2002	English
ta for		Latin American and Caribbean Initiative for Sustainable Development	2002	English
		Indicateurs de Developpement Durable pour le Luxembourg	2002	English
		Methodological sheets of the 34 priority indicators for the "Mediterranean Strategy for Sustainable Development" Follow-up. Working document, May 2006.	2006	English
tuto la nte,		Indicadores de Desarrollo Sustentable en M_xico	2000	Spanish
		Monitoring progress towards a sustainable New Zealand, 2002	2002	English
		Indicators for sustainable development 2006 - Future challenges for Norway	2006	English
		Strategic challenges, A further elaboration of the Swedish strategy for sustainable development	2006	English
ffice		Monitoring Sustainable Development, sustainable development in Switzerland	2004	English
g		Sustainable Development Indicators System	2002	English
		Project of Sustainable Development Indicators of Thailand	2005	Thai language and English
The United Kingdom	UK government	Quality of life counts _ 2004 update	2004	English

詳細:国等が作成する持続可能性指標　http://www.nies.go.jp/sdi-db/reference.php

UK

Indicators:
-12 headline
-23 supplementary

https://www.gov.uk/government/publications/sustainable-development-indicators-sdis

GOV.UK

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Statistics - national statistics

Sustainable development indicators (SDIs)

Sustainable Development Indicators July 2013

PDF, 1.37MB, 100 pages

Sustainable Development Indicators - Summary datasets

MS Excel Spreadsheet, 138KB

This file may not be suitable for users of assistive technology. Request a different format.

This document forms part of the "Sustainable Development Indicators" published 18th July 2013 by Defra
https://www.gov.uk/government/publications/sustainable-development-indicators-sdis
Email: enviro.statistics@defra.gsi.gov.uk
Nobel House, 17 Smith Square, London SW1P 3JR
Tel: 08459 33 55 77

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Indicator 1	Economic Prosperity	Economic	Headline
Indicator 2	Long Term Unemployment	Economic	Headline
Indicator 3	Poverty	Economic	Headline
Indicator 4	Knowledge and Skills	Economic	Headline
Indicator 5	Healthy Life Expectancy	Societal	Headline
Indicator 6	Social Capital	Societal	Headline
Indicator 7	Social Mobility in Adulthood	Societal	Headline
Indicator 8	Housing Provision	Societal	Headline
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Indicator 23	Air Quality		
Indicator 24	Noise		
Indicator 25	Fuel Poverty		
Indicator 26	UK CO2 Emissions by Sector	Env	
Indicator 27	Energy From Renewable Sources	Env	
Indicator 28	Housing Energy Efficiency	Env	
Indicator 29	Waste Disposal and Recycling	Env	
Indicator 30	Land Use	Env	
Indicator 31	Origins of Food Consumed in the UK	Env	
Indicator 32	Water Quality	Env	
Indicator 33	Sustainable Fisheries	Env	
Indicator 34	Priority Species and Habitats	Env	

	A	B
1	Indicator 6	Social Capital
2	Geographical coverage	England
3	Source	Citizenship Survey, DCLG, Community Life Survey, Cab
4	Links	http://www.ons.gov.uk/ons/guide-method/user-guidance
5	Contact	Email: enviro.statistics@defra.gsi.gov.uk
6		
7	6a The proportion of people engaging in actions designed to identify and address is	
8		
9	**Year**	**Civic Participation at least once a year**
10	2001	38
11	2003	38
12	2005	38
13	2007-08	39
14	2008-09	38
15	2009-10	34
16	2010-11	34
17	Aug 2012 - Jan 2013	41
18		
19	6b) The proportion of people engaging in any volunteering activity at least once a ye	
20		
21	**Year**	**Volunteering at least once a year**
22	2001	74
23	2003	73
24	2005	76
25	2007-08	73
26	2008-09	71
27	2009-10	66
28	2010-11	65
29	Aug 2012 - Jan 2013	72
30		
31	6c)The proportion of people who have a partner, family member or friend to rely on	
32		
33	**Type of relationship**	**Proportion of people**
34	Partner, friend or relative	98
35	Partner	63

UK headline indicators

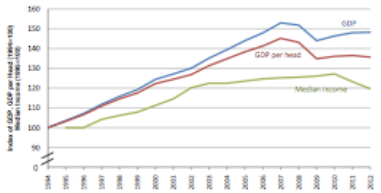
Economy

1. Economic Prosperity

Comparisons of GDP, GDP per head and median income

Gross Domestic Product (GDP) measures the scale of economic activity (goods and services produced) within a country. GDP per head (also known as per capita) is equivalent GDP per individual in the population which allows us to take into account the effects of changes in the population size. Median income[2] is a measure of disposable income and is a reflection of the economic prosperity of individuals as opposed to the country. This is important to include as GDP does not reflect the level of economic prosperity experienced by people on a daily basis.

Figure 1.1: Indices of GDP, GDP per head and median income, UK, 1994 to 2012

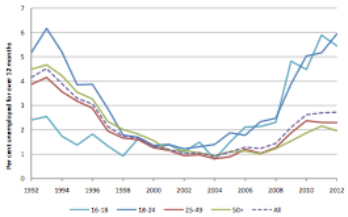


2. Long Term Unemployment

Proportion of economically active adults unemployed[3] for over 12 months by age group

An extended period of unemployment can impact on individuals and families, through loss of income, social isolation, sense of worth and other factors. Employment enables people to meet their needs and improve their living standards and is an effective and sustainable way to tackle poverty and social exclusion for those who can work.

Figure 2.1: Percent of economically active adults unemployed for over 12 months by age group, UK, 1992 to 2012



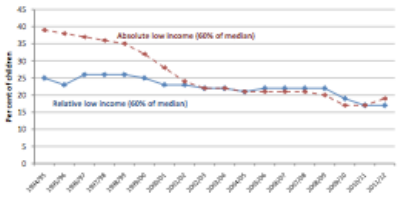
Source: ONS – UNEM01: Unemployment by Age and Duration

3. Poverty

Proportion of children in low income households

Poverty can perpetuate from one generation to the next and the proportion of children in poverty is therefore a key issue for intergenerational wellbeing. Poverty is currently measured based on the proportion of children living in households with incomes below 60 per cent of the median.

Figure 3.1: Proportion of children in relative and absolute low income households Before Housing Costs, England, 1994/95 to 2011/12

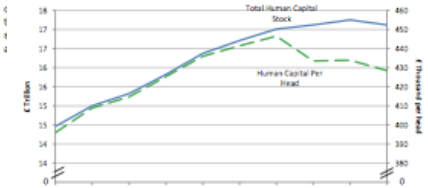


4. Knowledge and Skills

Value of human capital (£)

Human capital is defined as "the knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being" (OECD, 2001).

Figure 4.1: Human capital stock (£ trillion) and human capital per Head (£ thousand), UK, 2001 to 2010



Source: ONS Notes: Figure in 2010 prices.

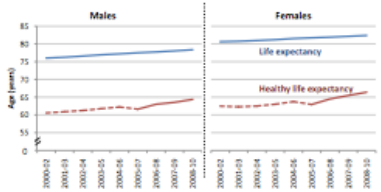
Society

5. Healthy Life Expectancy

Healthy life expectancy at birth

As life expectancy continues to increase, it is important to understand whether our increasing longevity is accompanied by longer periods in favourable or unfavourable health states. Variations in the proportion of life spent in good health have impacts on and general health and wellbeing as well as having potentially significant implications for future healthcare resource need and fitness for work in the face of planned state pension age increases.

Figure 5.1: Years of life expectancy and healthy life expectancy at birth, England, 2000-02 to 2008-10

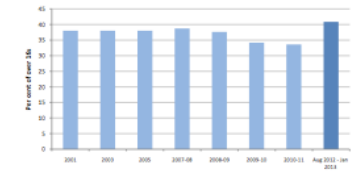


6. Social Capital

Civic participation, social participation, social networks and trust

This section presents some example measures within the wide-ranging area of social capital. Social capital can be described as the pattern and intensity of networks among people and the shared values which arise from those networks. While definitions vary, the main aspects include citizenship, 'neighbourliness', social networks and civic participation[5]. These measures may change slightly over time as Cabinet Office and the Office for National Statistics further develop their work on measuring social capital

Figure 6.1: The proportion of people engaging in actions designed to identify and address issues of public concern at least once a year, England, 2001 to Q3 2012/13



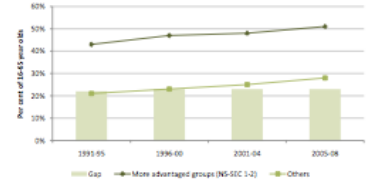
Source: Citizenship Survey, DCLG; Community Life Survey, Cabinet Office

7. Social Mobility in Adulthood

Proportion of adults in managerial or professional positions by social background

Patterns of inequality and a lack of social mobility can carry over from one generation to the next and this is therefore a key issue for intergenerational wellbeing. Improving social mobility is about ensuring that individuals can fulfil their potential regardless of their own or their parents' background.

Figure 7.1: Per cent of 16 to 65 year olds who are in paid employment who are in managerial or professional positions by social background using father's occupational group, UK, 1991-95 to 2005-08

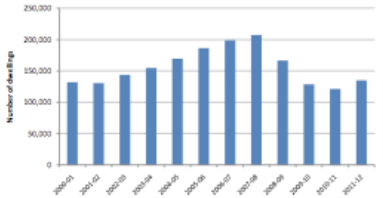


8. Housing Provision

Annual net additional dwellings

As the number of households forming increases so too does the need for an adequate housing supply. Additional housing provision offers economic and social sustainability and should be looked at alongside other aspects of sustainable development.

Figure 8.1: Trends in net additional dwellings, England, 2000/01 to 2011/12



Source: Department for Communities and Local Government

Environment

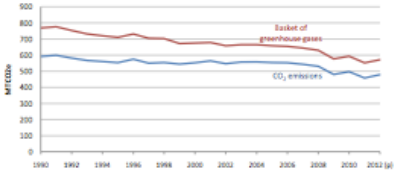
9. Greenhouse Gas Emissions

UK Greenhouse gas emissions

The data from this indicator is derived from the UK greenhouse gas emission statistics produced by the Department of Energy and Climate Change. The indicator focuses on the basket of greenhouse gases covered by the Kyoto protocol[7] but we also split out carbon dioxide for reference.

Human emissions of greenhouse gases since the industrial revolution are very likely responsible for most of the global surface warming observed over recent decades.

Figure 9.1: Greenhouse gas emissions million tonnes carbon dioxide equivalent (MTCO2e), UK, 1990 to 2012



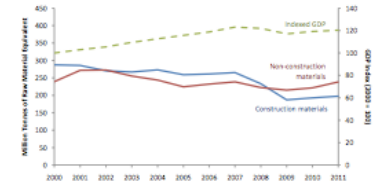
Source: DECC
Notes: 2012 data is provisional (p)

10. Natural Resource Use

Consumption of raw construction and non-construction materials

Natural resource use is a consumption based indicator showing the amount of material used to meet UK consumption. This includes material used in the production of imports to the UK which is not incorporated into the product. The indicator has two components: construction materials (e.g. sand and gravel) and non-construction materials (i.e. biomass and minerals). This indicator does not include fossil fuels or other energy carriers. A reduction in non-renewable resource use, either by switching to renewable materials from sustainable sources, or from increased resource productivity, would be a positive outcome.

Figure 10.1: Raw material consumption of construction and non-construction materials, UK, 2000 to 2012



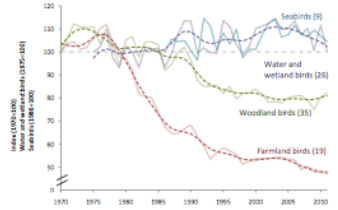
Source: Defra
Note: Excludes use of fossil fuels. These are currently classified as experimental statistics.

11. Wildlife

Populations of farmland birds, woodland birds, water and wetland birds and seabirds

Natural capital includes those elements of the environment that yield resources and ecosystem services, but we cannot determine our entire capital of natural resources and instead have to focus on selected aspects of the natural environment and changes in its state. Populations of key species of birds are a good indicator of the broad state of wildlife and countryside because they occupy a wide range of habitats and key positions in the food chain. It may be possible to compile further indicators of natural capital when it is been included within the UK Environmental Accounts.

Figure 11.1: Populations of wild birds, England, 1970 to 2011



Source: RSPB, BTO, JNCC, Defra
Notes: dashed lines represent the smoothed trend which is calculated based on a three-year average for each year. The solid lines represent unsmoothed individual data points for each year. Assessments of change are made based on smoothed data and are therefore based on the 2010 (2009-2011) data point.

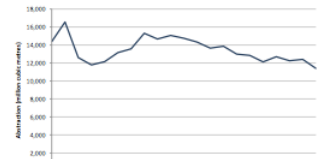
12. Water Use

Abstractions from non-tidal surface waters and ground waters

Water is a vital resource that needs to be managed carefully to ensure both that people have access to affordable and safe drinking water and sanitation and that industry needs are met, without depleting water resources or damaging ecosystems. A decrease in abstraction over a period of several years means less water is being taken from surface and ground waters. As this indicator has been included to represent the state of our natural environmental (water) stocks, a decrease in abstractions has been assessed on balance as being a favourable outcome. Year on year estimated direct actual abstraction is likely to fluctuate up or down as a consequence of a range of factors; such as changes in abstraction licences, prevailing weather conditions and changes in patterns of water use. As such an increase in abstraction may also be observed in the estimates.

More information about the availability of our water resources can be obtained from the Environment Agency's website via the link below.

Figure 12.1: Estimate of actual direct abstractions from non-tidal surface waters and groundwaters, England and Wales, 1991 to 2011



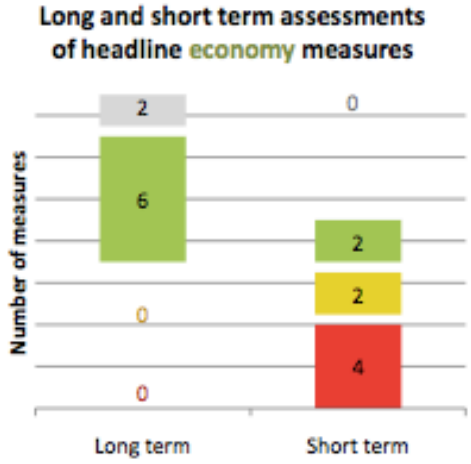
Headline measures

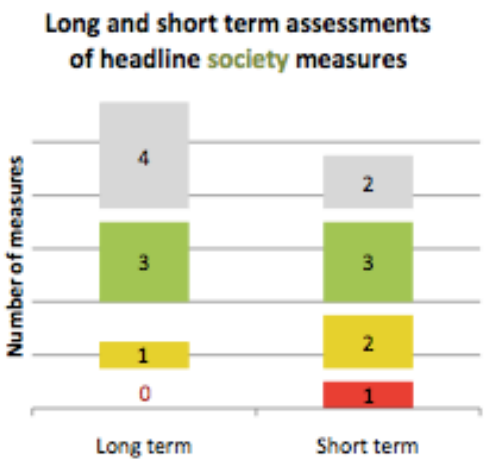
			Long term	Short term
Economy				
1	Economic prosperity	GDP	✓	✗
		GDP per head	✓	✗
		Median income	✓	✗
2	Long term unemployment	Proportion of adults unemployed over 12 months	✓	✗
3	Poverty	Proportion of children in relative low income households (before housing costs)	✓	✓
		Proportion of children in absolute low income households (before housing costs)	✓	≈
4	Knowledge and skills	Human capital (£) stock	···	✓
		Human capital per head	···	≈
Society				
5	Healthy life expectancy	Healthy life expectancy at birth: males	✓	✓
		Healthy life expectancy at birth: females	✓	✓
6	Social capital	Proportion of people engaging in actions addressing issues of public concern	···	···
		Proportion of people who have a spouse, family member or friend to rely on if they have a serious problem	···	···
		Proportion of people engaging in any volunteering activity	···	≈
		Proportion of people agreeing that people in their neighbourhood can be trusted	···	≈
7	Social mobility in adulthood	Proportion of adults from less advantaged groups in managerial or professional positions	✓	✓
8	Housing provision	Net additional dwellings	≈	✗
Environment				
9	Greenhouse gas emissions	UK greenhouse gases emissions	✓	✓
		Greenhouse gas emissions associated with UK consumption	✗	✓
10	Natural resource use	Raw material consumption of non-construction materials	≈	≈
		Raw material consumption of construction materials	✓	✓
11	Wildlife: bird population indices	Farmland birds,	✗	✗
		Woodland birds	✗	≈
		Seabirds	≈	≈
		Water and wetland birds	≈	≈
12	Water use	Abstractions from non-tidal surface waters and ground waters	✓	✓

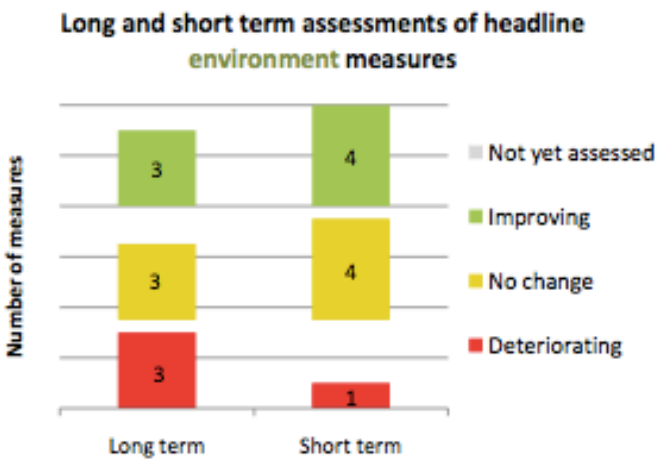
Supplementary measures

			Long term	Short term
Economy				
13	Population demographics	Population estimates and projections	n/a	n/a
		Household estimates and projections	n/a	n/a
14	Debt	Public sector net debt and public sector net borrowing as proportions of GDP to 2017/18	n/a	n/a
15	Pension provision	Percentage of eligible workers in a workplace pension	✗	✗
16	Physical infrastructure	Total non-financial assets net worth	···	✓
17	Research and development	Expenditure on R&D performed in UK business	✓	≈
		Expenditure on R&D related to environmental protection expenditure	···	✓
18	Environmental goods & services sector	Value of the environmental goods and services sector	···	···
Society				
19	Avoidable mortality	Mortality from deaths considered avoidable	···	✓
		Mortality from deaths considered amenable	···	✓
		Mortality from deaths considered preventable	···	✓
20	Obesity	Proportion of children overweight and obese (2-15 year olds)	✗	≈
		Proportion of adults overweight and obese	✗	≈
21	Lifestyles	Prevalence of smoking in adults	···	···
		Proportion of adults doing 150 minutes of exercise per week	···	···
		Proportion of urban trips under 5 miles taken by walking or cycling	···	≈
		Proportion of urban trips under 5 miles taken by public transport	···	≈
		Average daily consumption of fruit and vegetables	···	···
22	Infant health	Incidence of birth weight less than 2,500g in full term live births in England	···	✓
23	Air quality	Number of air pollution days classed as moderate or high - urban	···	···
		Number of air pollution days classed as moderate or high - rural	···	···
24	Noise	Proportion of the population affected by noise	···	≈
25	Fuel poverty	Number of households in fuel poverty	✓	✗

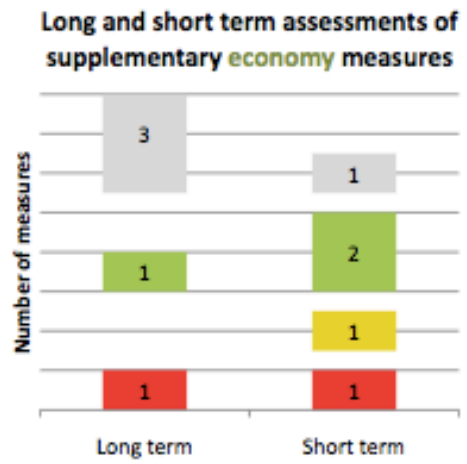
Headline measures by theme

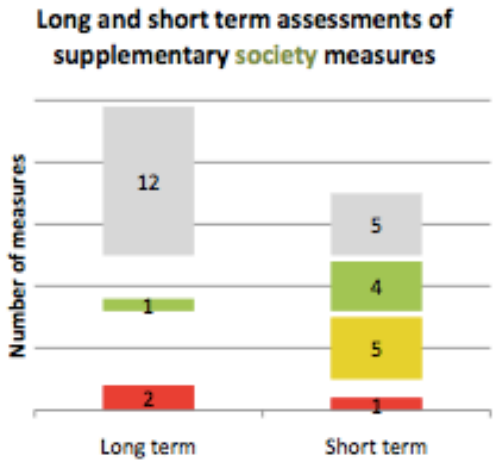


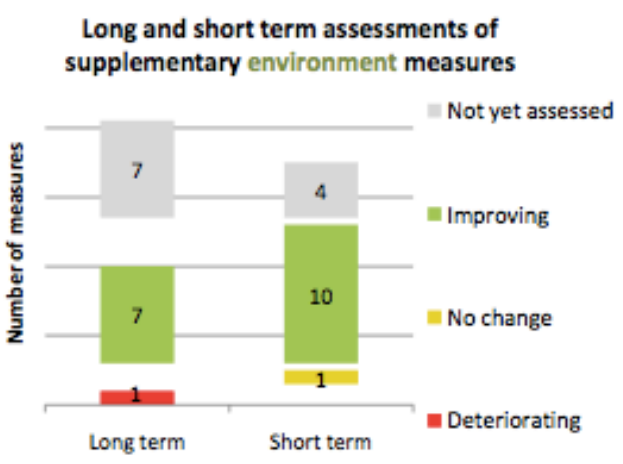




Supplementary measures by theme







Germany

Our Strategy for Sustainable Development

No.	Indicator areas Sustainability axiom	Indicators	Goals	Status	5 year trend[1]
	I. Intergenerational equity				
1a	**Resource conservation** *Using resources economically and efficiently*	Energy productivity	To be doubled between 1990 and 2020		t
1b new		Primary energy consumption	To be reduced by 20 % by 2020 and 50 % by 2050 compared to 2008		t
1c		Raw material productivity	To be doubled between 1994 and 2020		t
2	**Climate protection** *Reducing greenhouse gases*	Greenhouse gas emissions	To be reduced by 21 % by 2008/2012, 40 % by 2020 and 80 to 95 % by 2050, in each case compared to 1990		t
3a amen-ded	**Renewable energy sources** *Strengthening a sustainable energy supply*	Share of renewable energy sources in final energy con-sumption	To be increased to 18 % by 2020 and 60 % by 2050		t
3b		Share of renewable energy sources in electricity consump-tion	To be increased to 12.5 % by 2010, to at least 35 % by 2020 and to at least 80 % by 2050		t
4	**Land use** *Sustainable land use*	Built-up area and transport infrastructure expansion	Increase to be reduced to 30 hectares a day by 2020		t
5	**Species diversity** *Conserving species – protecting habitats*	Species diversity and landscape quality	Increase to the index value of 100 by 2015		t[2]

1 t = Trend, nt = no trend. – 2 10 year trend.


The target value of the indicator has been achieved or the remaining 'distance' would be covered by the target year (deviation less than 5 %).


The indicator is developing in the right direction, but if the annual trend continues unaltered there will still be a gap of between 5 and 20 % which will need to be covered to reach the target value in the target year.


The indicator is developing in the right direction, but if the annual trend continues unaltered there will still be a gap of more than 20 % which will need to be covered to reach the target value in the target year.

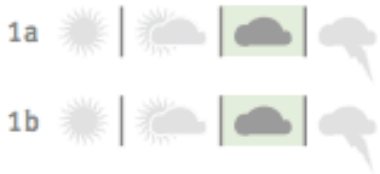

The indicator has developed in the wrong direction and if the annual trend continues unaltered the distance to be covered to reach the goal would become even greater.

Sustainable Development in Germany Indicator Report 2012

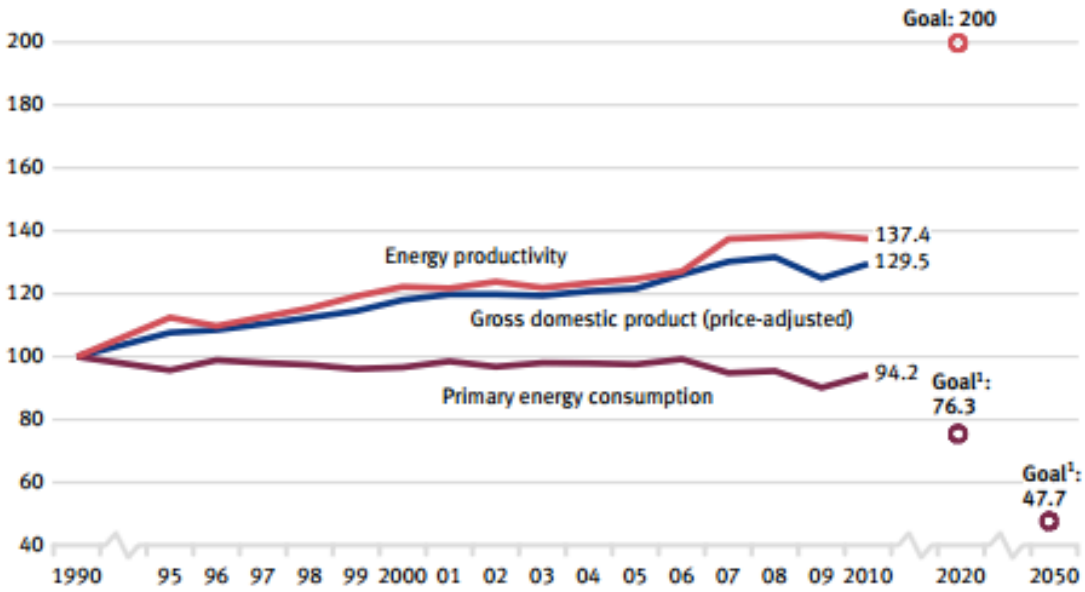
http://www.bundesregierung.de/Content/EN/StatischeSeiten/Schwerpunkte/Nachhaltigkeit/Anlagen/2012-05-24-indikatorenbericht-2012-englisch.pdf?__blob=publicationFile&v=2

Resource conservation

Using resources economically and efficiently



Energy productivity and economic growth
1990 = 100



1 These goals correspond to a reduction of primary energy consumption from 2008 levels of 20% (76.3) in 2020 and 50% (47.7) in 2050 (Energy Concept).

Source: Federal Statistical Office, Working Group on Energy Balances

1a Energy productivity

1b Primary energy consumption

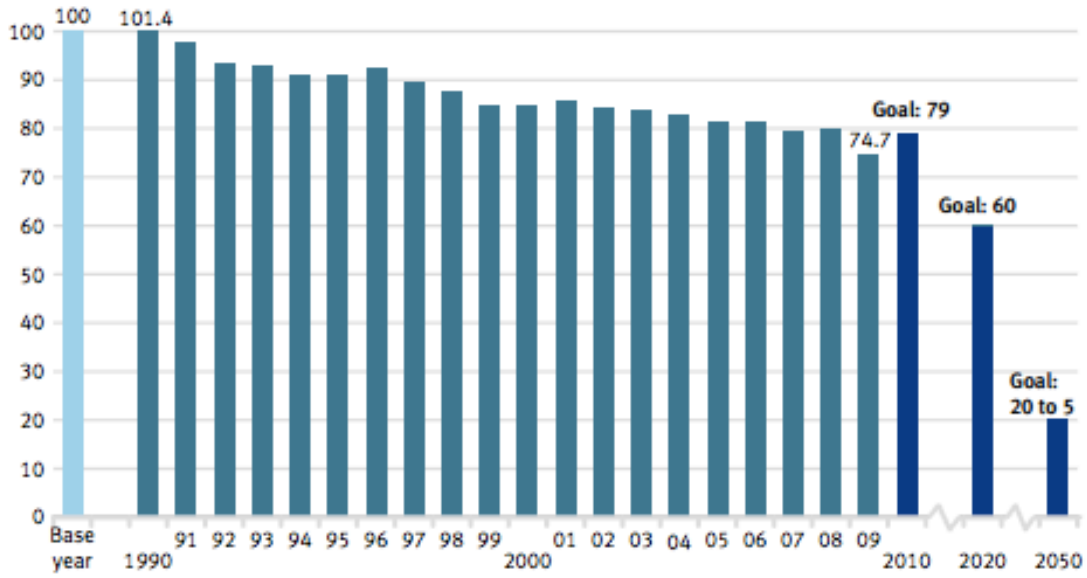
The use of energy occupies a key position in the economic process because almost every production activity is either directly or indirectly associated with the consumption of energy. Private households use energy particularly for heating their homes and providing hot water, using electrical appliances as well as to run motor vehicles. The consumption of energy has a number of environmental effects, such as a detrimental impact on landscapes, ecological systems, the soil, water bodies and ground water due to the depletion of natural energy resources, emissions of harmful substances and greenhouse gas emissions. Last but not least, the consumption of non-renewable resources is of great importance with regard to safeguarding the livelihood of future generations.

The aim of the Sustainability Strategy is to double energy productivity (price-adjusted GDP per unit of primary energy consumption) by 2020 compared to that of 1990. A new goal added to the Sustainability Strategy is to lower the primary energy consumption seen in 2008 by 20 % between

Climate protection

Reducing greenhouse gases

Greenhouse gas emissions (six Kyoto gases) in CO_2 equivalents
Base year = 100



Source: Federal Environment Agency

2 Greenhouse gas emissions

Climate change is an enormous challenge for mankind. Germany has thus committed itself to an average reduction of 21 % in its emissions of the six greenhouse gases and greenhouse gas groups referred to under the Kyoto Protocol between 2008 and 2012 compared with 1990. Beyond this, the Federal Government has set itself the goal of cutting emissions by 40 % from 1990 levels by the year 2020. Looking to the long term, the Federal Government wants to see greenhouse gases slashed by 80 to 95 % compared to 1990 by 2050 as part of the Energy Concept.

According to the Kyoto Protocol, greenhouse gases include the following substances: carbon dioxide (CO_2), methane (CH_4), nitrous oxide = laughing gas (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6). In terms of quantity, these gases are emitted chiefly during the burning of fossil energy sources, such as coal, oil and natural gas. But they are also produced during other, non-energy related activities, for example in the production of iron and steel, during the application of solvents, in the

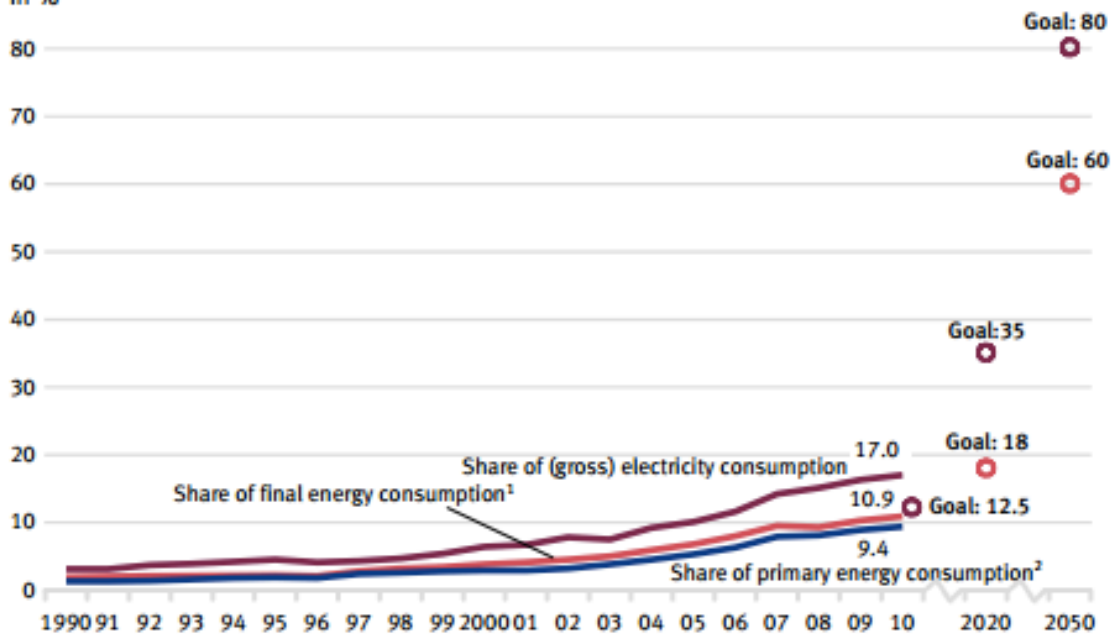
Renewable energy sources

Strengthening a sustainable energy supply

3a

3b

Share of renewable energy sources in total energy consumption
in %



1 Gross final energy consumption. 2 Based on efficiency method.

Source: Working Group on Renewable Energies - Statistics, Working Group on Energy Balances, Centre for Solar Energy and Hydrogen Research Baden-Württemberg, Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, July 2011

3a Share of renewable energy sources in final energy consumption

3b Share of renewable energy sources in electricity consumption

The reserves of important fossil energy sources such as oil and gas are limited, and their use is associated with greenhouse gas emissions. Switching to renewable energies (natural energy sources that constantly regenerate) serves to reduce energy-related carbon dioxide emissions and hence the extent of climate change. It makes the economy less dependent on energy imports, reduces the consumption of resources, improves the security of supply, promotes technical innovation and leads to gains in efficiency.

The goal of the Federal Government's Sustainability Strategy is to promote the development of renewable sources of energy. Renewable energies include hydropower, wind power, solar energy and geothermal energy, but also biomass and the biodegradable portions of domestic refuse.

The development of the use of renewable energy is measured in the Sustainability Strategy by means of the indicators 'Share

Contin.

No.	Indicator areas Sustainability axiom	Indicators	Goals	Status	5 year trend[1]
6a	**Government debt** *Consolidating the budgets – creating intergenerational equity*	General government deficit	Ratio of government deficit to GDP less than 3 %		t
6b new		Structural deficit	Structurally balanced public spending, total national structural deficit of no more than 0.5 % of GDP		t
6c new		Government debt	Ratio of government debt to GDP no more than 60 %		t
7	**Provision for future economic stability** *Creating favourable investment conditions – securing long-term prosperity*	Gross fixed capital formation in relation to GDP	Increase in gross fixed capital formation share in GDP		nt
8	**Innovation** *Shaping the future with new solutions*	Private and public spending on research and development	To be increased to 3 % of GDP by 2020		t
9a	**Education and training** *Continuously improving education and vocational training*	18- to 24-year-olds without a school leaving certificate	To be reduced to less than 10 % by 2020		t
9b amended		30- to 34-year-olds with a tertiary or post-secondary non-tertiary level of education	To be increased to 42 % by 2020		t
9c		Share of students starting a degree course	To be increased to 40 % by 2010, followed by further increase and stabilisation at a high level		t

1 t = trend, nt = no trend, * New goal / new evaluation; cannot be compared to previous period; see indicator description for explanation

No.	Indicator areas Sustainability axiom	Indicators	Goals	Status	5 year trend[1]
	II. Quality of life				
10	**Economic output** *Combining greater economic output with environmental and social responsibility*	Gross domestic product per capita	Economic growth		nt
11a	**Mobility** *Guaranteeing mobility – protecting the environment*	Intensity of goods transport	To be reduced to 98 % by 2010 and to 95 % by 2020, compared to 1999 levels		nt
11b		Intensity of passenger transport	To be reduced to 90 % by 2010 and to 80 %by 2020, compared to 1999 levels		nt
11c		Share of rail transport in goods transport performance	To be increased to 25 % by 2015		nt
11d		Share of inland freight water transport in goods transport performance	To be increased to 14% by 2015.		t
12a	**Farming** *Environmentally sound production in our cultivated landscapes*	Nitrogen surplus	To be reduced to 80 kg/hectare of agricultural area by 2010, further reduction by 2020		t
12b		Organic farming	Share of organic farming on land used for agriculture to be increased to 20 % in coming years		t
13	**Air quality** *Keeping the environment healthy*	Air pollution	To be reduced to 30 % by 2010, compared to 1990 levels		t

1 t = trend, nt = no trend.

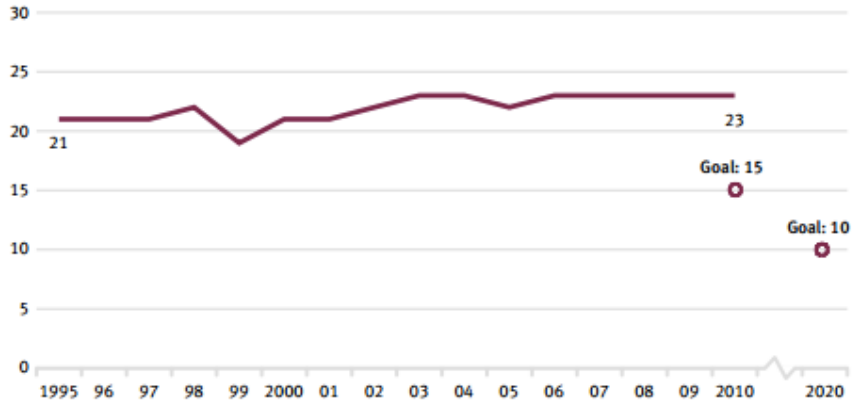
No.	Indicator areas Sustainability axiom	Indicators	Goals	Status	5 year trend[1]
14a	**Health and nutrition** *Living healthy longer*	Premature mortality (cases of death per 100,000 residents under 65): Men	To be reduced to 190 cases per 100,000 by 2015		t
14b		Premature mortality (cases of death per 100,000 residents under 65): Women	To be reduced to 115 cases per 100,000 by 2015		t
14c		Smoking rate amongst young people (12- to 17-year-olds)	To be decreased to under 12 % by 2015		nt
14d		Smoking rate amongst adults (15 years and older)	To be decreased to under 22 % by 2015		nt
14e		Proportion of adults suffering from obesity (18 years and older)	To be reduced by 2020		nt
15 amen-ded	**Crime** *Further increasing personal security*	Criminal offences	To be reduced in number of recorded cases per 100,000 inhabitants to under 7,000 by the year 2020		t
	III. Social cohesion				
16a	**Employment** *Boosting employment levels*	Employment rate (total) (15- to 64-year-olds)	To be increased to 73 % by 2010 and 75 % by 2020		t
16b		Employment rate (older people) (55- to 64-year-olds))	To be increased to 55 % by 2010 and 60 % by 2020		t

No.	Indicator areas Sustainability axiom	Indicators	Goals	Status	5 year trend[1]
17a	**Prospects for families** *Improving the compatibility of work and family life*	All-day care provision for children (0- to 2-year-olds)	To be increased to 30 % by 2010 and 35 % by 2020		nt
17b		All-day care provision for children (3- to 5-year-olds)	To be increased to 30 % by 2010 and 60 % by 2020		nt
18	**Equal opportunities** *Promoting equal opportunities in society*	Gender pay gap	To be reduced to 15 % by 2010 and to 10 % by 2020		t
19	**Integration** *Integration instead of exclusion*	Foreign school leavers with a school leaving certificate	Proportion of foreign school leavers with at least a *Hauptschule* certificate (lower secondary schooling) is to be increased, with their diploma rate to be raised to that of German school leavers by 2020		t
	IV. International responsibility				
20	**Development cooperation** *Supporting sustainable development*	Share of expenditure for official development assistance in gross national income	To be increased to 0.51 % by 2010 and 0.7 % by 2015		nt
21	**Opening markets** *Improving trade opportunities for developing countries*	German imports from developing countries	Further increase		t

1 t = trend, nt = no trend.

18 Gender pay gap

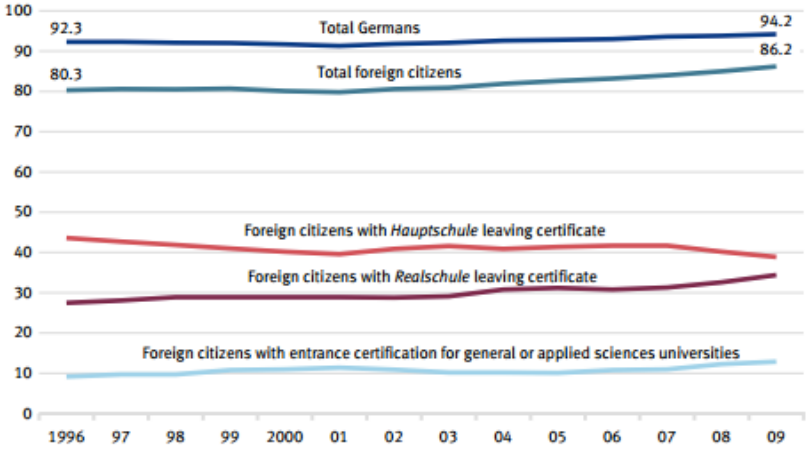
Difference between average gross hourly earnings of women and men
in % of men's earnings



Because of changes to the applied method made in 2002 and 2006, the gender pay gap probably rose by one percentage point in each of these years.

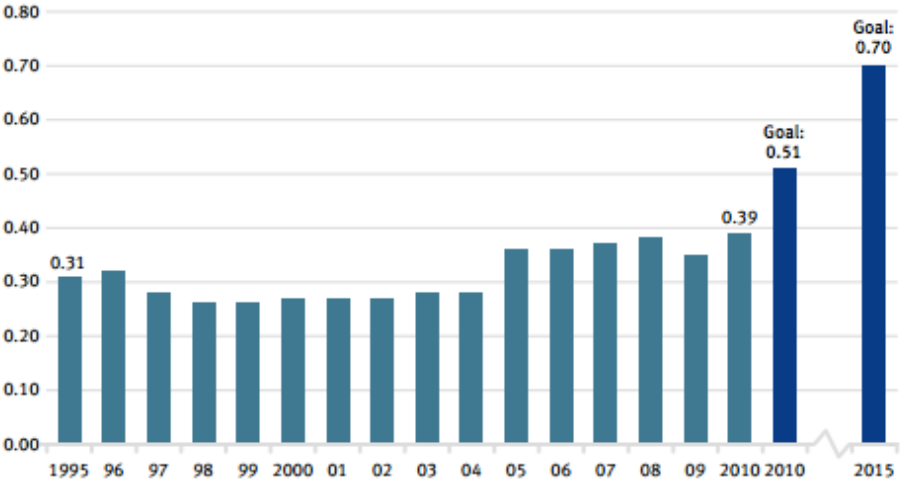
19 Foreign school leavers with a school leaving certificate

General school leavers with a school leaving certificate
in % of all school leavers by year



20 Share of expenditure for official development assistance in gross

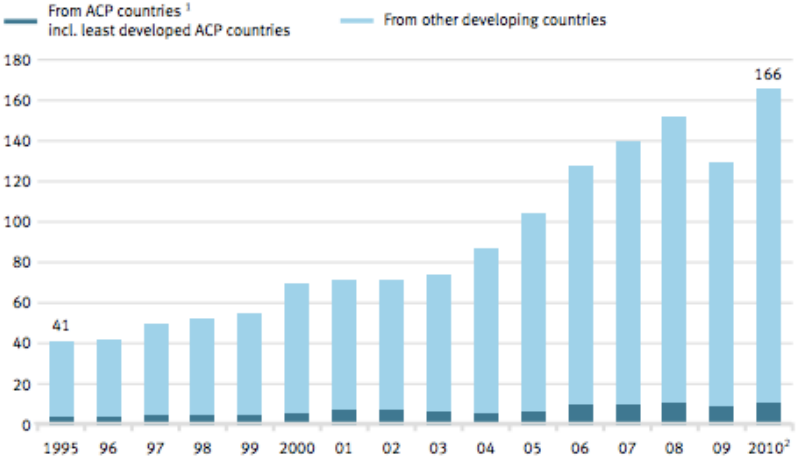
Share of expenditure for official development assistance (ODA) in gross national income
in %



Sources: Federal Statistical Office, Federal Ministry for Economic Cooperation and Development

21 German imports from developing countries

German imports from developing countries
in billion EUR



Excl. advanced developing countries.
1 ACP = Africa, the Caribbean and the Pacific. 2 Preliminary results.

Millenium Development Goals: Progress chart (2014)

Goals and Targets	Africa		Asia				Oceania	Latin America and the Caribbean	Caucasus and Central Asia
	Northern	Sub-Saharan	Eastern	South-Eastern	Southern	Western			
GOAL 1 | Eradicate extreme poverty and hunger									
Reduce extreme poverty by half	low poverty	very high poverty	moderate poverty	moderate poverty	very high poverty	low poverty	very high poverty	low poverty	low poverty
Productive and decent employment	large deficit	very large deficit	moderate deficit	large deficit	very large deficit	large deficit	very large deficit	moderate deficit	moderate deficit
Reduce hunger by half	low hunger	high hunger	moderate hunger	moderate hunger	high hunger	moderate hunger	moderate hunger	moderate hunger	moderate hunger
GOAL 2 | Achieve universal primary education									
Universal primary schooling	high enrolment	moderate enrolment	high enrolment	high enrolment	high enrolment	high enrolment	moderate enrolment	high enrolment	high enrolment
GOAL 3 | Promote gender equality and empower women									
Equal girls' enrolment in primary school	close to parity	close to parity	parity	parity	parity	close to parity	close to parity	parity	parity
Women's share of paid employment	low share	medium share	high share	medium share	low share	low share	medium share	high share	high share
Women's equal representation in national parliaments	moderate representation	moderate representation	moderate representation	low representation	low representation	low representation	very low representation	moderate representation	low representation

http://www.un.org/millenniumgoals/2014%20MDG%20report/MDG%202014%20Progress%20Chart_English.pdf

Millenium Development Goals: Progress chart (2014)

GOAL 4 | Reduce child mortality

Reduce mortality of under-five-year-olds by two thirds	low mortality	high mortality	low mortality	low mortality	moderate mortality	low mortality	moderate mortality	low mortality	low mortality

GOAL 5 | Improve maternal health

Reduce maternal mortality by three quarters	low mortality	very high mortality	low mortality	moderate mortality	moderate mortality	low mortality	moderate mortality	low mortality	low mortality
Access to reproductive health	moderate access	low access	high access	moderate access	moderate access	moderate access	low access	high access	moderate access

GOAL 6 | Combat HIV/AIDS, malaria and other diseases

Halt and begin to reverse the spread of HIV/AIDS	low incidence	high incidence	low incidence	low incidence	low incidence	low incidence	low incidence	low incidence	low incidence
Halt and reverse the spread of tuberculosis	low mortality	moderate mortality	low mortality	moderate mortality	moderate mortality	low mortality	high mortality	low mortality	low mortality

Millenium Development Goals: Progress chart (2014)

GOAL 7 | Ensure environmental sustainability

Halve proportion of population without improved drinking water	high coverage	low coverage	high coverage	moderate coverage	high coverage	high coverage	low coverage	high coverage	moderate coverage
Halve proportion of population without sanitation	high coverage	very low coverage	low coverage	low coverage	very low coverage	moderate coverage	very low coverage	moderate coverage	high coverage
Improve the lives of slum-dwellers	moderate proportion of slum-dwellers	very high proportion of slum-dwellers	moderate proportion of slum-dwellers	high proportion of slum-dwellers	high proportion of slum-dwellers	moderate proportion of slum-dwellers	moderate proportion of slum-dwellers	moderate proportion of slum-dwellers	—

GOAL 8 | Develop a global partnership for development

Internet users	high usage	moderate usage	high usage	high usage	moderate usage	high usage	moderate usage	high usage	high usage

The progress chart operates on two levels. The words in each box indicate the present degree of compliance with the target. The colours show progress towards the target according to the legend below:

- Target already met or expected to be met by 2015.
- Progress insufficient to reach the target if prevailing trends persist.
- No progress or deterioration.
- Missing or insufficient data.

How to measure and track Sustainability?

NO.	事例		
1	国際競争力ランキング	国際経営開発研究所（IMD）	世界の60カ国の競争力ランキングを323の基準で毎年報告している。総合ランキングでは、日本は23位（2004年）。
2	NationMaster.com		世界各国の4000を超える統計データが見られる。図で国別比較もできる。
3	Environmental Sustainability Index (ESI)	コロンビア大学、エール大学	5つの構成要素で、21の指標を設定。
4	主要環境指標	経済協力開発機構（OECD）	気候変動、オゾン層など10の指標
5	環境指標	国連環境計画・アジア太平洋地域事務所（UNEP/ROAP）	北東アジア、中央アジアなど地域別に環境指標を設定した
6	The Wellbeing of Nation	国際自然連合（IUCN）	180カ国の持続可能性をランキング
7	人間開発報告書	国連開発計画	人間開発指数（１人当たりのGDP、平均寿命、就学率から算出）を開発の度合いを測定する尺度として設定、毎年報告書を作成
8	持続可能な開発のための指標と情報システム	ドネラH.メドウズ	バラトングループへの報告として1998年に作成。持続可能性指標のフレームワークが提案されている。
9	Limits to Growth: The 30-Year Update	ドネラH.メドウズ	1972年に出された「成長の限界」の改訂版。
10	持続可能な開発指標	国連持続可能な開発委員会（CSD）	経済、環境、社会、制度の4つのフレームで指標を設定

Limits to Growth – The 30-Year Update

Key question:

Are current policies leading to a sustainable future or to collapse? What can be done to create a human economy that provides sufficiently for all?

⇒Systems Thinking

⇒Computer Modeling (exponential growth, feedback loops, sources & sinks, overshoot..)

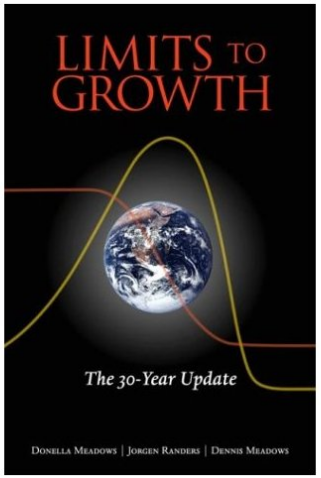
⇒10 different scenarios

⇒Asking for Choice

"Limits to Growth – The 30-Year Update"
Some quotations

"We worry that current policies will produce global overshoot and collapse through ineffective efforts to anticipate and cope with ecological limits."

"Ecological overshoot seems to us to be a much more important concept in the 21st century than free trade. But it is far behind in the fight for public attention and respect. This book is a new attempt to close that gap."



Key points

1. **10 different pictures** of how the 21st century may evolve
2. Purpose is to **encourage learning, reflection, and personal choice.**
3. Report will be updated in 2012 – there will be abundant data to test the reality
4. "You have to form your own opinion about causes and consequences of growth in the human ecological foot print."

World 3 Model – looking at dynamic systems

- ✓ Sets of interconnected material and immaterial elements that change overtime
- ✓ Many elements of demography, economy, and the environment as one planetary system
  - ➢ Stocks and flows
  - ➢ feedback loops
  - ➢ sources & sinks
  - ➢ thresholds
  - ➢ Overshoot

=> See demo simulation soft “Stella”

“Overshoot”

<daily examples>

hangover, driving on icy road, CFCs, stock market…

<Causes>

- Growth, acceleration, rapid change
- Limit, barrier
- Delay or mistake in the perceptions and the responses that strive to keep the systems within its limits

<Results>

- Crash of some kind
- Deliberate turnaround, correction, careful easing down

World 3 Model - Lesson

- When do we start observing the effect of "overshoot"?

⇒First decade of the 21st century will still be a period of growth.

=>It will take another decade before the consequences of overshoot are clearly observable and two decades before the overshoot is generally acknowledged.

Lessons from World 3

- ✓Change the "structure"
  - ➢Change feedback structure/information links in the system
  - ➢Change the content and timeliness of the data that actors in the system have to work with
  - ➢Change the ideas, goals, incentives, costs, and feedbacks that motivates or constrain behavior
  - ➢In time, system with a new information structure is likely to change its social and physical structures.
  - ➢It may develop new laws, organizations, technologies, people with new skills, machines and buildings.
  - ➢Such a transformation need not be directed centrally; it can be unplanned, natural, evolutionary, exciting, joyful.

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.

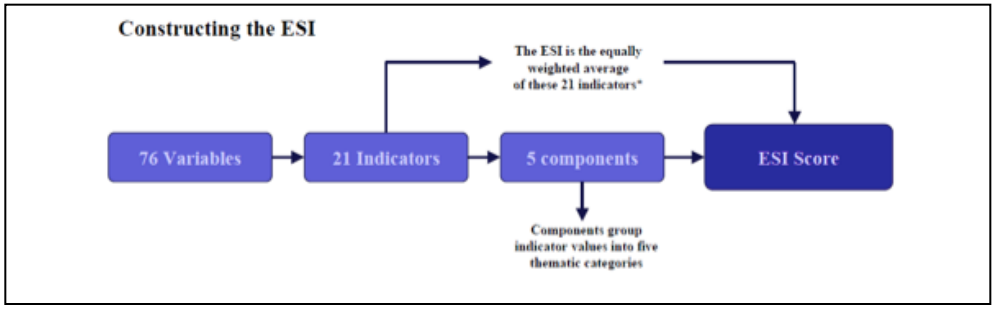
The ESI in action...

"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

http://sedac.ciesin.columbia.edu/data/collection/esi/

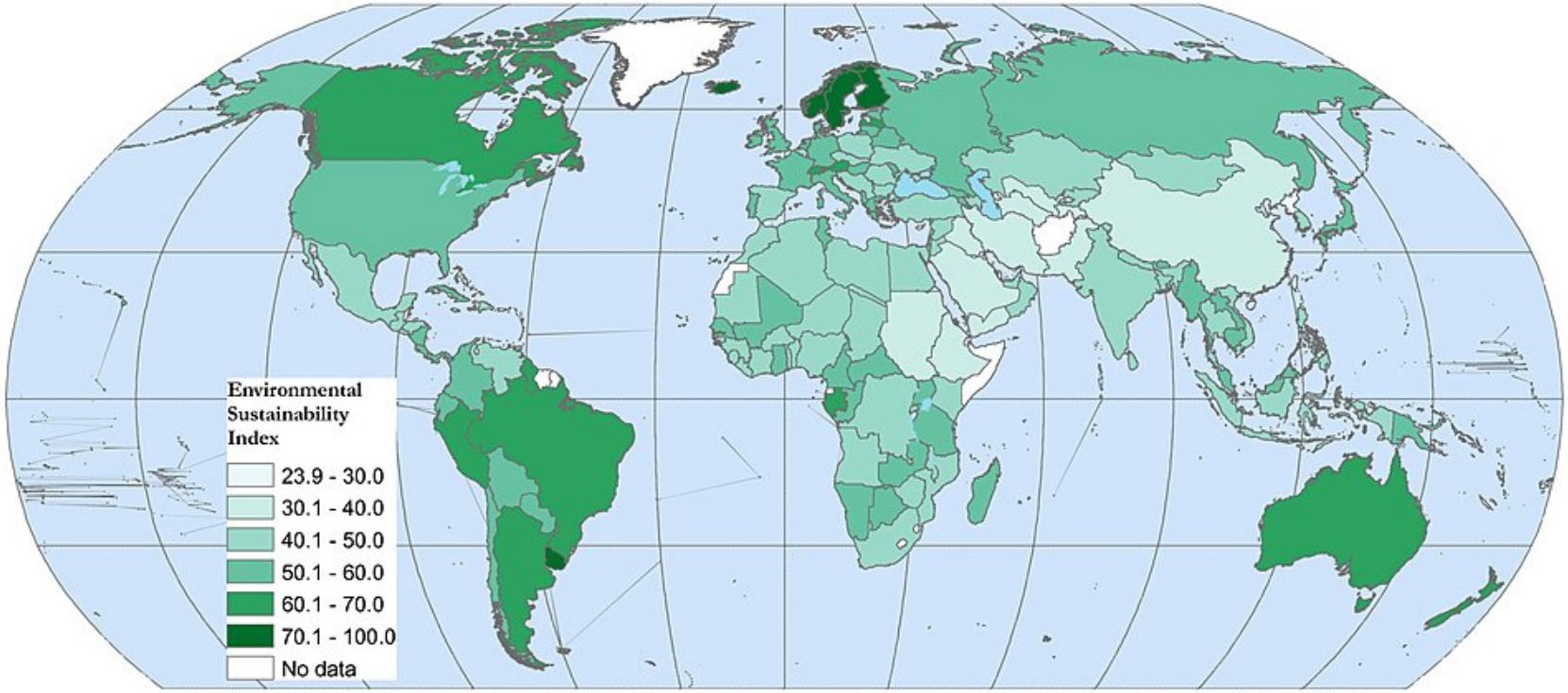
How Sustainable is Japan?



5 components

- Environmental Systems 32/100 NEGATIVE
  - Air Quality/water/biodiversity/land
- Reducing Environmental Stresses 37/100 Mixed
  - Reducing air pollution/water stress/ecosystem stress…
- Reducing Human Vulnerability 64/100 Mixed
  - Basic human sustenance/environmental health
- Social and Institutional Capacity 89/100 POSITIVE
  - Env. Governance/Eco Efficiency/ Private Sec. Responsiveness/Science & Tech
- Global Stewardship 78/100 POSITIVE
  - Participation in int'l cooperative efforts/reducing greenhouse gas emissions/ transboundary environmental pressures

Environmental Sustainability Index 2005, by country



Robinson Projection

Index Description:

The Environmental Sustianability Index (ESI) is a unitless score ranging from theoretical minimum of 0 [bad] to a maximum of 100 [good].

The ESI score quantifies the likelihood that a country will be able to preserve valuable environmental resources effectively and avoid major environmental deterioration over the period of several decades.

Source:

Esty, Daniel C., Marc Levy, Tanja Srebotnjak, and Alexander de Sherbinin (2005). 2005 Environmental Sustainability Index:Benchmarking National Environmental Stewardship. NewHaven: Yale Center for Environmental Law & Policy.

Environmental Performance Index (EPI)

Japan

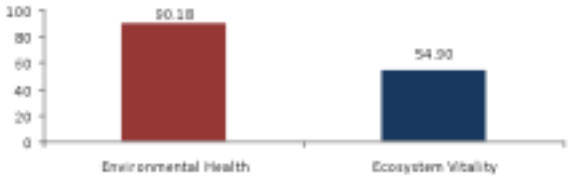
EAST ASIA AND THE PACIFIC

GDP/capita 2007 est. (PPP) $31,689
Income Decile 2 (1=high, 10=low)

2010 ENVIRONMENTAL PERFORMANCE INDEX

Rank:	20
Score:	72.5
Income Group Average:	66.1
Geographic Group Average:	57.1

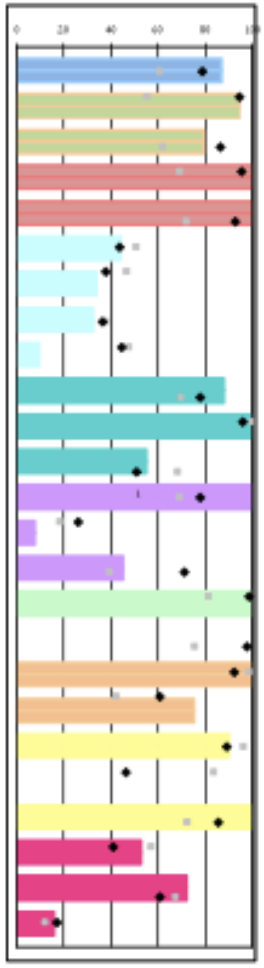
Environmental objectives:



Policy Categories

	Country	Income Group	Geographic Group
Environmental Burden of Disease (DALYs)	86.86	78.7	60.8
Air Pollution (impact on humans)	87.0	90.8	58.6
Water (impact on humans) *	100.0	94.3	70.7
Air Pollution (impact on ecosystem)	34.7	41.5	47.6
Water (impact on ecosystem) *	82.6	75.7	77.8
Biodiversity	63.2	63.1	54.4
Forestry	100.0	98.3	80.1
Fisheries	87.6	76.4	70.5
Agriculture	68.0	74.3	80.14
Climate Change *	48.3	39.9	48.6

Indicators



	Value	Target	Proximity to Target (100=target met)
DALY: Environmental Burden of Disease (DALY)	15.0	0	86.9
INDOOR: Indoor air pollution (%)	5.0	100	94.7
OUTDOOR: Outdoor air pollution ($\mu g/m^3$)	29.6	100	79.3
ACSAT: Access to sanitation (%)*	100.0	100	100.0
WATSUP: Access to water (%)	100.0	100	100.0
SO2: Sulfur dioxide emissions (Gg/1000 sq km)	2.1	<= 0.01	44.2
NOX: Nitrogen oxides emissions (Gg/1000 sq km)	5.3	<= 0.01	33.8
NMVOC: Non-methane volatile organic compound emissions (Gg/1000 sq km)	4.5	<= 0.01	32.7
OZONE: Ecosystem ozone (ppb)	84317701.1	0	9.3
WQI: Water quality index *	87.8	100	87.8
WSI: Water scarcity index	0.0	0	100.0
WATSTR: Water stress index	5.6	0	54.9
PACOV: Biome protection (%)	10.0	>= 10	100.0
MPAEEZ: Marine protection (%)	0.2	>= 10	7.6
AZE: Critical habitat protection (%)	45.0	100	45.0
FORGRO: Growing stock change (ratio)	1.1	>=1	100.0
FORCOV: Forest cover change (%)	..	>=0	..
MTI: Marine trophic index (slope)	0.02	>=0	100.0
EEZTD: Trawling and dredging intensity (%)	24.7	0	75.3
AGWAT: Agricultural water intensity (%)	12.8	<=10	90.0
AGSUB: Agricultural subsidies (MRA)	0.7	0	0.0
AGPEST: Pesticide regulation	22.0	22	100.0
GHGCAP: Greenhouse gas emissions per capita including land use emissions (Mt CO2 eq) *	10.8	2.5	52.5
GHGIND: Industrial greenhouse gas emissions intensity(t CO2 per mill US$)	65.1	36.3	72.2
CO2KWH: CO2 emissions per electricity generation (CO2 per kWh) *	450.4	0	15.9

1st lecture -- Lessons

1) What is Sustainability?

- Variety of definitions

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

2) How are countries responding?

-Climate change targets

-National strategies and indicators

3) How to measure and track it?

-Models / index