

Economics of Procurement

Green Procurement - Environmental Reasons

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Aldo Ravazzi Douvan

Master of Science in Business Administration
School of Economics
Tor Vergata University of Rome

Aldo Ravazzi Douvan

(as professor Federico Caffè used to say declare your values, your starting point, and discussion will be much clearer and fruitful)

chief economist, DG International & European Affairs, Mase (Italian Ministry of Environment & Energy Security)

economic adviser of Minister prof. Enrico Giovannini (sustainable mobility & infrastructures, Draghi Govt)

first part of career at IRI (holding of public enterprises)

University Tor Vergata, environmental global governance - University Luiss, sustainable development & climate

2022 GCET Award (Global Conference on Environmental Taxation) for the contribution to research and policy on env. taxes)

EAERE, Policy Committee (European Association of Environmental & Resource Economists)

IAERE, co-founder (Italian Association of Environmental & Resource Economists)

past-Chair OECD-Jmtee (Tax & Environment), OECD-Wpew (Environmental Performance country peer-reviews),

OECD-Wpbwe (Biodiversity Water & Ecosystems), OECD-Wpieep (Integration of Environmental & Economic Policies),

today: OECD-Epoc vice-chair (environmental policies) - OECD-Wpfieg chair (green and sustainable finance)

IPCC, observer (Intergovernmental Panel on Climate Change)

IRP, Steering Committee (International Resources Panel)

GBE Green Budget Europe Past-President

Plan Bleu, vice-president (for environment & development in Mediterranean, UNEP-MAP)

EU-Suseet, key staff team (EU Summer School on European Environmental Taxation)

coordinator of the first 4 editions of the Italian Catalogue of EHS &EFS (including FFS and BHS)

past technical secretary of the Italian Observatory on Sustainable Finance - EC-MSEF SF expert (2017-20)

past technical secretary of the Italian Natural Capital Committee

Opinions expressed are those of the author and not of the institutions he cooperates with

ravazzi.aldo@mase.gov.it ravazzidouvan@economia.uniroma2.it aravazzi@luiss.it

Where do we come from

a)What is our first degree:

- Economics: 9 + 1
- Law:
- Pol. Sciences:
- Management:
- ...:

b)Where do we come from:

- Roma & Lazio 2 + 1
- Italy (- Roma & Lazio): 3
- EU: 1
- Beyond EU: 3

c)Did we have courses of:

- Environmental Economics: 1 +0
- Sustainable Development: 2
- Climate Policy: 0
- ...:

How old is Universe (U)?
How old is the Earth (E)?
How old is the Human (H)?

Economics of Procurement students' guesses (hypotheses, knowledge, ...):

- Khadija	U 4 bn y.	E 1.4 bn y.	H 200.000 y.
- Marie	U 8	E 4.0	H 200.000
- Niccolò	U 7	E 1.0	H 100.000
- Rebecca	U 5	E 0.3	H 150.000
- Shadi	U 12	E 4.0	H 300.000
- ...			

Best available knowledge from the scientific community:

- G. Bologna	U 13.8 bn y.	E 4,6 bn y.	H 250.000 y
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We are Nature.

<i>The stages (steps – milestones) of the origins</i>	<i>Years ago</i>
1) Origin of the Universe (the Big Bang)	13.800.000.000
2) Origin of mass (a fraction of a second after BB)	13.800.000.000
3) Origin of light	13.500.000.000
4) Origin of stars and galaxies	13.400.000.000
5) Origin of the first molecules	11.000.000.000
6) Origin of the Solar System and of the Earth	4.600.000.000
7) Origin of the appearance of rocky crust and water	4.400.000.000
8) Origin and formation of the first oceans	4.000.000.000
9) First unicellular life forms (prokaryotes)	3.800.000.000
10) Origin and structuring of plate tectonics	2.800.000.000
11) Origin of complex cells and multicellular organisms	2.000.000.000
12) The Great Oxidation Event (GOE)	2.000.000.000
13) Cambrian explosion, spread of complex life forms	530.000.000
14) Origin of the genus Homo	2.400.000
15) Origin of the species Homo Sapiens	250.000
<i>Gianfranco Bologna (2022) "Noi siamo natura"</i>	<i>[We are nature]</i>

We are Nature. [Italian version]

<i>Le tappe delle origini</i>	<i>Anni fa</i>
1) Origine dell'universo (il Big Bang)	13.800.000.000
2) Origine della massa (una frazione di secondo dopo il BB)	13.800.000.000
3) Origine della luce	13.500.000.000
4) Origine delle stelle e delle galassie	13.400.000.000
5) Origine delle prime molecole	11.000.000.000
6) Origine del sistema solare e della Terra	4.600.000.000
7) Origine della comparsa della crosta rocciosa e dell'acqua	4.400.000.000
8) Origine e formazione dei primi oceani	4.000.000.000
9) Prime forme di vita unicellulari (procarioti)	3.800.000.000
10) Origine e strutturazione della tettonica a placche	2.800.000.000
11) Origine cellule complesse e organismi pluricellulari	2.000.000.000
12) Grande evento ossidativo (GEO)	2.000.000.000
13) Esplosione del Cambriano, diffusione di forme di vita complesse	530.000.000
14) Origine del genere <i>Homo</i>	2.400.000
15) Origine della specie <i>Homo sapiens</i>	250.000
<i>Gianfranco Bologna (2022) "Noi siamo natura"</i>	

We are Nature (the last years)

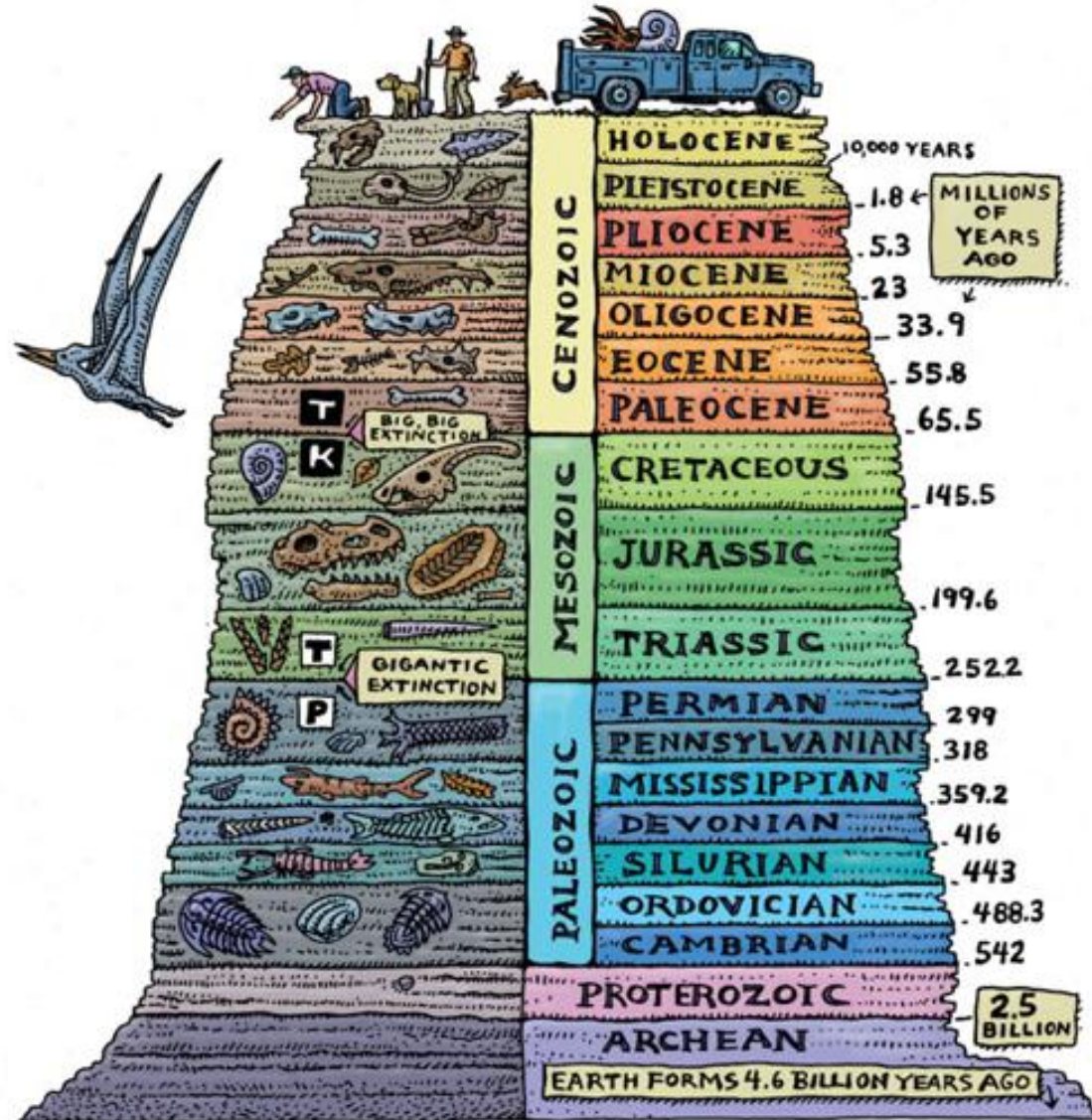
	<i>The stages (steps – milestones) of the origins</i>	Years ago
1	Origin of the Universe (the Big Bang)	13.800.000.000
4	Origin of stars and galaxies	13.400.000.000
6	Origin of the Solar System and of the Earth	4.600.000.000
11	Origin of complex cells and multicellular organisms	2.000.000.000
13	Cambrian explosion, spread of complex life forms	530.000.000
14	Origin of the genus Homo	2.000.000
15	Origin of the species Homo Sapiens	250.000
	<i>Gianfranco Bologna (2022) "Noi siamo natura"</i>	
16	Bible	3.020
17	Jesus (2.020) – Egira (1.400) – Buddha (2.590)	2.020
18	1 st industrial revolution (steam engine)	270
19	2 nd industrial revolution (electricity, chemical products, oil)	150
20	3 rd industrial revolution (electronics, telecommunications and information technology)	50

We are Nature (gli ultimi anni) [Italian version]

	Le tappe delle origini	Anni fa
1	Origine dell'universo (il Big Bang)	13.800.000.000
4	Origine delle stelle e delle galassie	13.400.000.000
6	Origine del sistema solare e della Terra	4.600.000.000
11	Origine cellule complesse e organismi pluricellulari	2.000.000.000
13	Esplosione del Cambriano, diffusione di forme di vita complesse	530.000.000
14	Origine della specie Homo	2.000.000
15	Origine della specie Homo Sapiens	250.000
	<i>Gianfranco Bologna (2022) "Noi siamo natura"</i>	
16	Bibbia	3.020
17	Gesù (2.020) – Egira (1.400) – Buddha (2.590)	2.020
18	1° rivoluzione industriale (motore a vapore)	270
19	2° rivoluzione industriale (elettricità, prodotti chimici, petrolio)	150
20	3° rivoluzione industriale (elettronica, telecomunicazioni e tecnologia dell'informazione)	50

Framework: Anthropocene and relation between Economic & Environmental Systems

From Holocene to Anthropocene?



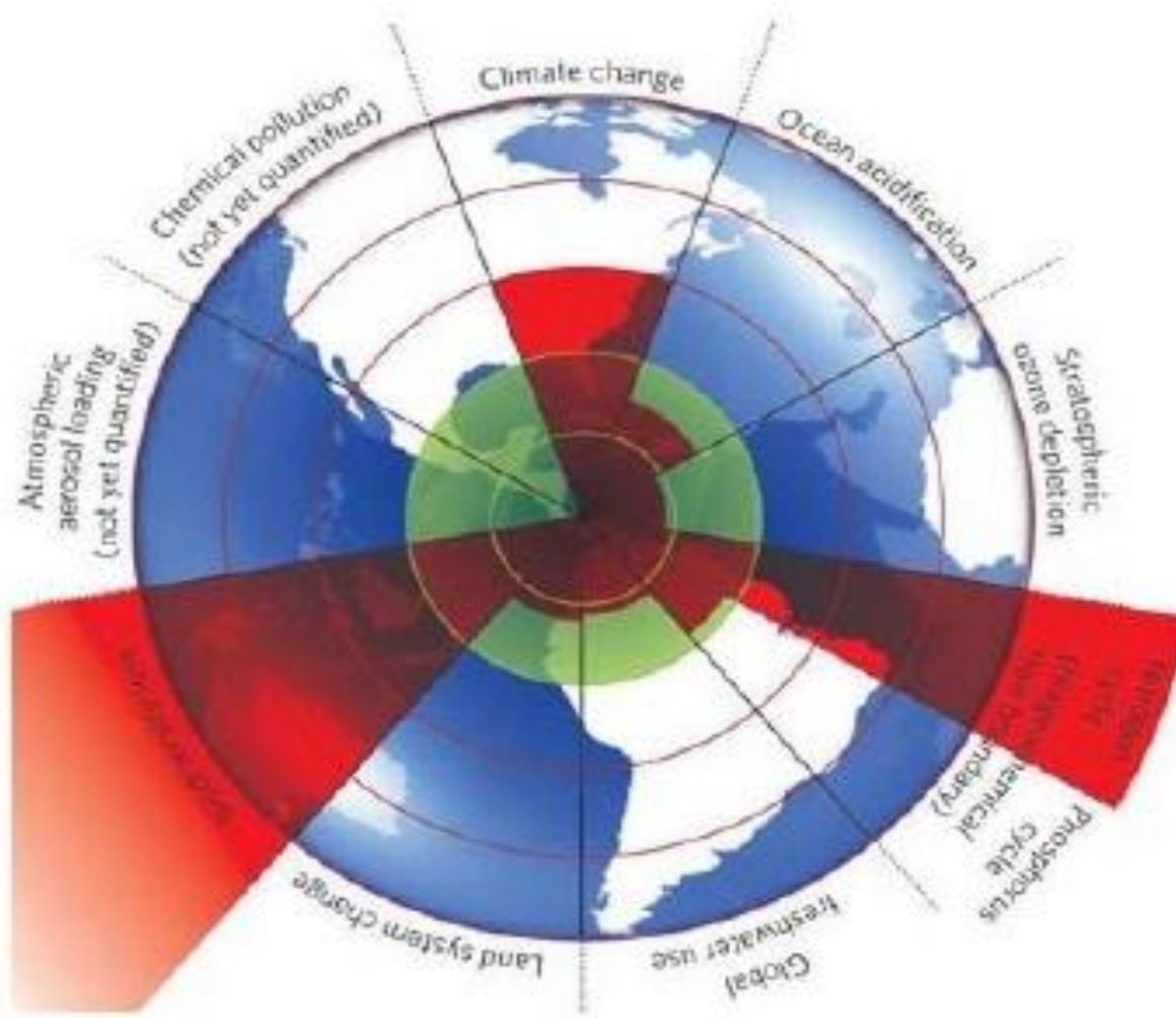
Paul Crutzen

Nobel Prize

Chemistry 1995

https://en.wikipedia.org/wiki/Paul_J._Crutzen

Paul J. Crutzen

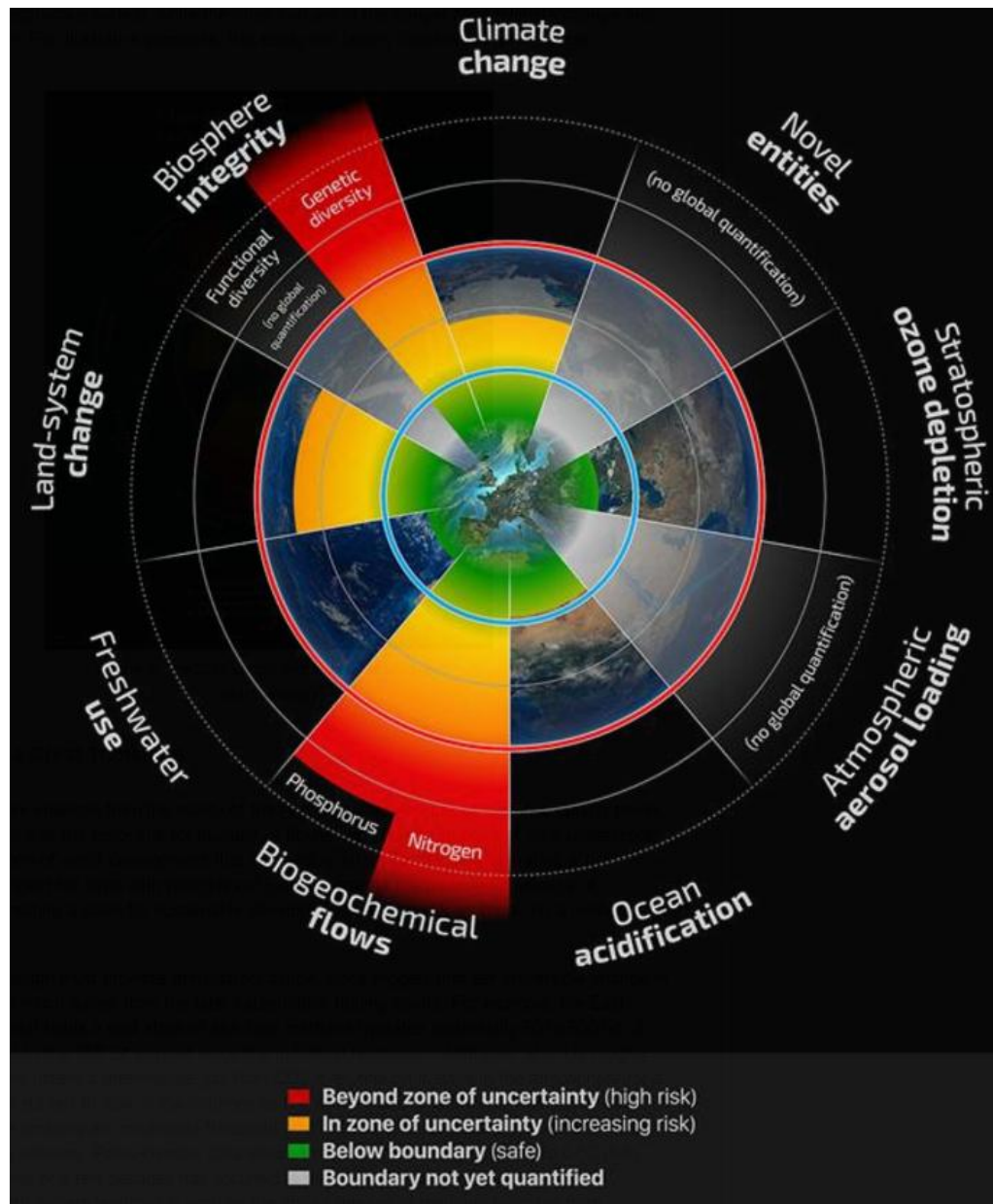


Source: Rockstrom et al (2009)

BE BASED ON AVAILABLE SCIENCE: THE PLANETARY BOUNDARIES

10 Planet
Ecosystems
to be kept
under control:

1. Climate change
2. Biodiversity loss
3. Nitrogen cycle
4. *Phosphorus cycle*
5. Stratospheric
ozone depletion
6. *Ocean acidification*
7. *Global
freshwater use*
8. *Land system
change*
9. Atmospheric
aerosol loading
10. Chemical pollution

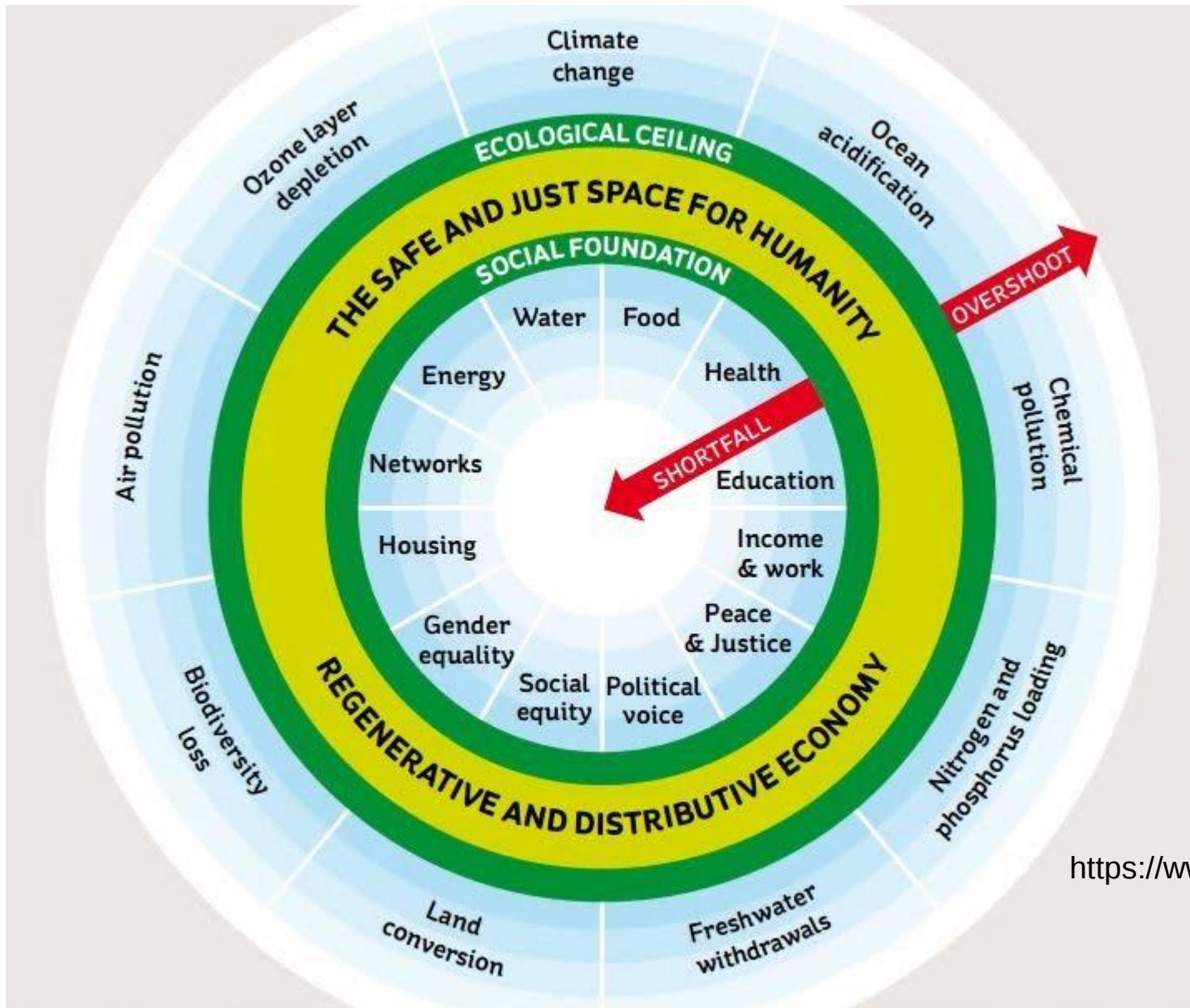


9 Planet Boundaries to be kept under control:

1. *Climate Change*
2. Biosphere integrity (*Biodiversity*)
3. Stratospheric ozone
4. Atmospheric aerosol
5. Ocean acidification
6. Biogeochemical flows (*P, N*)
7. *Land-system change*
8. *Freshwater use*
9. Novel entities ...

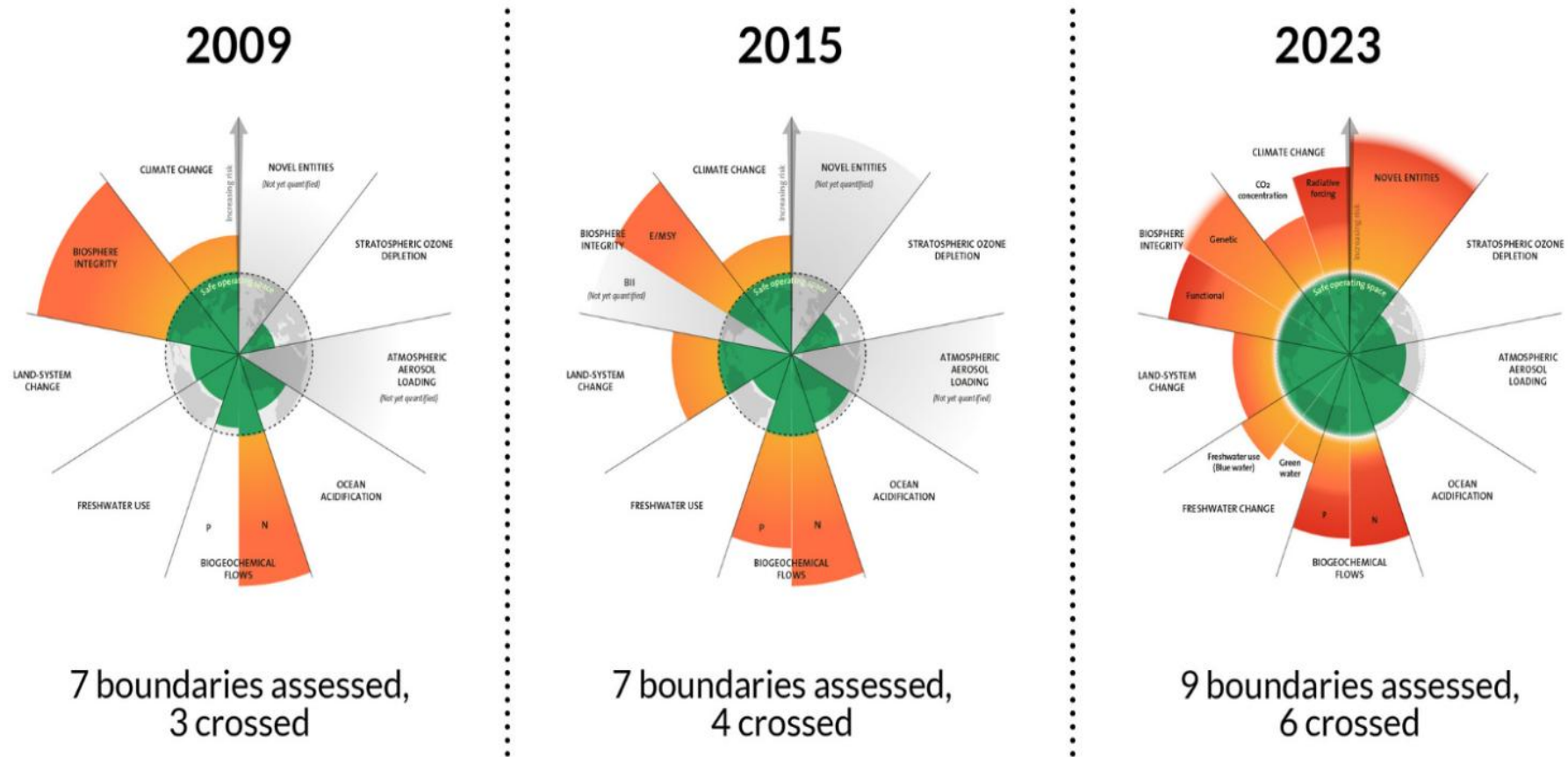
Source: Rockstroem et al. (2009) and Steffen et al. Planetary Boundaries: Guiding human development on a changing planet, Science, 16.1.2015; <http://www-ramanathan.ucsd.edu/files/pr210.pdf>

“A safe operating space SOS for humanity” (2009)
“Doughnut Economics” Kate Raworth



<https://www.kateraworth.com/>

6 of the 9 identified relevant ecosystems appear now as having crossed the planetary boundaries: a) Climate Change; b) Biosphere Integrity (i.e. biodiversity); c) Land-System Change; d) Freshwater; e) Biogeochemical Flows (i.e. nitrogen and phosphorous); f) Novel entities.



Azote for Stockholm Resilience Centre, Stockholm University. Based on Richardson et al. 2023, Steffen et al. 2015, and Rockström et al. 2009.
<https://www.stockholmresilience.org/research/planetary-boundaries.html>

An economic and ecological reference

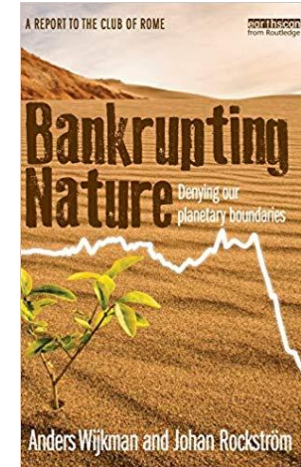
Anders Wijkman
Johan Rockström
(2012)



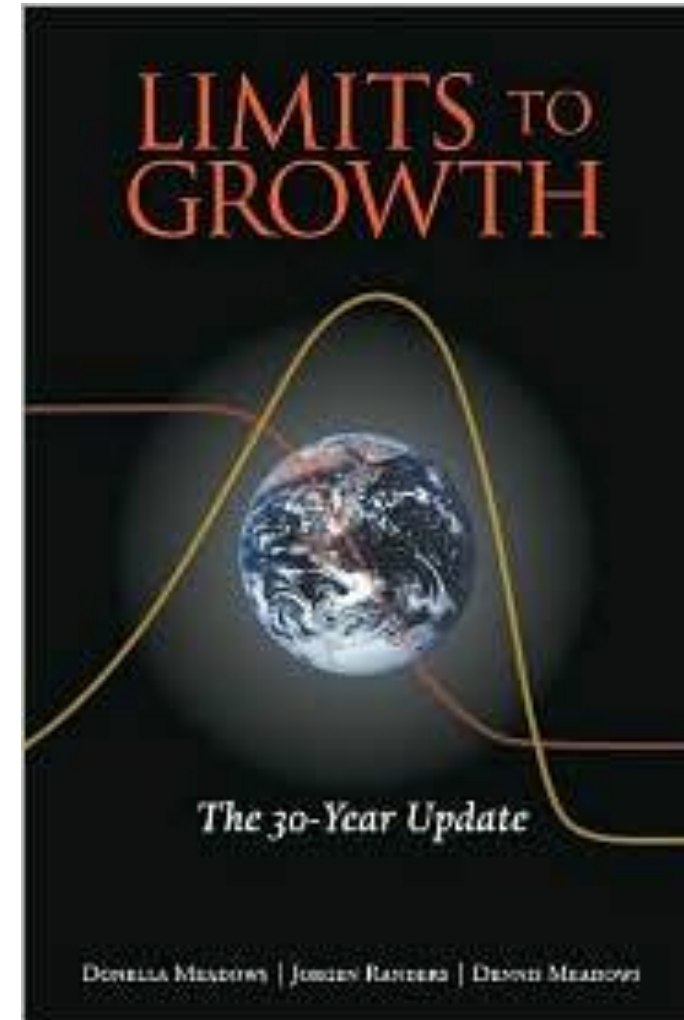
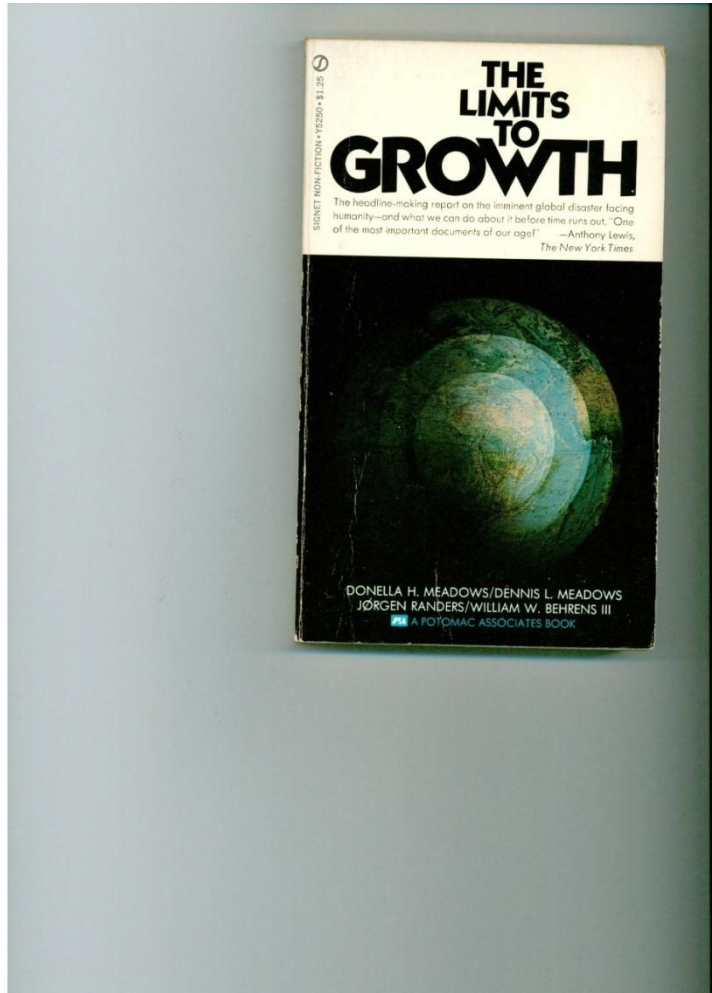
“Bankrupting Nature: Denying Our Planetary Boundaries - A report to the Club of Rome”, Earthscan-Routledge.

(Available also in Italian:

“Natura in bancarotta. Perché rispettare i confini del pianeta. Rapporto al Club di Roma”, Edizioni Ambiente, 2014)

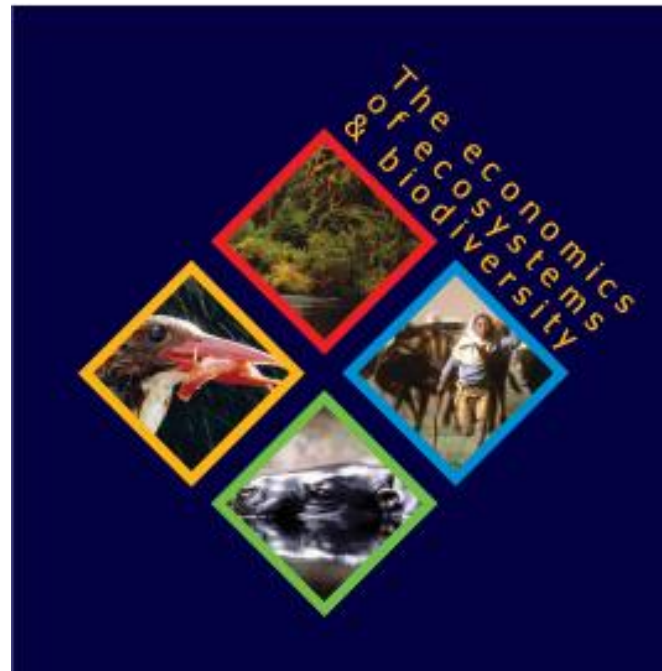
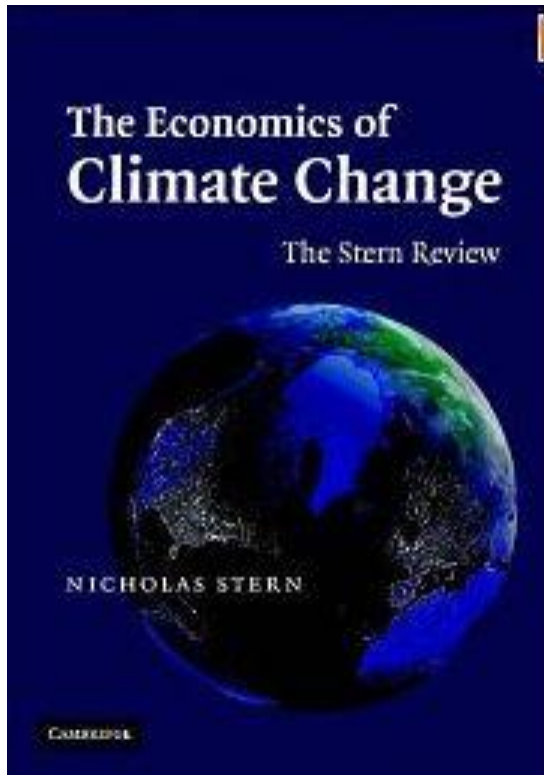


Club of Rome (1968): the MIT study 1972 – Oct. 2018: 50 years celebration in Rome



Sustainable Development Economics

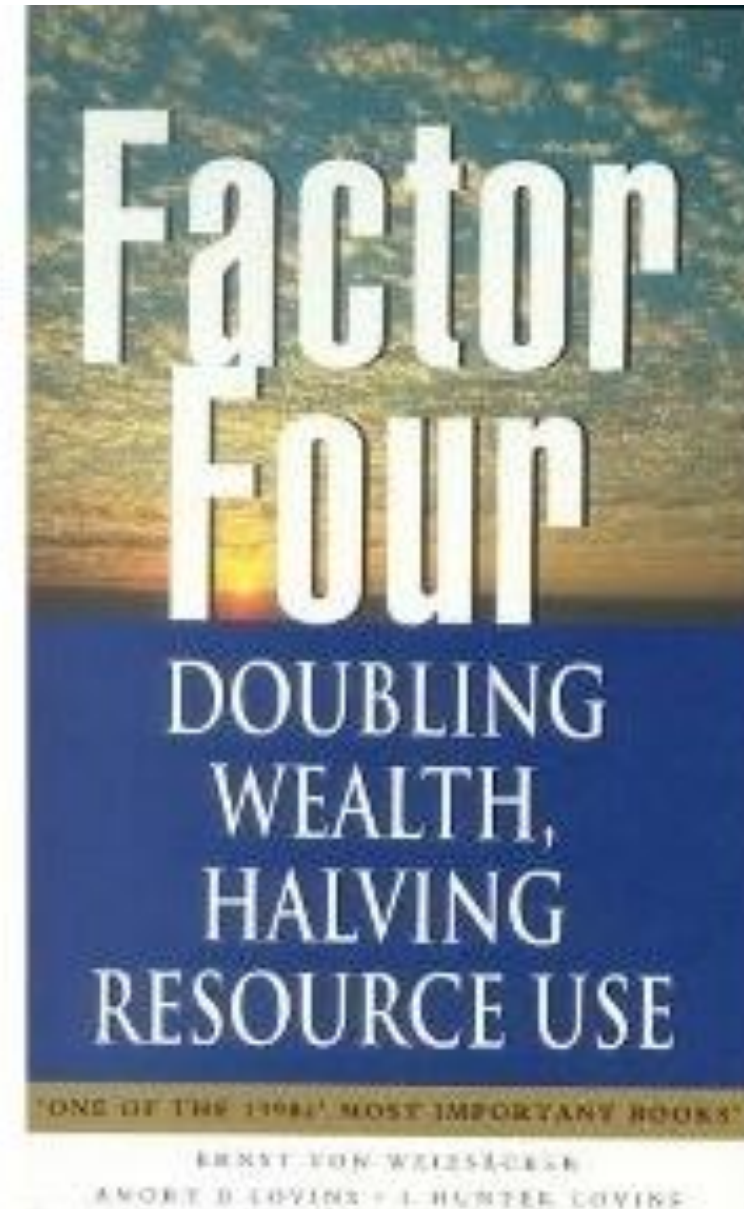
(Green Growth, Green Economy, Resource Efficiency, Circular Economy, etc.)

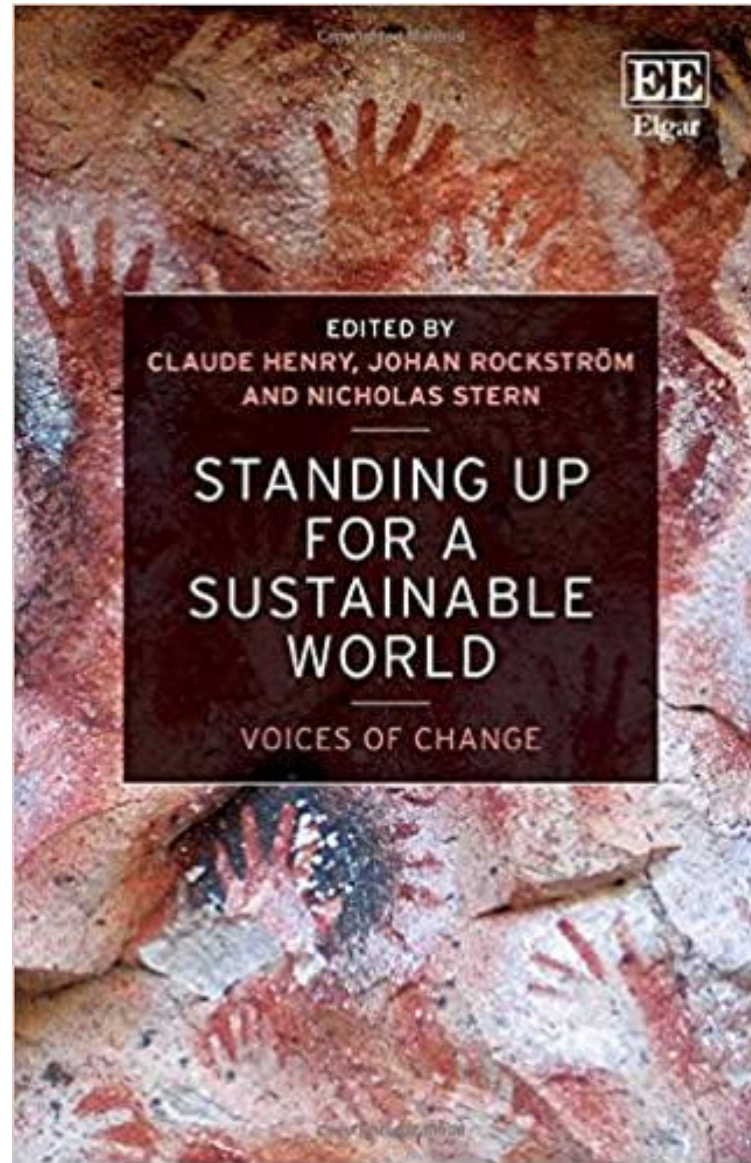


- Nicholas Stern (2006), "The Economics of Climate Change - The Stern Review ", HM Treasury, London
- Pavan Sukhdev ed. (2010 e 2011), "TEEB - The Economics of Ecosystems and Biodiversity", vol.1 "TEEB: Ecological and Economic Foundations , vol.2 "TEEB in National and International Policy Making", Earthscan, London
- E. Von Weizsaecker et al. (2009), "Factor 5 - Transforming the Global Economy through 80% Improvements in Resource Productivity", Earthscan, London

Origins of Resource Efficiency: “Factor 4”

- Factor 4: the goal of being twice as productive with half the resources (materials and energy), leading to a factor 4 improvement in efficiency.
- In other words: practices which are just as productive with 1/4 of the resources or 4 times as effective with the same resources.
- The concept was introduced in the 1998 book, [Factor 4](#), written by L. Hunter Lovins and Amory Lovins of the Rocky Mountain Institute, and Ernst von Weizsäcker, founder of the Wuppertal Institute for Climate, Environment & Energy.
- Firms maximise Resource Efficiency every day, they practice Circular economy whenever it is convenient: they reduce costs, they maximize profits: why is the cumulative behaviour at economy level insufficient, why do we need public intervention? And how?

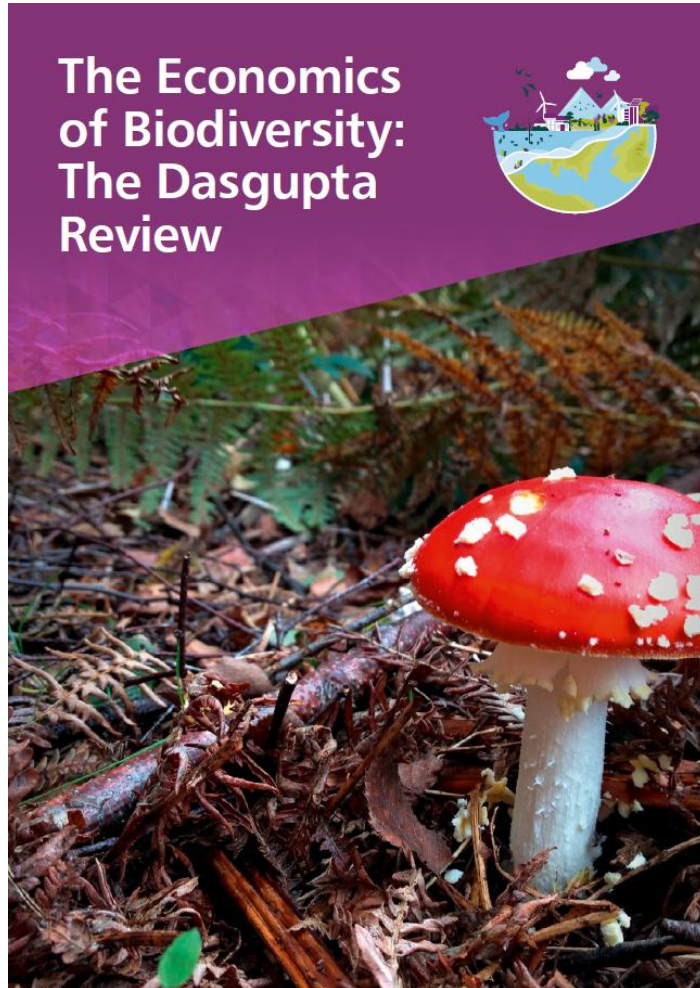




[Standing Up for a Sustainable World: Voices of Change](#)

Claude Henry,
Johan Rockstroem,
Nicholas Stern
eds. (Dec. 2020)

The Economics of Biodiversity: the Dasgupta Report for the G7 2021 UK Presidency and the UN-CBD COP Kunming-China /Montréal-Canada



NATURAL CAPITAL: MULTI-LEVEL CONTEXT – International / Global

	INITIATIVES / STRATEGIES
INITIATIVES / STRATEGIES	➤ AGENDA 2030 (17 SDGs) ➤ Biodiversity Strategic Plan 2011-2020 (CBD) and the new Kunming-Montréal GBF Global Biodiversity Framework (2021-30) ➤ IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services) ➤ Sendai Framework for Disaster Reduction ➤ MEA (Millennium Ecosystem Assessment) ➤ Natural Capital Coalition (Natural Capital Protocol) ➤ Natural Capital Project ➤ World Forum on Natural Capital
ACCOUNTING / VALUATION	➤ TEEB (The Economics of Ecosystem and Biodiversity) ➤ WAVES (Wealth Accounting and the Valuation of Ecosystem Services) ➤ SEEA (System of Environmental-Economic Accounting) ✓ CF (Central Framework) ✓ EEA (Experimental Ecosystem Accounting)

NATURAL CAPITAL: MULTI-LEVEL CONTEXT - EU

	INITIATIVES / STRATEGIES
INITIATIVES / STRATEGIES	➤ 8th EU Environment Action Plan ➤ EU Biodiversity Strategy ➤ EU Green Infrastructure Strategy ➤ EU Action Plan for Nature, People and the Economy ➤ EU Nature Restoration Law proposed in June 2022, with the ambition to reverse the decline of Europe's Nature and restore 20% degrade land and sea by 2030, and full health by 2050
ACCOUNTING / VALUATION	➤ CICES (Common International Classification of Ecosystem Services) ➤ MAES (Mapping and Assessment of Ecosystems and their Services) ➤ KIP-INCA (Knowledge Innovation Project on Accounting for Natural Capital and Ecosystem Services) ➤ Eurostat Environmental Accounts

NATURAL CAPITAL: MULTI-LEVEL CONTEXT - Italy

	INITIATIVES / STRATEGIES
INITIATIVES / STRATEGIES	➤ Biodiversity Italian Strategy (MATTM-MITE) ➤ Committee on Urban Greening (MATTM-MITE) ➤ Report on Policies for Landscape (MIBACT) ➤ Tourism Strategic Plan (MIBACT)
ACCOUNTING / VALUATION	➤ Report on Land Consumption (ISPRA) ➤ Material Flows, Environmental Accounts (ISTAT) ➤ Italian Natural Capital Committee

The Forgotten Capital ...

[Il Capitale Dimenticato ...]

The 4 forms of capital (Herman Daly)

- **Manufactured capital:** plant and equipment that contribute to production
- **Human capital:** knowledge and experience that contributes to production (can be split into knowledge capital and human capital)
- **Social capital:** institutions and relationships (formal and informal) that contribute to production - can be considered as institutions that are distinct from capital
- **Natural capital:** ecosystem states or processes, biological stocks, physical natural resources that contribute to provision/production

Which are the services that Nature gives us? (the Ecosystems Services)

A-Resources (water, raw materials, energy)

G- ...

H- ...

B-Tourism

I- ...

C-Health Benefits

D-Spiritual

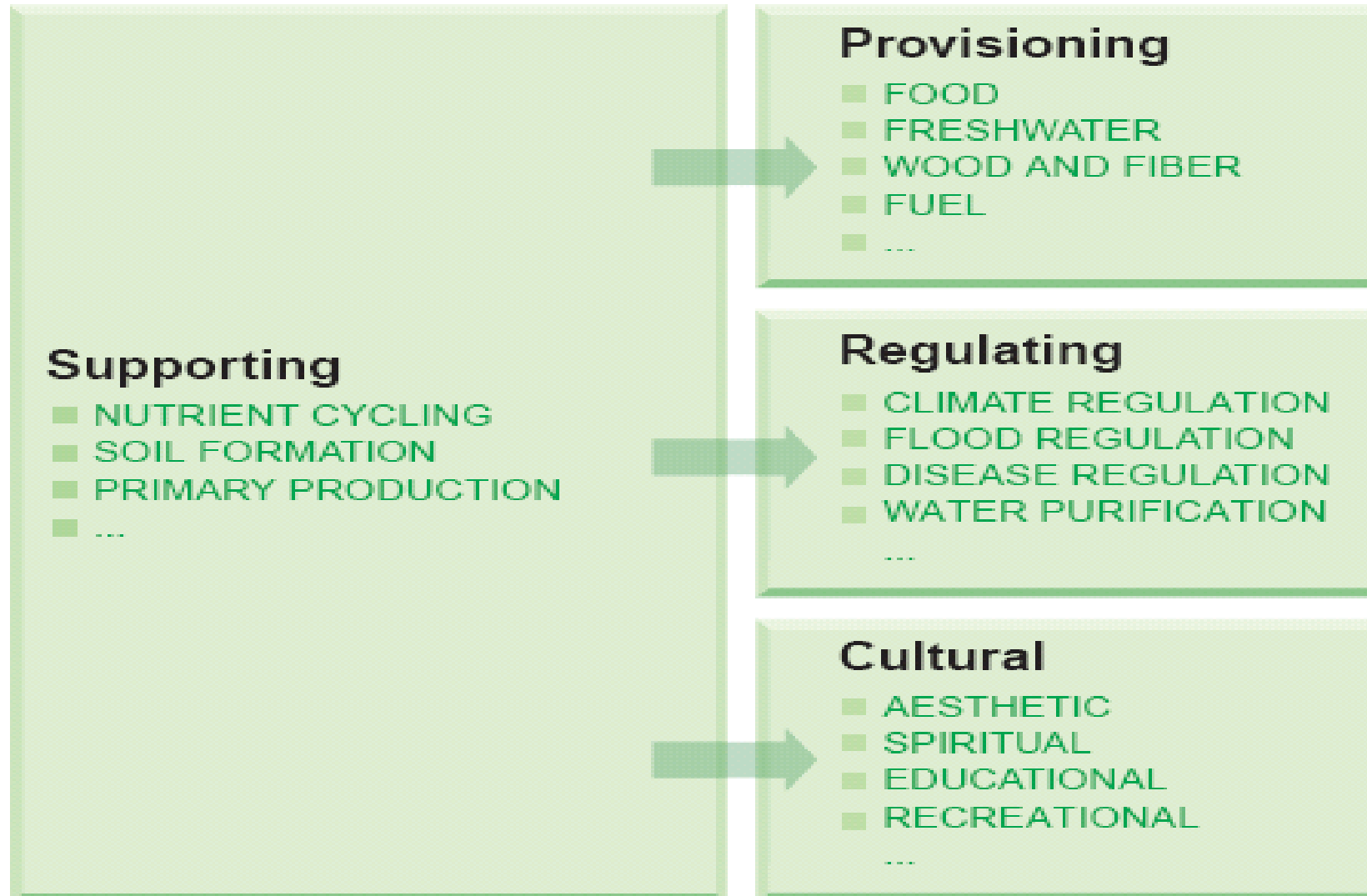
E-

F- ...

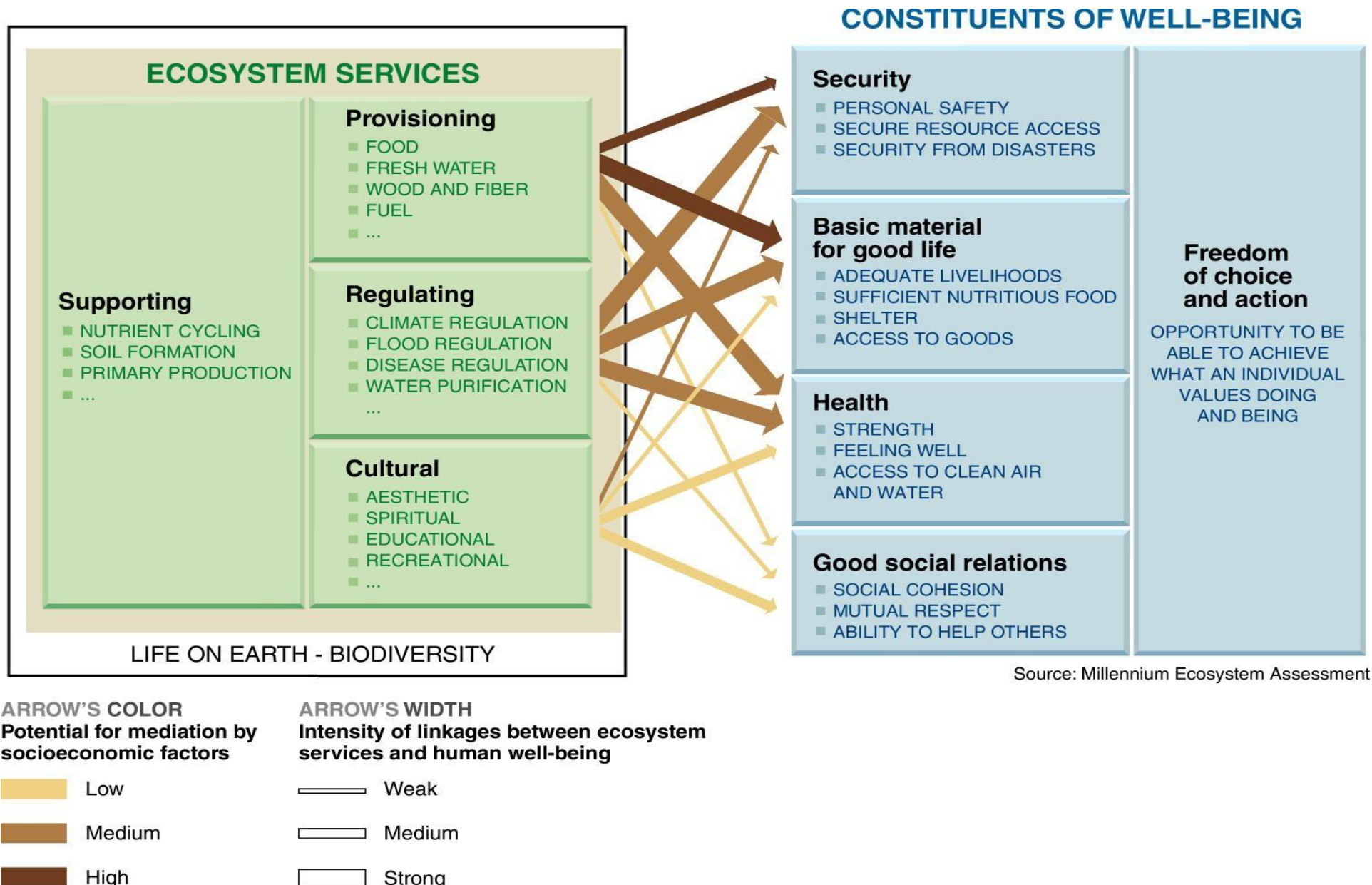
Ecosystem Services

The benefits people obtain from ecosystems

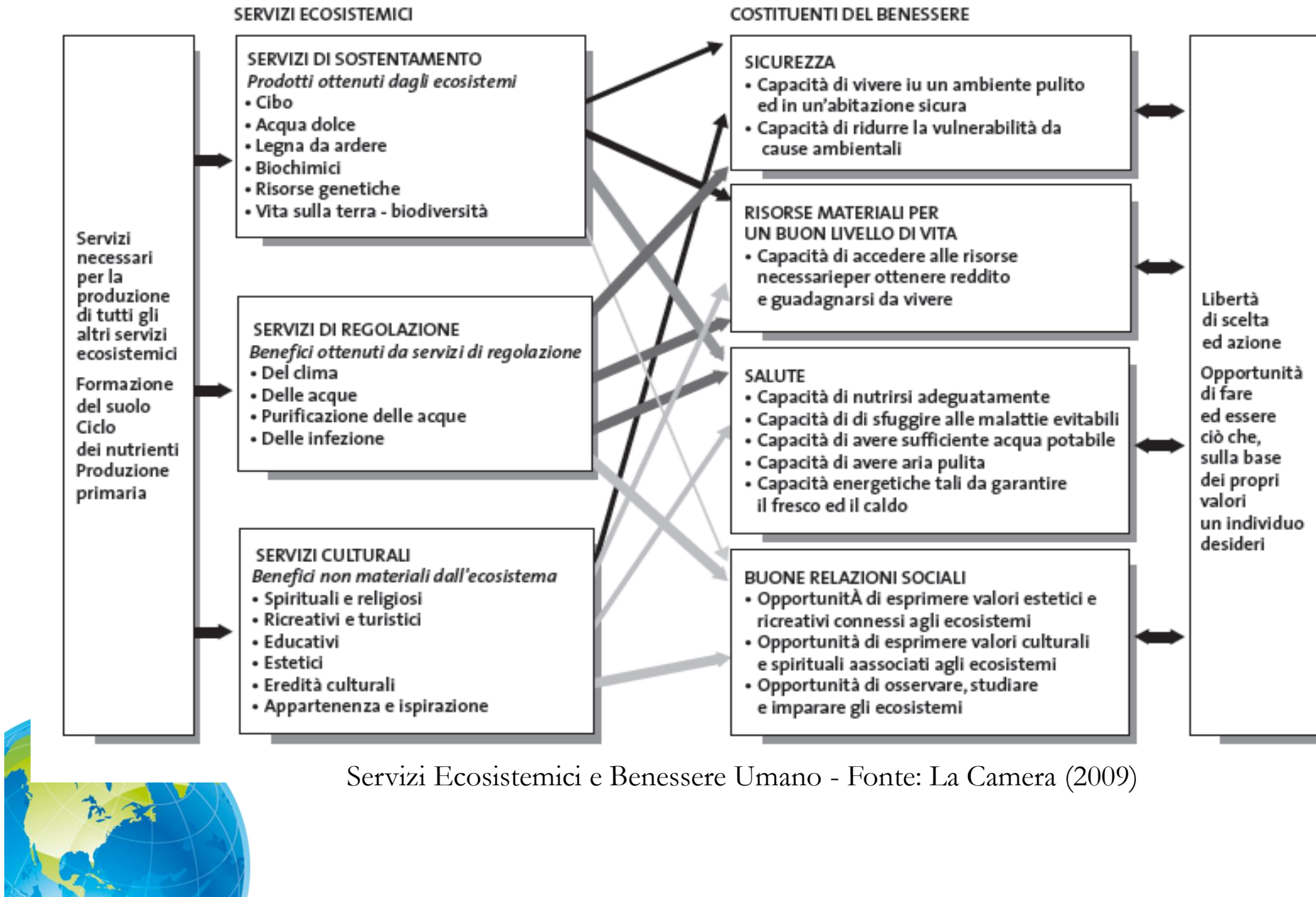
ECOSYSTEM SERVICES



Consequences of Ecosystem Change for Human Well-being



Natural Capital & Welfare [Italian version]



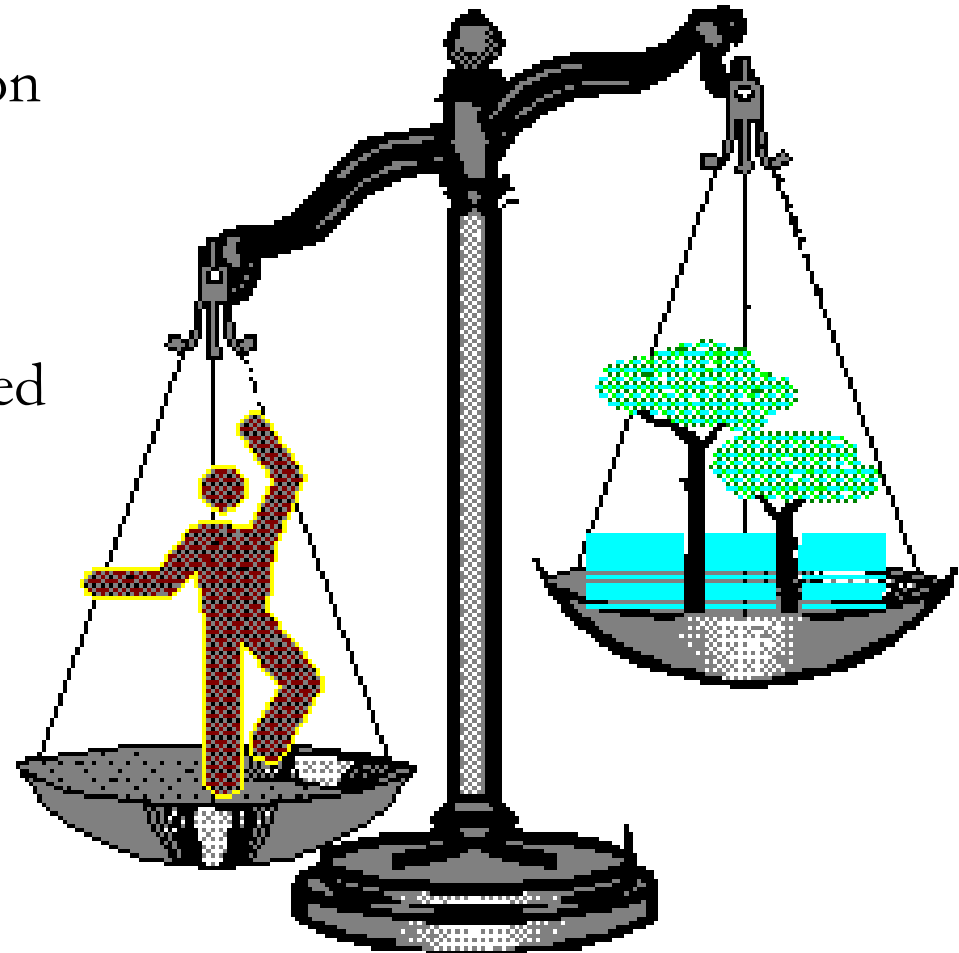
Servizi Ecosistemici e Benessere Umano - Fonte: La Camera (2009)

PROVISIONING SERVICES	REGULATING SERVICES	CULTURAL SERVICES
<i>The "products" obtained from ecosystems</i>	<i>Benefits obtained from the regulation of ecosystem processes</i>	<i>Nonmaterial benefits obtained from ecosystems</i>
Foods Fibers Ornamentals Medicines Biofuels Fresh water Genetic resources	Climate regulation Flood prevention Erosion control Pest control Pollination Seed dispersal Disease regulation	Educational Recreational Sense of place Spiritual Cognitive development Stress relief Gardening
SUPPORTING SERVICES		
<i>Services necessary for the production of all other ecosystem services</i>		
Biodiversity Nutrient recycling Primary productivity		

Ecosystem services include provisioning services, regulating services, cultural services and supporting services
(Source: Millenium Ecosystem Assesment. Ecosystems Human Well-Being: Synthesis; Island Press: Washington, DC, USA, 2005).

Example

- If a country cuts down 1 million acres of forest
- We see positive impact on income from timber sales
- The only depreciation accounted for is in chain saws and trucks
- What about the loss of natural services
- Situations like this lead to undervaluing natural resources





SUSTAINABLE DEVELOPMENT GOALS

17 GOALS TO TRANSFORM OUR WORLD



Agenda 2030

obiettivi [Italian version]



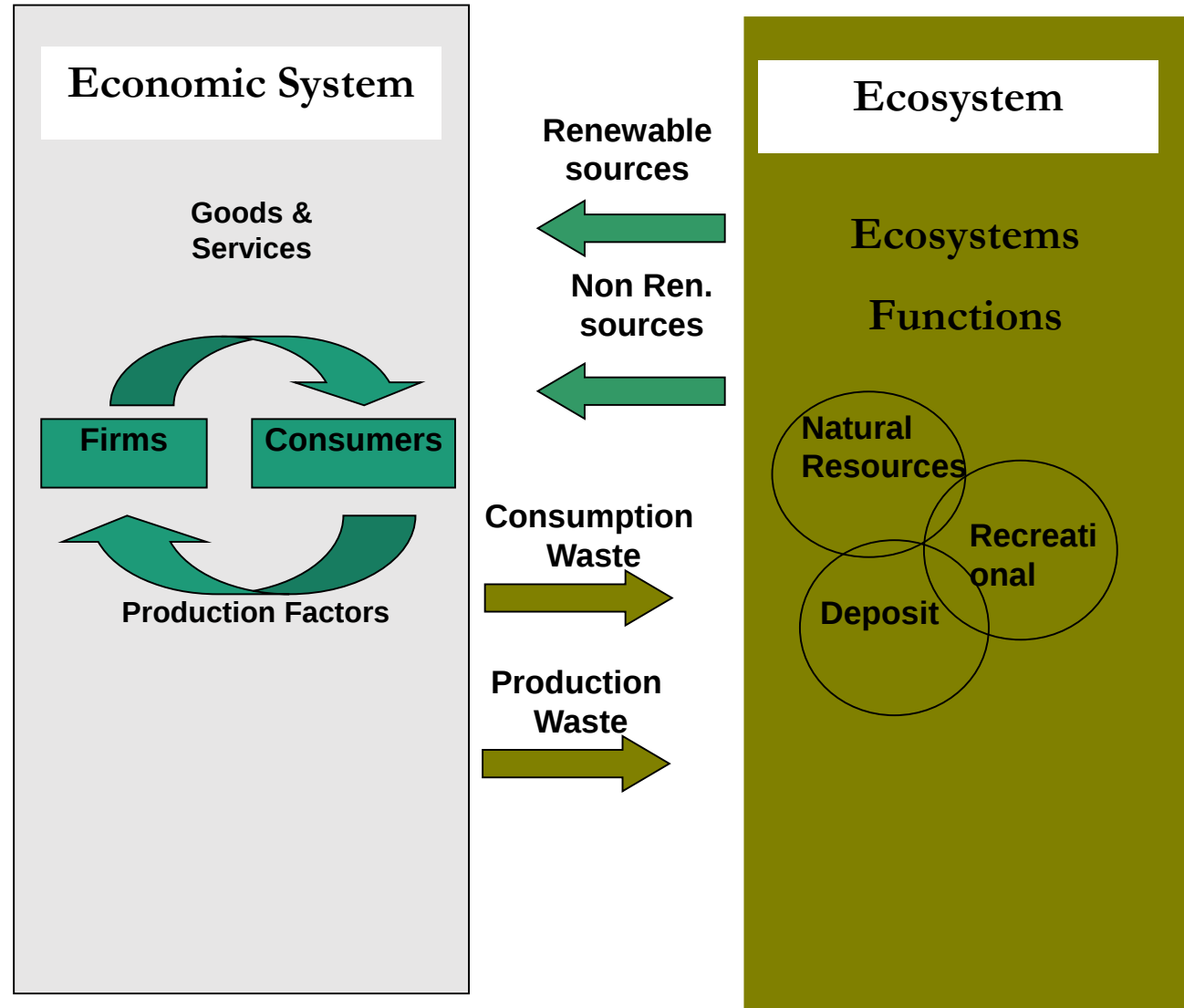
THE GLOBAL GOALS

For Sustainable Development



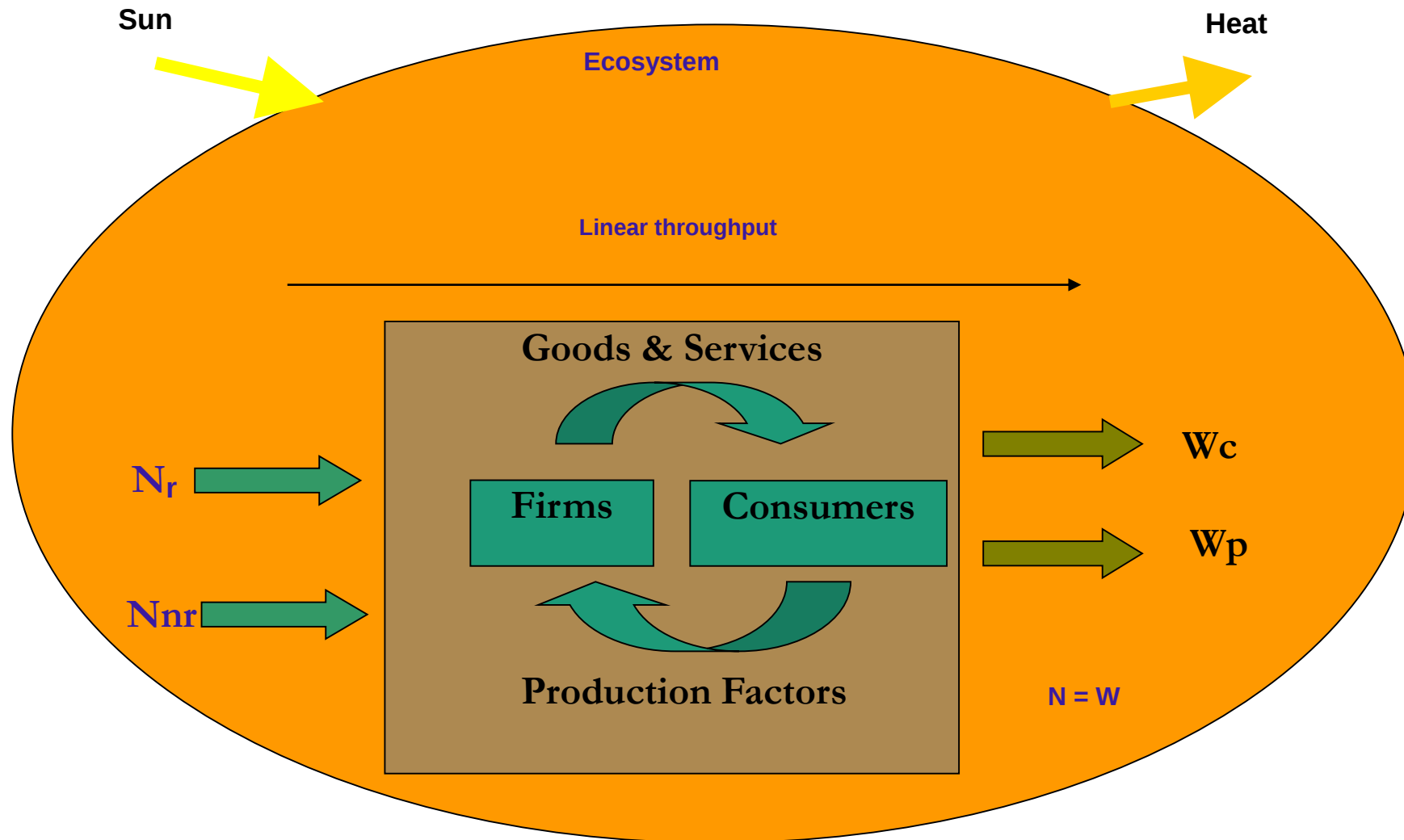
Source: SRC Stockholm
Resilience Centre –
re-reading
by Rockstroem & Sukhdev

Traditional relation between Economic and Environmental Systems

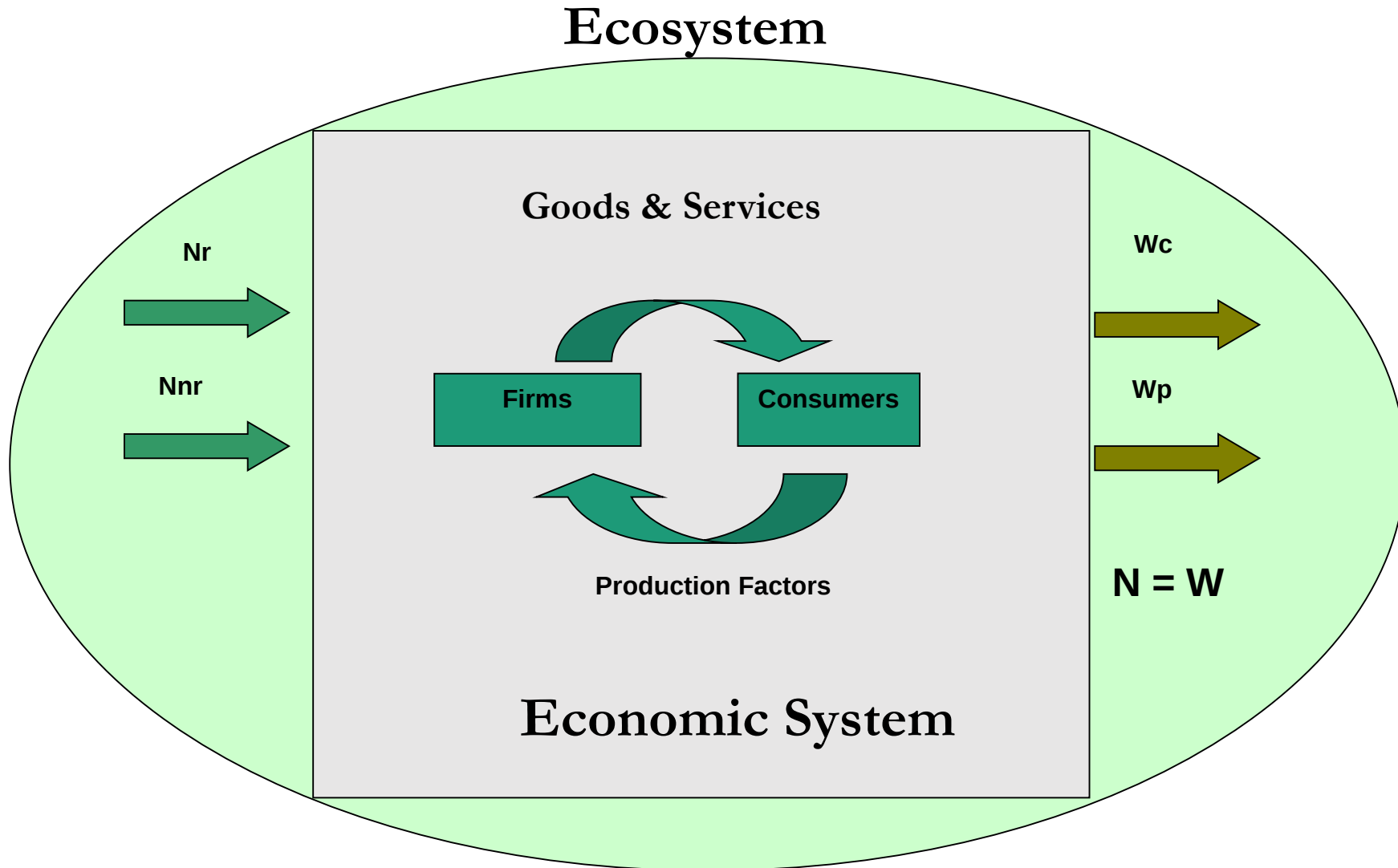


Sustainability: a change of paradigm

(Herman Daly – Francesco La Camera)



Sustainability: from an Empty World to a Full World



Traditional Economic Indicators

- There are hundreds if not thousands of economic indicators, but the two most commonly reported in traditional reporting (e.g. in USA) are:
 - 1) The **Gross Domestic Product (GDP)**, reported on a quarterly basis (i.e., every three months).
 - 2) The various **stock market averages** (e.g., the Dow Jones Industrial Average (DIJA), the NASDAQ Composite Index, and the Standard & Poor's (S & P) 500), which measure stock market activity on a daily basis (Monday through Friday). FTSE 100, NIKKEI 225, FTSE MIB (40), FTSE Italia All Share...

Traditional Economic Indicators

EU chose its Maastricht indicators for euro convergence criteria (also known as the Maastricht parameters, 1992):

- **Inflation:** max 1.5% more than the lowest 3 countries average
- **Government budget deficit:** max 3% of GDP
- **Government debt-to-GDP ratio:** 60% limit (if over, reentry plan)
- **Exchange rate stability** (prep phase)
- **Long-term interest rates** (10yr government bonds) (prep phase)

No indicators for employment, investment, income distribution, ...

Bank of Italy Report (la “Relazione” of the central bank):

102 tables in the Annex (Allegato) with more than 400 indicators

GDP Can Be Deceiving if not well considered (possible wrong messages coming from GDP)

Ideas from EoP Students:

- a) total GDP versus Income per capital
- b) PPP - Purchasing Power Parities
- c) Quantity vs quality
- d) Sustainability
- e) Trends through time
- f) Inequality in distribution of income and wealth
- g) International trade and investment - GDP vs GNP

Conclusion: GDP measures ... not ... nor ... neither ...

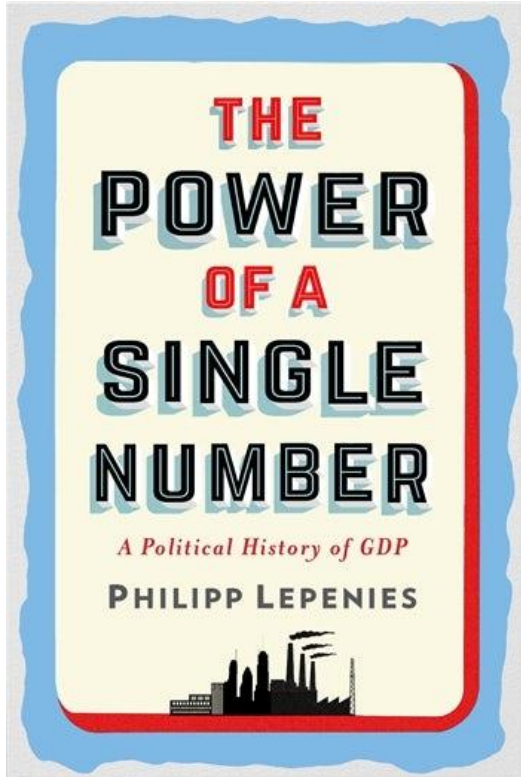
**GDP Can Be Deceiving if not well considered
(possible wrong messages coming from GDP)**

- a) GDP can grow even if poverty and inequality increase;
- b) More work hours make GDP grow –
free time has no value – may affect health (stress);
- c) GDP ignores work that contributes directly to community health and wealth
(volunteers, work at home);
- d) GDP does not account for the black or informal market;
- e) GDP does not account for externalities like crime, divorce, environmental
conditions,
- f) Public administration salaries or unemployed subsidies grow ...
- g) Military and security expenditure grow ...
- h) Health expenditure grow ...
- i) Recovery expenditure for earthquakes, natural disasters, ...
- j) Environmental defensive expenditure grows ...
- k) Recovery expenditure for epidemics, pandemics,

Conclusion: GDP measures “economic activities”

not well-being or welfare nor happiness neither sustainable development

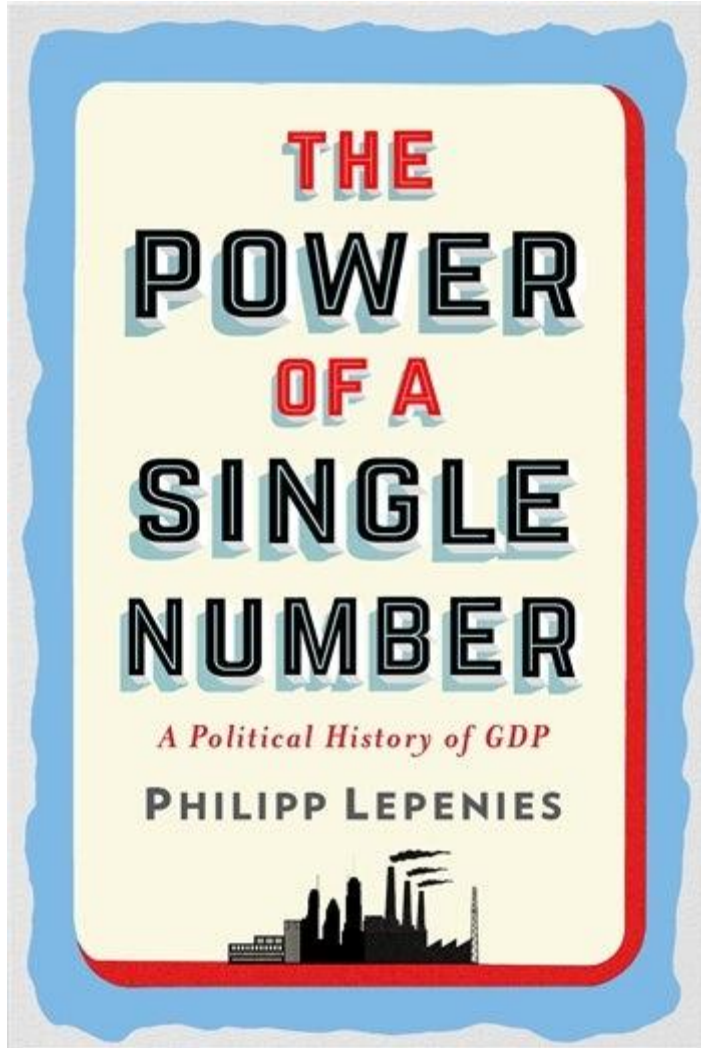
Philipp Lepenies (2016). The Power of a Single Number: A Political History of GDP. Columbia University Press.



Philipp Lepenies recounts the lively history of GDP's political acceptance - and eventual dominance. Lepenies explores the social and political factors that originally hindered its use. John Maynard Keynes encouraged the study of national income. American economists furthered this work by emphasizing GDP's ties to social well-being, setting the stage for its ascent. GDP finally achieved its singular status during World War II, assuming the importance it retains today.

Lepenies helps us understand the personalities and popular events that propelled GDP to supremacy and clarifies current debates over the wisdom of the number's rule.

- Suggested readings: Philipp Lepenies (2016). *The Power of a Single Number: A Political History of GDP*. Columbia



Widely used since the mid-twentieth century, GDP (gross domestic product) has become the world's most powerful statistical indicator of national development and progress.

Practically all governments adhere to the idea that GDP growth is a primary economic target, and while criticism of this measure has grown, neither its champions nor its detractors deny its central importance in our political culture.

What's Wrong with GDP as a Measure of Progress?

- As written in a World Bank report, GDP “works like a calculating machine that adds but cannot subtract. It treats everything that happens in the market as a gain for humanity, while ignoring everything that happens outside the realm of monetized exchange, regardless of the importance to well-being.”

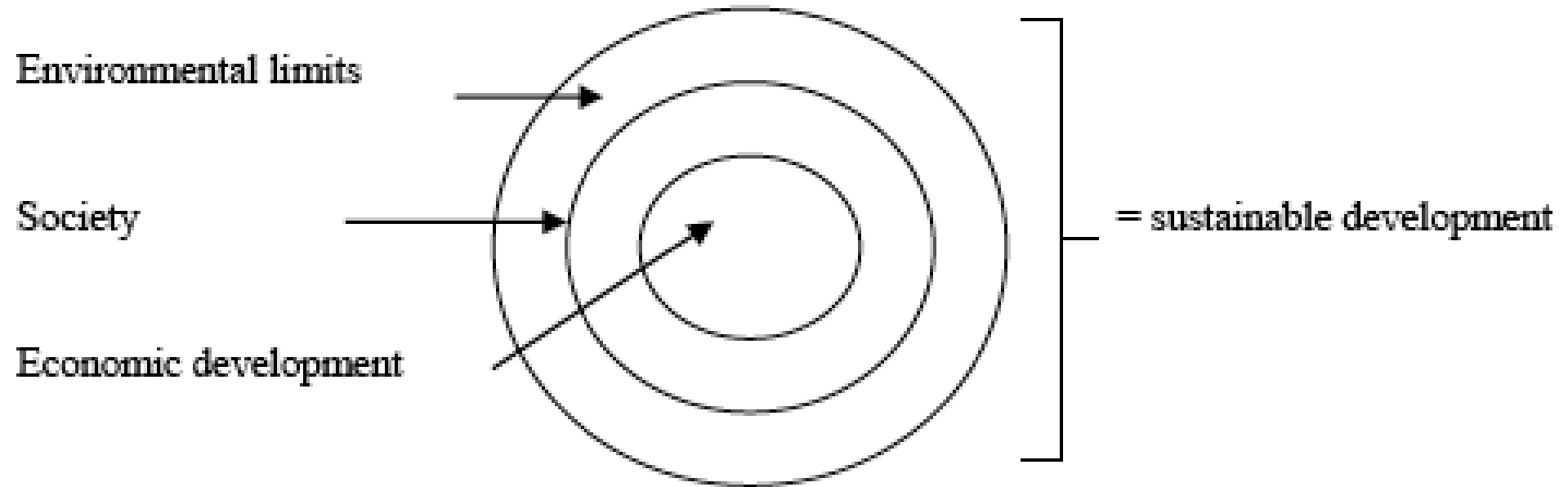
What's the Economy for? What's GDP for?



“Distinctions must be kept in mind between quantity and quality of growth, between its costs and return, and between the short and long run... Goals for more growth should specify more growth of what and for what.”

Simon Kuznets, the Nobel Prize-winning economist and creator of the GDP as a measurement tool, warned against treating GDP as a gauge of progress.

Expanded definition of capital



Values, elements of Wellbeing (Welfare Economics)

- Health
- Security
- Knowledge
- Community
- Freedom
- Ecological integrity
- Equity
- ...

A Sampling of Alternative Measures of Economic and Social Well-Being (from GDP to SDGs, many attempts to integrate/correct GDP ...)

- [Human Development Index](#)
- [Adjusted Net Savings](#)
- [Canadian Index of Well-Being](#)
- [Ecological Footprint](#)
- [Calvert-Henderson Quality of Life Indicators](#)
- [Genuine Progress Indicator](#)
- [Happy Planet Index](#)
- [Index of Sustainable Economic Welfare](#)
- [Sustainable Society Index](#)
- [Living Planet Index](#)
- [Measure of Domestic Progress](#)
- [Sustainable National Income](#)
- [Environmental Performance Index](#)
- ...

The Genuine Progress Index

(USA, Australia mainly)

or Index of Sustainable Welfare

or Measure of Domestic Progress (UK only)

GPI is calculated by **adjusting GDP** by subtracting **social and environmental costs**, and adding in the **value of non-market productive activity**, such as volunteer work and child rearing.

Calculated by NGOs and think tanks - Redefining Progress (GPI, 2006, USA only); New economics foundation (MDP, 2004; UK only); Friends of the Earth UK and New economics foundation (ISEW)

Adjusted Net Savings (Genuine Savings) – World Bank

ANS = Net savings

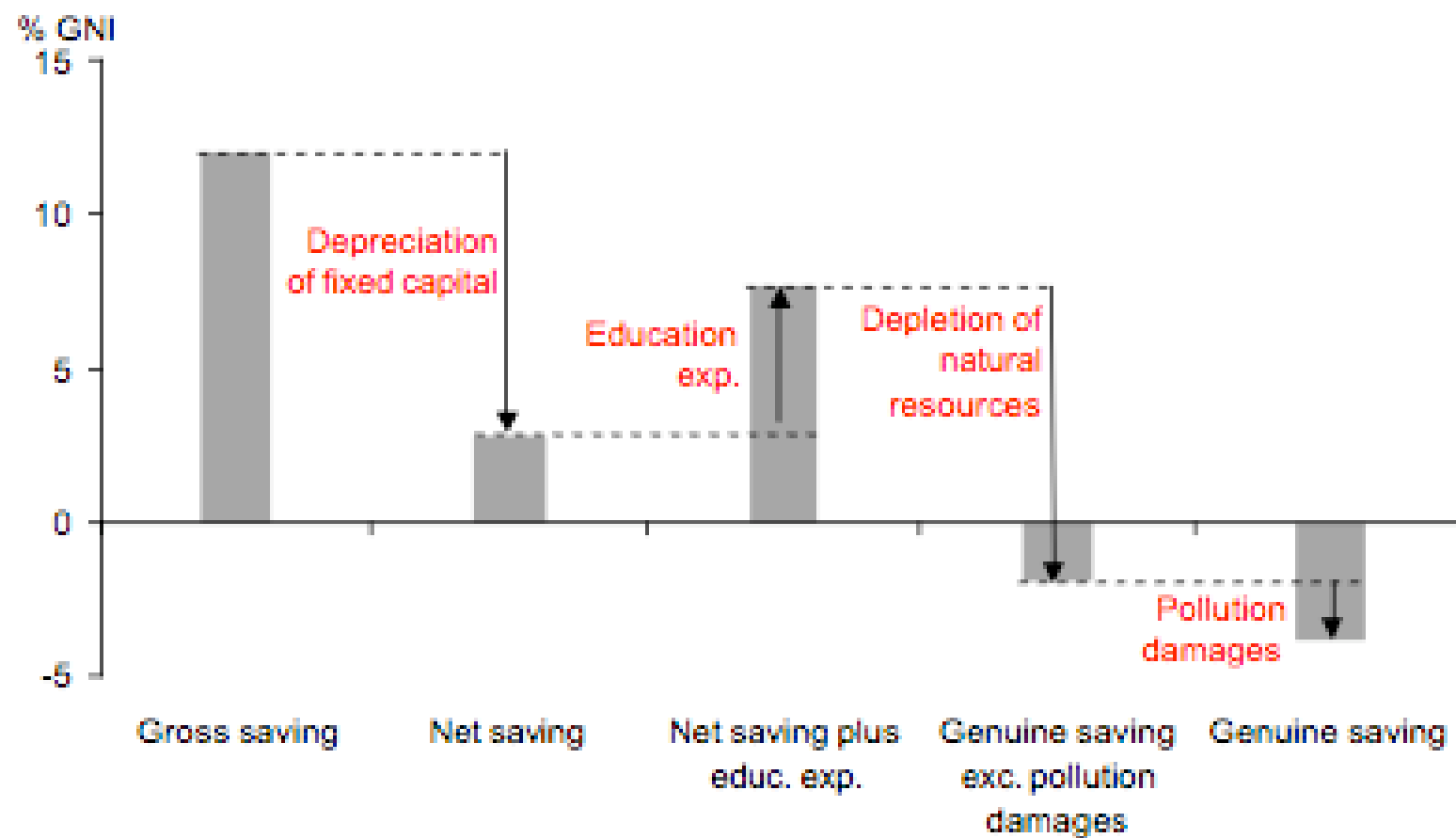
- resource depletion & environmental degradation**
- + the value of investment in human capital.**

Negatively adjusted net saving rates imply a total wealth in decline.

The basic idea behind this concept is that only net savings increase wealth.

While the standard national accounts solely show change in physical capital, i.e. man-made assets like machinery and infrastructure, 'genuine savings' strive to include the natural, environmental and human capital as a source of wealth.

World Bank's Genuine Savings



Adjusted Net Savings (Genuine Savings)

World Bank : the formula

- $ANS = GNS - CFC + EDU - NRD - GHG - POL$

where ANS = Adjusted Net Saving.

+GNS = Gross National Saving (difference between GNI (Gross National Income) and public and private consumption).

-CFC = Consumption of fixed capital.

+EDU = Current public expenditure on education.

-NRD = Natural resource depletion (sum of net forest depletion, depletion of fossil energy resources, and metals and minerals depletion).

-GHG = Damages due to carbon dioxide emissions from fossil fuel use and the manufacture of cement.

-POL = Damages due to exposure of a country's population to air pollution.

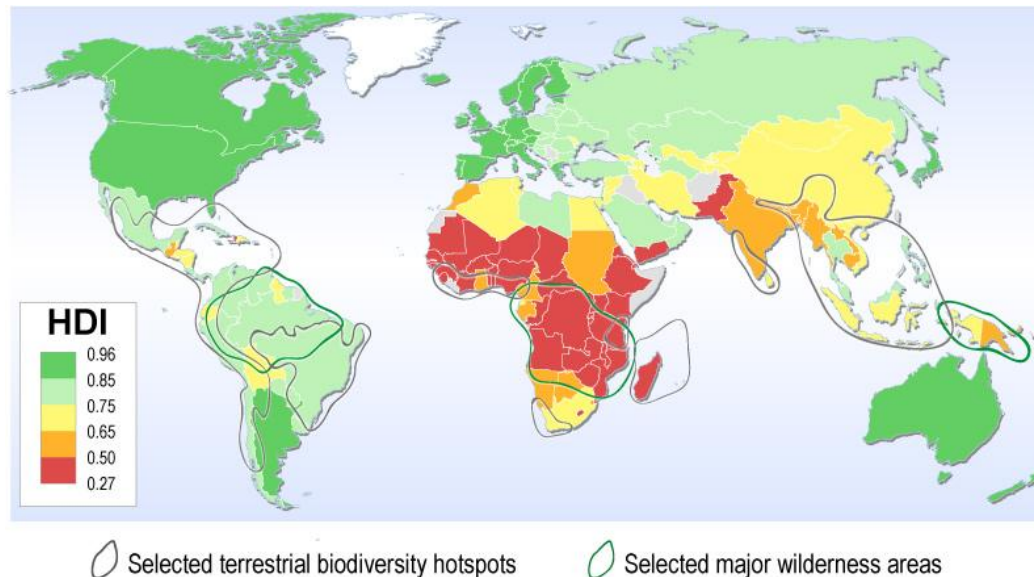
Source: https://development-data-hub-s3-public.s3.amazonaws.com/ddhfiles/143151/ans-methodology-january-30-2018_2_0_0.pdf

Human Development Index (UNDP)

The HDI was designed as a measure for progress in developing countries beyond simple income figures such as GDP.

A long and healthy life, knowledge and a decent standard of living are considered as the three key elements of development.

Therefore, data on a) life expectancy, b) adult literacy and school enrolment and c) GDP are combined to calculate the index.



Gross National Happiness

(Kingdom of Bhutan)

- The **four pillars** of GNH are:
 - sustainable and equitable socio-economic development;
 - preservation and promotion of cultural values;
 - conservation of the environment; and
 - establishment of good governance.
- **Application:** GNH is not a quantified measure. Rather, happiness is the guiding framework for the country's five-year planning processes.
- **Assessment:** After two international conferences about the concept of GNH, the current focus is to develop indicators to measure GNH. Linked to the democratic evolution in Bhutan.

Ecological Footprint

EF measures the amount of natural resources an individual, a community, or a country consumes in a given year.

To understand the humanity's footprint we need to know two key things:

- **Ecological Supply** (the available biocapacity / ecological capacity)
 - **Ecological Demand** (our use of biological resources / the footprint).
- Compares human consumption of natural resources with the planet's ecological capacity to regenerate them
 - Assumes current technology levels and looks at the amount of area needed to generate and to dispose of waste.
 - <https://www.footprintnetwork.org/our-work/ecological-footprint/>

Measuring (un)sustainability

- European footprint – 4,8 ha
- USA footprint – 9,6 ha
- An Average European needs 3 planets
- An Average American needs 5 planets



Possible Solutions: the “One Planet Living Framework”
by WWF and Bio-regional (British sustainability experts)
BedZED (Beddington Zero Energy Development, London-Sutton)
Sonoma Mountain Village (California)
Masdar (Abu Dhabi) (zero car, zero carbon, zero waste)

1 Zero Carbon

2 Zero Waste

3 Sustainable Transport

4 Local and Sustainable Materials

5 Local and Sustainable Food

6 Sustainable Water

7 Natural Habitats and Wildlife

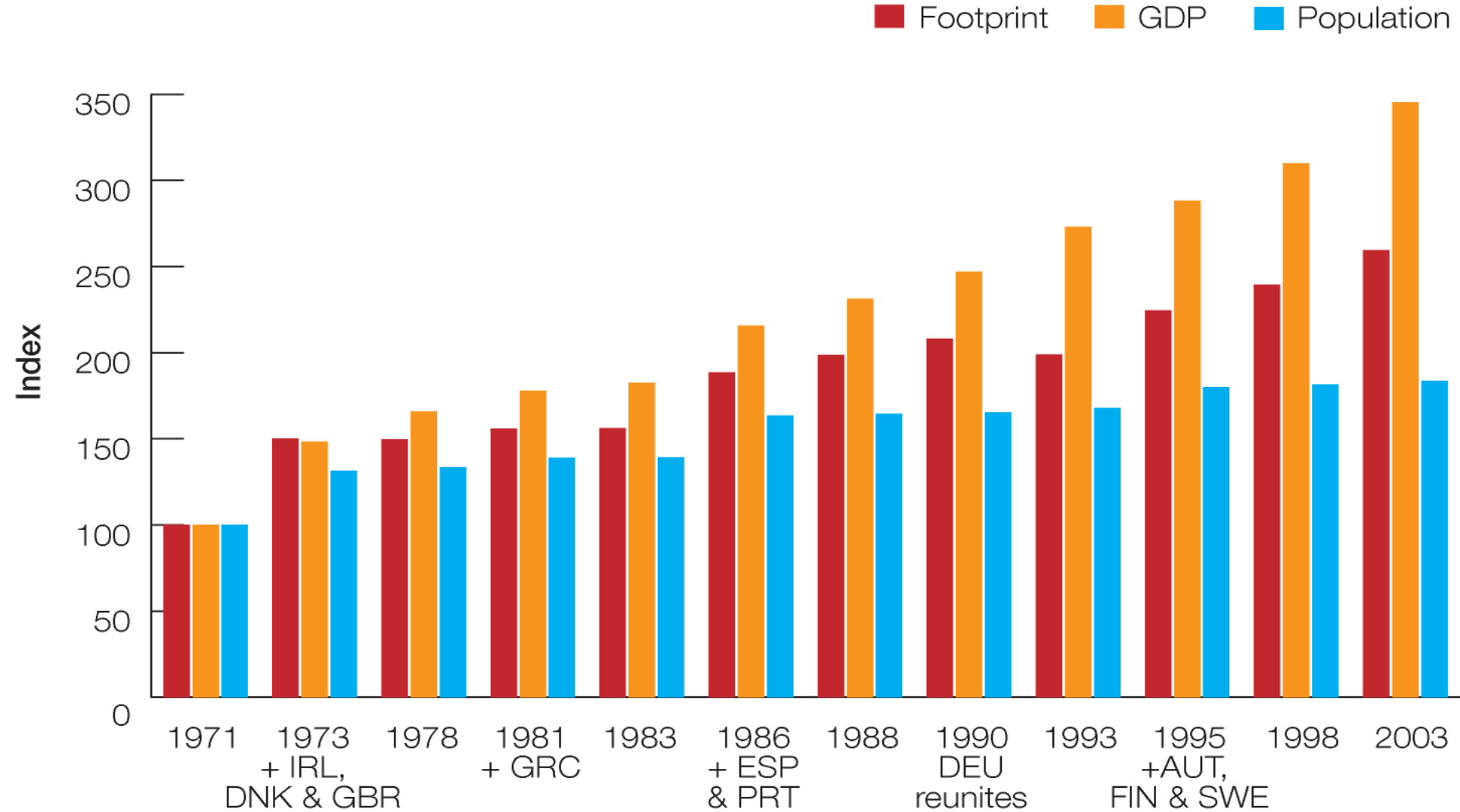
8 Culture and Heritage

9 Equity and Fair Trade

10 Health and Happiness

EF and Growth in EU

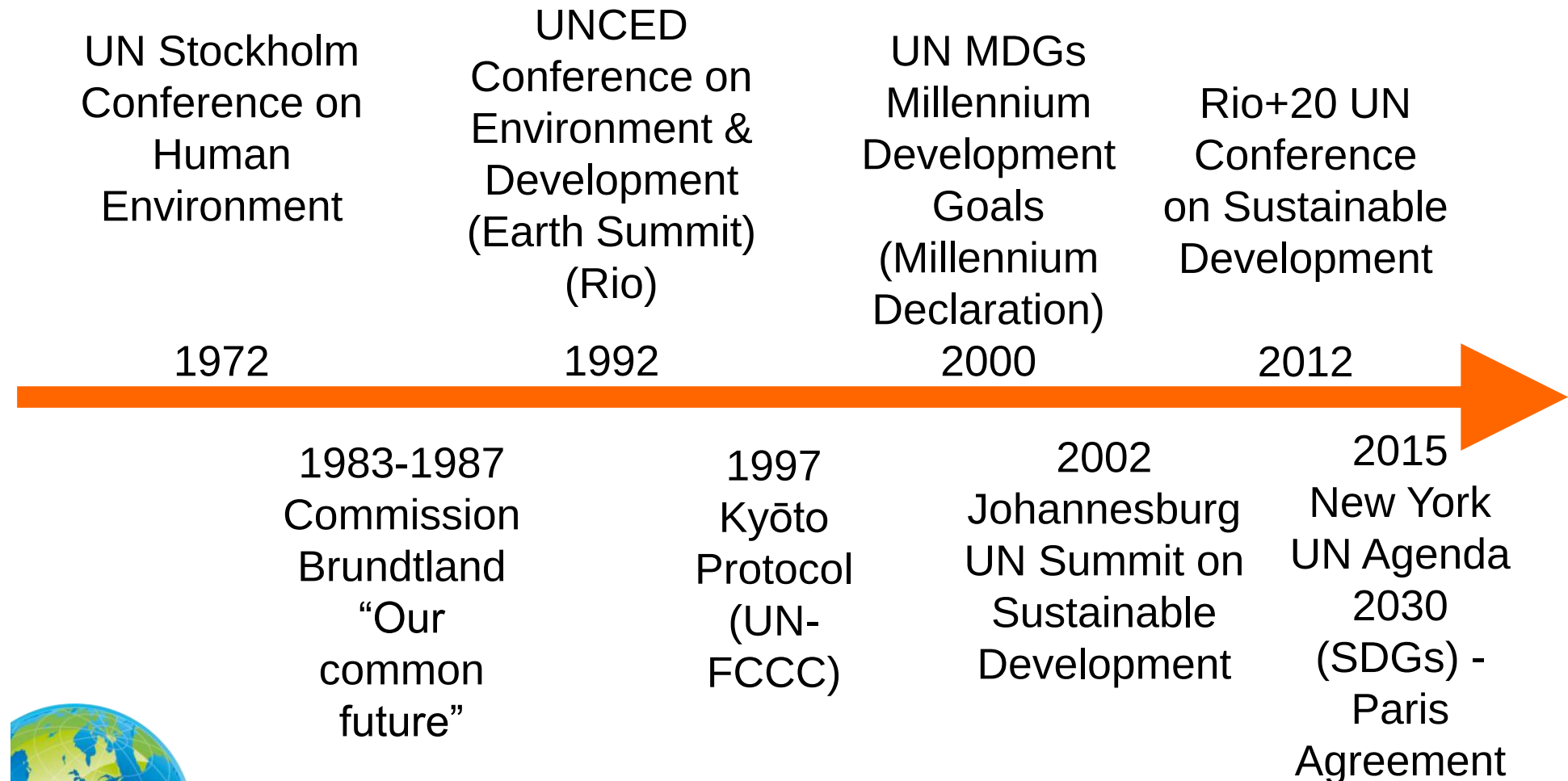
Fig 2: EU's total Ecological Footprint, GDP, and population growth, 1971-2003
(Index, 1971=100)



From GDP to SDGs

- Club of Rome Limits to Growth 1972
- Brundtland Report 1987
- Rio 1992 and Agenda 21
- Kyoto Protocol 1997
- Johannesburg 2002
- Beyond GDP 2007 (OECD, Club of Rome, Wwf, EC-EP)
- Rio+20 2012
- UN Agenda 2030 and 17 SDGs (2015) Paris Agreement (2015)
- UN Pact for the Future (2025) (inter alia «High Level Experts Group on Beyond GDP» appointed by the UN Secretary General)

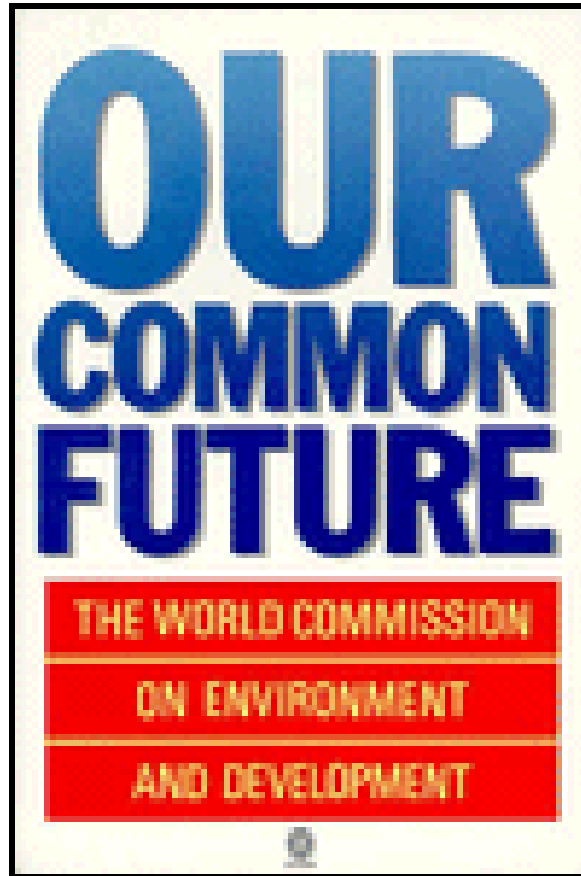
SUSTAINABLE DEVELOPMENT: THE INTERNATIONAL PROCESS



Definitions of Sustainable Development

- Ideas and proposals from EoP Students:
 - Long-term benefits
 - Future generations
 - ...

A long way: The Brundtland Report



- The most known definition of sustainable development is certainly that coming out of the Brundtland* Report (1987) defining as sustainable:

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

* https://en.wikipedia.org/wiki/Gro_Harlem_Brundtland

Definitions of Sustainable Development

- Ideas and proposals, converging and diverging concepts and language:
 - Growth
 - Development
 - Sustainable Development - UN
 - Développement Durable - France/Québec/FR
 - Green Growth - OECD
 - Green Economy - UNEP
 - Sustainable Economy - UK against (eq. to assisted economy)
 - Sustainable Prosperity - Canada
 - Prosperity without growth - Tim Jackson (UK SD Commission)
 - Planetary Boundaries - Rockstroem et al.
 - Limits to Growth - Club of Rome

 - Degrowth - Smart degrowth - Happy degrowth - Serge Latouche

 - Sustained Growth - LDCs - WB

A long way: MDGs

Millennium Development Goals



From MDGs...

8 Millenium Development Goals

- 2000 for 2015
- Only LDCs
- Incentive to catch up
- (or control on LDCs?)
- Mainly Social
- (some Environment)

... to SDGs

17 Sustainable Development Goals

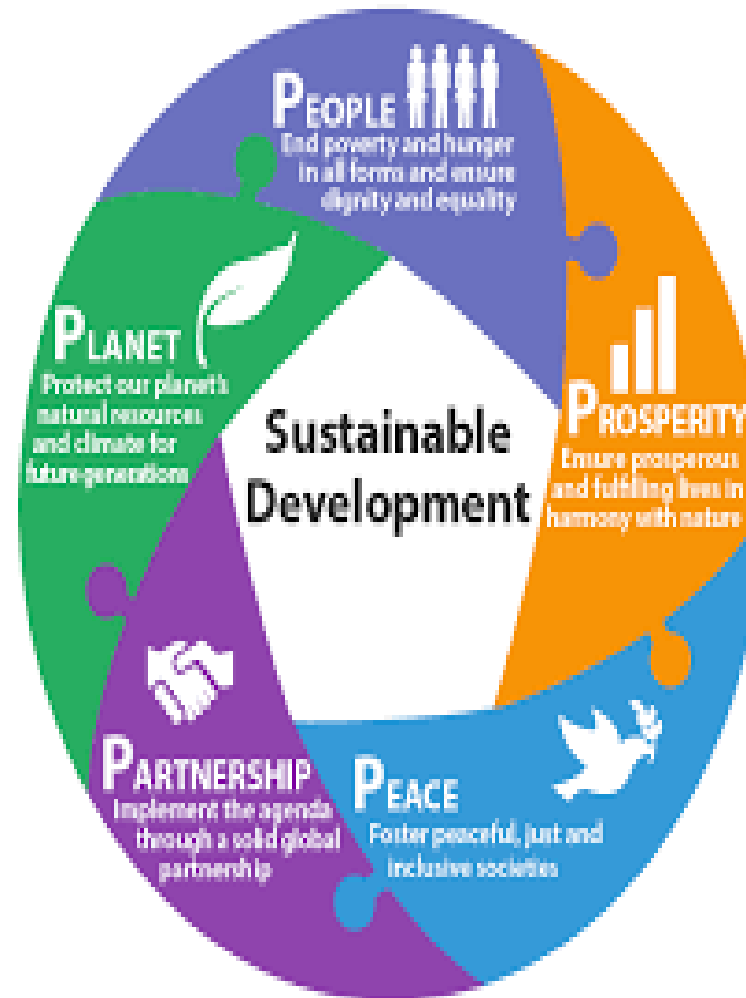
- 2015 for 2030 (some to 2020)
- All Countries
- Common effort
- Balanced
- Economic-Social-Environment

NB 17 SDGs mainly include the 8 MDGs

All the attempts to integrate GDP with other quality of life, welfare and progress measurements have contributed to establish the SDGs



The 5 areas – the 5 Ps



2030 Agenda for Sustainable Development

- 17 Sustainable Development Goals (SDGs)
- 169 Targets
- 231 Indicators



Beware of definitions and language ...

The 3 UN Pillars of Sustainable Development

- 1) Economic
- 2) Social
- 3) Environment

The 3+1 UN Pillars of Sustainable Development

- 4) Governance

The 4 Pillars of Sustainability by a brilliant Italian Minister of Economy

- a) Economic
- b) Financial
- c) Budget
- d) Accounting

Some say “SD is environment but also, economy and social”

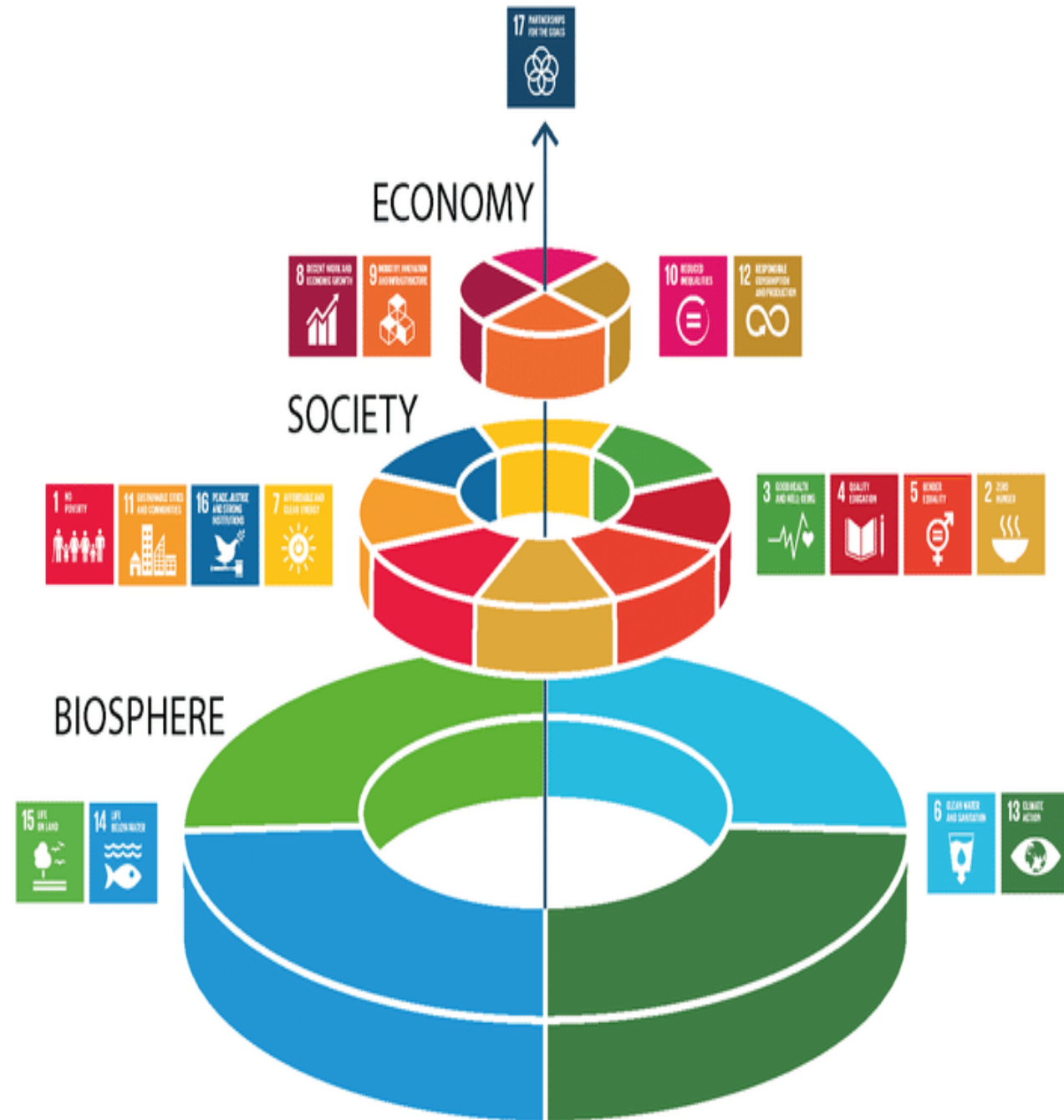
But let’s not forget “SD is economic and social, but also environment”

Priority and alignment between:

SD strategy and Budget/Financial/Stability law

THE GLOBAL GOALS

For Sustainable Development

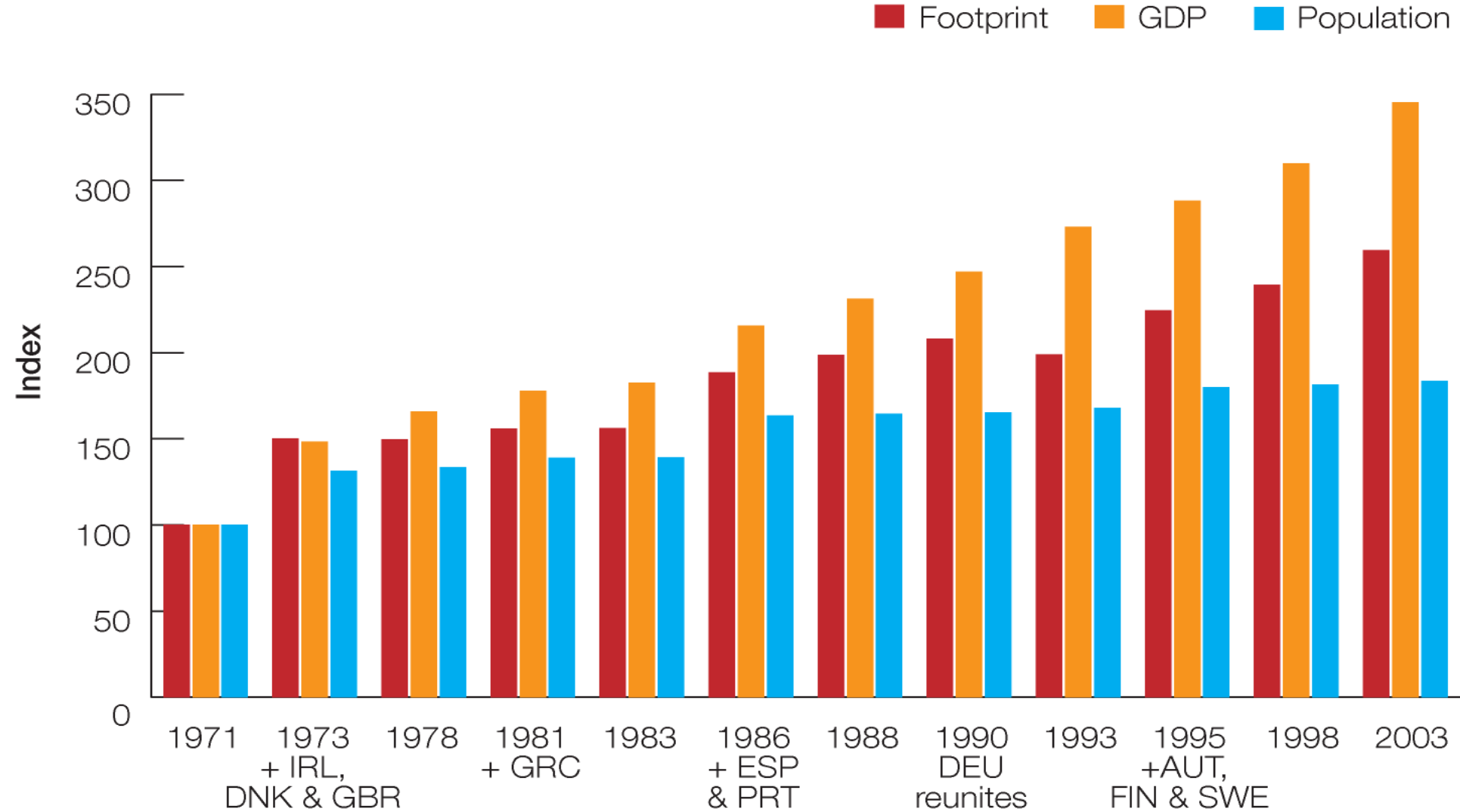


Contents of Day 2 and Day 3:

1. Decoupling (environmental impact from GDP ...) - Population - Tipping Points
2. Considerations on private and public reporting (time for non-financial reporting)
3. Economic and Environmental Assessment Instruments
4. Externalities (external costs)
5. Policy Instruments available for Environmental Policy (Oecd1)
6. Economic Instruments available for Environmental Policy (Oecd2)
7. Green Tax Reforms
8. Roles of Fiscal System
9. International Initiatives for Carbon Pricing
10. Stopping Climate Change - Policies for Net-Zero
11. Conclusion: do we need *Green* Public Procurement

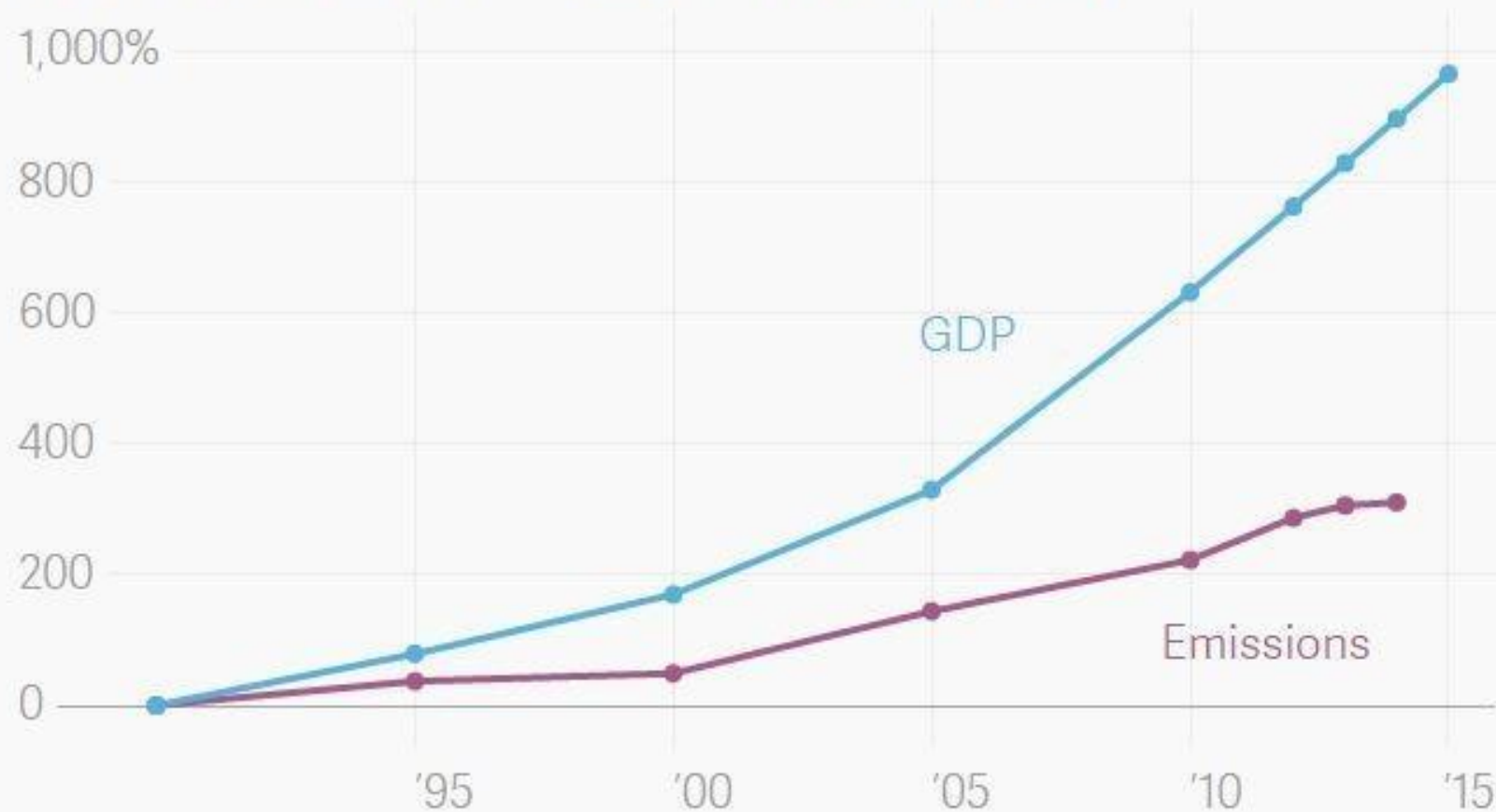
EF and Growth in EU

Fig 2: EU's total Ecological Footprint, GDP, and population growth, 1971-2003
(Index, 1971=100)



Relative decoupling

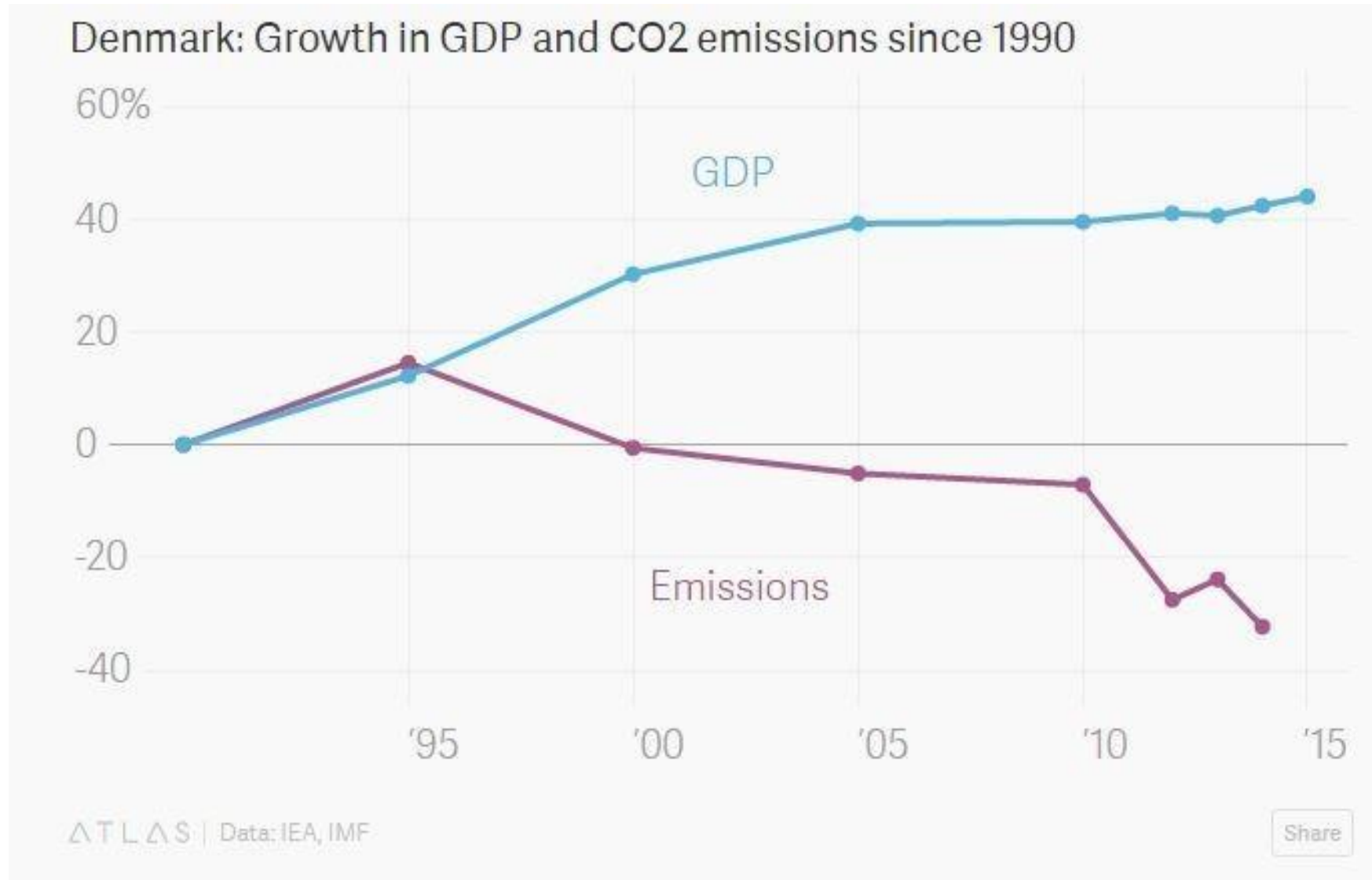
China: Growth in GDP and CO2 emissions since 1990



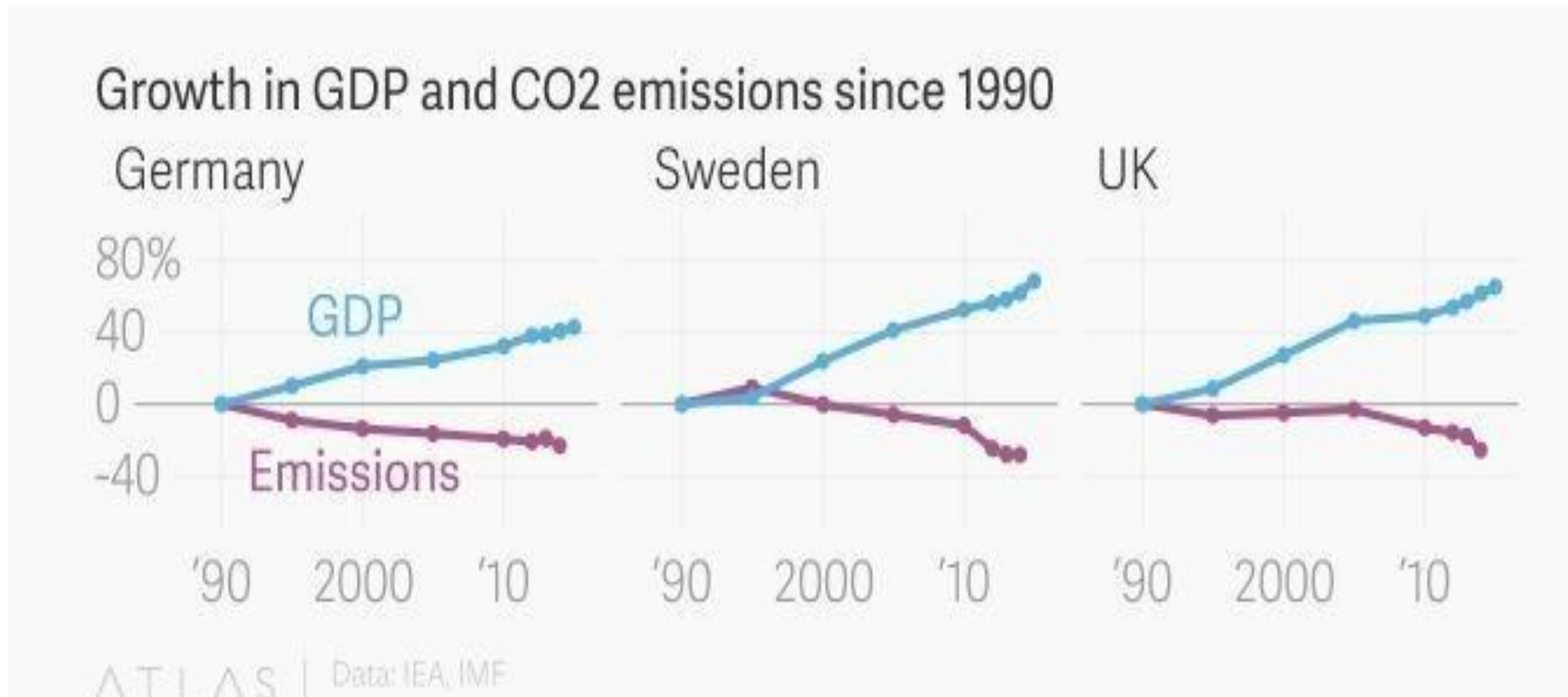
Δ T L Δ S | Data: IEA, IMF

Share

Absolute decoupling



Absolute decoupling (2)



Traditionally when GDP increases,
other variables (e.g. resource use, energy, emissions, waste, ...) increase approximately as much:
they are “coupled”, their trends are associated

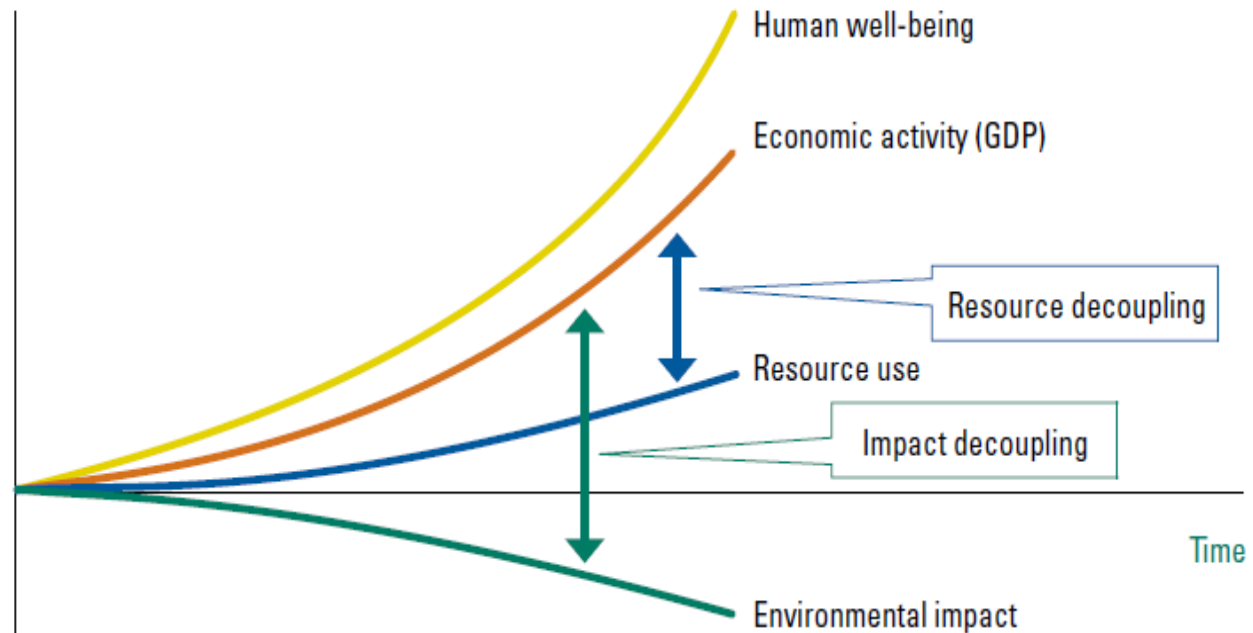
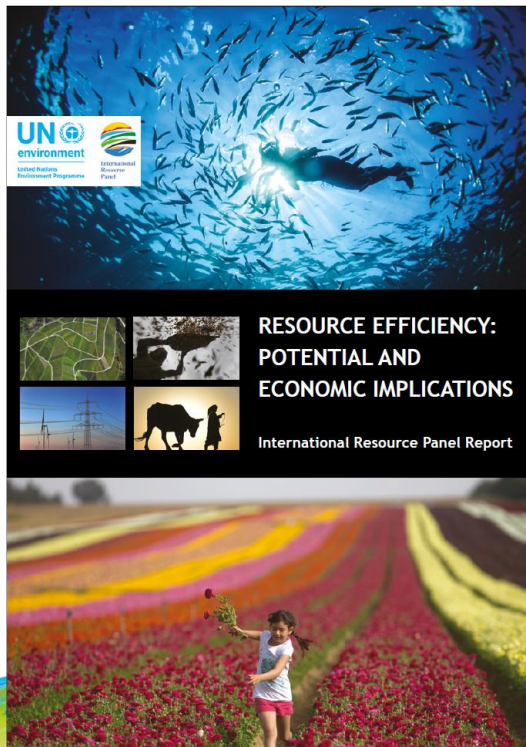


Summing up: DECOUPLING

Traditionally when GDP increases, other variables (resource use, energy, emissions, waste, ...) increase approximately as much: they are coupled;

Relative Decoupling: when resource use, energy, emissions, waste, ..., increase less than GDP;

Absolute Decoupling: when resource use, energy, emissions, waste, ..., decrease with an increasing GDP



Source: IRP (International Resource Panel) 2017
Paul Ekins, UCL, report leader

The possibility of double decoupling



International
Resource
Panel

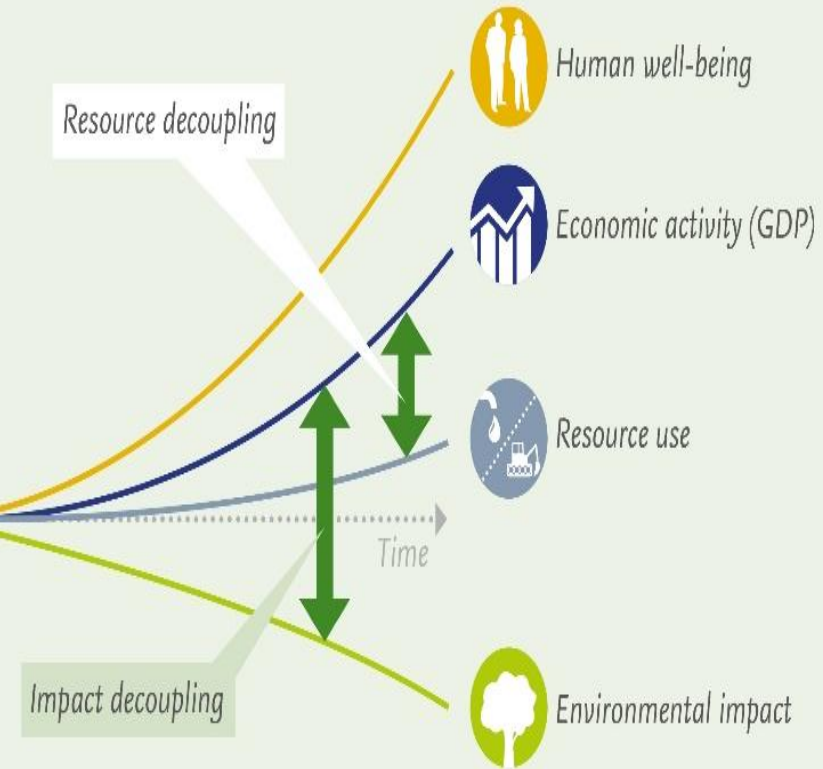
How can we protect the environment, reduce poverty and maintain economic growth?

By **Decoupling**: breaking the link between resource use and economic growth

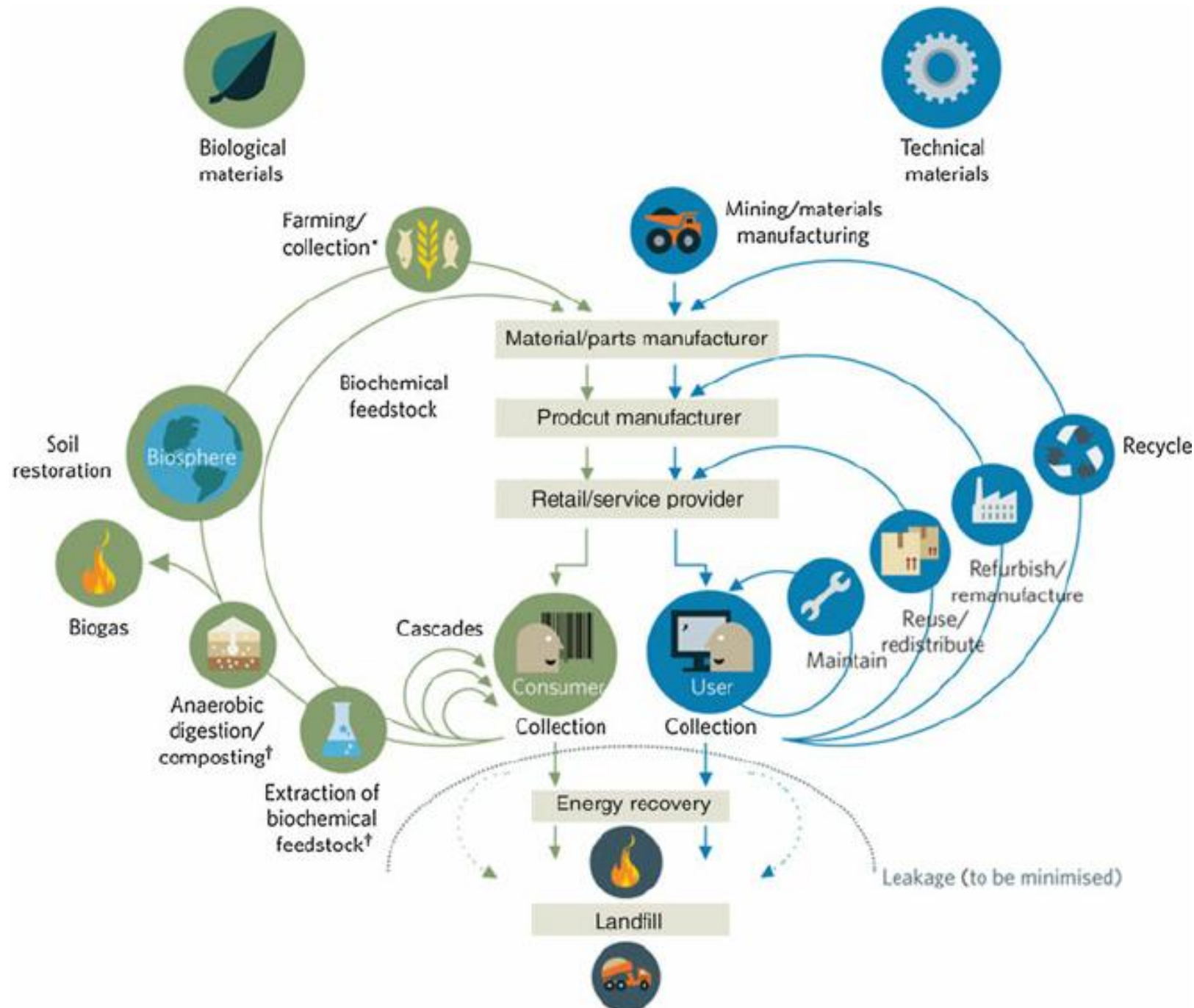


Using less land, water, energy and materials to maintain economic growth is: **Resource decoupling**

Using resources wisely over their lifetime to reduce environmental impact is: **Impact decoupling**



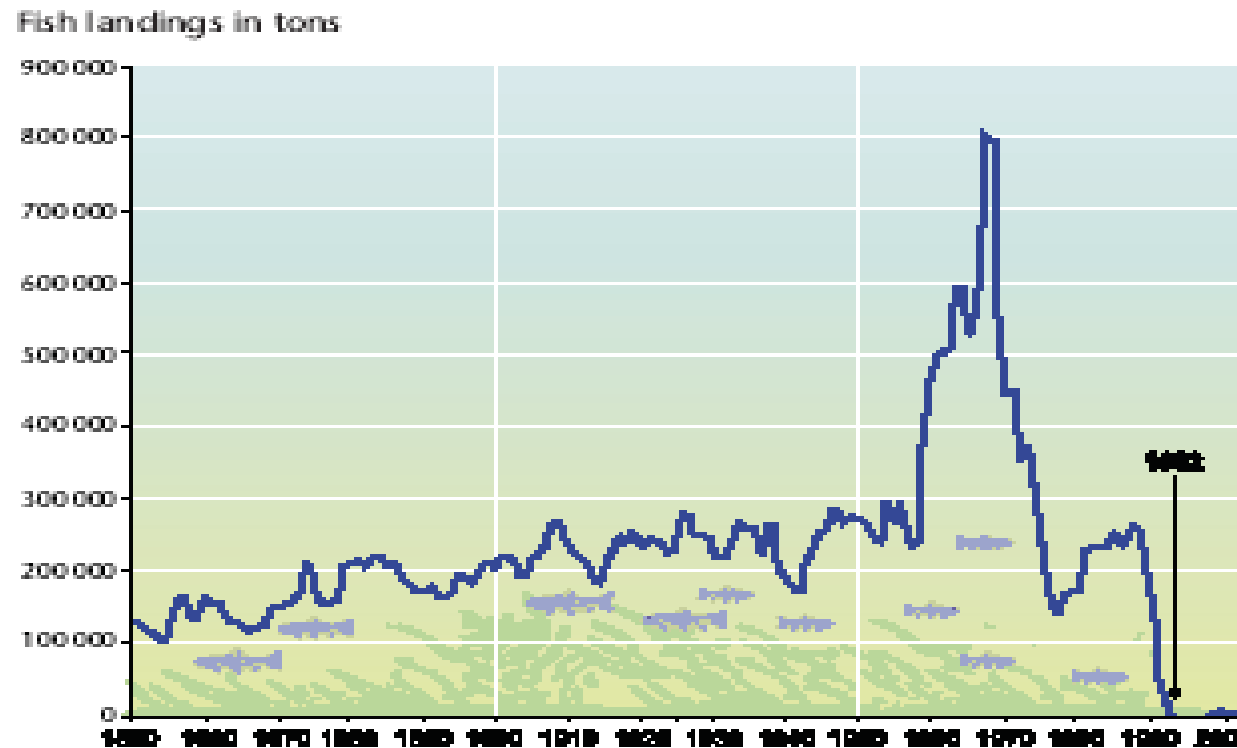
Towards Circular Economy



- Source: Ellen Mc Arthur Foundation (2012), «Towards the circular economy - Vol.1: an economic and business rationale for an accelerated transition», p.25
- www.ellenmcarthurfoundation.org/towards-the-circular-economy-vol-1-an-economic-and-business-rationale-for-an

Pay attention to Tipping Points (irreversibility)

The Cod Fishery's collapse

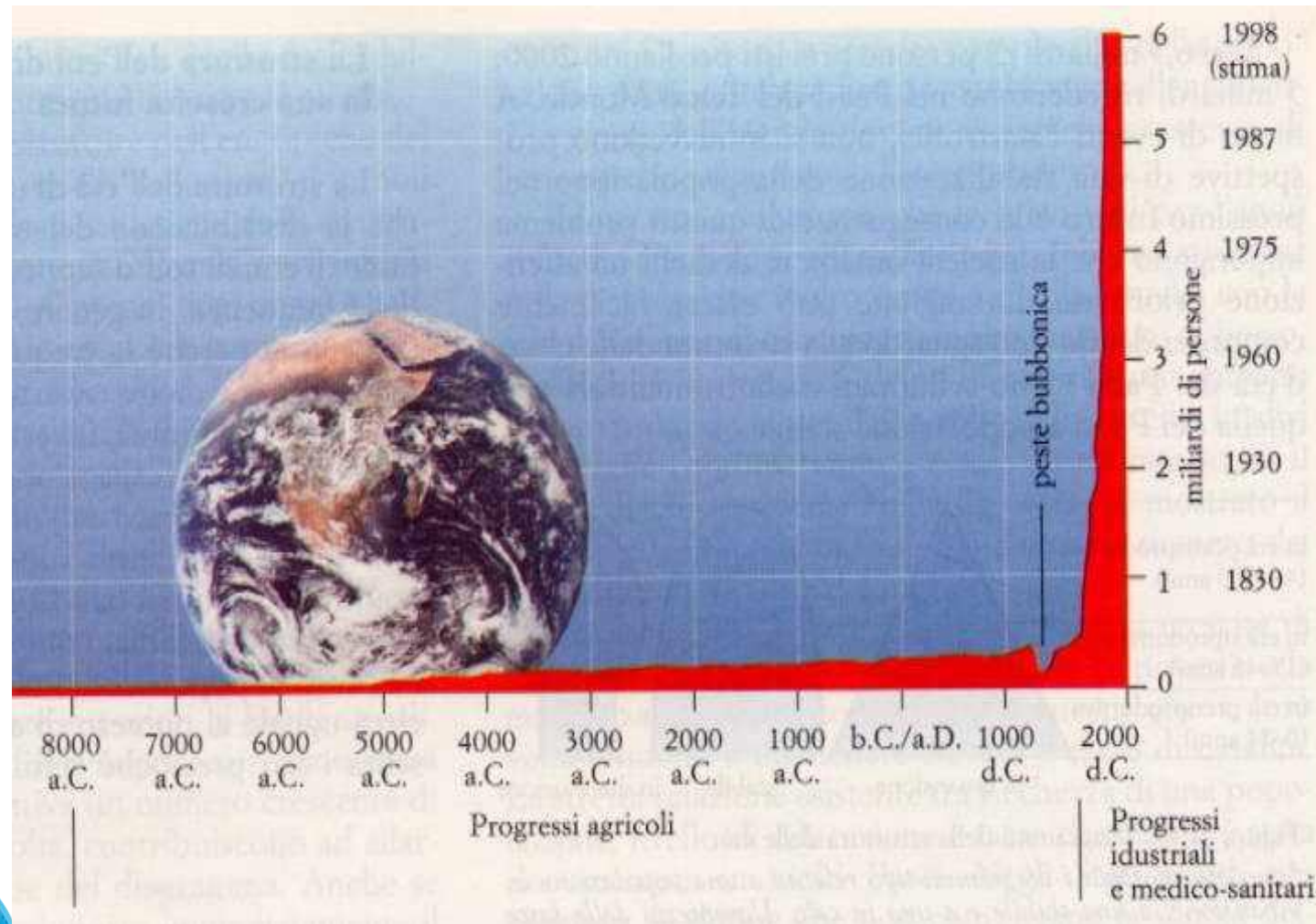


Source: Millennium Ecosystem Assessment, 2005.

The collapse of Canada's Newfoundland cod fishery in the 1990s forced its indefinite closure after hundreds of years of exploitation. Offshore bottom trawling, beginning in the late 1950s, increased the catch temporarily but caused declines in the ocean's underlying biomass. After more than a decade the stock has still not recovered.



Pay attention to population growth : 8000 AC – 2000 DC



- Stima: Estimate
- Miliardi di persone: Billion people;
- Peste bubbonica: Bubonic plague
- Progressi agricoli: Agricultural progress
- Progressi industriali e medico-sanitari: Industrial and medical-health progress



**Some considerations on public and
private reporting (accounting)**

Issues from a policy-maker (-preparer) perspective

1.EVERY DAY

- Companies/businesses/firms are practicing resource efficiency and circular economy every day across their value chains: it saves materials and energy, it reduces costs, it maximises profits.
- Profits as primary and legitimate priority of businesses.
- Why the cumulative impact of individual behaviours does not correspond to a social optimum? Public intervention may be justified.

Issues from a policy-maker (-preparer) perspective

2. EFFORT

- Many enterprises « making the effort » of SD, Circular Economy and Resource Efficiency Reporting (Non-Financial Reporting, Environmental, Climate, Sustainability, CSR, ESG, etc.) would appreciate that everybody « makes the effort ».
- WBCSD CEO at OECD making the point.
- Risk of companies coming back on their commitment (disclosure and industrial secret).
- There is an issue of fairness - competition - transparency.
- There is an issue of comparability thru time, thru firms, thru sectors, thru countries, ...

Issues from a policy-maker (-preparer) perspective

➤ 3. BEST PRACTICES (linked to effort issue)

➤ Strength, exemplarity, usefulness.

➤ We need to recognize and valorize the 5-10% of best practices showing the way.

➤ But what about the remaining 95-90% ...

➤ EU-Ecolabel had the pragmatic principle to give the label-medal to the best market 20%.

➤ The then French State Secretary Poirson indicated 25% for G7 Coalitions.

➤ We need to bring with us all the economy.

Issues from a policy-maker (-preparer) perspective

4a. EVOLUTION OF REPORTING

- Traditional reporting of businesses today is not the same as 30, 50, 100 years ago.
- Profit&Losses, Capital Statement, Financial Statement have evolved thru time. Because of:
 - - business needs and research findings;
 - - transparency and comparability needs (from public and investors);
 - - data availability improvements (IT).

Issues from a policy-maker (-preparer) perspective

4b. EVOLUTION OF REPORTING

➤ After 30 years of reflection at OECD and elsewhere, the time seems ripe to develop a fourth sheet for SD/CE/RE, Climate and Natural Capital.

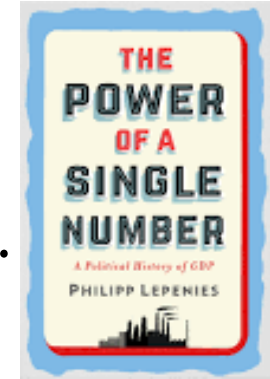
➤ Nobody will oppose minimum contents of *traditional financial reporting*. They are adapted to size, conditions, knowledge, ..., but we have minimum contents.

➤ Why should we oppose minimum contents for *non-financial reporting*, starting with circular economy and resource efficiency, climate, biodiversity and natural capital.

Issues from a policy-maker (-preparer) perspective

5. EVOLUTION OF REPORTING – PUBLIC

- Countries/States/Governments as well do not calculate their budgets and accounts as 30-50-100 years ago.
- GDP didn't even exist 100 years ago.
- The 1929 crisis, Kuznets and the American Congress.
- The 1944 decision on the standard for GDP.
- State accounting and Environmental accounting at UN Statistics.
- Evolution thru time, again because of:
 - - Governments needs and research findings;
 - - transparency and comparability needs (from taxpayers and voters);
 - - data availability improvements (IT).
 - - improvements, fine-tuning, adapting to new needs.



SUSTAINABLE FINANCE (SF) in EU (1)

- European Strategy on Sustainable Finance 2018 Jan.
(prepared by experts from the financial community)
- European Commission Action Plan on SF 2018 Mar.
- Four priorities:
 - 1. **EU taxonomy** for sustainable investments (technical screening criteria for environmentally sustainable economic activities);
 - 2. **EU Green Bond Standard**; (firms; banks; Govmts)
 - 3. **Climate benchmarks** (minimum standards for the methodology of "EU Climate Transition" and "EU Paris-aligned" benchmarks, and improving the transparency of benchmarks on ESG factors and Paris alignment)
 - 4. Reforming NFR – reforming **Non-Financial Reporting** (metrics allowing improving disclosure on climate-related information).
- 2014 NFRD (Non-Financial Reporting Directive)
- 2022 CSRD (Corporate Sustainability Reporting Directive)
- 2025 26 February 2025, the European Commission adopted a **simplification package ("omnibus")**. It covers a number of legislative areas, including sustainable finance rules, carbon border adjustment mechanism and investment with the aim of simplifying EU rules, enhancing competitiveness and attracting investment.

EU Taxonomy of Sustainable Investments & Activities - 6 environmental objectives

AT A GLANCE

The EU Taxonomy is a tool to help investors, companies, issuers and project promoters navigate the transition to a low-carbon, resilient and resource-efficient economy.

The Taxonomy sets performance thresholds (referred to as 'technical screening criteria') for economic activities which:

- make a substantive contribution to one of six environmental objectives (Figure 1);
- do no significant harm (DNSH) to the other five, where relevant;
- meet minimum safeguards (e.g., OECD Guidelines on Multinational Enterprises and the UN Guiding Principles on Business and Human Rights).

The performance thresholds will help companies, project promoters and issuers access green financing to improve their environmental performance, as well as helping to identify which activities are already environmentally friendly. In doing so, it will help to grow low-carbon sectors and decarbonise high-carbon ones.

The EU Taxonomy is one of the most significant developments in sustainable finance and will have wide ranging implications for investors and issuers working in the EU, and beyond.



Climate change mitigation



Climate change adaptation



sustainable and protection of
water and marine resources;



transition to a circular economy



pollution prevention and control;



protection and restoration of
biodiversity and ecosystems.

EU Taxonomy for Sustainable Investments

- How do we choose the criteria for defining an investment as “green” or “sustainable”?
- 17 SDGs
- 3+1 pillars of Sustainable Development:
- Economic-Social-Environmental + Governance
- Green Sectors: - water - waste – air – renewables – energy efficiency - green agriculture (e.g. organic) – sustainable transport – green buildings
- Issue of “green” and “greener”
- Natural Gas vs Coal and Oil – Nuclear Energy – Chemicals – Transport – ...
- Where do we start from:
- NACE sectors (17 Categories) - ATECO (21 Sections)
- (Statistical classification of economic sectors and subsectors)

Economic & Environmental Assessment Instruments

Upstream and Downstream

Level:	Sector: --->	Economic Private	Economic Public	Environmental Private/Public
Laws & Bills, Directives&Regulations				
Programmes & Plans, Strategies		Costs & Revenues		
Company / Public Agency		Budget, Annual Report (P&L, CS, FS)		
Project		Costs & Revenues		
Plant		Industrial Accounting		
Product		Industrial Accounting		

Economic & Environmental Assessment Instruments

Upstream and Downstream

Level:	Sector: --->	Economic Private	Economic Public	Environmental Private/Public
Laws & Bills, Directives&Regulations		IA (RIA-SDIA)		
Programmes & Plans, Strategies		Costs & Revenues	CBA	SEA
Company / Public Agency		Budget, Annual Report (P&L, CS, FS)	Budget, Annual Report	NFR (Env., Climate, Sustainability, CSR, ESG, etc.) – CSRD
Project		Costs & Revenues	CBA	EIA
Plant		Industrial Accounting	n.r.	EMAS
Product		Industrial Accounting	n.r.	ECOLABEL

IA: Impact Assessment (European Commission, Denmark, UK)

SDIA: Sustainable Development Impact Assessment

RIA: Regulatory Impact Assessment

NFR: Non-Financial Reporting – CSRD: Corporate
Sustainability Reporting Directive

CBA: Cost-Benefit Analysis

SEA: Strategic Environmental Assessment

EIA: Environmental Impact Assessment

EMAS: Environmental Management Scheme

Ecolabel: Ecological Label

P&L: Profits & Losses

CS: Capital Statement

FS: Financial Statement

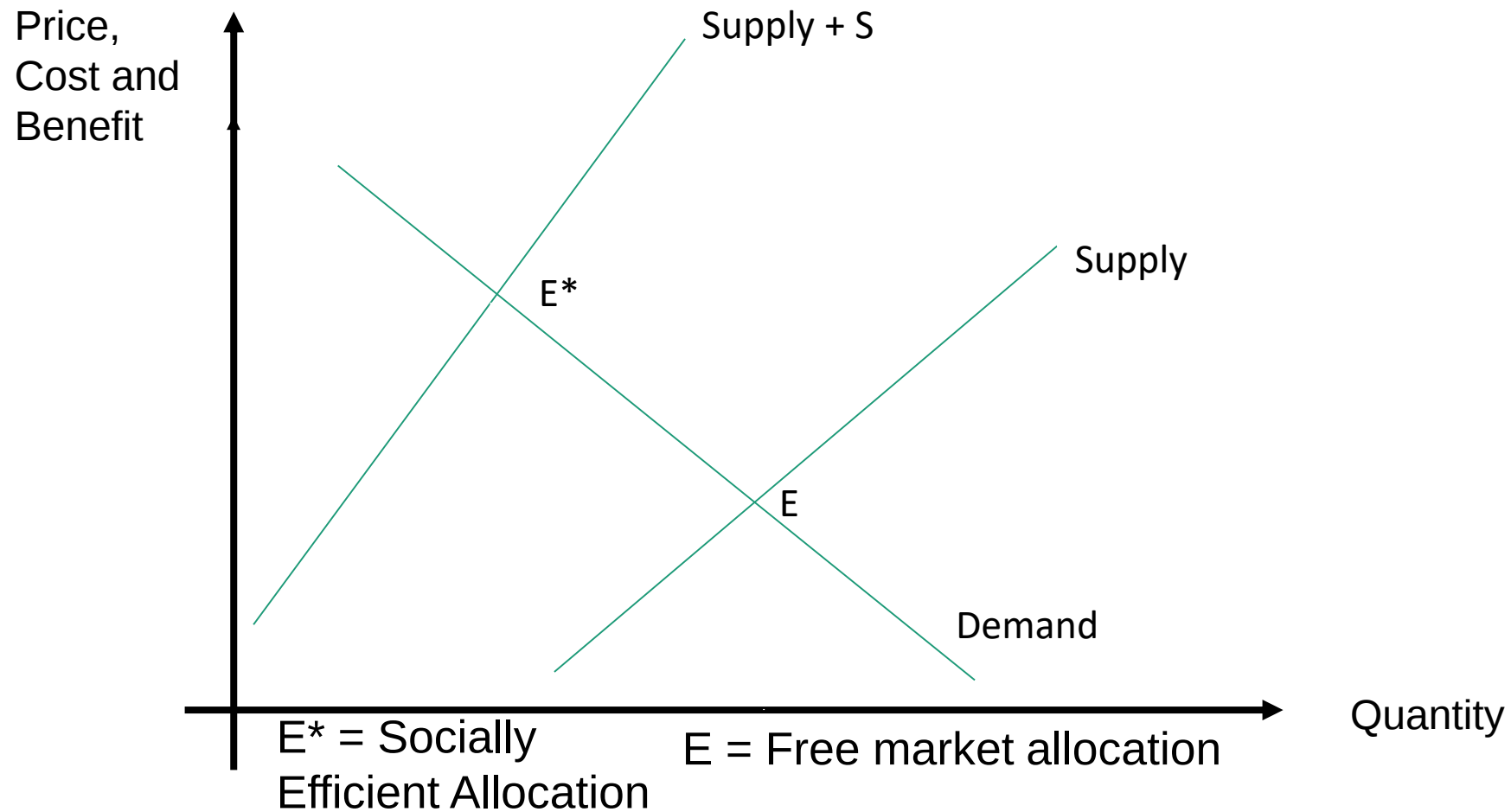
The concept of negative externality

- Definition:

Negative effects that the behaviour or activity of a private agent (consumer or producer) exerts on the rest of the economic system and the ecosystem.

- In other words, a third party suffers a cost derived by the activity of an agent without being involved at any stage of its process. This creates a social cost that is larger than the marginal cost that the private agent bears in carrying over the private activity.
- Classical example: a firm that pollutes air or water, and lowers the air and water quality of its neighbourhood or of the river downstream.

Graph on negative externality



OECD explored principles in the '70s and '80s
introduced in EU Treaties in the '90s

- A) PPP(2) Polluter-Pays-Principle
- B) Precautionary Principle
- C) Prevention Principle
- D) Integration of environmental policies in economic (financial-fiscal) policies, in social policies, and in sector policies (industry-energy-agriculture-...)
- E) Sustainable Development Principle
- F) ...

Careful with acronyms ...

- PPP2 Polluter-Pays-Principle
- PPP3 Public-Private Partnerships
- PPP1 Purchasing Power Parities (OECD methodology for comparing GDPs across countries with different p systems)

What Policy Instruments can we use for Environmental Policy

Ideas from EoP Students:

- ... Instruments: laws (in EU: regulations and directives)
- ... Instruments: taxes, economics instruments
- ... Instruments: voluntary instruments

OECD classification 1
Policy Instruments for EP-GE-GG-SD-CP-DC
(Environmental Policy - Green Economy - Green Growth - Sustainable Development - Climate Policy - Decarbonisation)

- **A. Regulatory Instruments:** Command&Control, regulations, limits, standards (e.g. banned mercury)
 - **B. Voluntary Instruments:** covenants, deals, contracts... Gov-Firms/Sectors, Gov/Regions-Cities, soft measures: education, information, participation
 - **C. Economic Instruments – MBI Market-Based Instruments**
-
- Traditional approach based on regulatory instruments
 - Relative efficiency of instruments
 - Economic instruments need in most cases regulations and laws
 - Regulatory instruments have in most cases an economic cost
-
- Reality: Instruments Mixes

SELF-TEST 1 – What kind of instruments are the following

- 1. Asbestos and mercury bans
- 2. The Euro 0-1-2-3-4-5-6 EU vehicle categories
- 3. Excise taxes on fossil fuels (gasoline, diesel, etc.)
- 4. Dutch Coal Covenant 2020 between Government & Firms
- 5. Dutch Agreement on Sustainable Garments and Textile among Firms
- 6. The Milan/Stockholm/London/Singapore Access Fee to city centre

SELF-TEST 1 – What kind of instruments are the following

- 1. Asbestos and mercury bans (A)
- 2. The Euro 0-1-2-3-4-5-6 EU vehicle categories (A)
- 3. Excise taxes on fossil fuels (gasoline, diesel, etc.) (C)
- 4. Dutch Coal Covenant 2020 between Government & Firms (B)
- 5. Dutch Agreement on Sustainable Garments and Textile among Firms (B)
- 6. The Milan/Stockholm/London/Singapore Access Fee to city centre (C)

OECD classification 1+
Policy Instruments for EP-GE-GG-SD-CP-DC
(Environmental Policy - Green Economy - Green Growth - Sustainable
Development - Climate Policy - Decarbonisation)

➤ **Regulatory Instruments:** Command&Control, regulations, limits, standards (e.g. banned mercury)

➤ **Voluntary Instruments:** covenants, deals, contracts... Gov-Firms/Sectors, Gov/Regions-Cities, soft measures: education, information, participation

➤ **Economic Instruments – MBI Market-Based Instruments**

+ **Environmental Assessment Instruments:**

- EIA of projects (Environmental Impact Assessment) [VIA] (compulsory) ↔ private project economic analysis - CBA

- SEA of plans & programmes (Strategic Impact Assessment) [VAS] (compulsory) ↔ private plan economic analysis - CBA

- IA of laws and bills (Impact Assessment) – SDIA – RIA

- EMAS firm plant – EU regulation (voluntary)

- Ecolabel product – EU regulation (voluntary) best 20% market

Environmentally-related taxes in Italy

- In Italy, we have a database on environmentally-related taxes that is nourished by our Office for National Statistics (ISTAT).
- The definition adopted reads as follows: «A tax is environmental when it is based on a physical quantity (in some cases proxied) that has a negative and specific impact on the environment».

Environmentally-related taxes in OECD

- OECD has a database with a definition of environmentally-related taxes: Environmentally related taxes increase the cost of polluting products or activities, which discourages their consumption and production – regardless of whether this was the intended purpose of the tax or not.
- This is key since an “increased or more effective use of environmentally related taxes can drive growth-oriented reform by shifting the tax burden away from more distortive taxes, e.g. on corporate or personal income, and contribute to fiscal consolidation”.

OECD Classification 2
Economic Instruments for EP-GG-GE-SD-CP-DC

- **1.Environmental Taxes** or Taxes with an environmental impact
e.g. Excise Taxes on fuels and energy (historically fiscal motivation, environmental motivation is increasing), CO2 tax
- **2.Environmental Fees/Charges/Tariffs** (for an environmental service)
e.g. water, electricity, waste, local transport, ...
- **3.Subsidies**
 - EHS-EFS Environmentally Harmful & Friendly Subsidies
 - FFS Fossil Fuel Subsidies (G20 and G7 commitments)
 - BHS Biodiversity Harmful Subsidies (CBD Aichi Target 3 and GBF Target 18)
- **4.Deposit systems:** plastic or glass containers, electronic devices, ...
- **5.Sanctions**-penalties-fines
for exceeding a limit/standard, for using a prohibited substance
- **6.Creation of markets** where they do not exist (e.g. EU/ETS - Insurance on climate risks and disasters - GPP Green Public Procurement – Green/White Certificates)

SELF-TEST 2 What kind of market-based instruments are:

- 1. The Swedish Carbon Tax and the UK Carbon Levy**
- 2. The kerosene excise tax exemption for international aviation and international shipping**
- 3. The Diesel Tax discount on trucks**
- 4. The EU ETS (Emissions Trading Scheme)**
- 5. The free allocation part of ETS**
- 6. The Irish and Italian Plastic Bag Tax**
- 7. The Italian SO₂-NO_x Tax on major energy plants**
- 8. The Eco-Contribution for the recycling of Weee**
- 9. The Italian (36-)50-60-70-85(-110)% bonus on buildings energy requalification**
- 10. The eco-incentives for buying Euro6 cars and EVs**
- 11. The Waste Tariff**
- 12. The Waste Tax**
- 13. The UK and Italian Landfill Tax**
- 14. An administrative sanction for exceeding 65 decibel of noise**
- 15. The Access Fee to Venice**
- 16. The Sojourn Tax in hotels and tourism structures**
- 17. The EU CBAM (Carbon Border Adjustment Mechanism)**

SELF-TEST 2 - What kind of market-based instruments are:

- 1. The Swedish Carbon Tax and the UK Carbon Levy (1.EnvTax/MBI)**
- 2. The kerosene excise tax exemption for international aviation and international shipping (3a. Subsidy EHS) [IMO and ICAO]**
- 3. The Diesel Tax discount on trucks (3a.Subsidy EHS)**
- 4. The EU ETS (Emissions Trading System) (6.MktCr)**
- 5. The free allocation part of EU-ETS (3a.Subsidy EHS)**
- 6. The Irish and Italian Plastic Bag Tax (1.EnvTax/MBI or 6.MktC)**
- 7. The Italian SO₂-NO_x Tax on major energy plants (1.EnvTax/MBI)**
- 8. The Eco-Contribution for the recycling of Weee (4.DepositS)**
- 9. The Italian (36-)50-60-70-85(-110)% bonus on buildings energy requalification (3b.Subsidy EFS)**
- 10. The eco-incentives for buying Euro6 cars and EVs (3b.Subsidy EFS)**
- 11. The Waste Tariff (2.Env.Fee)**
- 12. The Waste Tax (1.Ec/MBI)**
- 13. The UK and Italian Landfill Tax (1.Ec/MBI)**
- 14. An administrative sanction for exceeding 65 decibel of noise (5.Sanctions)**
- 15. The Access Fee to Venice (2.Env.Fee)**
- 16. The Sojourn Tax in hotels and tourism structures (1.Ec/MBI or (2.Env.Fee)**
- 17. The EU CBAM (Carbon Border Adjustment Mechanism) (Ec/MBI or MktC)**

Summing up

Policy Instruments for EP-GE-GG-SD-CP-DC (Environmental Policy - Green Economy - Green Growth - Sustainable Development - Climate Policy - Decarbonisation)

- **A.Regulatory Instruments**
- **B.Voluntary Instruments**
- **C.Economic Instruments**
- + **D.Environmental Assessment Instruments**
(IA/SDIA/RIA-SEA-EIA-Emas- Ecolabel)

Economic Instruments for EP-GE-GG-SD-CP-DC

- **C1.Environmental Taxes or Taxes with an environmental impact**
- **C2.Environmental Fees/Charges/Tariffs**
- **C3.Subsidies harmful & friendly – EHS (including FFS-BHS) and EFS (Incentives, ...)**
- **C4.Deposit systems**
- **C5.Sanctions-penalties-fines**
- **C6.Creation of markets where they do not exist**
(e.g. EU/ETS-Insurance-GPP-Green/WhiteCertificates)

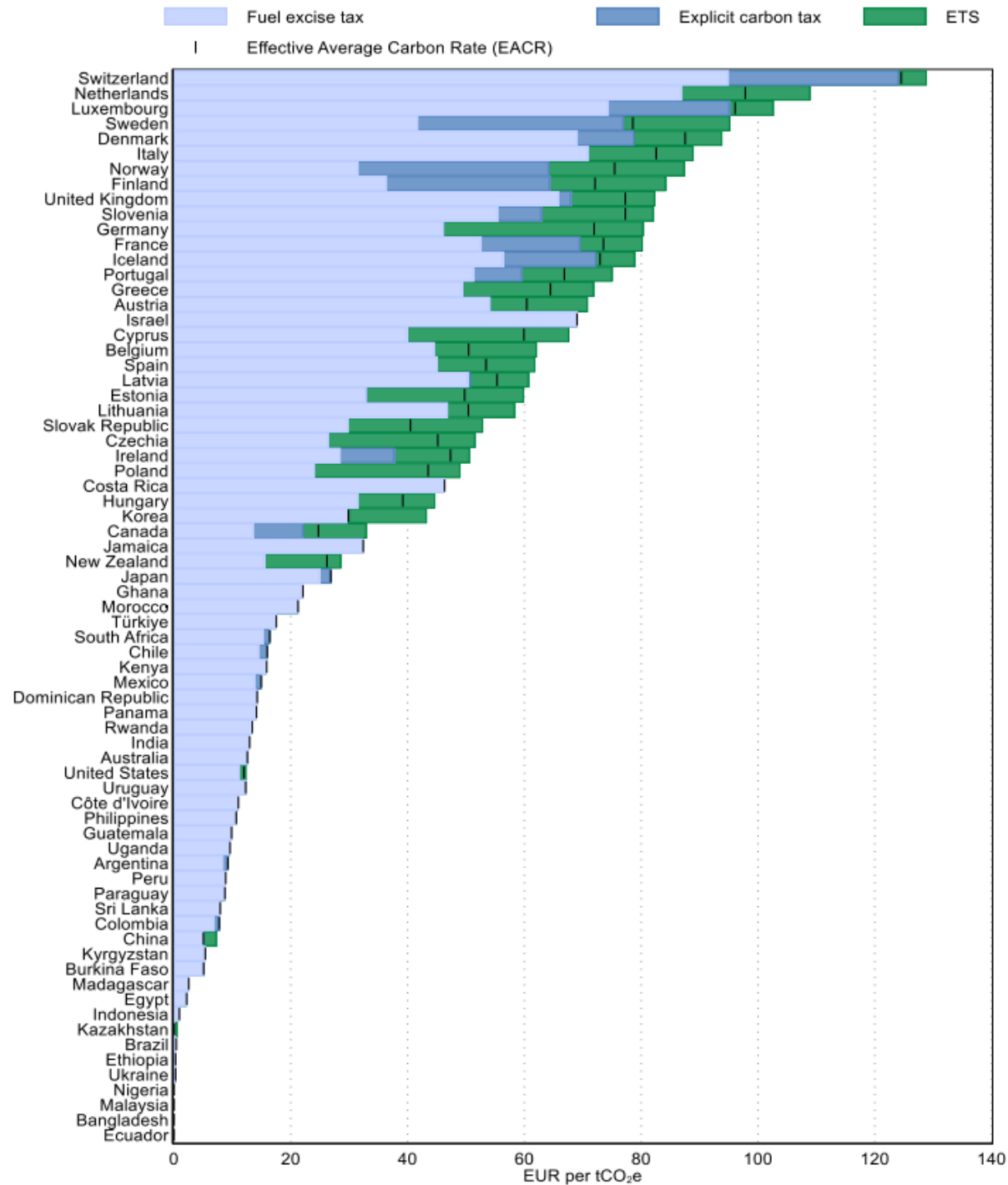
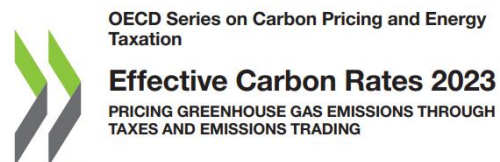
Challenging issues in Carbon Taxation in interaction with other instruments

- Better CO₂ tax or ETS markets? Pigou or Coase
- Optimality in One Policy - One Instrument? Tinbergen - Mundell
- Reality rarely optimal: policy mixes dominate:
- But also theoretically: 2 instruments for 1 same goal and there is no duplication: analogy with the home property market: most Countries tax flats/houses/properties with an income proxy estimate; but flats/houses/properties have a price on the home sales market which can be taxed as well. Same can happen with Carbon taxes and ETS-alike markets: we can use both. Carbon Taxes discourage emissions and encourage PPP. ETS encourages green innovation. And old Excise Taxes can still help!

Effective Av. Carbon Rates levels and coverage by country.

(71 countries,
2021)

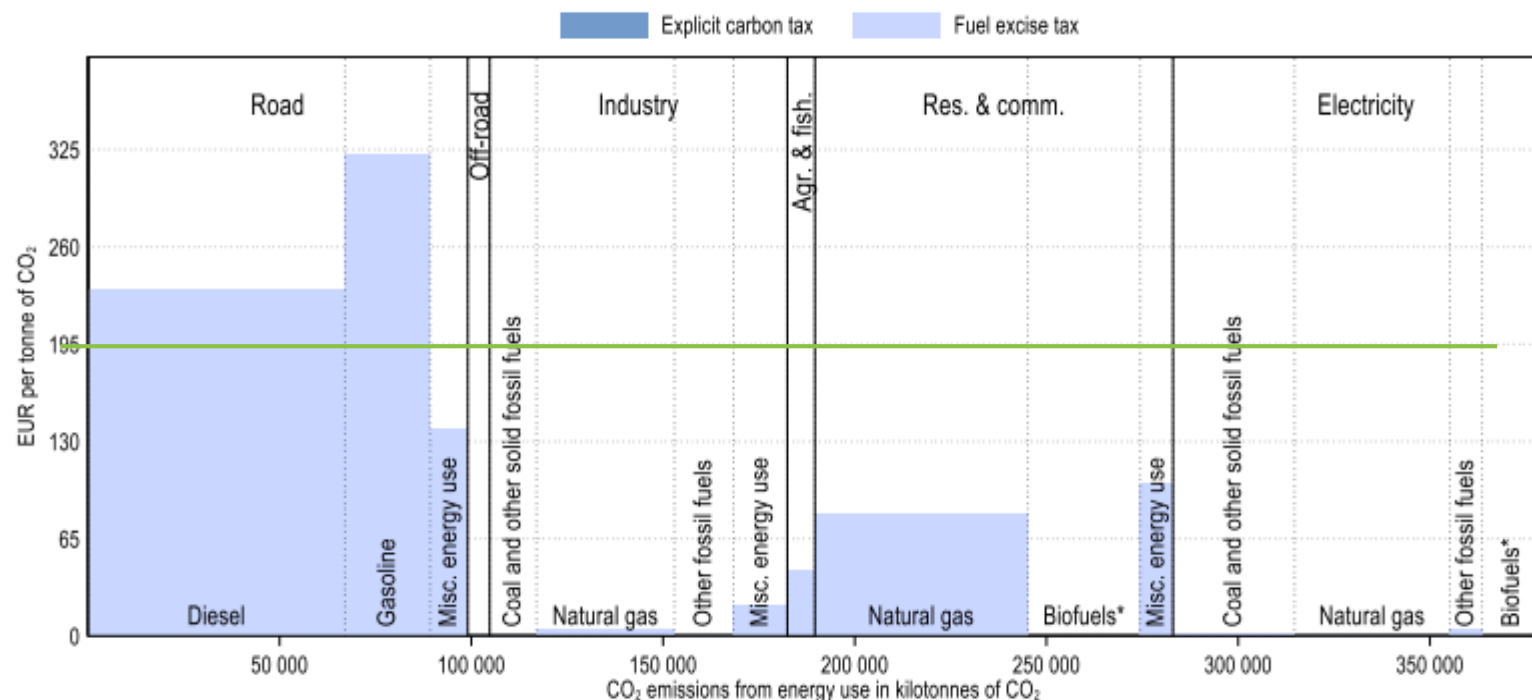
Source: OECD,
2023, p.23





Annex Figure 3.A.23. Effective carbon tax rates in Italy

Average by sector and energy category – rate in EUR per tonne of CO₂



Note: Tax rates applicable on 1 July 2018. CO₂ emissions are calculated based on energy use data for 2016 from IEA (2018), World Energy Statistics and Balances. The figure groups energy categories that represent less than 2% of the horizontal axis into "miscellaneous energy use", which is not always labelled. Biofuels are marked with an asterisk as under the IPCC Guidelines for emissions from energy use, emissions from the combustion of biofuels are not included in the national total (see Chapter 1).

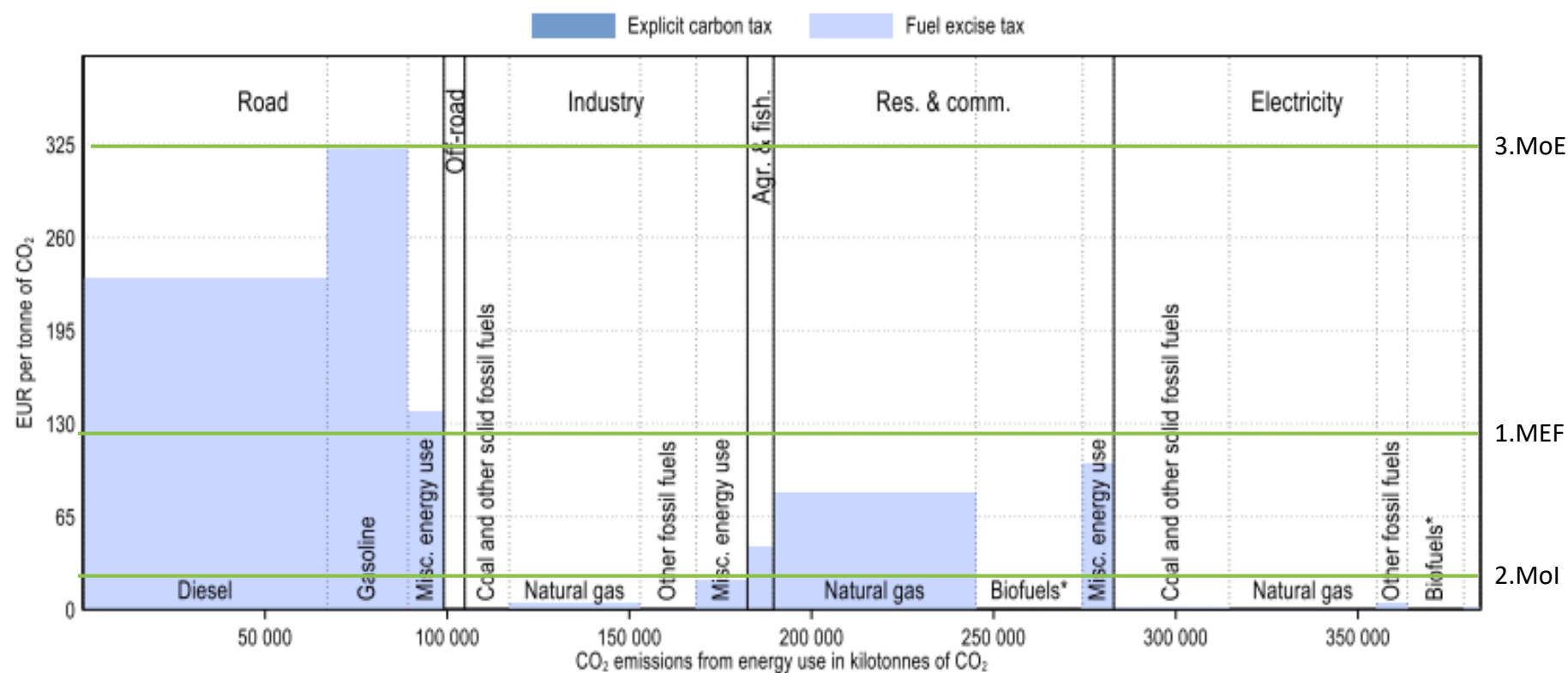
EFFECTIVE CARBON RATES - DIFFERENT POINTS OF VIEW: GUESSES...

5.IPCC

4.IMF

Annex Figure 3.A.23. Effective carbon tax rates in Italy

Average by sector and energy category – rate in EUR per tonne of CO₂



3.MoE

1.MEF

2.MoI

Note: Tax rates applicable on 1 July 2018. CO₂ emissions are calculated based on energy use data for 2016 from IEA (2018). World Energy

POLICY INSTRUMENTS for EP: OBJECTIVES

Ideas from EoP Colleagues:

1. Reducing negative externalities
2. Encouraging ecological policies aimed at innovation
3. ...



POLICY INSTRUMENTS for EP: OBJECTIVES

1. Improve environmental conditions/performance
2. Internalize externalities (environmental costs)
3. Correct market failures
4. Influence the behaviour of consumers, producers, investors
(reorient decisions of investment/production/consumption)
5. Remunerate an environmental service (e.g. ecosystem service)
6. Give a value to the environment (not necessarily a price)
7. Create a market where it does not exist
8. Minimize prohibitions/bans
9. Leave the market to make the right choices
10. Promote GG, GE, SD, eco-innovation, low-CO economy
11. ...



ECONOMIC INSTRUMENTS: useful for ...

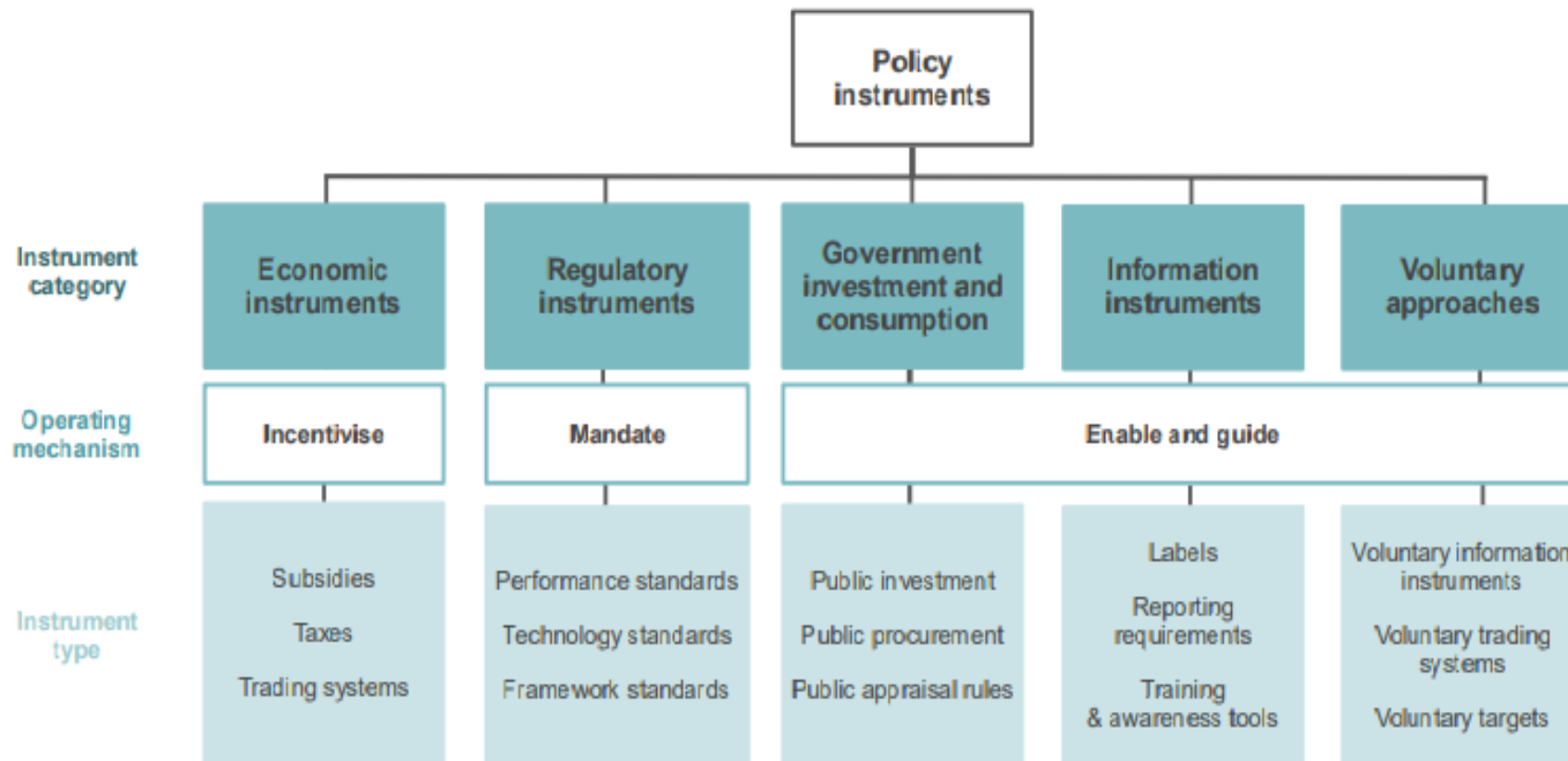
- Environmental Policies
- but also:
- Sustainable Development Policies
- Sustainability Policies
- Green Economy Policies
- Green Growth Policies
- Resource Efficiency Policies
- Circular Economy Policies
- Climate Change Policies
- Low-Carbon or Net-Zero (Carbon) Economic Policies
- Ecological Transition
- Energy Transition



Advancing classifications and policy mixes

OECD – IFCMA

Figure 2.2. Policy typology for IFCMA



Source: OECD (2024). The IFCMA's Climate Policy Database: Policy Instruments Typology and Data Structure. Inclusive Forum on Carbon Mitigation Approaches Papers. OECD Publishing, Paris. p.12

One step back: what are OECD and IFCMA

- OECD a nice place for economists to work for ...
- OECD which countries participate and what for?

One step back: what are OECD and IFCMA

- OECD 38+1 members among which:
- 23 EU Countries (all 27 -Mt-Cy-Ro-Bg) +1 (EC)
- 6 non-EU European and Mediterranean: Ice-Nor-Uk-Swi-Tk-Isr)
- 6 Americas: Canada-Usa-Mexico-CostaRica-Colombia-Chile
- 4 Pacific: Japan-(S.)Korea-Australia-NewZealand
- 7 accession: Brazil-Argentina-Peru + Indon-Thai + Rom-Bul-Cro

One step back: what are OECD and IFCMA

- IFCMA: Inclusive Forum on Carbon Mitigation Approaches an OECD Initiative open to non-OECD Countries
- Instruments, CO2 metrics, modelling, ...
- 2 Pilot studies on Chile & Switzerland
- Presently 60 Countries
- (38 OECD + 22 + Observers)
- i.a. Arg-Barb-Jam-Par-Peru-Uru; Saf
- Among observers: Brazil-China

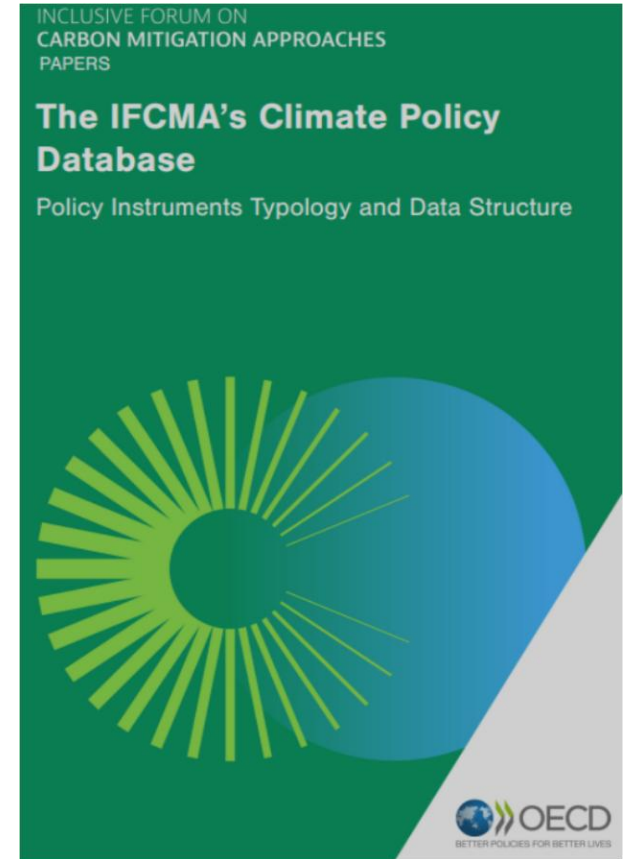


Table 1. Examples of policy instruments, classified along IFCMA typology

Instrument category	Instrument type	Instrument examples
Economic instruments	Subsidies	Renewable electricity feed-in tariff Subsidy for carbon capture, use and storage technologies Vehicle purchase subsidy Payment for eco-system services
	Taxes & tax incentives	Carbon tax Fuel excise tax Corporate income tax allowance for clean technologies
	Trading systems	GHG emission trading system Tradable renewable energy quotas
Regulatory instruments	Performance standards	GHG emissions standard Fuel economy standard Minimum energy performance standard for appliances, buildings, etc.
	Technology standards	Biofuel quota Electric vehicle sales mandate Bans/ phase out of coal-fired power generation
	Framework standards	Requirement to adopt an energy management system (e.g. ISO 50001) Electricity market regulations (e.g. priority grid access/dispatch for renewables)
Government investment and consumption	Public investment	Public investment in climate R&D, energy or public transport infrastructure
	Public procurement	Public procurement of electric vehicles
	Public appraisal rules	Project and programme evaluation rules (e.g. requirement to conduct a Strategic Environmental Assessment before adopting a law)
Information instruments	Labels	Energy performance label for appliances, vehicles, etc.
	Reporting requirements	Energy audit requirement for industrial facilities
	Capacity building & public awareness	Public information campaign/education/training
Voluntary approaches	Voluntary information instruments	Voluntary energy performance label Voluntary green investment label
	Voluntary trading systems	Voluntary GHG emissions trading system (e.g. pilot ETS)
	Voluntary targets	Voluntary GHG emission reduction target Voluntary energy efficiency target/ energy performance target

Green Tax Reform - 1 - the idea

➤ The idea:

- Restructuring the fiscal system shifting the tax burden from labour and firms towards pollution and the use of natural resources (Delors, EU White paper “Growth, Competitiveness, Employment”, 1994) (Von Weizsaecker - Jesinghaus, “Ecological Tax Reform”, 1991) (W-R, 2012)

➤ The motivations:

- Giving a price signal discouraging the consumption and production impacting negatively the environment
- Economic instruments can be effective and efficient

Green Tax Reform - 2 - the tools

➤ The tools:

- Increasing or introducing taxes on goods and services which have an environmental impact (reducing or eliminating externalities)
- Restructuring existing taxes in an environmentally friendly way (ex. car ownership tax)
- Introducing EFSs (Environmentally Friendly Subsidies), Removing EHSs (Environmentally Harmful Subsidies) OECD: Harmful, Usa: Perverse Subsidies, France: Subventions Néfastes)
- Creating markets which do not exist (ex EU-ETS)

Green Tax Reform - 3 - issues

- **Fiscal neutrality: compensating the increase on environmental taxes with the decrease of other non-environmental taxes**
- **Dynamic version of fiscal neutrality:**
 - in times of need to increase the fiscal burden ...
 - in times of abating taxation in general ...
- **Removing EHS Environmentally Harmful Subsidies: Fossil Fuel Subsidies but not only: Nuclear, Water, Waste, Transport, Land, ...**
- **Introducing EFS Environmentally Friendly Subsidies: must be done efficiently but is justifiable for a transition period**

Green Tax Reform - 4 - false problems

- **GFR / ETR / EFR: Green/Environmental/Ecological Tax/Fiscal Reforms**
- **The name: environmental or green name is not sufficient**
- **They must be used for environment (ear-marking): not necessarily; Double Dividend stands; Triple Dividend may arise**
- **Increase taxes: Level of Environmental taxation still low (Oecd: 1-5% of GDP, 2-14% of Total Revenues); wide margins;**
- **They hit the poor: Distribution problems can be solved (e.g. income tax, direct subsidies, environmental checks)**
- **They hit internationally exposed sectors: Competitiveness problems can be solved (e.g. Direct support, BTA Border Tax Adjustments), carbon leakage**
- **They distort the market: Environmental taxes do not distort the market, they restore fair market conditions (transparency, competition, economic efficiency, level playing field)**

Functions of a Fiscal System?

Ideas from EoP Students:

- Finance public expenditure
- Financing public services
- Financing infrastructure, education, military, ...
- Disincentivise specific production and consumption models

Functions of a Fiscal System

- 1. Raise revenue for financing the Public Expenditure (Budget)
 - Sovereign public services: justice, defence, security, civil rights, ...
 - Guarantee public services: health, transport, schools, ...
 - Anti-depression anti-crises measures (economic, pandemic, war, ...)
 - ...
- 2. Income and Wealth redistribution
- 3. Internalise externalities
- 4. Orient consumption, production and investment choices
- ...
- 5. Technically: minimize revenue collection costs, complications to taxpayers, evasion-erosion-elusion

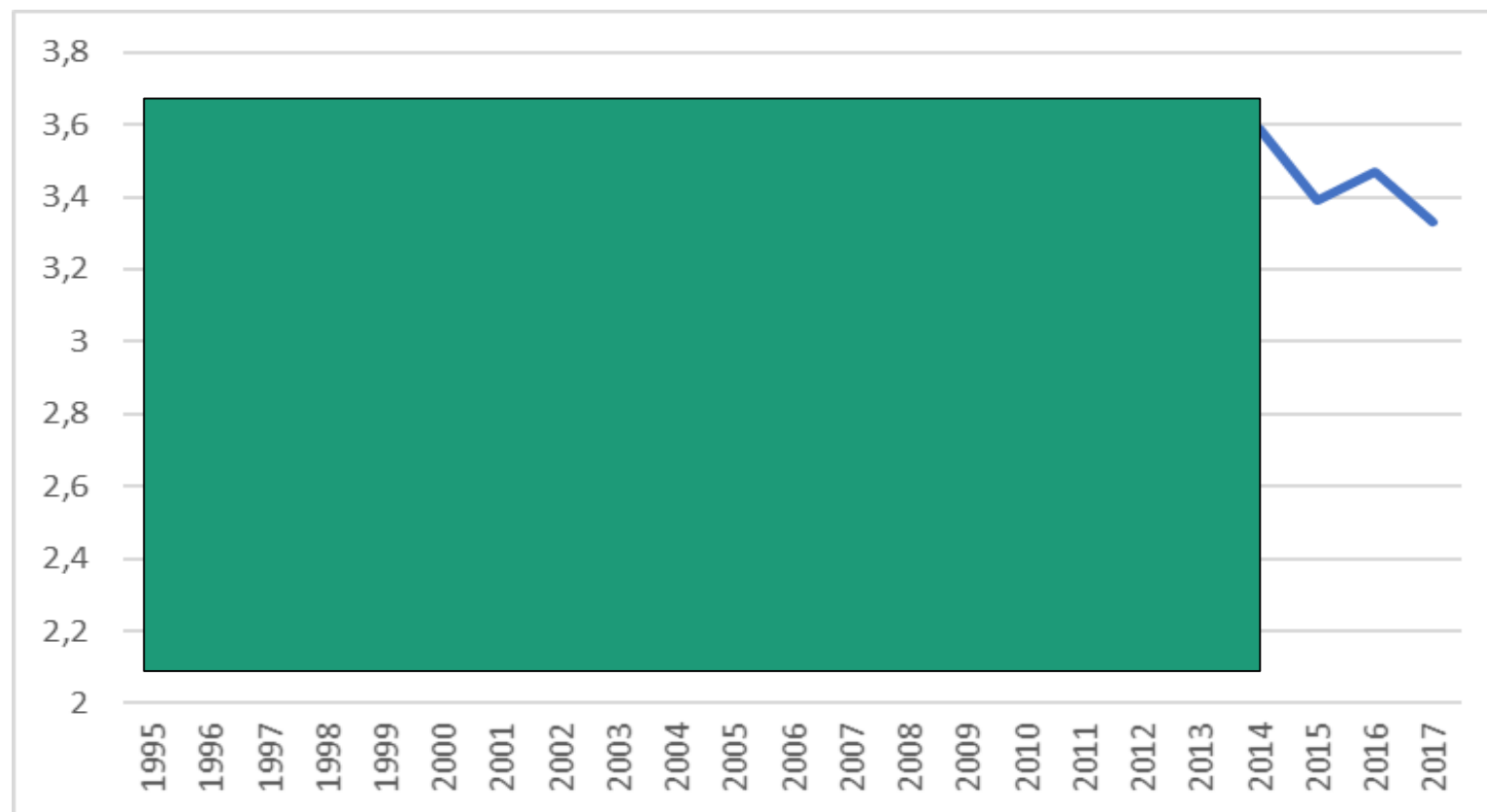
Environmental Tax Reform ?

Is there space for an Environmental Tax Reform (ETR)? in which form?

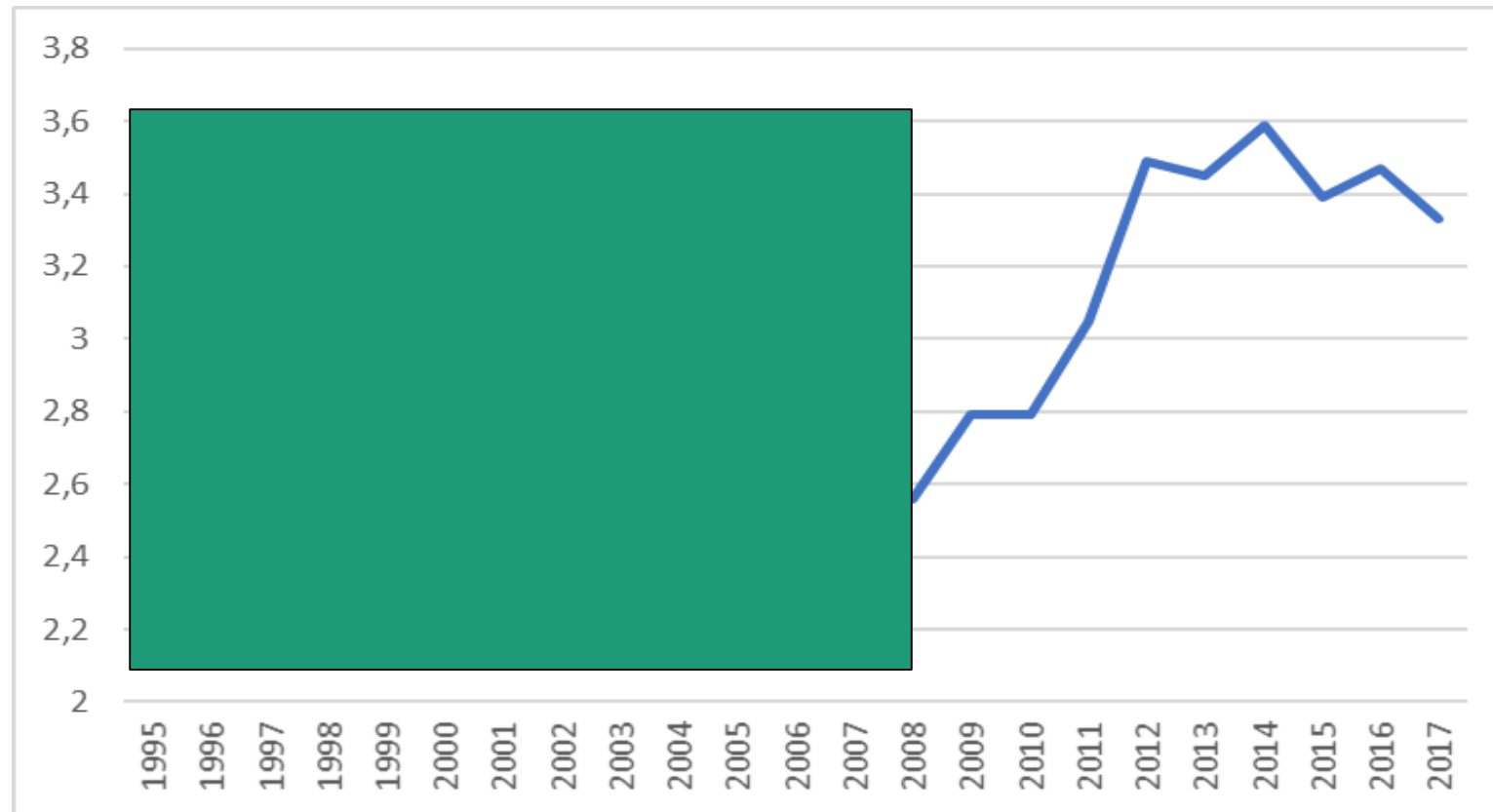
- - measure by measure?
- - an independent package of ETR?
- - in the frame of a General Tax Reform?

Is it good for the economy? for the environment? social issues?

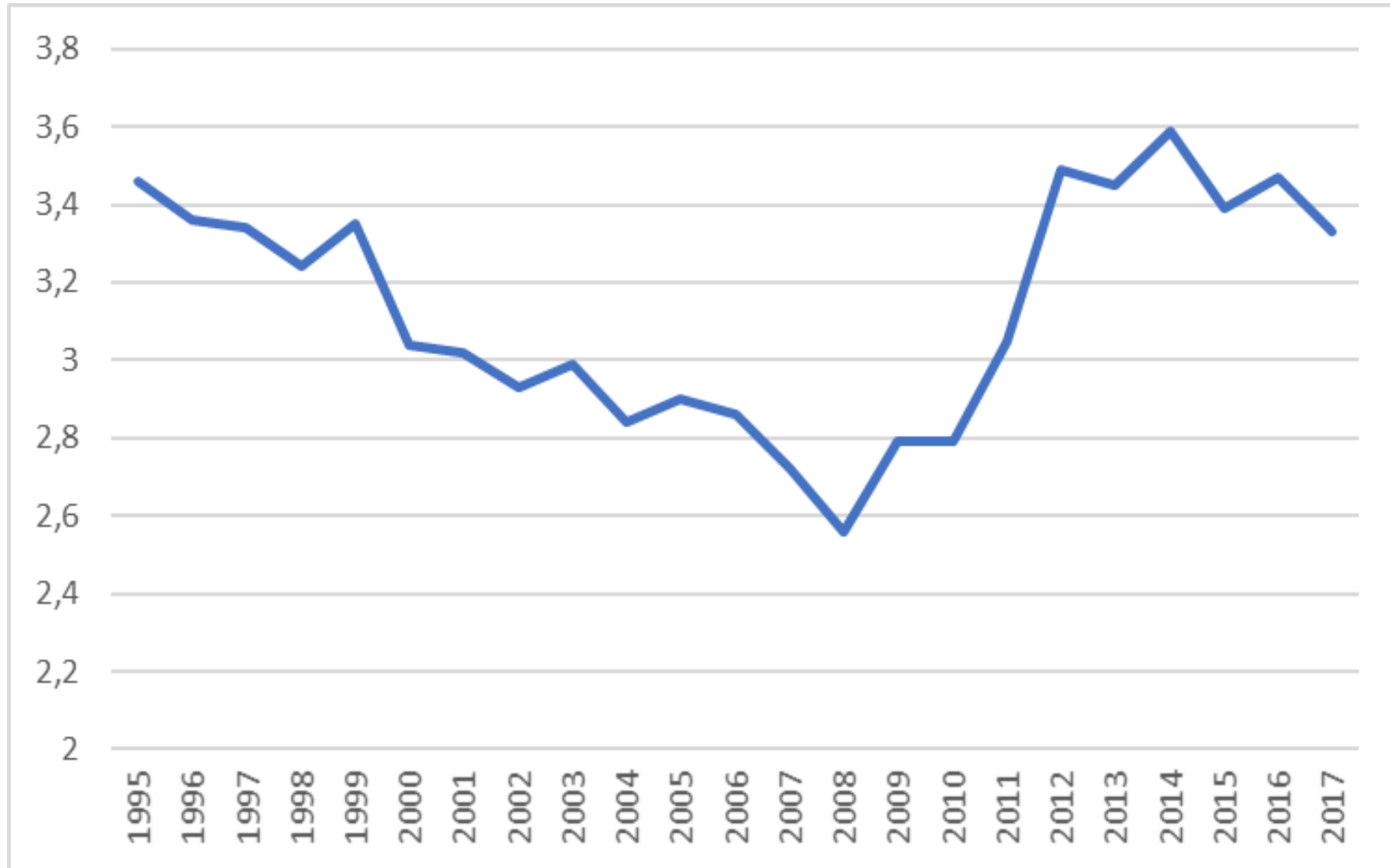
Revenue of Environmentally-related taxes in Italy % on GDP



Revenue of Environmentally-related taxes in Italy % on GDP



Revenue of Environmentally-related taxes in Italy % on GDP



OECD Policy Instruments (reminder)

Instruments for EP-GG-SD

(Environmental Policy – Green Growth – Sustainable Development)

- Regulatory Instruments
- Voluntary Instruments
- Economic Instruments
- + Environmental Assessment Instruments (IA/SDIA/RIA-SEA-EIA-Emas- Ecolabel)

Economic Instruments for EP-GG-SD

- Environmental Taxes or Taxes with an environmental impact
 - Environmental Fees/Charges/Tariffs
 - EHS-EFS Environmentally Harmful or Friendly Subsidies
 - Deposits systems
 - Sanctions-penalties
 - Creation of markets where they do not exist
- (e.g. ETS-Insurance-GPP-GreenCertificates-WhiteCertificates)

OECD Data, Analysis & Policy Work

Effective Carbon Rates

Inventory of Fossil Fuel Subsidies

Scaling up Financial Instruments for Biodiversity

Green Budgeting

Environmental Performance Country Reviews

IFCMA Inclusive Forum on Carbon Mitigation Approaches

...

OECD explored principles in the 70s and 80s
introduced in EU Treaties in the 90s

- A) PPP2 Polluter-Pays-Principle [Chi-Inquina-Paga]
- B) User-Pays-Principle
- C) Precautionary Principle ...
- D) Prevention Principle
- E) Integration of environmental policies in economic (economic-financial-fiscal-...) and social (housing-health-education-...) policies, and into sector policies (energy-transport-agriculture-...)
- F) Sustainable Development Principle
- G) ...

New/Old Acronyms that we are using/learning ...
(this is a start, please continue yourself in a specific file!)

- UN
- UN-FAO - UN-WFP - IFAD
- UNEP - UNDP - UNIDO
- OECD - WB - IMF

- GDP - HDI - ANS
- SD - SDGs

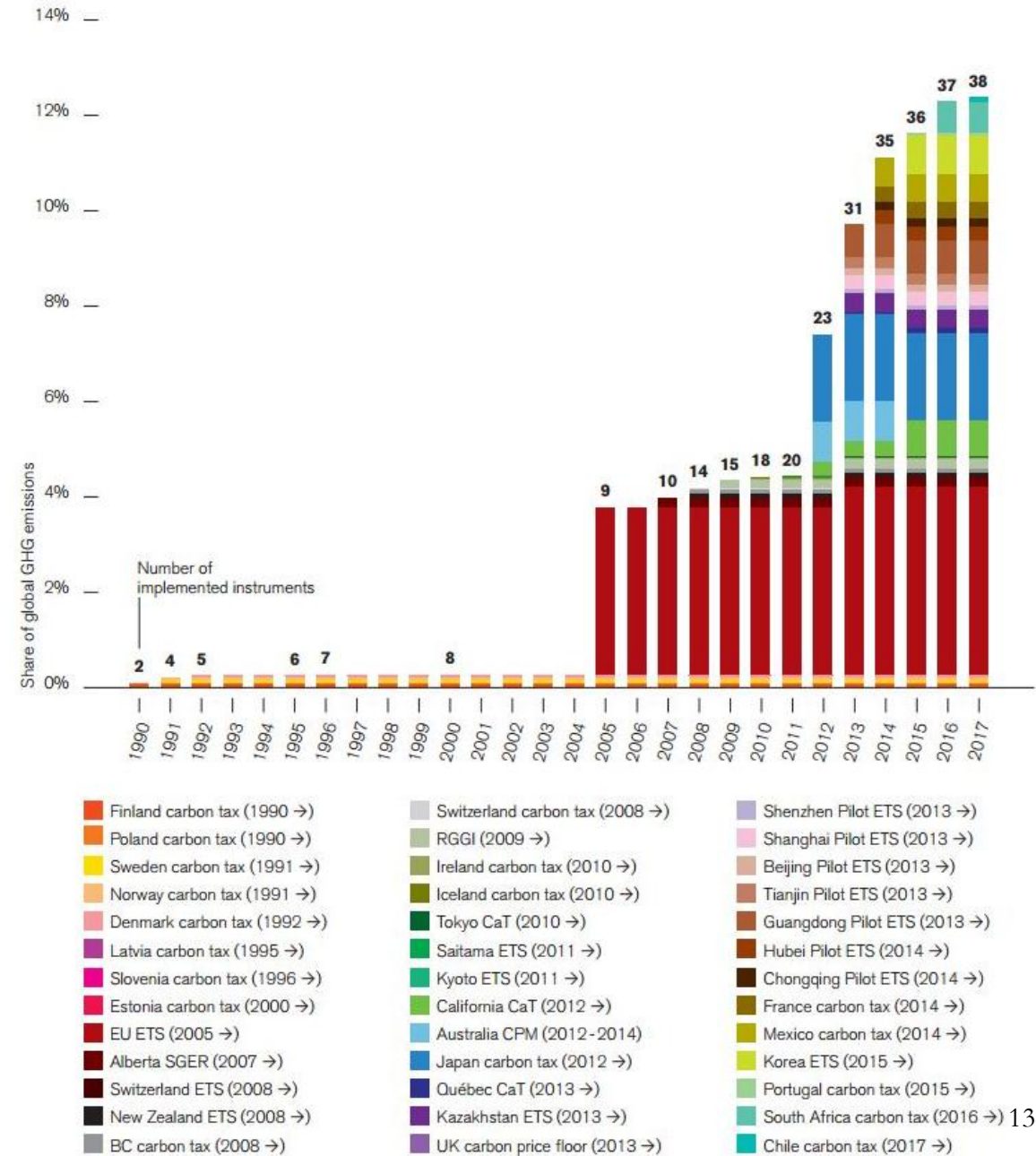
- CoP
- UNFCCC IPCC
- UNCBD IPBES
- UNCCD
- . IRP

Emission Trading and Carbon Taxes

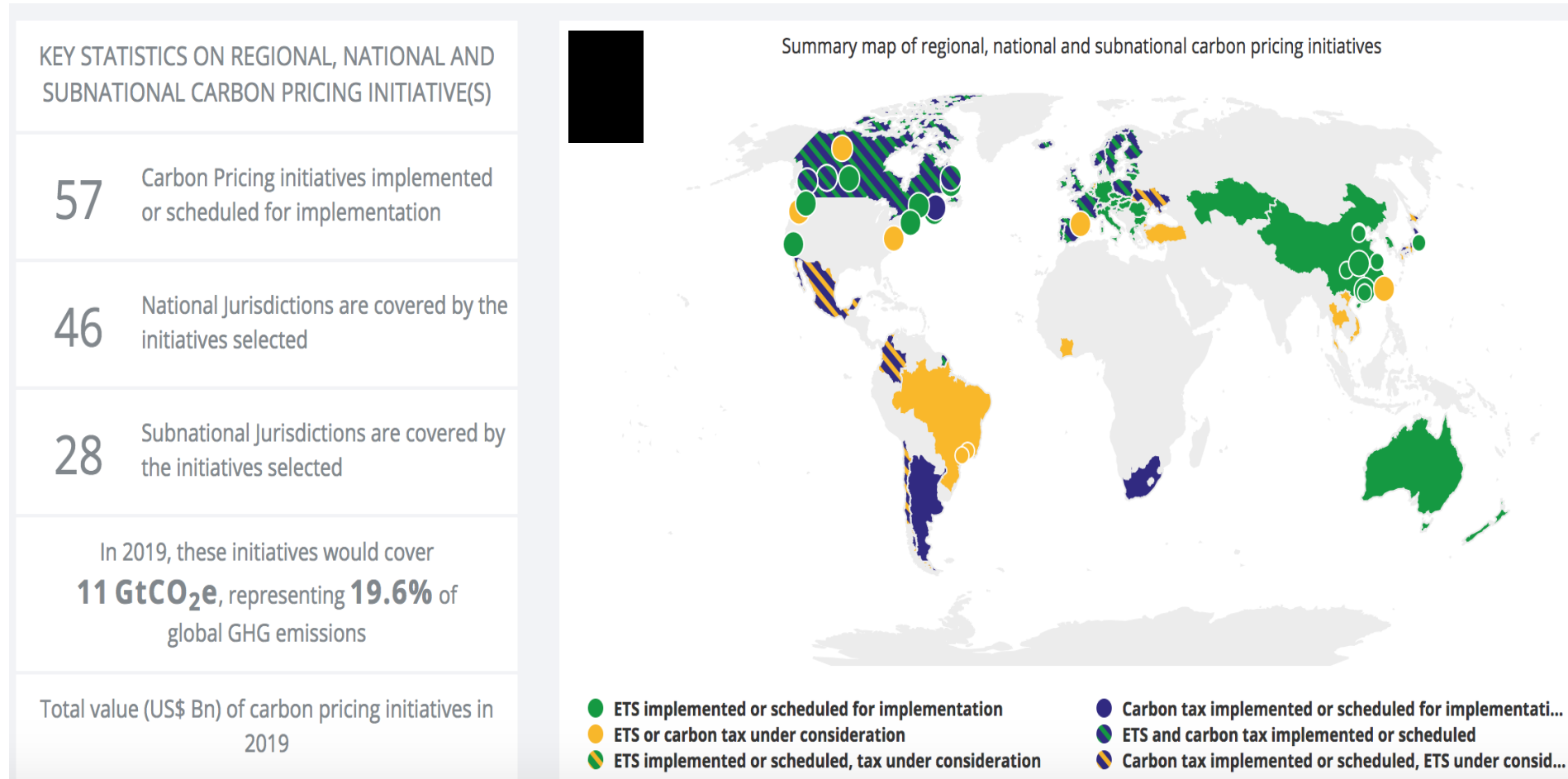
Regional, national, and subnational carbon pricing instruments already implemented or scheduled for implementation: share of global GHG emissions covered.

The fossil fuels (coal, oil, and natural gas) we use to generate electricity, power our vehicles, and heat our homes all produce carbon dioxide emissions, which are a leading cause of climate change.

Source: World Bank 2015



Carbon pricing Worldwide



Source: Carbon Pricing Dashboard - World Bank 2019 – see <https://carbonpricingdashboard.worldbank.org/>

Carbon Tax

vs.

ETS

Carbon tax directly targets the price of carbon (via tax) and the market determines the amount of CO₂.

ETS directly targets the volume of CO₂ emissions and the market determines the price.

Both place a «price on carbon», in order to reduce greenhouse gas emissions, and raise considerable amounts of new revenue, whether by taxation, by trade of emissions rights on the market or by buying emission quota auctioning.

Carbon Tax & ETS: how can we use the new revenues raised?

New revenues that could be used to:

- ...
- ...
- ...

Carbon Tax & ETS: how can we use the new revenues raised?

New revenues that could be used to:

- reduce income taxation, in particular on jobs generated by green economy;
- promote innovation and diffusion of low-carbon technologies and products;
- financing sustainable patterns of production and consumption;
- financing subsidies for energy renewable sources;
- increase financing of energy efficiency measures;
- reduce accumulated public debt.

International initiatives supporting carbon pricing

- Carbon Pricing Leadership Coalition (World Bank)
- Carbon Pricing Declaration 2014 - the Heads of States and CEO of large firms - Stoltenberg
- Carbon Pricing Principles (World Bank e OECD) [Explicit]
- G7 Carbon Markets Platform (Germany Presidency) [Implicit]

International initiatives supporting carbon pricing (2)

- Economists Call for a Global Carbon Price in the long period (ETS, CO₂ Tax).

De Perthuis, Tirole, Heal, Ekins, Sterner, Arrow, Giovannini, Bob Costanza, ... [Explicit]

- Low Carbon Society-Research network (LCS-Rnet)

Bert Metz, Nishioka, Nakicenovic, Hourcade, Ken Arrow, ...

Recognition of the social and economic cost The role of Climate Finance

2019 pre-Cop Madrid
European Economists Statement for Carbon Pricing –
EAERE – 1700 economists signed

1. Fix a **price** for CO₂ emissions so to reduce them in the needed quantity and speed.
2. The **progressive increase** of the carbon price must be correlated with the objectives-targets agreed by the *Paris Agreement*. The carbon price can be established through a **tax or a system of exchange (trade)** of emissions quotas.
3. To increase the effectiveness of EU-ETS (*Emissions Trading System*) it is necessary **to further reduce the number of permits** for emissions (i.e. in the energy sector, in manufacturing) and at the same time **increase the share of permits offered to auction**. – In order to safeguard companies' competitiveness, a system of **border adjustment** of carbon price might be considered in a multilateral context. [reference to BCA then entered in the European Green New Deal]
4. In parallel with EU-ETS, it is necessary to introduce a **carbon taxation** aimed to reduce greenhouse gases (GHGs) in the **residential and transport** sectors. [i.e. Maritime sector, IMO, and international aviation, ICAO]
5. In order to **promote effectiveness, equity and political feasibility** of the carbon price, it would be desirable to use **part of the revenue** to incentivize **innovation** and face the issue of the **social and distributional impact**.

Jos Delbeke, Paul Ekins, Carlo Carraro, Ottmar Edenhofer, Ard, ...

Stopping Climate Change: Policies for Net-Zero - Paul Ekins (1)

Top-level priorities to stop climate change

- Stop emitting carbon dioxide and methane from the production and burning of fossil fuels
- Stop deforestation
- Start removing carbon dioxide from the atmosphere at scale, by sequestering it underground, and in land (in new forests and in soils) and the oceans

We know what policies to use, and we know that they work

Stopping Climate Change: Policies for Net-Zero - Paul Ekins (2)

The major obstacles to stopping climate change

- The **fossil fuel industry**, which is determined to produce far more oil and gas than is consistent with the Paris 1.5°C target, and uses its huge power for systematic misinformation and lobbying
- The '**voluntary carbon market**', whereby some companies pay other companies to buy 'carbon offsets' that do not sequester carbon in order to keep on emitting themselves
- Governments that continue to **subsidise fossil fuels** and do not incentivise adequately investment by the private sector in low-carbon infrastructure and permit (or encourage) continuing investment in high-carbon infrastructure
- Politicians who believe (wrongly) that the transition to low-carbon energy will make the 'cost of living' crisis **worse** for their citizens
- Publics who are **confused**, **unaware** or in **denial**, but do not **want** to change the most carbon-emitting aspects of their lifestyles

Stopping Climate Change: Policies for Net-Zero - Paul Ekins (3)

To remove the obstacles, need policies for:

- **Investment** at scale in low-carbon and removal technologies (cost reduction):
 - **Energy efficiency:** zero-carbon new homes, deep retrofit in existing homes, greater efficiency in industry and transport
 - **Zero-carbon energy carriers:** electricity (renewables, nuclear, CCS), hydrogen (electricity, CCS), biomass, biofuels
 - **Grid integration and stability:** technologies for long-, medium- and short-term storage (batteries, thermal, mechanical, hydrogen, pumped hydro), (transmission, interconnection, demand response, local energy markets)
 - **Transport:** electric vehicles (batteries, fuel cells)
 - **Heating/cooling:** heat pumps, district heating, biomethane, hydrogen
 - **Industry:** hydrogen, carbon capture and storage (CCS)

In order to **phase out** fossil fuels by 2050 at the latest

Stopping Climate Change: Policies for Net-Zero - Paul Ekins (4)

Also need policies to:

- Invest at scale in **carbon removal**: ultimate target 350ppm, land- and ocean-based, and Direct Air Capture
- **Transform** the food system: **reduce** food waste, **incentivise** lower-meat diets where current diets are bad for health (free up land), **provide** appropriate incentives for regenerative agriculture and provision of ecosystem services
- **Introduce** policy mixes to achieve these objectives by **making investment in them profitable**, involving economic instruments (e.g. taxes and subsidies), regulation, information measures and innovation support
- **Create** for implementation a new Delivery Body across government and the private and third sectors to achieve Real Zero by 2050

Stopping Climate Change: Policies for Net-Zero - Paul Ekins (5)

The policies also need to:

- **Change** behaviour: **measure** personal GHG emissions, **eat** less meat, **fly/drive** less often, buy smaller cars and longer-lasting products, **live** in warmer (cooler) summer (winter) homes, **question** personal lifestyles (fast fashion, second homes, culture of consumption)
- **Ensure** that developing countries can **develop** economically using zero-carbon electricity (a new financial settlement: A Low-Carbon Marshall Plan?)
- **Protect** the vulnerable and least well off during the transition: climate justice, 'just transition' at home and abroad

EFR STILL VALID IN TIMES OF CRISES (1)

- 1) Environmental taxes (economic & market-based instruments) are not the only solution, but are an essential part of the solution
- 2) Carbon pricing: Carbon Tax/Levy, ETS, Excise Taxes
- 3) ETS and CO2 tax often proposed as alternative: not necessarily! ETS sectors are paying excise taxes, they could pay a CO2 tax; analogy with the property (houses/flats/..) market & property taxation
- 4) role of removing EHS-FFS-BHS, would need much less EFS (national catalogues/inventories by Fra/Ger/Ita/Fin/Swe/Swi)
[research project by Vva for EC-Env]
- 5) OECD work: Pine database, FFS-Fishery/AgrSubsidies inventories and companions, BHS, Peer Reviews, Greening Budgets, ...
- 6) G7/G20, UNFCCC, UNCBD

STILL VALID IN TIMES OF CRISES (2)

- 7) link to science and link to global goals
(SDG, Paris Agreement, Fccc-Ipcc, Cbd-Ipbes, Irp, new UNEP Plastic);
- 8) single strong measure (e.g. carbon pricing alone),
or in the frame of EFR (Ecological/Environmental/Green Fiscal/Tax Reform),
or in the frame of GTR (General Tax Reform)
[research project by Ieep for EC-Env]
- 9) we can (we must) help the poor and the vulnerable citizens-consumers, maybe
also some vulnerable industrial & agricultural sectors, but not by under-pricing the
environment, we have direct instruments
- 10) clear compensations: abate distortionary taxes, environmental taxes restore a
fair market, e.g. abate labour taxes
- 11) EU taxation unanimity rule reform; in the meanwhile we can work on EU
enhanced cooperation, coalition of the willing - like-minded countries
- 12) we need analysis and research to be able to nourish the public decision-makers
and politicians, mutual support between jurists and economists; and be ready when
the train passes ...

REINFORCED IN TIMES OF CRISES (3)

EU Green Deal must go on: ETD Reform, ETS Reform, CBAM,
Resources Taxes, Carbon Tax, ...

(but also at national, sub-national and local level)

Omnibus Package might be a problem

Issue of Own Resources and financing the Next EU Generation, NRRPs
(National Recovery & Resilience Plans), EU Budget
(EU bonds and national bonds not necessarily sufficient)

Convenience to work and decide together in EU (and beyond)
economies of scale and scope, level playing field, larger market

Climate, Biodiversity, Pollution Triple Planetary Crises (and Water, Land,
Forests, ..., crises) did not wait the Covid-19 pandemic, the Russian
aggression to Ukraine, nor the economic crisis

So do we need Green Public Procurement?
the debate is open ...

Ideas from EoP Students:

- Government supporting environmental policy and climate policy SD
- Long term encouraging incentives
- ...

So do we need Green Public Procurement?

If we were able to integrate environmental costs (externalities) into prices through economic instruments probably not

But as we are not yet able, it is important to integrate environment, nature, sustainable development in all instruments: GPP, into values, cost-benefit-analysis, public and private non-financial reporting, climate disclosure, impact assessment, public and private decision-making,

Moreover, we have a function/role of example, potential, best practice played by the public sector, orientation of consumption, investment and production.

But the debate is open and in your hands ...

Goods, services, public investments,
infrastructures, ...





Good luck with the MSC in Business Administration,
your studies, your jobs, your lives...

Roma Insugherata, Quercia del Fibonacci

Prepare and
present a paper/
article/thesis?
Scientific
Associations
meetings ...



16-19 June 2025 - EAERE 2025 Annual Conference
(European Association of Environmental and
Resources Economists) Bergen, Norway [Welcome to EAERE 2025!](https://www.eaere.org/2025)

08-13 September 2025 - EU-SUSEET
(EU Summer School in European Environmental
Taxation & Policies)
Napoli, University Federico II <https://www.suseet.eu/>

**24-26 September 2025 - GCET 2025 (Global
Conference on Environmental Taxation)**
Porto Alegre (Bra) <https://gcet26.com.br/>

**12-13 February 2026 - IAERE 2026 Annual
Conference - Trento** (Italian Association of
Environmental & Resource Economists)
[2025 Annual Conference | iaere](https://www.iaere.org/2026)

**29 June - 3 July 2026 - WCERE 2026 World
Conference of Environmental and Resources
Economists** Lisboa, Portugal

24-26 September 2026 - GCET 2026 - Pik-Berlin

- ...



Summer
School
in European
Environmental
Taxation

