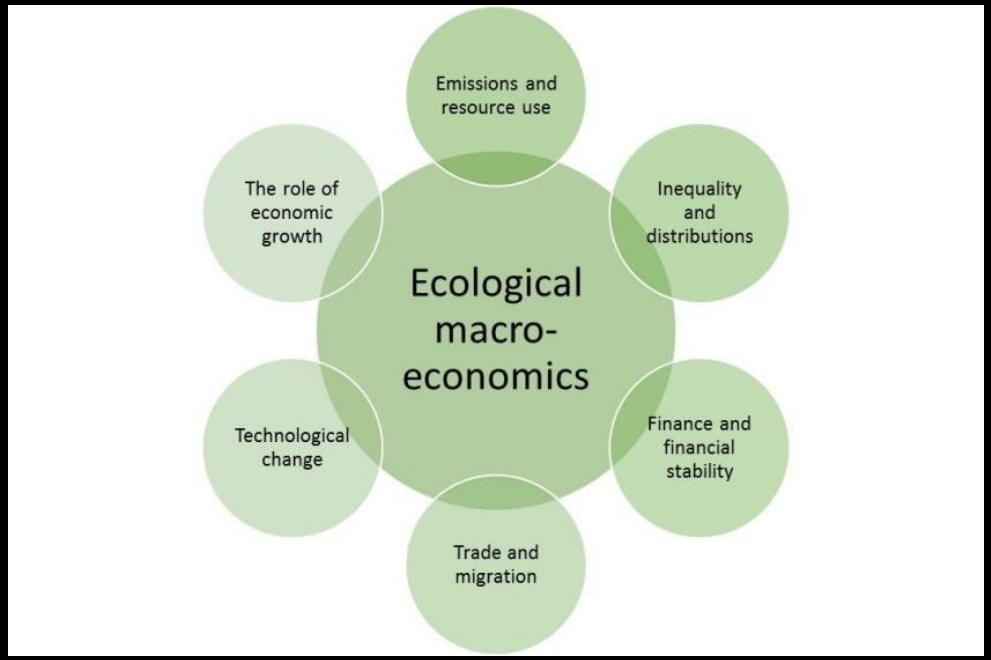
The case for ecological economics:
An economics where matter matters



Federico Demaria

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Department of Applied Economics,

Autonomous University of Barcelona

UAB Universitat Autònoma de Barcelona

icta

What is the most pressing issue economists today should be addressing?

What is the most pressing issue economists today should be addressing?

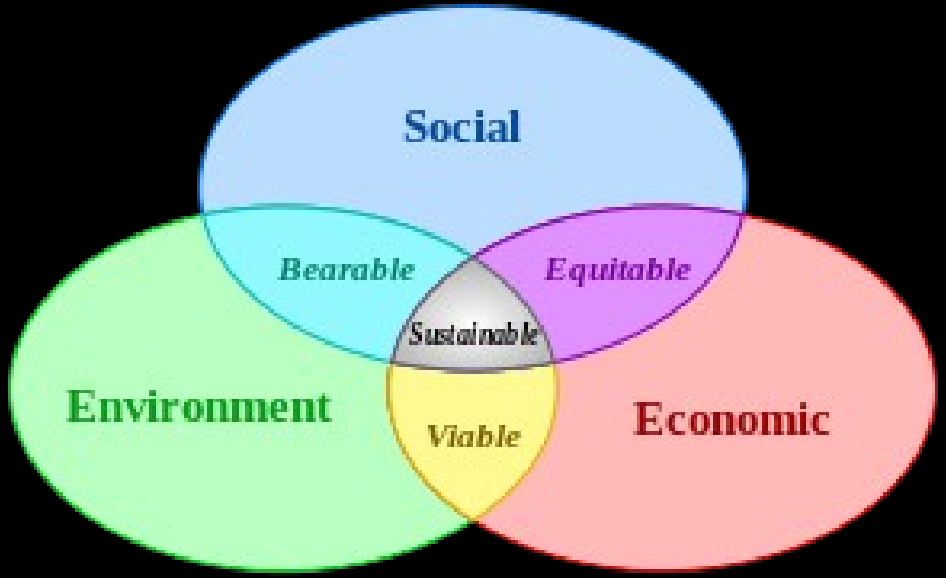
Source: Economics for a changing world. core-econ.org

1. Ecological economics

On the relationships between the environment and the economy

Environmental economics

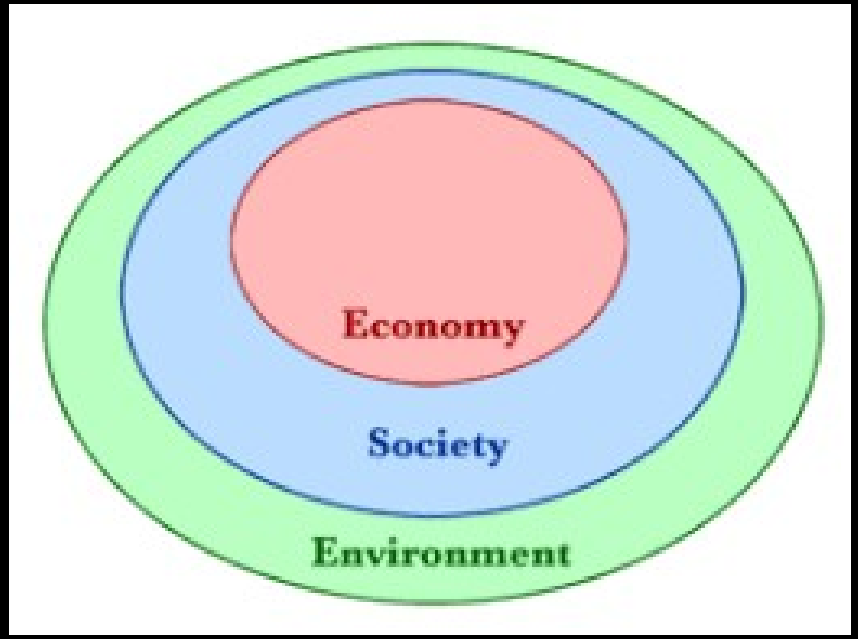
The environment is integrated into the economic system



→ Standard economic tools

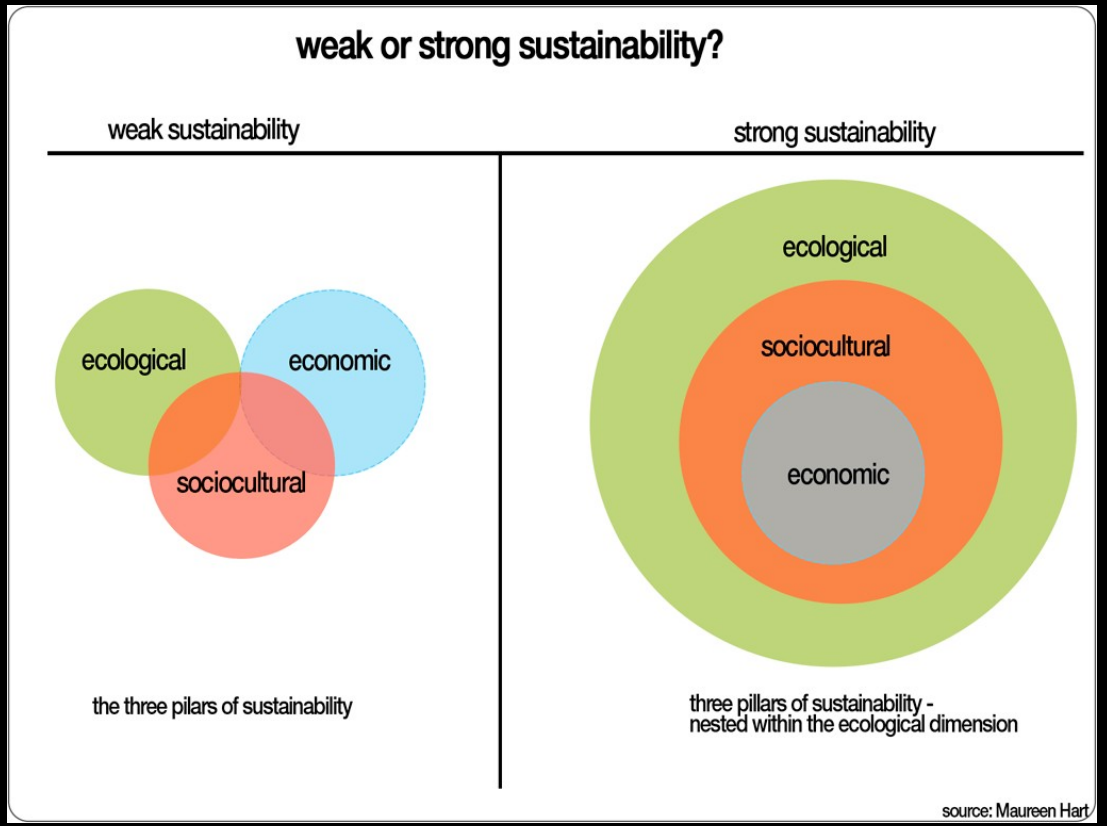
Ecological economics

The economy is embedded in the environment

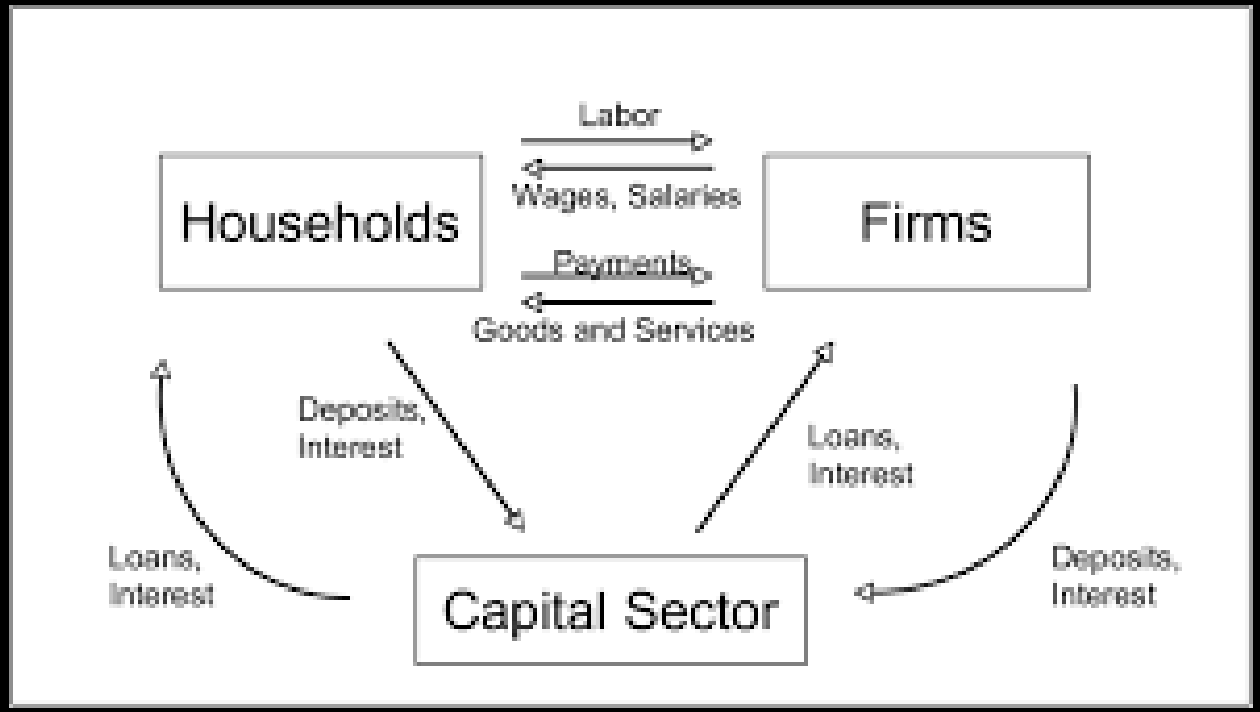


→ Methodological pluralism

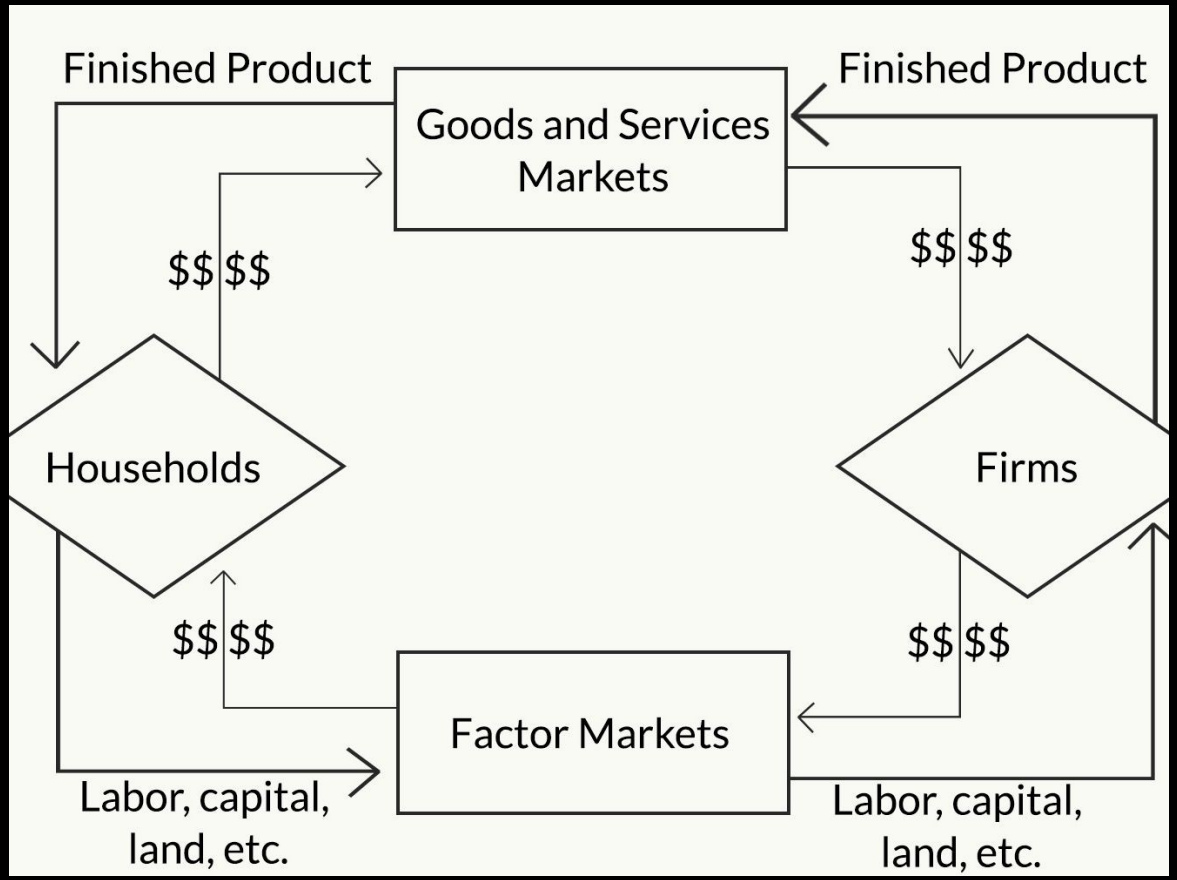
Are natural and human-made capital substitutable?



Economics: Circular flow model



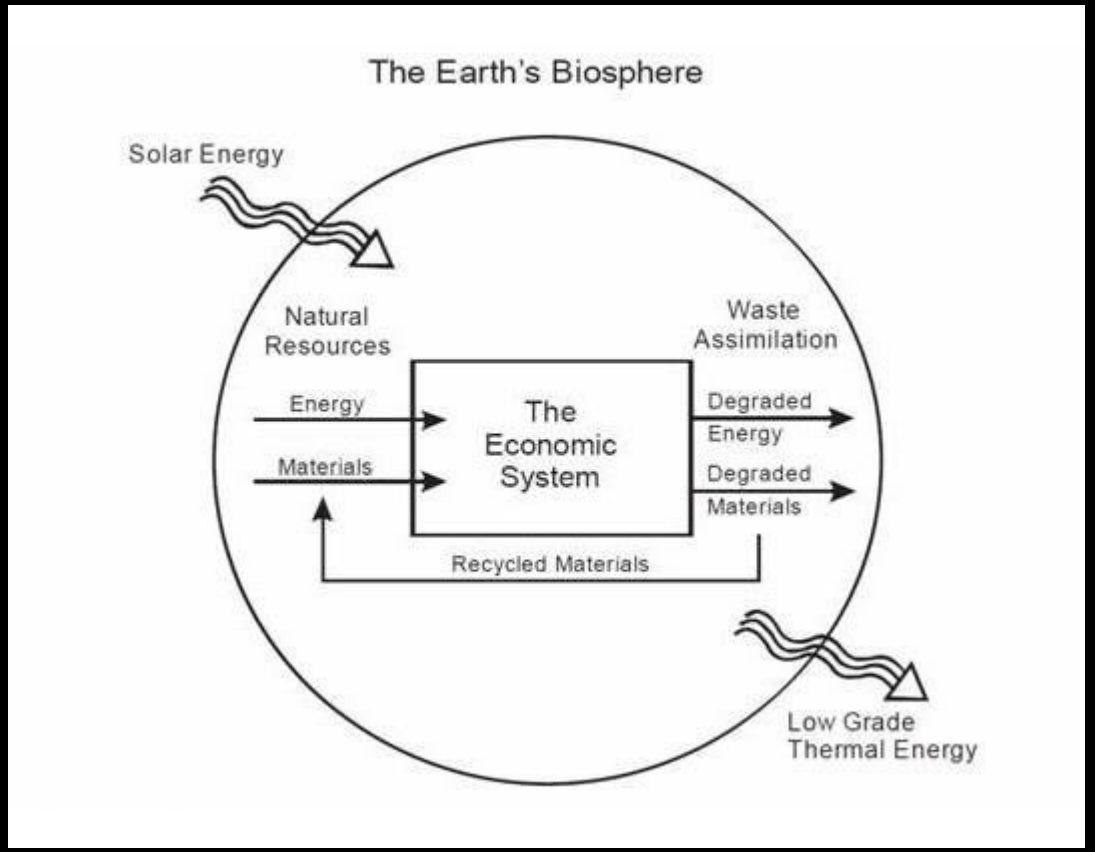
Economics: Circular flow model



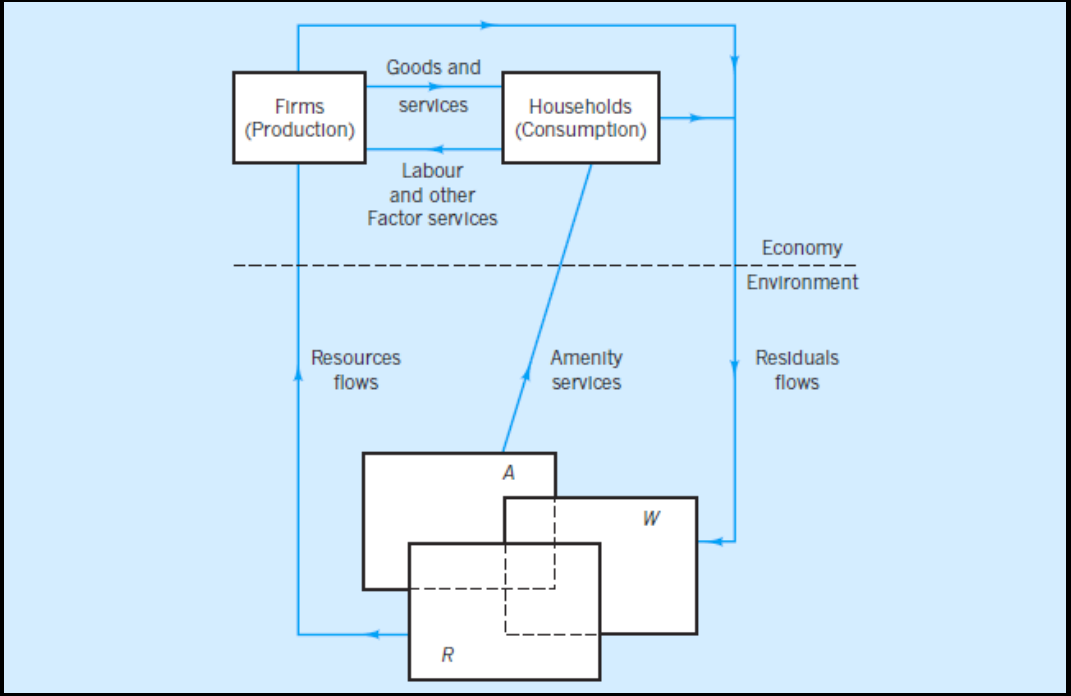
Merry-go-round?

Ecological economics

Social metabolism



Applied economics



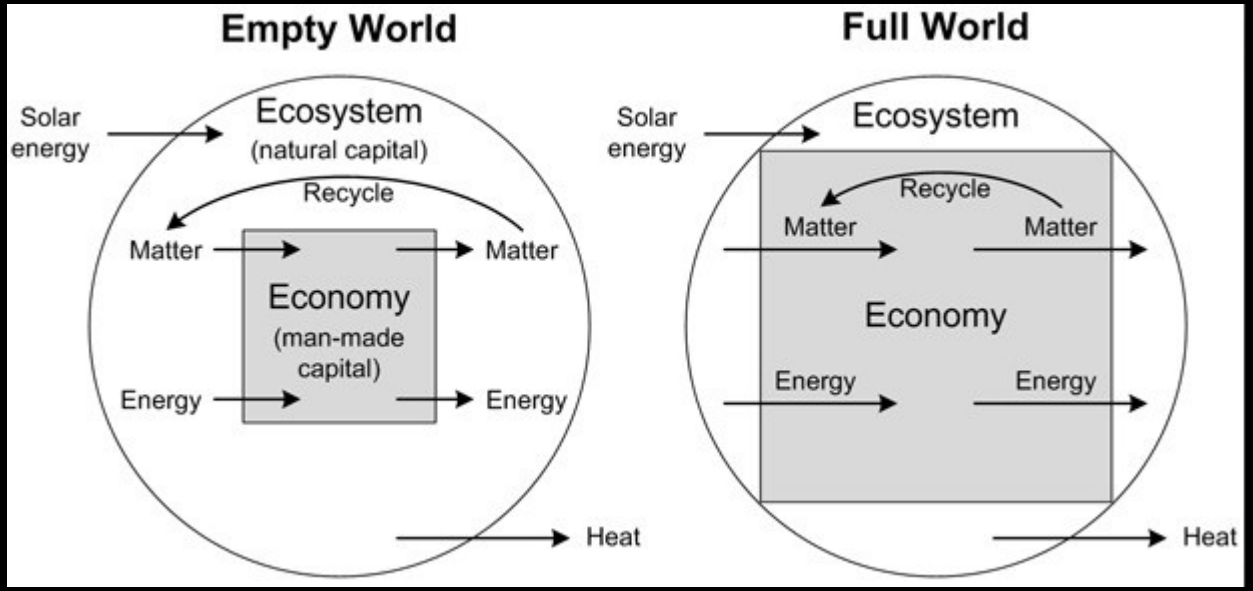
Source: Griffiths, A. and Wall, S. (2007) *Applied economics*. Pearson education.

Ecological economics

- Allocation → efficiency
- Distribution → justice
- Scale → ecological sustainability

Source: Daly, H. (1992) Allocation, distribution, and scale: towards an economics that is efficient, just, and sustainable. *Ecological Economics*

Ecological economics



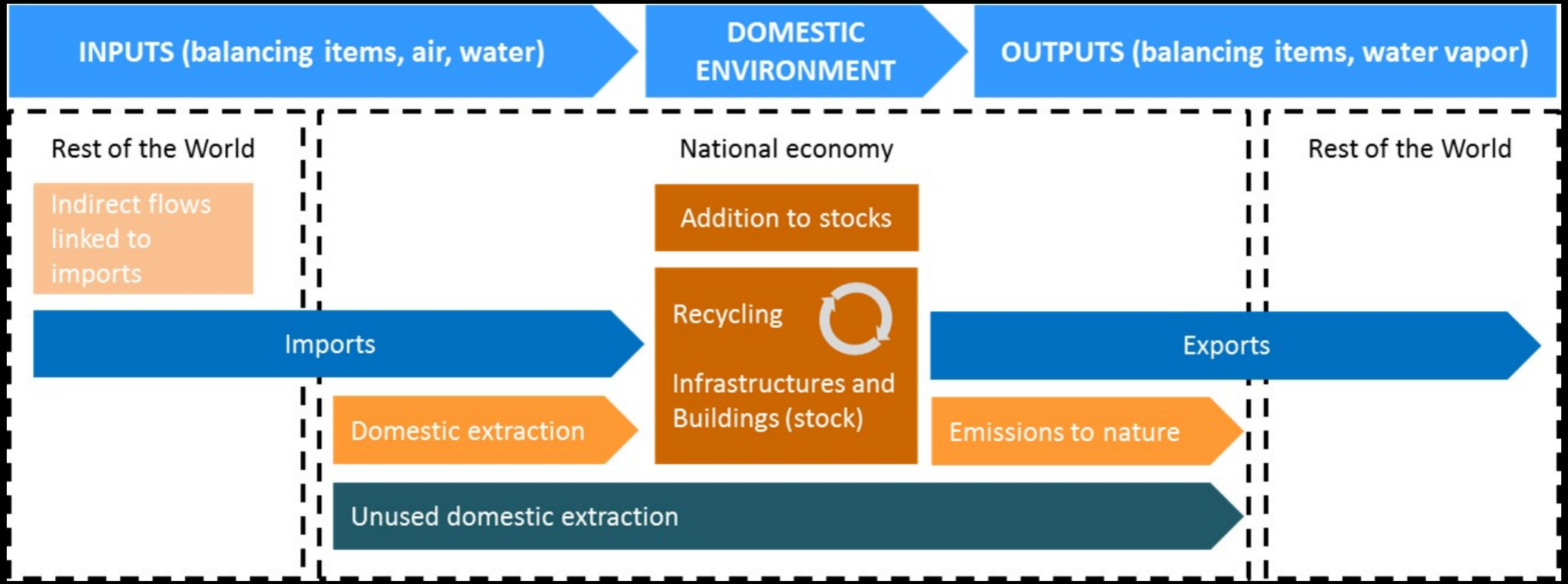
Source: Daly, H. (2004) E*cological Economics*

Methods for the study of social metabolism

How to expand economic theory to integrate the earth's natural systems?

- Materials Flow Analysis (MFA);
- Energy Flow Analysis (EFA);
- Human Appropriation of Net Primary Production (HANPP);
- Virtual water;
- Energy Return on Energy Investment (EROI)
- Etc…

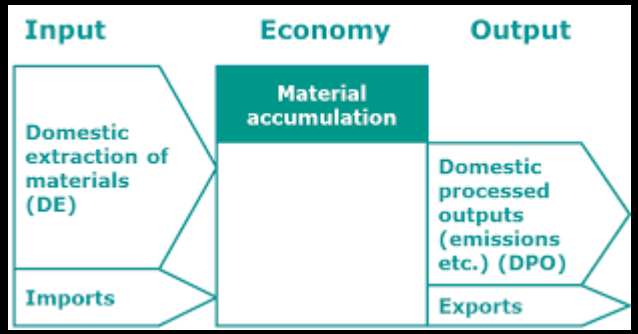
Material Flow Analysis



Material Flow Analysis (Tons per year)

Indicators by EUROSTAT:

- **Domestic Extraction** (DE): biomass, minerals for building materials, mineral ores for metals, and fossil fuels;
- **Domestic Material Consumption** (DMC): DE + imports – exports;
- **Physical trade balance** (PTB): physical imports - physical exports.



Non-equivalent description of the economy

Economic, social and physical indicators

For example, an economy may provide:

- 260 GJ (gigajoules) of energy per person/year.
- HANPP (human appropriation of net primary production) is 35%;
- Material flow amounts to 16 tons per person/year of which fossil fuels account for 5 tons. Of its material flows, 5 tons are imported and 1 ton is exported.
- Income per capita is 34,000 US$.
- It ranks 10th in the HDI.

Ecological economics
Central topics

1) The relationships between the environment and growth, trade and/or technology (e.g. substitution between natural and man-made capital);

2) The scale issue deriving from the embeddedness of the economy in nature, and the related social conflicts;

3) Valuation as well as decision- and policy-making (e.g. externalities or multicriteria assessment).

My research questions
Who and how promotes sustainability?

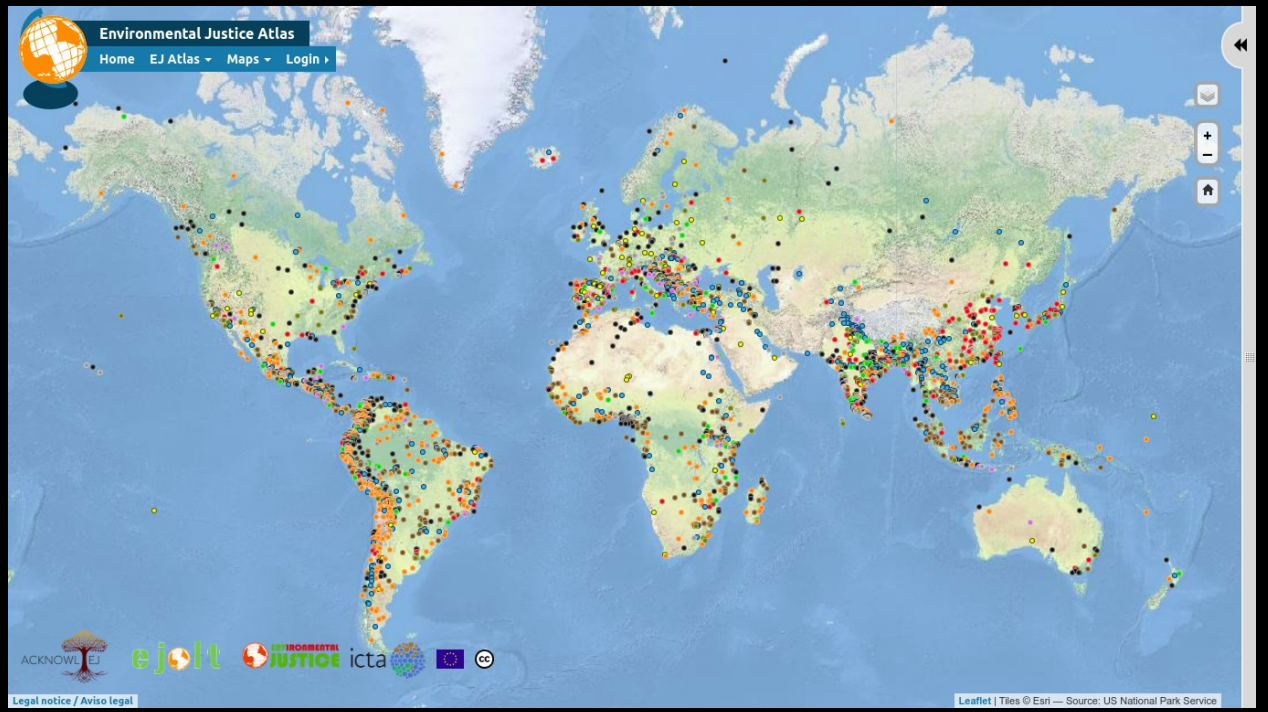
1) Why are natural resources and environmental impacts unequally distributed? How does this occur?

→ **Environmental justice**

2) Which public policies could promote more socially just and ecologically sustainable world? How could this be achieved?

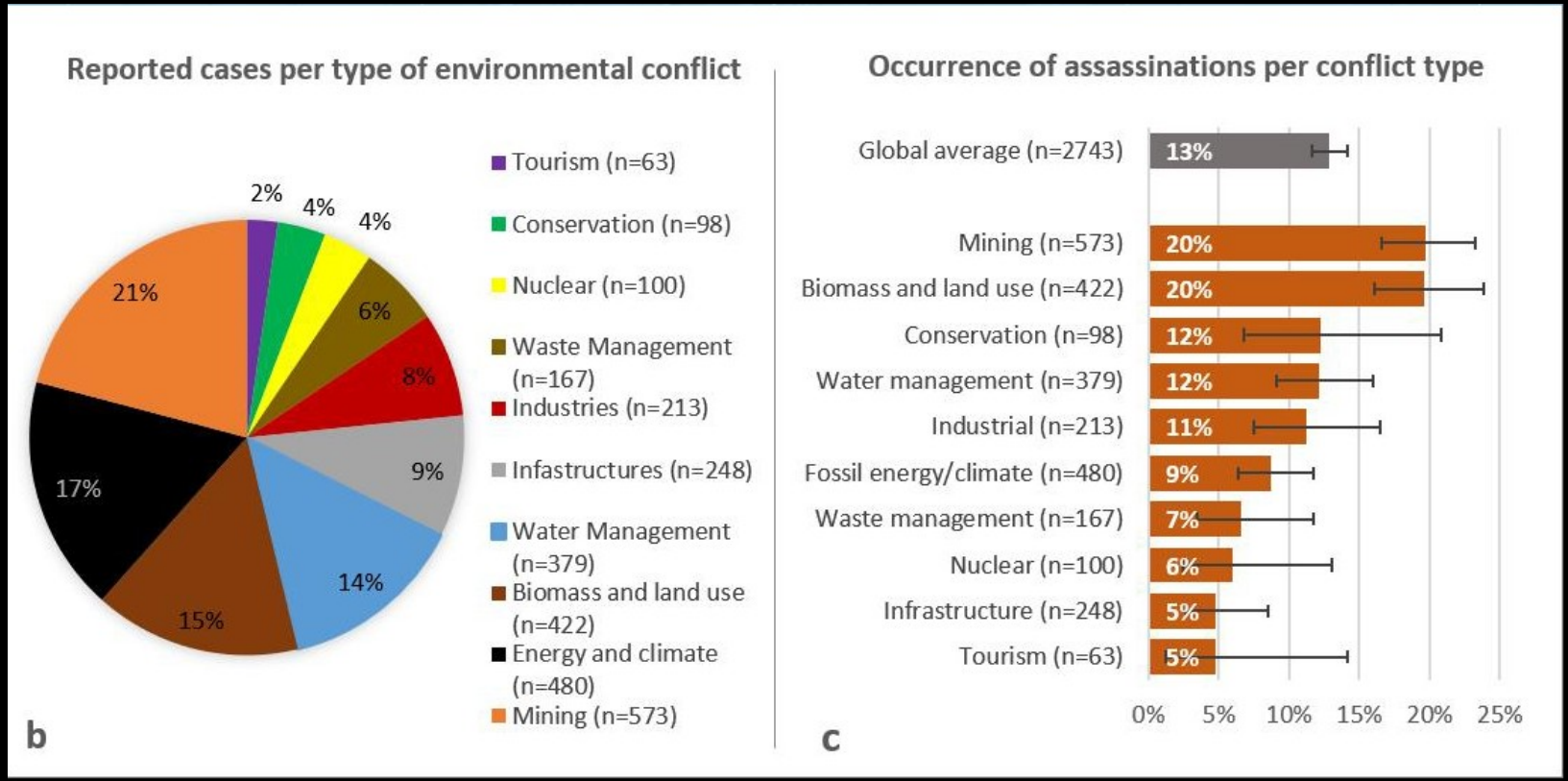
→ **Ecological macroeconomics**

1) Mapping environmental justice and conflicts



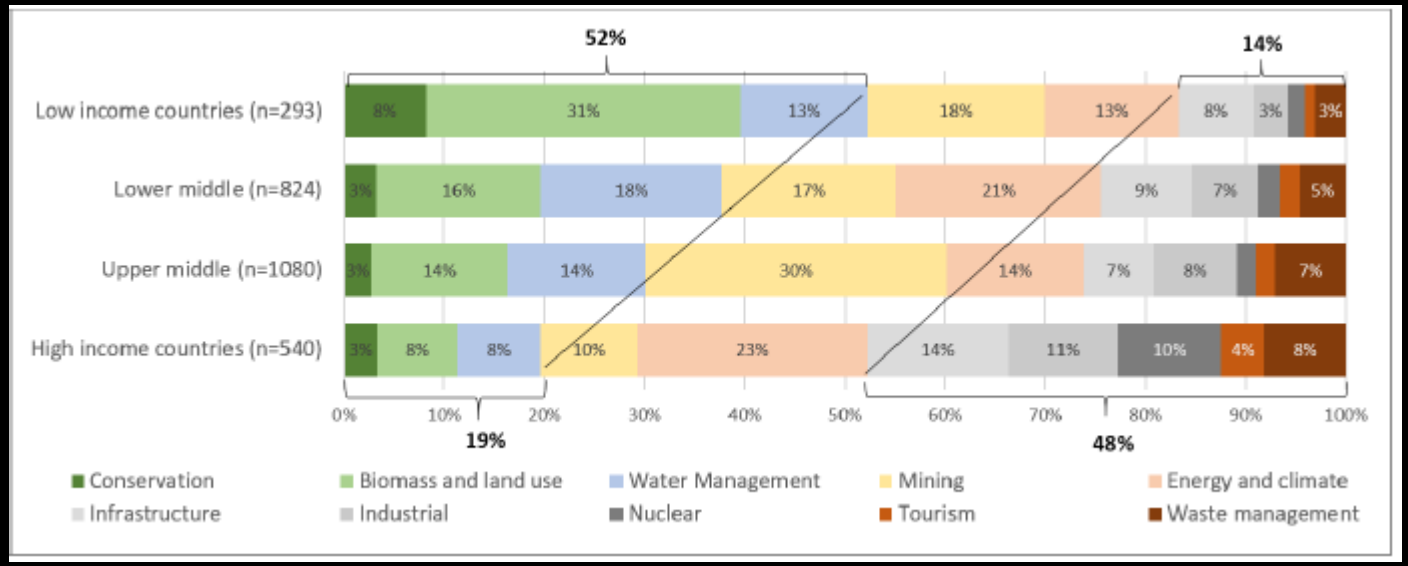
The Environmental Justice Atlas

Mapping environmental justice and conflicts



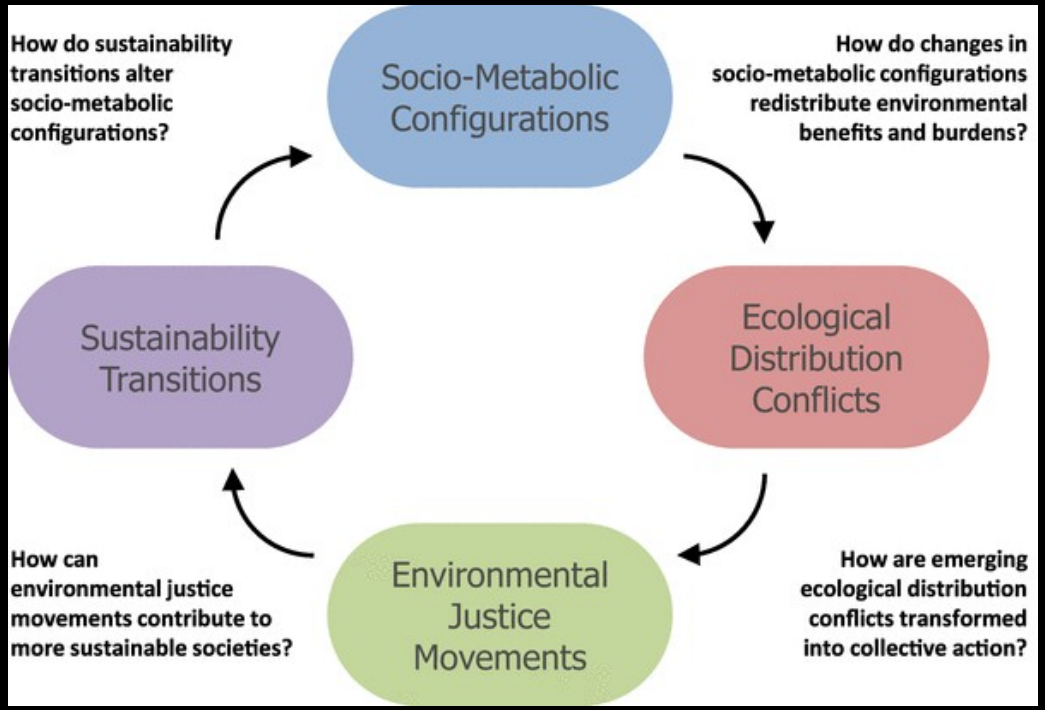
Source: Scheidel et al. (under review) A global overview of environmental conflicts and defenders. *Nature*

Occurrence of environmental conflict types across world income regions (n=2,737).



Source: Scheidel et al. (under review) A global overview of environmental conflicts and defenders. *Nature*

Ecological distribution conflicts as forces for sustainability



Towards a general theory of environmental conflicts:
Why, through whom, how, and when conflicts over the use of the environment may take an active role in shaping transitions toward sustainability?

What implications for economics?

1) The economy is embedded in the environment
   → Social conflicts

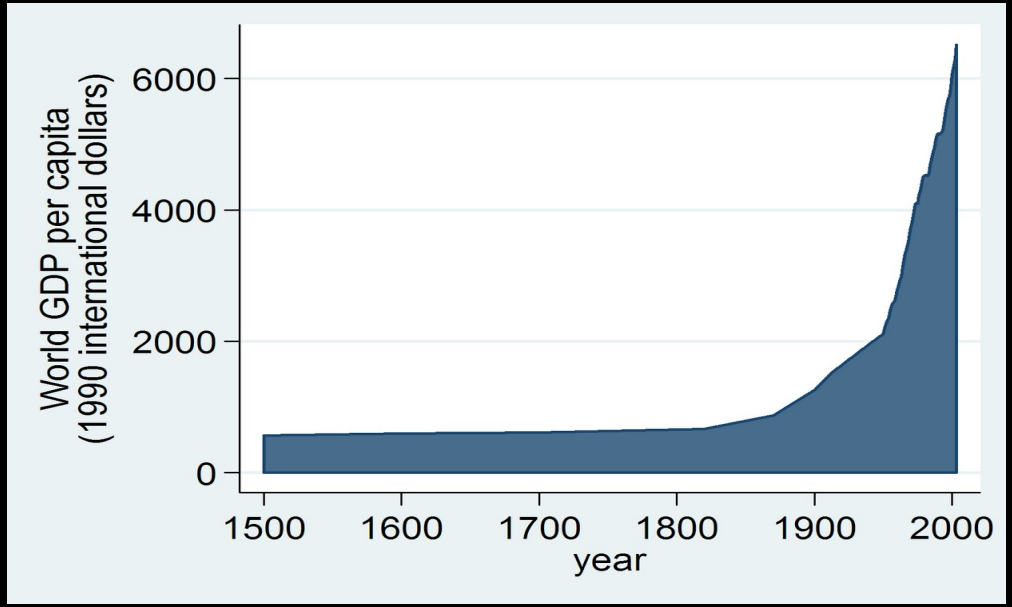
2) Valuation
   → The economy, from the ecological point of view, does not have a common standard of measurement.

2. Ecological macroeconomics

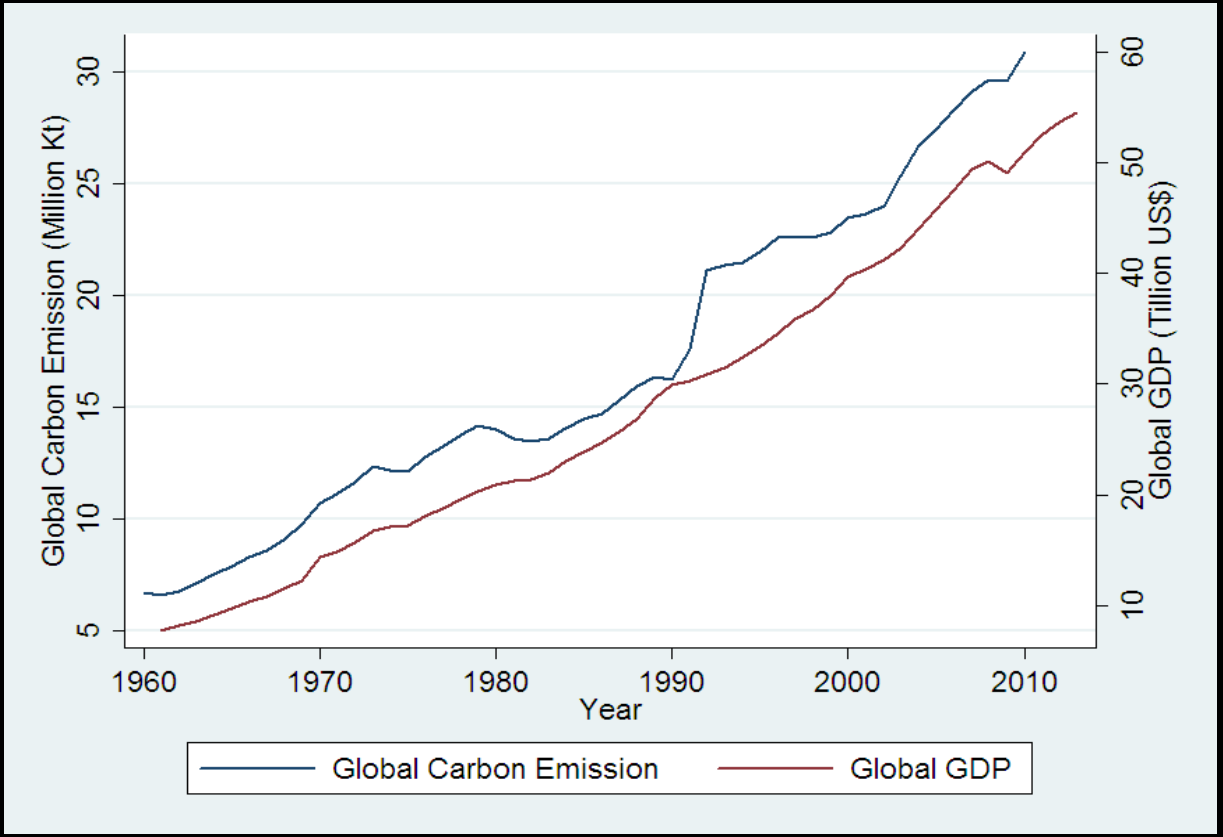
Debates on economic growth and the environment

Geometric growth is a recent phenomenon. Can it be sustained forever?

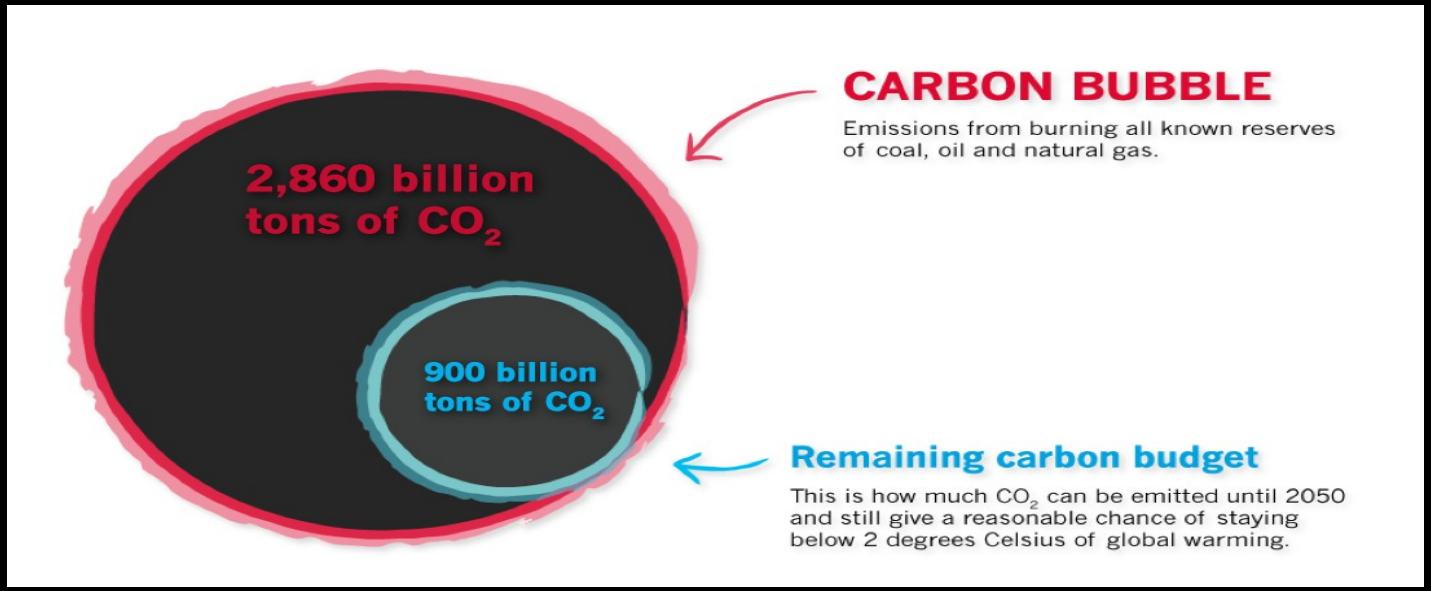
With 2% annual growth rate, an economy has to double in size every 35 years.



Global environmental impacts are directly related to the scale of the economy



Carbon budget (IPCC, 2013)



Source: Carbon Tracker and Grantham Institute (Imperial College – LSE; 2013; carbonbubble.info)
See also: Meinshausen et al, 2009; IPCC, 2013; Le Quere et al, 2013.

“Unburnable fuels”
(The Economist, 4th may 2013)

Most of the world’s fossil fuel reserves must be left in the ground, unburned, to keep global temperature rise to no more than 2°C.

An estimation: 88% of global coal reserves, 52% of gas reserves and 35% of oil reserves are unburnable and must be left in the ground (McGlade and Ekins, 2015).

How?

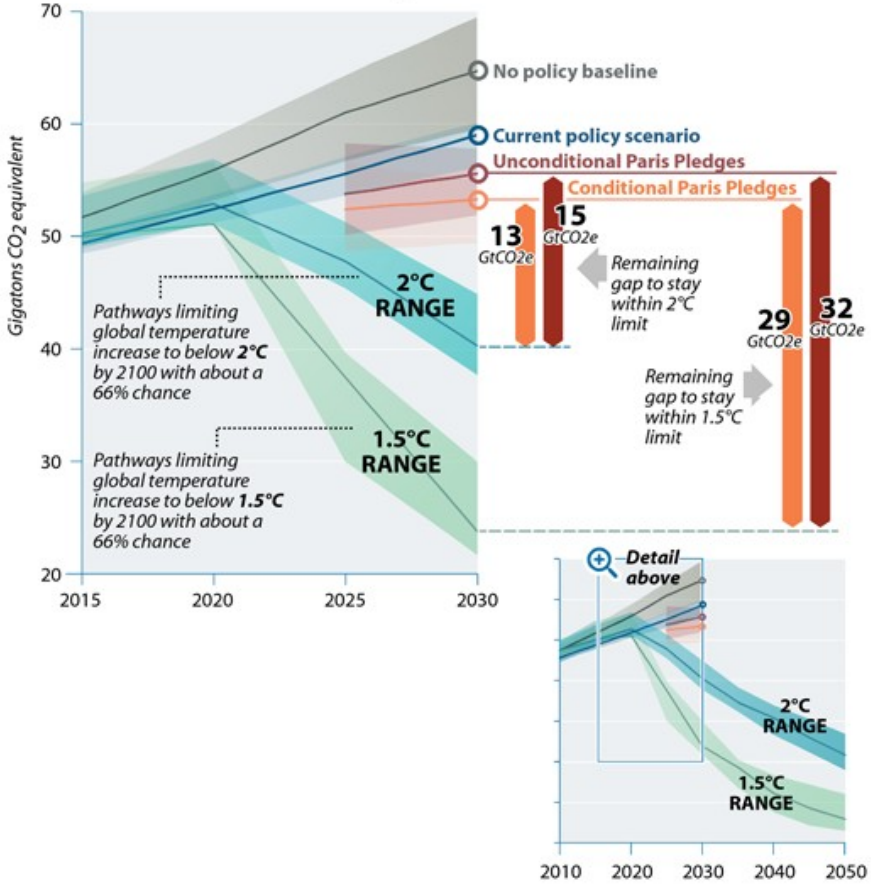
→ Grant as principal investigator by La Caixa Foundation (120,000 euro)

The Global Emissions Gap

A large gap exists between the pledges countries have made to cut greenhouse gas emissions and the cuts needed to keep global temperatures from rising 1.5°C and even 2°C. In its 2018 Emissions Gap Report, the UN Environment Program shows how much countries' unconditional Paris Agreement pledges will cut emissions by 2030, how much more their conditional pledges could cut them, and how far off both numbers are from the targets of the agreement.

GLOBAL GREENHOUSE GAS EMISSIONS

1.5°C and 2°C scenarios, estimates to 2030 and beyond



SOURCE: UNEP Emissions Gap Report 2018

InsideClimate News

Kevin Anderson

Director of the Tyndall Centre for Climate Change Research (UK)

"Avoiding dangerous climate change demands de-growth strategies from wealthier nations"

(Anderson and Bows, 2011).

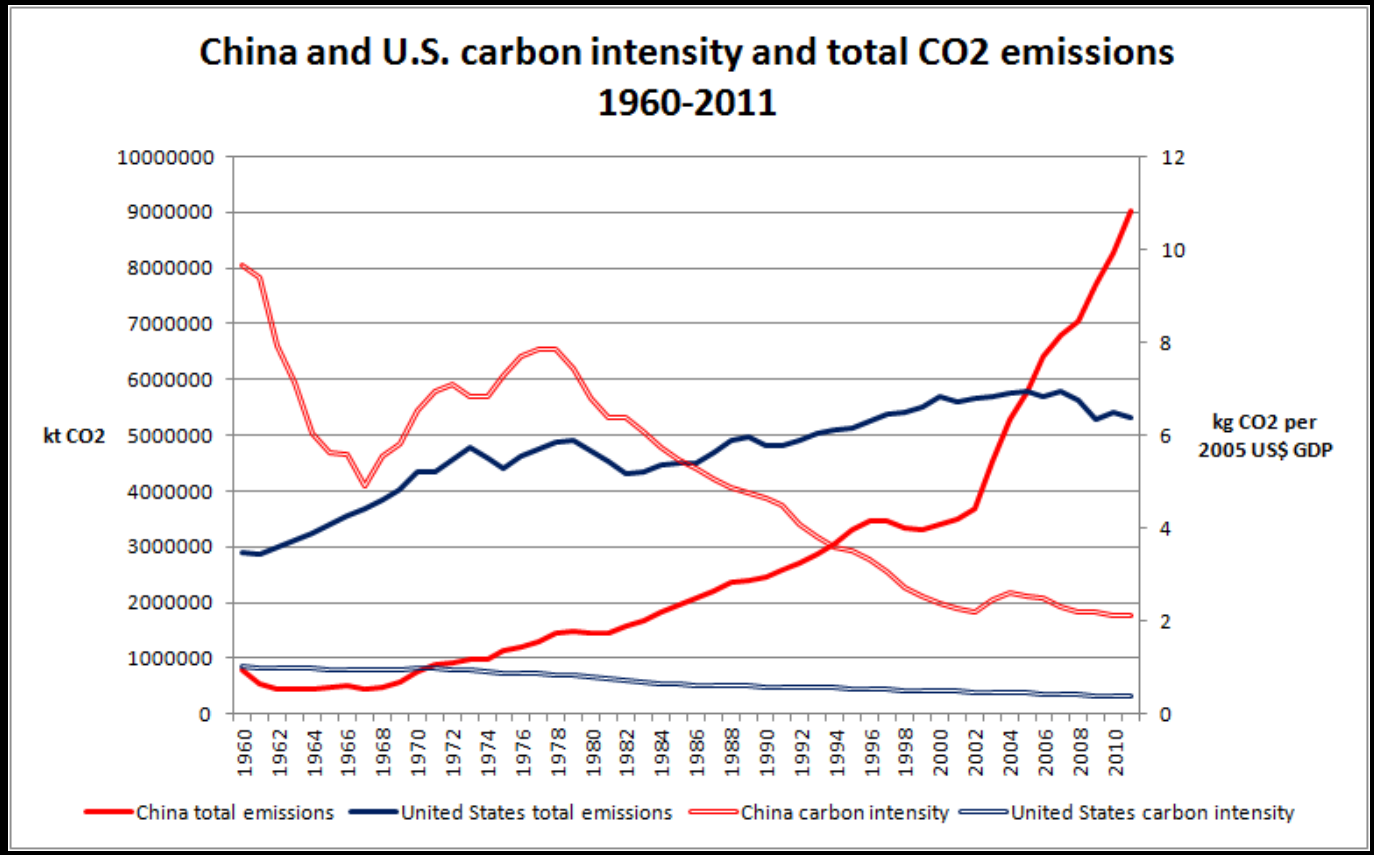
Anderson, K. and Bows, A. (2011) 'Beyond "dangerous" climate change: Emission scenarios for a new world'. *Philosophical Transitions of the Royal Society*, 369: 2–44.

Green growth is implausible

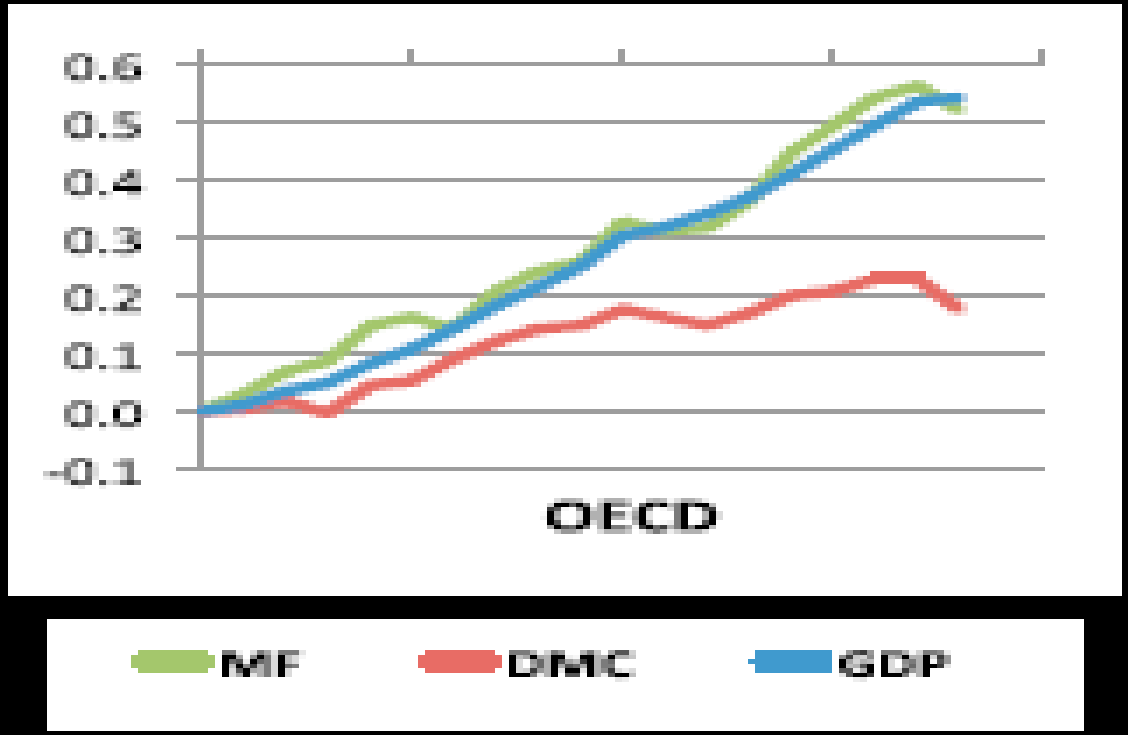
- Green growth = economic growth that uses natural resources in a sustainable manner.
- Is growth something measured in terms of economic value or material throughput?
- How to eliminate carbon emissions from developed economies in the space of little more than a decade with no impact at all on economic expansion?

Source: Jackson and Victor (2019) Unraveling the claims for (and against) green growth. *Science*

1. The more efficient an economy becomes, the more resources it uses (or vice versa...)

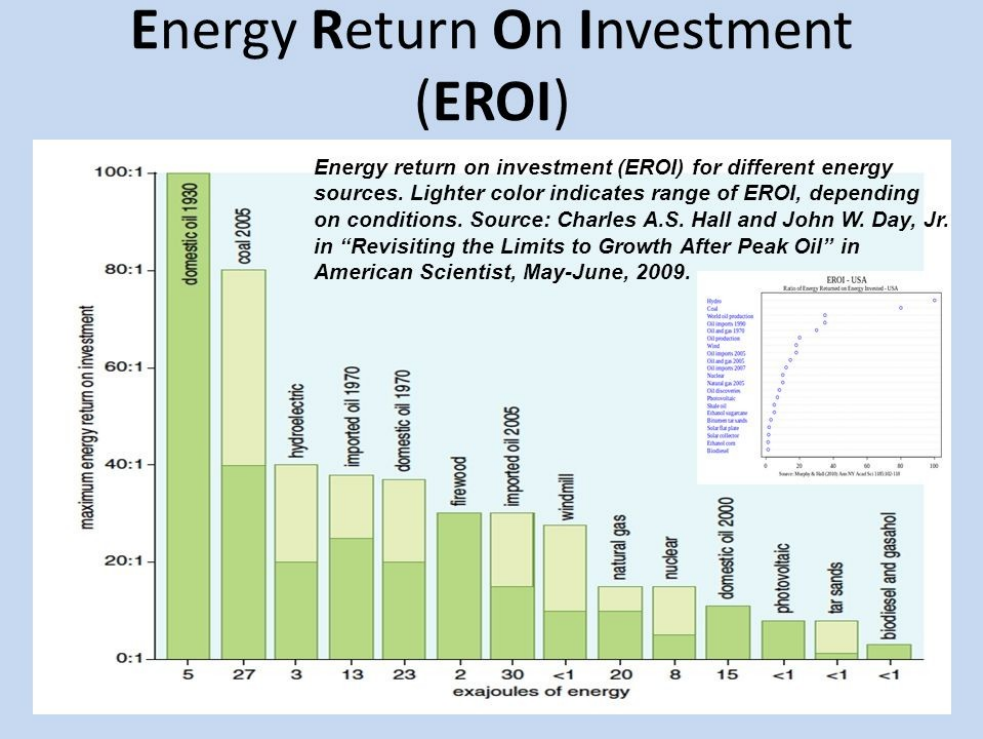


2. The more an economy grows, the more materials it uses.



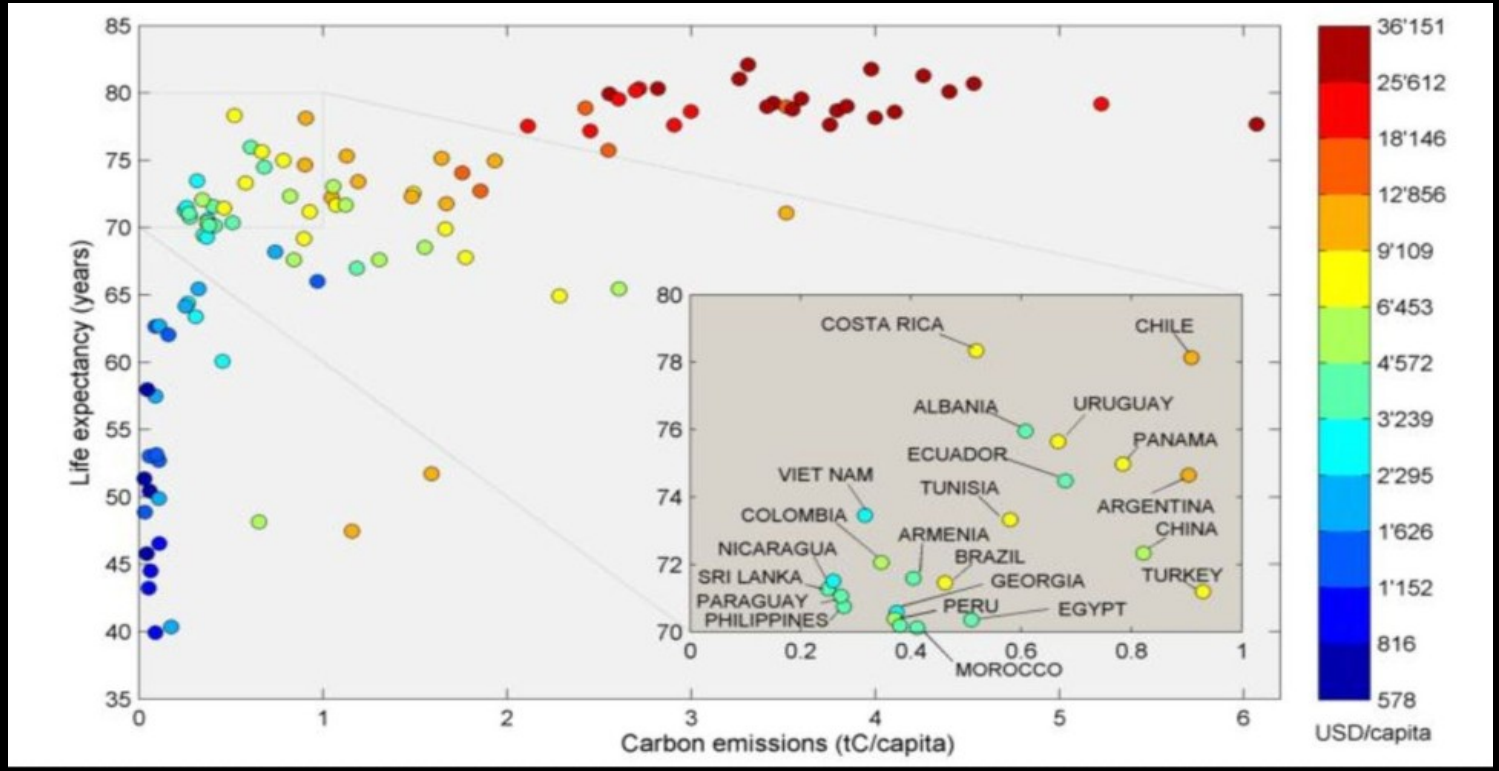
Source: Wiedmann, T. O., et al (2015). The material footprint of nations. Proceedings of the National Academy of Sciences (PNAS)

3. Renewable energies produce less net energy



Source: Murphy, D. J., & Hall, C. A. (2010). Year in review—EROI or energy return on (energy) invested. Annals of the New York Academy of Sciences.

4. ‘High life expectancy is compatible with low carbon emissions, but high incomes are not’.



Source: Steinberger, JK et al (2012), Pathways of human development and carbon emissions embodied in trade. Nature Climate Change

5. Lack of growth may increase inequalities... unless there is redistribution

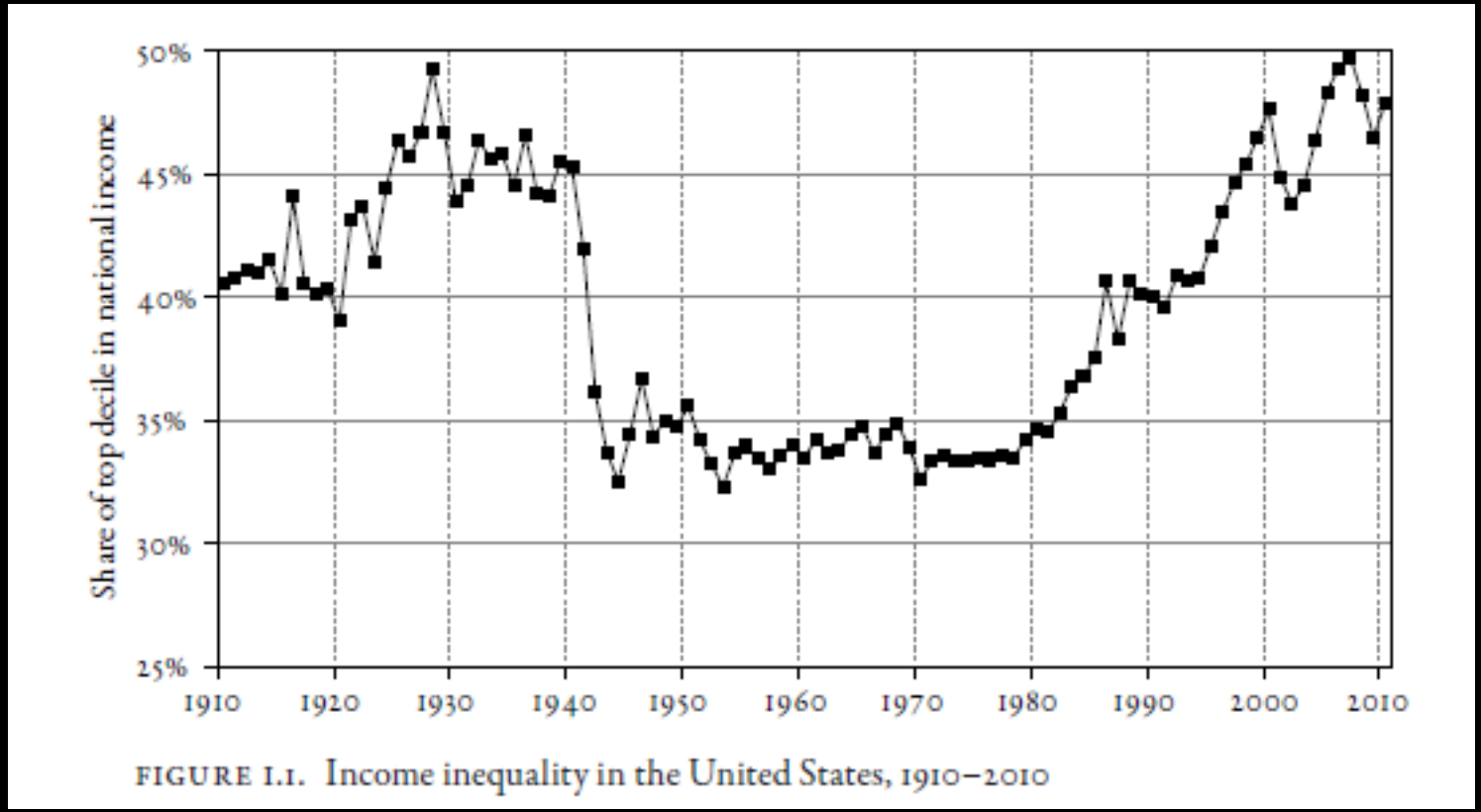


FIGURE I.1. Income inequality in the United States, 1910–2010

Source: Piketty, T., 2015. Capital in the 21st century

6. Growth = Welfare?

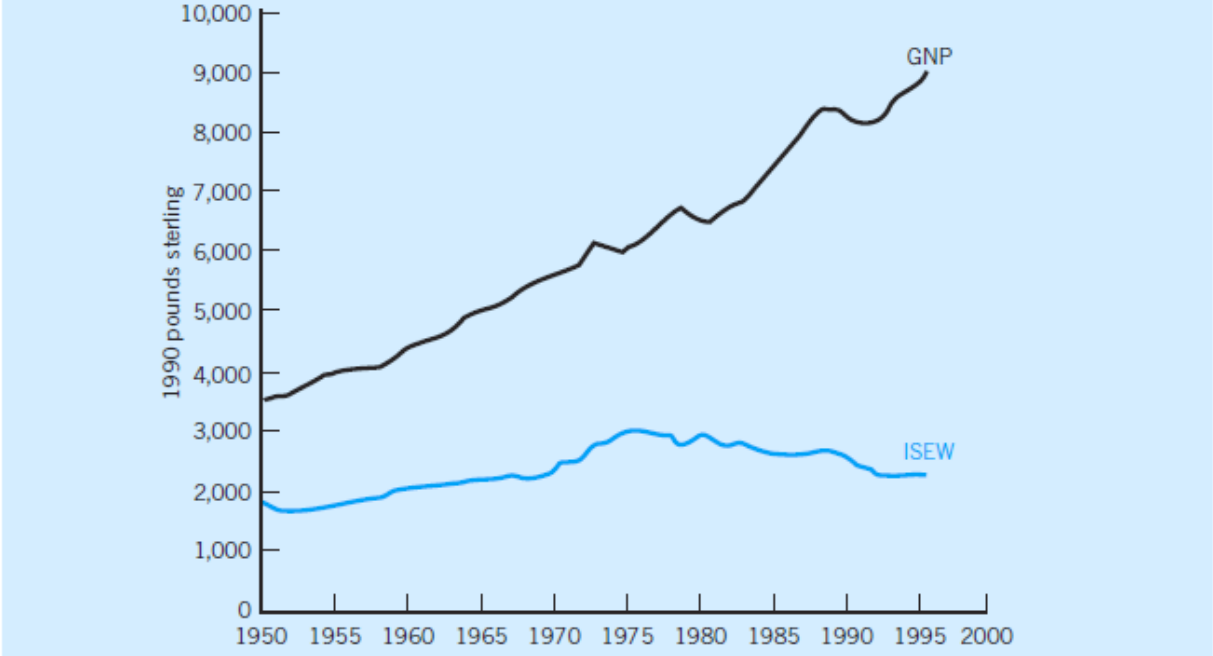


Fig. 10.2 Real GNP and ISEW per capita, UK, 1950–96.
Note: ISEW = Index of Sustainable Economic Welfare.
Source: Adapted from Jackson *et al*. (1997).

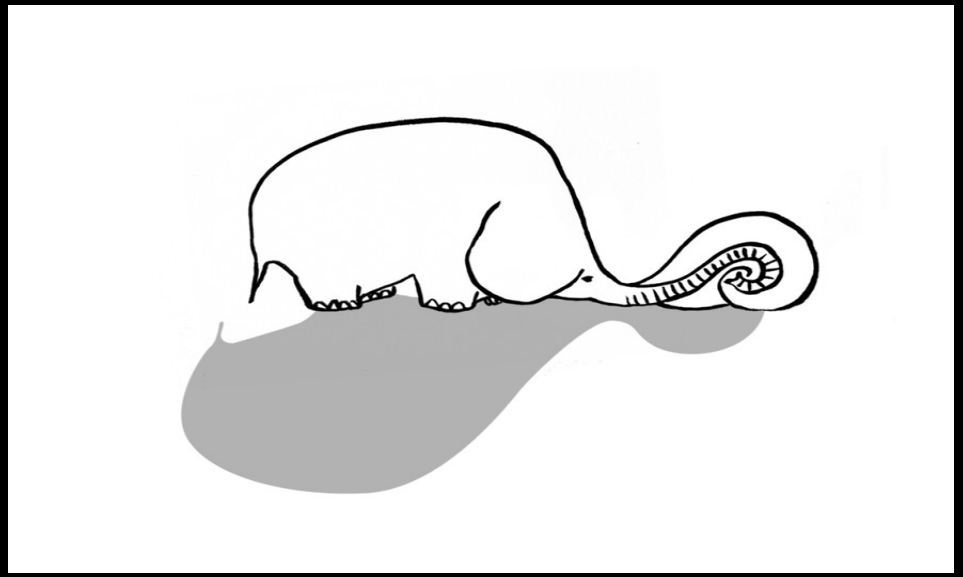
Source: Griffiths, A. and Wall, S. (2007) *Applied economics*. Pearson education.

3. Ecological macroeconomics

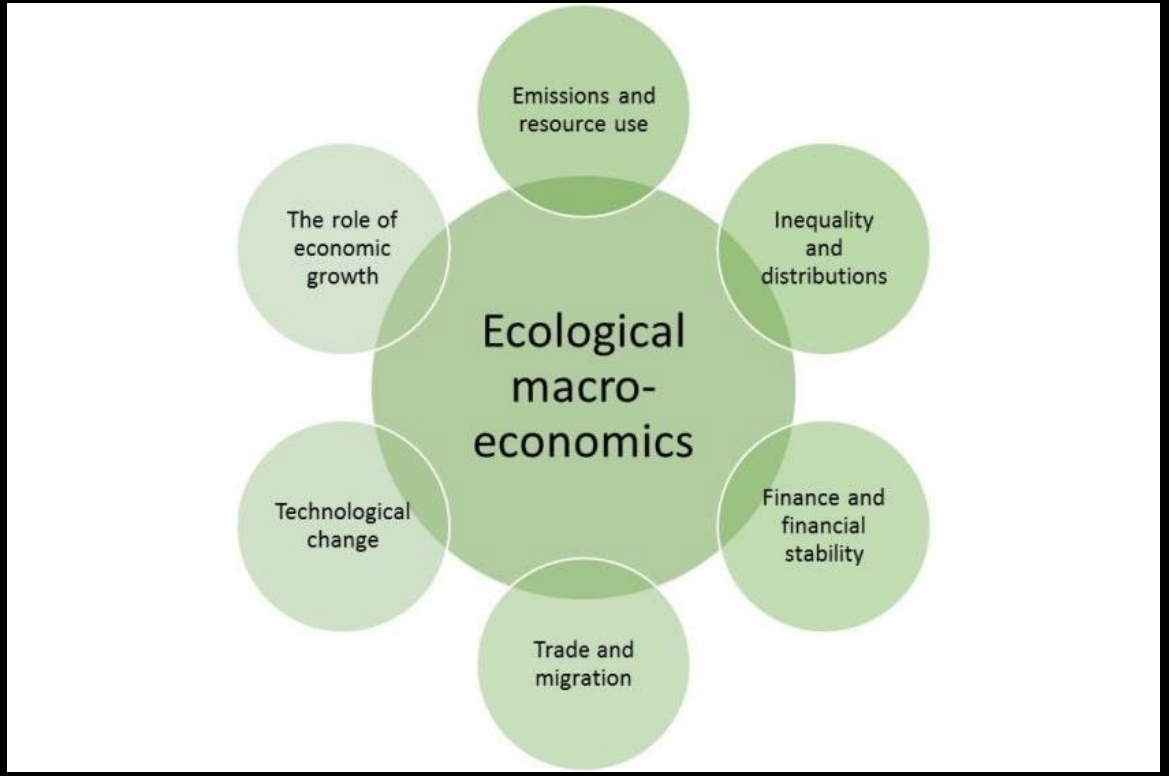
How can economies without growth be socially sustainable and economically stable?

Source: Jackson, Tim (2017) *Prosperity without Growth*. Routledge

The objective is not to make an elephant leaner, but to turn an elephant into a snail.



Can we manage an economy without growth?



Source: Victor, P (2008) *Managing Without Growth*. Edward Elgar.

Policy proposals

1. Establish environmental limits
2. Reduction of working time and Work-sharing
3. Basic and maximum income
4. Green tax reform
5. Stop subsidizing and investing in polluting activities

→ A coherent package of mutually supportive measures

Source: Demaria et al (2019) Geographies of degrowth. *Environment and Planning E*

Economic policy

The EU needs a stability and wellbeing pact, not more growth

Letters

Sun 16 Sep 2018 16.26 BST

1,722

238 academics call on the European Union and its member states to plan for a post-growth future in which human and ecological wellbeing is prioritised over GDP

Europe, It's Time to End the Growth Dependency

The European Union, its Institutions, and Member States

This petition is run by European Environmental Bureau

91,074
of 125,000 signatures

Petitions on you.wemove.eu are started and run by civil society groups and members of the public. WeMove.EU hosts these petitions and they are in line with our values but they

“...the time has come to accept **degrowth** in some parts of the world, in order to provide resources for other places to experience healthy growth”.

Pope Francis, 'Encyclical *Laudato Si'*

«Imagining a world without growth is among the most vital and urgent tasks for society to engage in.»

Tim Jackson & Peter Victor, *The New York Times*

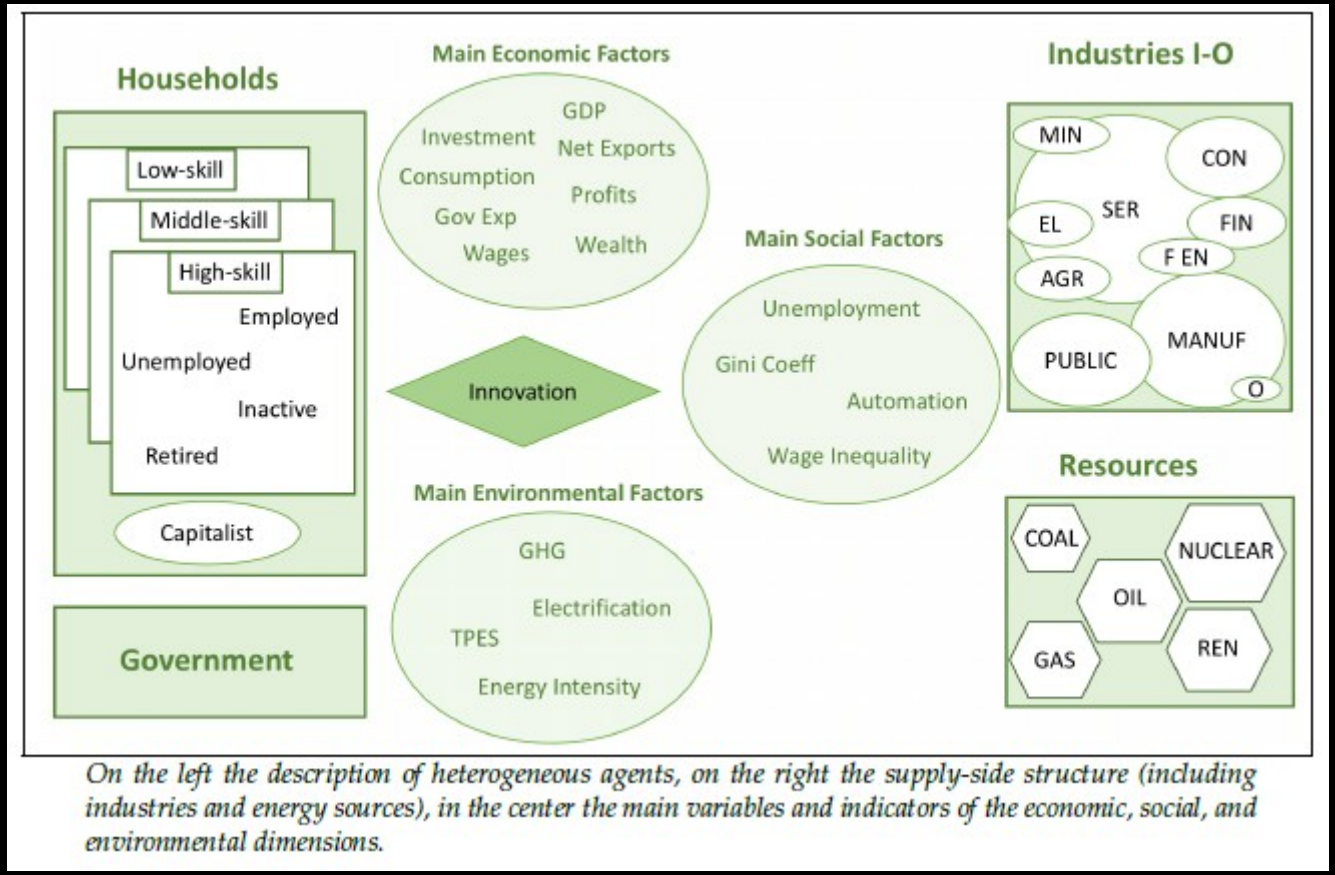
Research question

This project aims to explore the interlinkages among these societal challenges in order to evaluate policy responses that simultaneously address different goals.

The research question is:

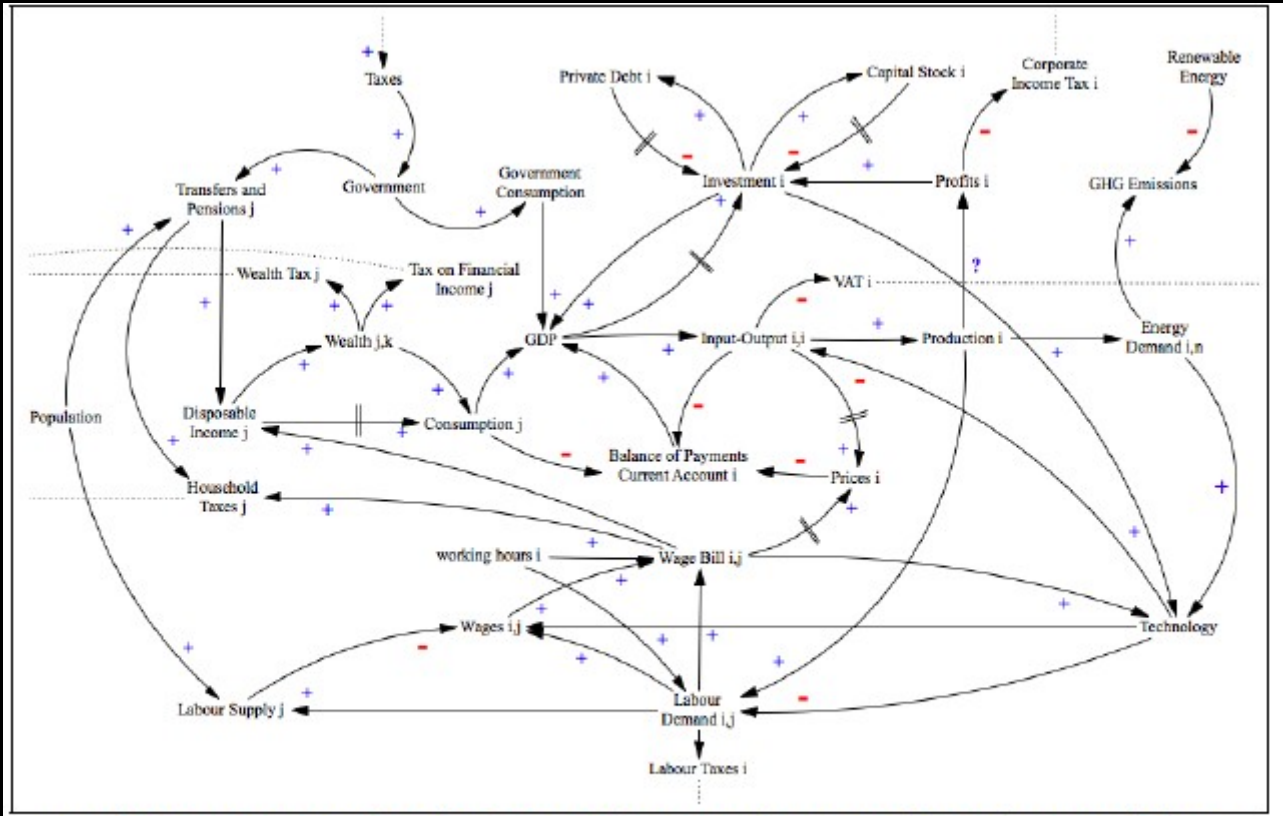
How could Spain manage a sustainable recovery that provides a good life for all within planetary boundaries?

Macroview of the model



On the left the description of heterogeneous agents, on the right the supply-side structure (including industries and energy sources), in the center the main variables and indicators of the economic, social, and environmental dimensions.

Scheme of the system dynamic model



Graphical representation of the feedback effects and lags among the main variables. Subscript i and j denote the industry and the skills, respectively. The signs on the arrows indicate a positive (+) or a negative (–) causal relationship, while the vertical double bar denotes a delayed effect.

Thank you!