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## Sustainability

Basic concepts for a common understanding



## Learning Objectives

At the end of the session, the participants should be able to:

1. Define sustainability/sustainable development;
2. Explain planetary boundaries and normative principle;
3. Discuss the pillars of sustainable development;
4. Describe the limits to growth and decarbonization;
5. Differentiate economic growth from economic development; and
6. Explain negative and positive externalities and resilience.



## Outline

- Sustainability / Sustainable development
- Planetary boundaries
- Normative principle
- Pillars of sustainable development
- Limits to growth / Decarbonisation
- Economic growth vs. economic development
- Negative and positive externalities
- Resilience



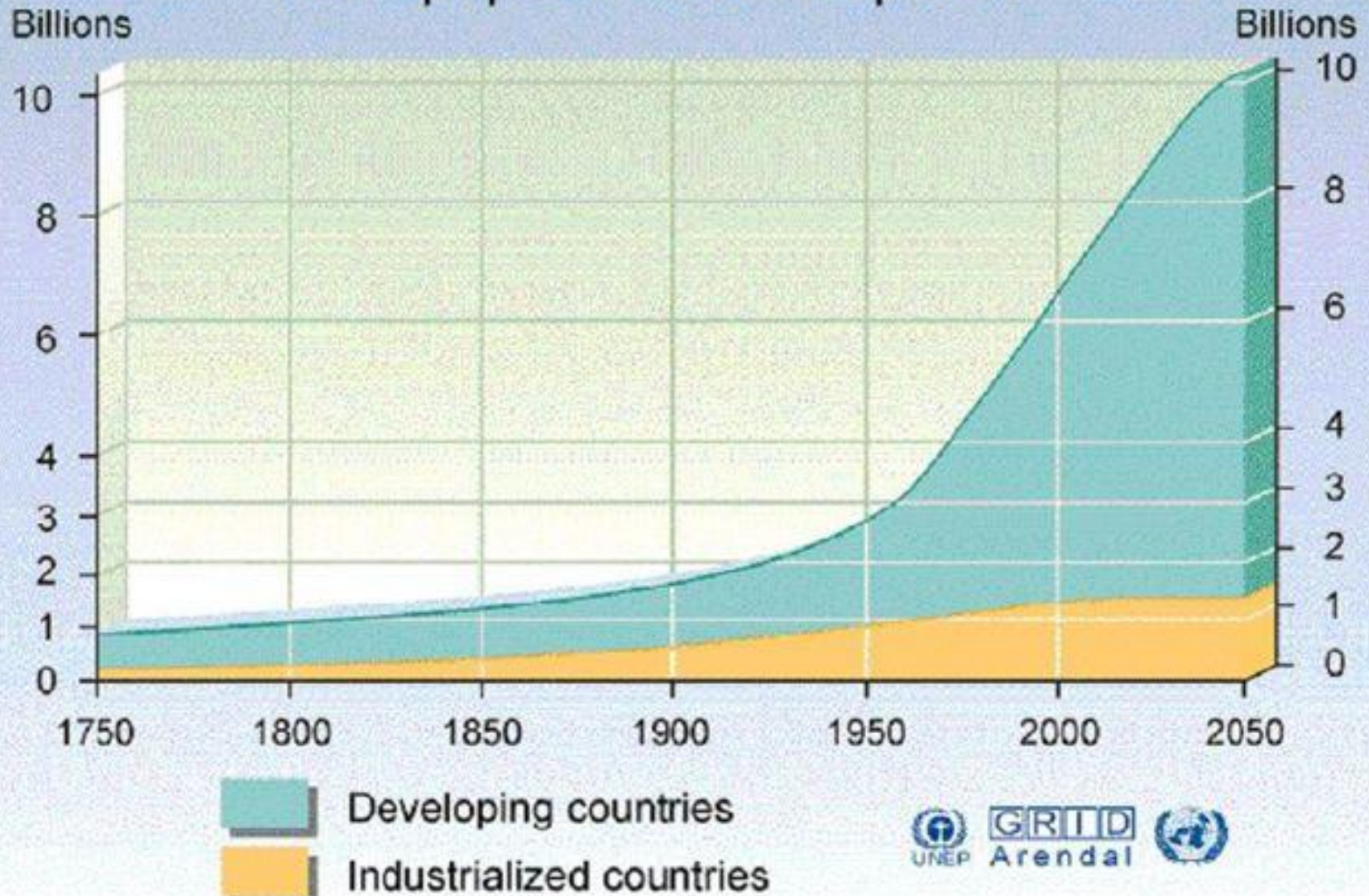
## The origins of the idea of sustainability

- In Europe in the 17<sup>th</sup> century, there was widespread fear of a coming wood scarcity. Hans Carl von Carlowitz and others addressed this risk:

***“do not take out more from an area than regrows in the same period”***

- Sustained yield forestry supported the rise of forest administration (“command + control”) and science.
- Even then, the question of whose needs should be met and to what extent was crucial.
- Pressure on forests was relieved, thanks to this approach, but also because of the rise of fossil fuels.

# World population development

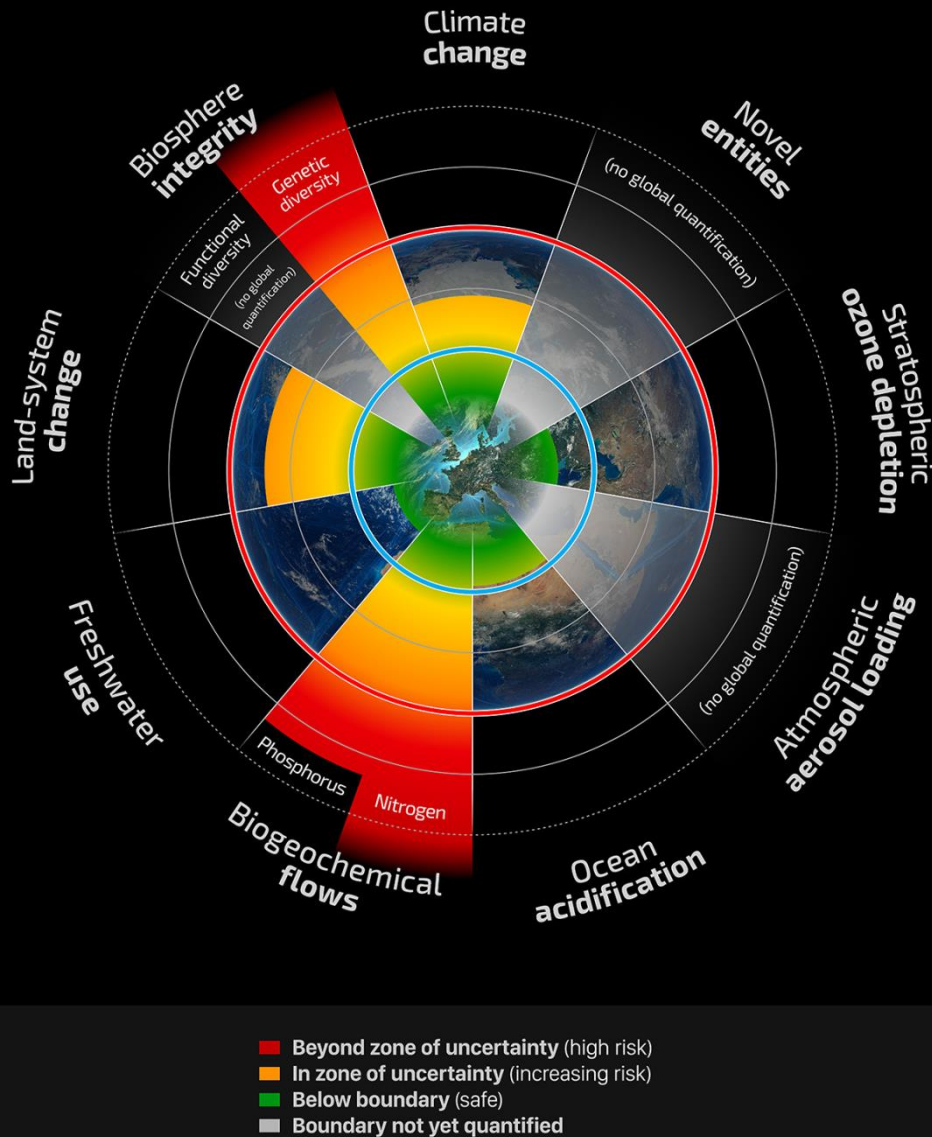


→ As population and economic turnover grow, so do our needs for natural resources and our waste production



# Planetary Boundaries

A safe operating space for humanity



Biosphere is  
1. the part of the earth's crust, waters, and atmosphere that supports life.

2. the ecosystem comprising the entire earth and the living organisms that inhabit it.

# Definitions: Sustainable development...

“[...] is development that meets the **needs** of the present without compromising the **ability** of future generations to meet their own needs.

It contains within it two key concepts: the concept of “needs”, in particular the essential needs of the world’s poor, to which priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment`s ability to meet present and future needs (chap 2, §1)<sup>1</sup>

“[...] meets the **needs** of the present while safeguarding Earth’s life-support system, on which the **welfare** of current and future generations depends.” <sup>2</sup>



## Caution: Sustainability is a normative principle

- Can we distinguish “good” from “bad” business?
- Is 1 € earned from food production better than 1 € earned from selling guns? Financial accounts give no answer to such questions. They must be answered based on the norms and values one accepts.





## Caution: Sustainability is a normative principle

- What is a sustainable development? And what contributes to such a development? All too often, there is no objective and unambiguous answer.
- Sustainable development defies a universally applicable, clear-cut definition. It is something that must be discussed. We have to find our way by agreeing e. g. on what are legitimate needs, what are the rights of future generations, and to what extent non-renewable resources may be consumed by our generation.



## The pillars of sustainable development

**"Ecological sustainability"** represents interests such as environmental protection, resource conservation, and preservation of biodiversity

**"Economic sustainability"** means to develop economies that can exist in the long term

**"Social sustainability"** means to strengthen all groups of society in order to secure peace and prosperity

The coordination and manifestation of the common objectives must be institutionalized as a requirement

A fourth pillar joins in this model when the **"institutional sustainability"** is added



# Visualizing pillars of sustainable development

## Pillar model



Source: FAO-NRDD (2013): Sustainability Assessment of Food and Agriculture Systems (SAFA). Rome.



The goal is a common "sustainable development"

If one of the pillars fails, the overall objective of "sustainable development" is lost

An important aspect is still missing in this pillar debate:

**"Cultural sustainability"**

Base on the cultural heritage and the cultural importance in the topic of "sustainability"

a "sustainable development" can only succeed if all pillars are working simultaneously and in coordination



## Decoupling and sustainable growth

- Starting with the “Brundtland report”, the dual goals of growth (in a sense of development!) and sustainability are postulated.
- To achieve this, economic output must be **decoupled** from resource depletion and pollution. This idea is more popular in industry than stricter approaches based on downshifting and sufficiency.
- UNDP and many governments expect the “green economy” to even create growth and employment

# Decarbonisation

- Definition of decarbonisation:

The reduction or removal of carbon dioxide from energy sources.

For example:

The European Union's leading power companies have set themselves the goal of making their electricity carbon free by 2050, which is, in theory, an achievable objective. A mix of renewables – such as wind and solar power, nuclear power stations and coal- and gas-fired plants that capture carbon dioxide emissions – could provide all the electricity we need with very little output of greenhouse gases

<http://lexicon.ft.com/Term?term=decarbonisation>



# Economic growth vs economic development

- Economic Growth can be measured by an increase in a country's gross domestic product (GDP)
- Economic growth is necessary but not sufficient condition of economic development
- Economic Growth does not take into account the depletion of natural resources which might lead to pollution, congestion & disease.

# Economic growth vs economic development

- Economic Development (ED) alleviates people from low standards of living into proper employment with suitable shelter.
- ED, however, is concerned with sustainability which means meeting the needs of the present without compromising future needs. These environmental effects are becoming more of a problem for Governments now that the pressure has increased on them due to Global warming.
- ED equals sustainable development?



## A critical voice from the past

*The world has enough for everyone's need,  
but not enough for everyone's greed.*

Mahatma Gandhi

# Positive and negative externalities

- Agriculture is inherently multifunctional. It jointly produces more than food, fibre or oil, having a profound impact on many elements of economies and ecosystems
- Negative externalities are very often “forgotten” when calculating economic profits. The community normally pays for these negative externalities
- Agriculture also produces positive externalities, and though there is no comprehensive valuation framework



## Key properties of sustainable social-ecological systems

- **Resilience:** “capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain (...) function, structure, identity, and feedbacks”
- **Adaptability:** “the capacity of humans to manage resilience”
- **Transformability:** “capacity to create a fundamentally new system when ecological, economic, or social (including political) conditions make the existing system untenable”

Source: Walker, B. et al. (2004): Resilience, adaptability and transformability in socio-ecological systems. Ecology and Society 9: 5. Available at [www.ecologyandsociety.org/vol9/iss2/art5](http://www.ecologyandsociety.org/vol9/iss2/art5)



## Reserve the term sustainability as:

- a goal, a measure of system performance
- an analytical framework to guide action
- a decision-making context i.e. how decisions translate into outcomes

The skeleton for sustainability is the recognition that a functioning biosphere is a precondition for economic and social development





## Take-home messages

- Sustainable development is no brainchild; it has deep roots in practical resource management

Sustainability is a normative principle and thus a subject of discussion

A sustainable development can only succeed if all pillars are working simultaneously and in coordination

- Sustainable growth is only possible if resource efficiency grows faster than the economy.
- System properties that encourage/foster sustainability are resilience, adaptability and transformability