

Sustainable Futures - Economic Dimension of Sustainability

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The Master's Programme of Futures Studies
Sustainable Futures - Futures2a. Environment, Culture, Society, Economy



Topics of Lecture

- The sense and overview of economic dimension of SD
- Investments in green technology
- Discount rates and time (generations equity)
- Economic impacts of Climate Change (Stern Review)
- How to impose limits on growth?
- How to decouple economic growth from environmental stress?

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Aims of Lecture (1/2)

- To give a sense and overview of the **economic dimension of sustainable development**
- The economic dimension of sustainable development concerns such questions as: investments in technology, discount rates and time, and sustainable growth beyond monetary terms

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Aims of Lecture (2/2)

- To give perspectives to critical argumentation (as regards economics and environmental issues)
- The reading for the lecture (Beckerman) represents a critical view to the debate on climate change and sustainable development
- The lecture gives a critical view to Beckerman's critical argumentation – metacritical approach



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Sustainability

- The concept of sustainable development popularised in 1987 with the publication of the “Brundtland Report” (the Report of the World Commission on Environment and Development). Radical agenda for s c
- This landmark report highlighted the need to conceptualize sustainable development that would *“meet the needs of the present without compromising the ability of future generations to meet their own needs”*.

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Core Problem of Sustainability

- Rio Conference in 1992, the United Nations Conference on Environment and Development (UNCED) met in Rio de Janeiro to discuss the planet’s dwindling resources in the face of **unrestrained economic growth** and the **failure of humankind to achieve equitable development**. The “Earth Summit”, as the UNCED came to be known, resulted in countries agreeing to the Rio Declaration setting out 27 principles for achieving sustainable development and complemented by Agenda 21, a guiding document for sustainable development.
- Kyoto conference on climate change took place in 1997. The developed countries agreed to specific targets for **cutting their emissions of greenhouse gases**. A general framework was defined for this, with specifics to be detailed over the next few years. This became known as the Kyoto Protocol.

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Precursor Reports towards the Concept of Sustainability

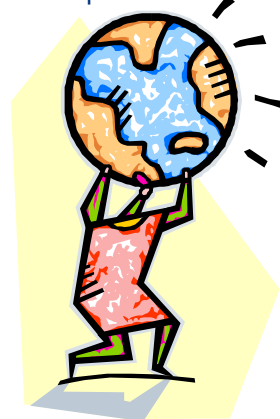
- Malthus - population would continually press against the limits to world food supply (mid 19th c.)
- Rachel Carson "Silent Spring" 1962
- Limits to Growth 1972, 1992, 2002
- Classical Big Bang of the environmental debate

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Prerequisites of Sustainability

- In making the links between the economy, society and the environment, the Brundtland Report puts "development" (a traditional economic and social goal) and "sustainability" (an ecological goal) together to make a new development model "sustainable development"
- previously the environment was linked with preservation, not with development (Baker 2006, 20)



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Prerequisites of Sustainability

- It has generally been accepted that achieving sustainable development will require **balancing environmental, societal, and economic considerations in the pursuit of development and an improved quality of life**. A number of ideals and principles underlying sustainability have been identified.
- These include **intergenerational equity, gender equity, just and peaceable societies, social tolerance, environmental preservation and restoration, poverty alleviation and natural resource conservation**.

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Prerequisites of Sustainability

- UN Department of Economic and Social Affairs/Division for Sustainable Development
Agenda 21 identified **education** as an essential tool for achieving sustainable development
- Reorienting education towards sustainable development
- Education, including formal education, public awareness and training should be recognized as a process by which human beings and societies can reach their fullest potential
- Education is critical for promoting sustainable development and improving the capacity of the people to address environment and development issues.

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Key Words of Sustainability



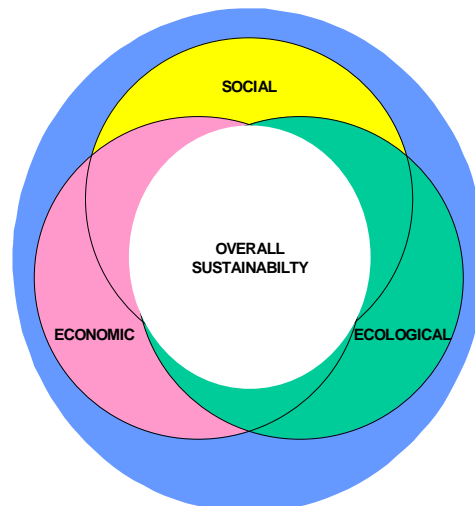
- *the needs*
- *the present*
- *without compromising*
- *future generations*



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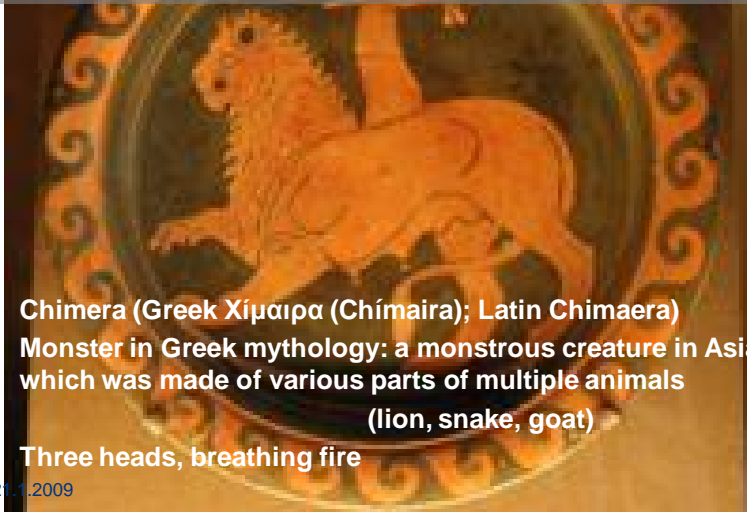
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The three basic dimensions of sustainability



Lahti, P., Calderón, E., Jones, P., Rijsberman, M. & Stuij, J. (editors).
Towards Sustainable Urban Infrastructure: Assessment, Tools and Good Practice.
European Science Foundation, ESF/COST Publication, Helsinki 2006. 336 p. ISBN 978-92-898-0035-8. (p. 20 and 32)

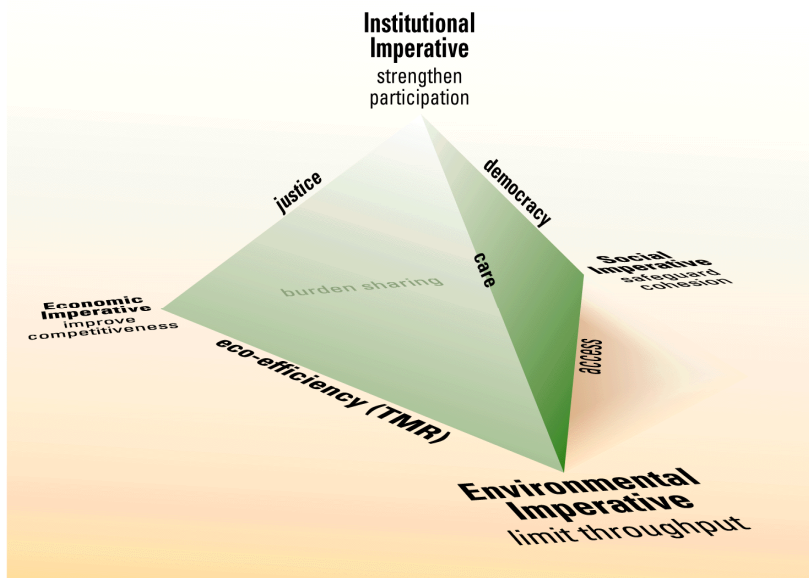
Beckerman compares the concept of sustainability to the myth of Chimera



Chimera (Greek Χίμαιρα (Chímaira); Latin Chimaera)
 Monster in Greek mythology: a monstrous creature in Asia which was made of various parts of multiple animals (lion, snake, goat)
 Three heads, breathing fire

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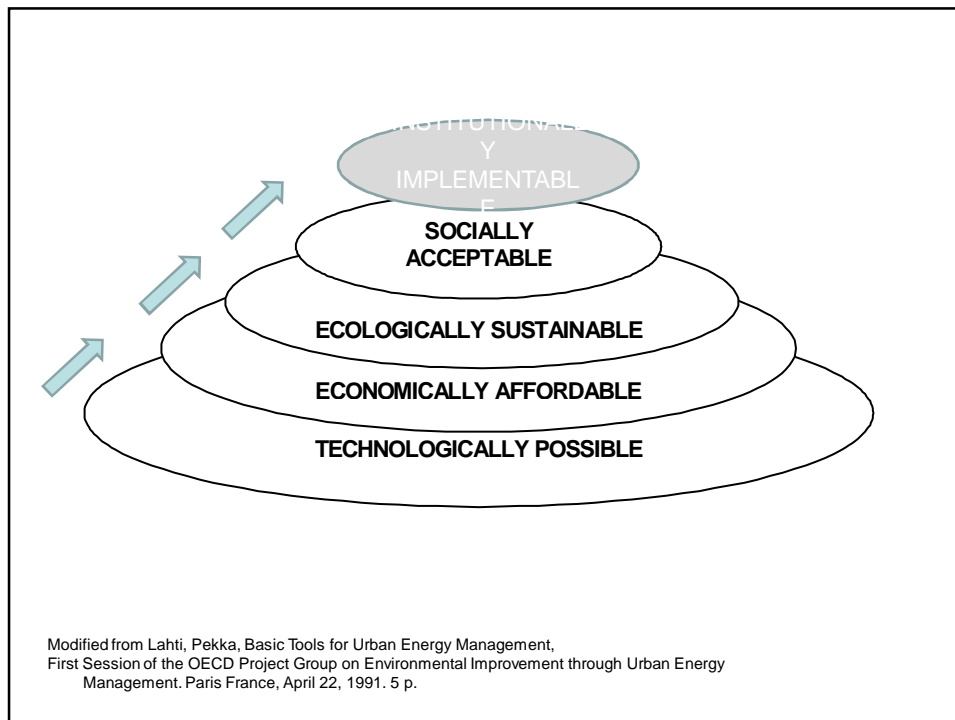


Quelle: J. Spangenberg, Wuppertal Institut, 1997

Wuppertal Institut UM-631e-1/97

The four dimensions of sustainable development

Valentin A. & Spangenberg J. (2000)



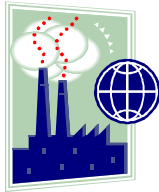
Economically Sustainable Development

Consists of two different, but parallel and interconnected prerequisites:

- Economically sustainable activities must also be profitable business-wise
- Sustainable economy is in harmony with the eco-systems as well as with the surrounding social and cultural systems

Tight Links

- Environmental stresses are linked with another
- Environmental stresses and patterns of economic development are linked with another
- Environmental and economic problems are linked with social and political factors



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Beckerman's Criticism

- Claims a long tradition of falsified predictions
- Questions the basic assumptions
- World Bank (1992) saw no evidence of marketable non-renewable resources (metals, minerals, and energy) becoming scarce in an economic sense....

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Beckerman's Criticism

- Common-knowledge counter-evidence: price of oil greatly varies:
- Jan. 08 over 100 doll/barrel, June08 147 doll/barrel, Jan.09 47 doll/barrel
- Peak Oil debate missing in B's text

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Peak Oil

- **Peak oil is the point in time when the maximum rate of global petroleum extraction is reached, after which the rate of production enters terminal decline.**
- **The concept is based on the observed production rates of individual oil wells, and the combined production rate of a field of related oil wells.**
- **The aggregate production rate from an oil field over time usually grows exponentially until the rate peaks and then declines—sometimes rapidly—until the field is depleted.**

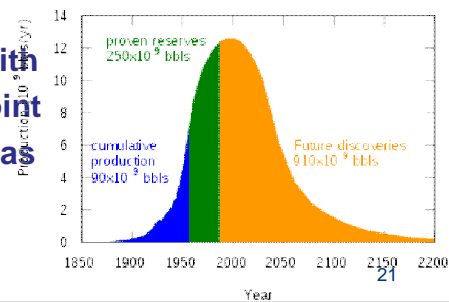
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Peak Oil

- This concept is derived from the Hubbert curve, and has been shown to be applicable to the sum of a nation's domestic production rate (M. King Hubbert 1956)
- The concept is also applied to the global rate of petroleum production.
- Peak oil is often confused with oil depletion; peak oil is the point of maximum production whereas depletion refers to a period of falling reserves and supply.

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Investment in Companies that Conduct...

- More and more investors want to invest in stocks of companies that conduct their business in accordance with the principle of sustainable development.
- This means that investment decisions are based on environmental and social aspects as well as economic performance.

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Investment in Green Technology

- More and more companies want to invest in technology that either promotes the principle of sustainable development
- Or is in itself environment-friendly.
- This is partly because of the growing awareness of clients and customers; and



partly because such technology in the long saves energy, AND money

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Sustainability linked with customer success


- Sustainability helps to achieve customer success and therefore long-term success
- "Real" sustainability efforts or image building?
- Green wash does not pay



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Key Issues in the Nexus of Sustainability and Economy (1/2)

- Growth (sustainable growth? smart growth?) 
 - progress thinking (continuous growth)
- Eco-efficiency
 - efficiency demands (more of less)
- Eco-sufficiency
 - change of mindset (what is enough)

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Key Issues in the Nexus of Sustainability and Economy (2/2)

- Technology
 - technological determinism
 - technological optimism
 - innovation

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Stern Review of the Economics of Climate Change

(2006)

- The most comprehensive study of the economics of climate change
- Assessed a wide range of evidence on the impacts of climate change and on the economic costs
- Conclusion: the benefits of strong and early action far outweigh the economic cost of not acting
- Climate change will affect the basic elements of life for people around the world – access to water, food, health, and the environment (hunger, water shortages, coastal floodings)

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Stern Review of the Economics of Climate Change

- If we don't act, the overall costs and risks of climate change will be equivalent to losing at least **5% of global GDP each year**, now and forever (with wider range of risks/impacts, the estimate of damage up to 20% or more)
- In contrast, the cost of action – reducing greenhouse gas emissions to avoid the worst impacts – can be limited to around **1% of global GDP each year**
- Because CC is a global problem, response to it must be international
- All countries affected, the poorest will suffer most
- The costs of stabilising the climate are significant, but manageable; delay would be dangerous and much more costly!

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Stern Review of the Economics of Climate Change

- Emissions trading is one of the key elements of future international frameworks for combatting CC
- Action on CC will also create significant business opportunities
- New markets are created in low-carbon energy technologies and other low-carbon goods and services
- These markets estimated to grow to 500 billions of dollars
- Employment in these sectors will expand accordingly

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Stern Review of the Economics of Climate Change

- **General criticism:**
 - 1) the discount rate used in calculations too low
 - 2) slowing CC will require deep emission cuts everywhere (i.e. Stern underestimated the severity of the problem)
- **Beckerman's criticism:**
 - 1) predictions of the likely harmful effects of climate change and of the possible worst-case scenarios are too alarmist;
 - 2) the discount rate implicit in its estimates of future damages from climate change is too low

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Beckerman's Criticism (1/3)

- “needs” is a subjective concept
- people at different points in time, or at different income level, or with different cultural or national backgrounds, will differ about the importance they attach to different “needs”

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Beckerman's Criticism (2/3)

- conventional economic analysis is inadequate when we are confronted with environmental problems
- CBA inappropriate in the context of climate change analysis



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Beckerman's Criticism (3/3)

- Between generations compensation is impossible – future generations cannot compensate present generations for any sacrifice the latter may make in the interest of the former
- There can never be trans-generational government that can adjust for any intergenerational inequities that may arise over time

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Pareto Efficiency

- **Pareto efficiency**, or **Pareto optimality**, is an important concept in [economics](#) with broad applications in [game theory](#), [engineering](#) and the [social sciences](#). The term is named after [Vilfredo Pareto](#), an Italian economist who used the concept in his studies of [economic efficiency](#) and [income distribution](#).
- Given a set of alternative allocations of, say, [goods](#) or income for a set of individuals, a movement from one allocation to another that can make at least one individual better off without making any other individual worse off is called a **Pareto improvement**.

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Pareto Efficiency in Economics

- An economic system that is Pareto efficient implies that no individual can be made better off without another being made worse off. Here 'better off' is often interpreted "put in a more preferred position." It is commonly accepted that outcomes that are not Pareto efficient are to be avoided, and therefore Pareto efficiency is an important criterion for evaluating economic systems and public policies.
- If economic allocation in any system (in the real world or in a model) is not Pareto efficient, there is theoretical potential for a Pareto improvement - an increase in Pareto efficiency: through reallocation, improvements to at least one participant's well-being can be made without reducing any other participant's well-being.

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Pareto Efficiency in Economics

- In the real world ensuring that nobody is disadvantaged by a change aimed at improving economic efficiency may require compensation of one or more parties.

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Ethical issues

- The choice of discount rate for projects spanning generations raises difficult ethical problems (Stern)
- How can a purely technical issue, i.e. The choice of of a discount rate for project analysis, turn out to raise basic ethical issues (in the context of climate change)? (Beckerman)

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Mystifying Sustainable Development

- Sustainable development is coming in the nick of time to save humanity from extinction (Beckerman's ridicule)
- Any alternative ethical systems?



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Difficulty of Measuring Sustainable Development

- Sets of indicators
- Green GDP
- Environmental accounting
- Factor four, ecological footprint, MIPs etc
- Environmental sustainability index (internationally comparative index of environmental sustainability in 122 countries)
- Beckerman: "they measure environmental condition, not sustainability"

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The Rights of Future Generations

- A concept related to the rights of future generations is that of sustainable development: future generations should have a right to a standard of living no lower than the current one (Stern 2006, 27)
- Non-existing entities cannot have characteristics (Beckerman 2007, 21)

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"True Meaning of Sustainable Development" according to Beckerman

- Development that enables people to live together peacefully
- If we are concerned with the welfare of future generations, we should pass on to them a greater respect for human rights throughout the world
- The most endangered species today is the human race
- ^{21.1.2009} *Beckerman fails to see the link btw sustainability and* ⁴¹

Climate change

- > floods, desertification, hurricanes
- > shortage of food, clean water, energy
- > riots, conflicts
- > forced migration

Questions for Discussion:
How to impose limits on growth? (1/2)

- Can today's level of wealth creation be sustained? – what is needed, what is enough?
- It is difficult to distinguish needs from wants, as they are socially and culturally determined. However, in most cultures, fundamental needs are similar, including subsistence, protection, affection, understanding, participation, creation, leisure, identity and freedom (Pepper 1996)

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Questions for Discussion:
How to impose limits on growth? (2/2)

- The industrialised world consumes in excess of these basic needs, because it understands development primarily in terms of ever increasing material consumption. (Baker 2006, 20)
- What would be a new development paradigm?

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Questions for Discussion:
How to understand development in terms of quality of life?

- changing the quality of growth: making it less material and energy intensive and more equitable in its impact
- Meeting essential needs for jobs, food, energy, water, and sanitation
- merging environmental and economic consideration in decision making
- reducing population growth to sustainable levels

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Questions for Discussion:
How to reduce consumption in the industrialised world?

- The industrialised countries bear more historical responsibility for global climate change, an idea known as "ecological debt"
- The North has more financial and technical ability to mitigate the effects of climate change

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Questions for Discussion: *How to deal with generations?*

- Generations are not homogeneous
- There are huge disparities btw the income levels of people alive today: a large proportion of today's people live at, or not far above, subsistence level

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Further Reading

Baker, Susan (2006). *Sustainable Development*. Routledge, New York.

Beckerman, Wilfred (2006). *The Chimera of "sustainable development"*. The Electronic Journal of Sustainable Development (2007)1(1). = BACKGROUND READING FOR THE COURSE.

Haukioja, Teemu (2007). *Sustainable Development and Economic Growth in the Market Economy*. Turun kauppakorkeakoulun julkaisuja A-6:2007.

Lahti, P., Calderón, E., Jones, P., Rijsberman, M. & Stuij, J. (editors) (2006), *Towards Sustainable Urban Infrastructure. Assessment, Tools and Good Practice*. European Science Foundation ESF/COST Publication. Helsinki. 336 p. ISBN 978-92-898-0035-8.

Meadows et al. (1972, 1992, 2002). Limits to Growth.

Stern Review of
the Economics of Climate Change (2006)

Von Weizsäcker, Ernst, Lovins, Amory B. & Lovins, L Hunter (1998). *Factor Four. Doubling wealth, halving energy use*. Report to the Club of Rome. London, 322 p.

World Commission on Environment and development (1987) *Our Common Future*. Oxford.

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