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# ECONICS:

## USING ECOSYSTEM THEORY TO SUPPORT SUSTAINABLE DEVELOPMENT IN SOCIO-ECONOMIC SYSEMS

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## The Starting Point

**Threatening actual problems of the global socio-economic system, like**

- **rapid climate change**
- **environmental pollution**
- **depletion of oceans**
- **species extinction**
- **degradation of soils**
- **increasing of mental diseases**
- **...**

**indicating principle systemic misconfiguration**



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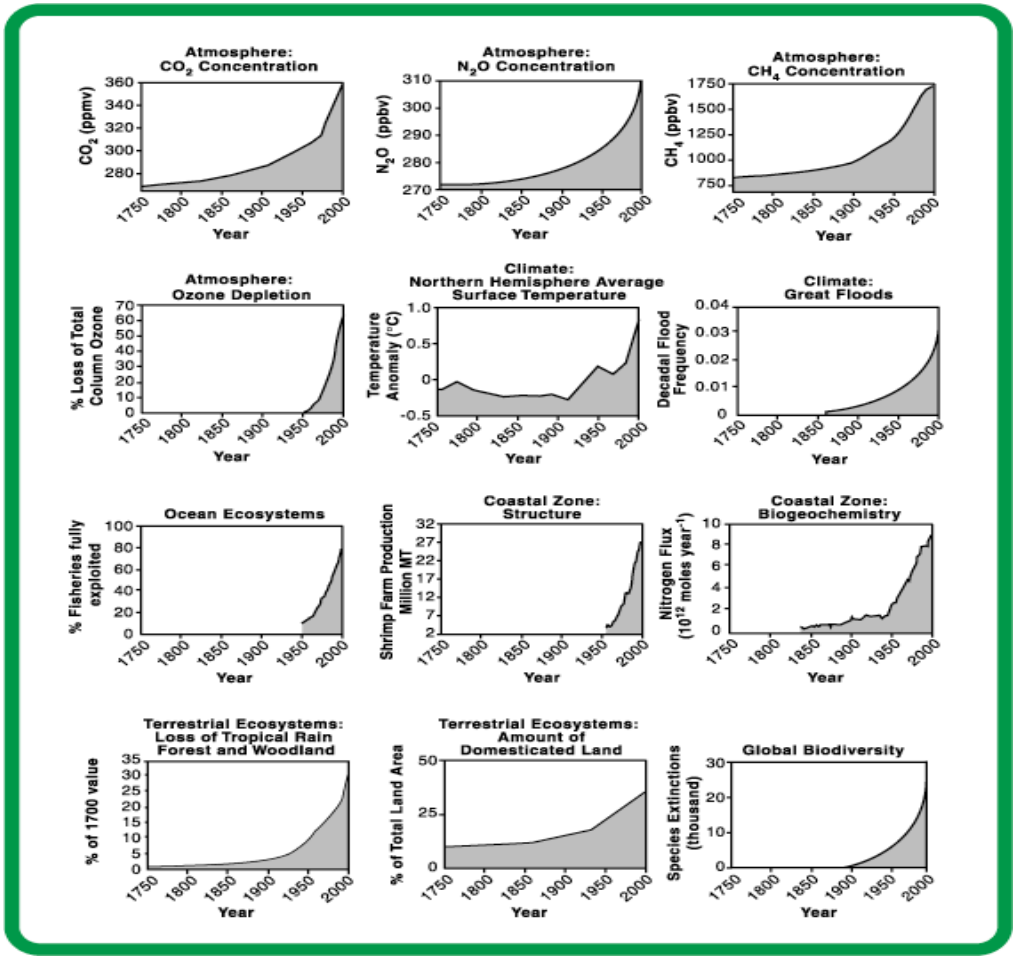
# Different Parameters




# Same Curve

GBP, 2004, Global Change and the Earth System, W. Steffen et. al. Springer Berlin, Heidelberg, New York



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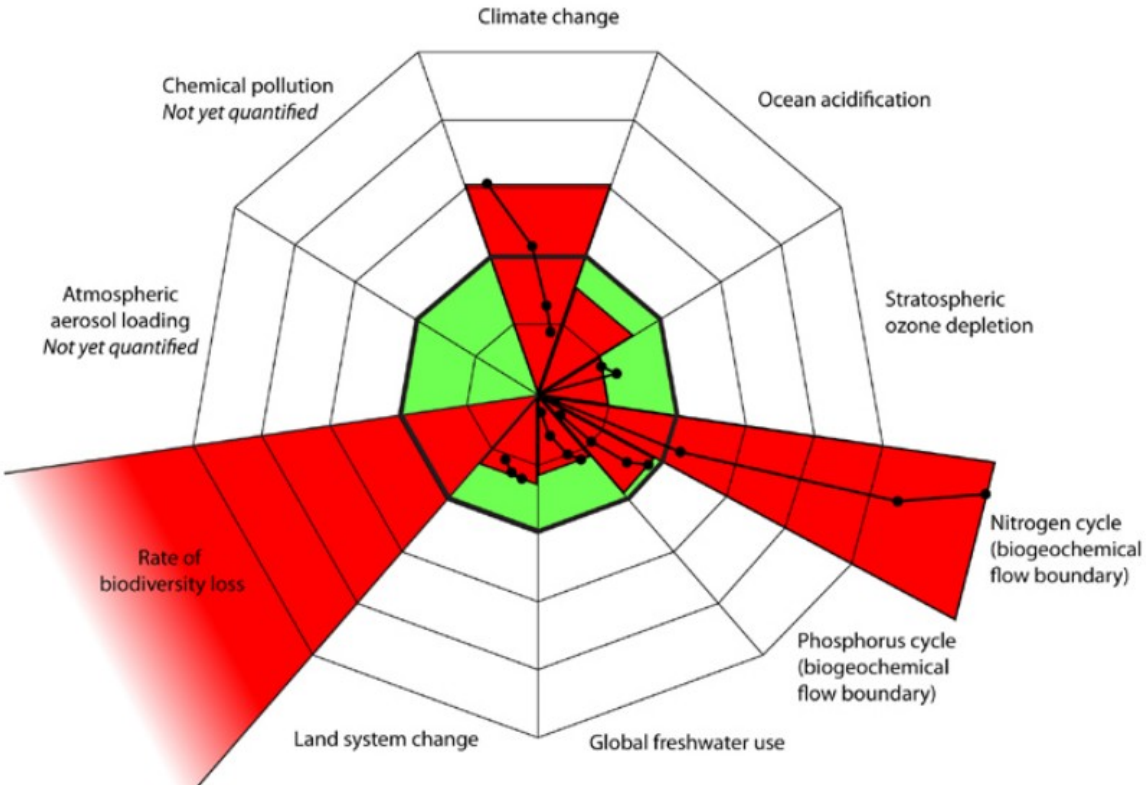
# And Boundaries Are Already Exceeded




J. Rockström, et al., 2009: Planetary Boundaries: Exploring the Safe Operating Space for Humanity, Nature 461, p. 472 - 475



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# The Challange

**Intended transformation of a self-organized, complex system towards a sustainable modus operandi**

**Comparable to the neolithic or industrial revolution and to be performed in 30 years (*)**

**driven not by new possibilities but by constrains**

(*) WBGU 2011, German Advisory Council on Global Change, „Welt im Wandel – Gesellschaftsvertrag für eine Große Transformation“, (2. modified edition)



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# The Econical Approach

**Learning from ecosystems, since**

- **they are subject of intensive scientific research**
- **they feature a quite similar complexity as socio-economic systems**
- **some exits for millions of years despite of changing environment condition and rapid disturbances**
- **they have “learned” to deal with limited resources**

**& the successes of bionics**



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## So We Define Econics As

**the systematic research of ecosystems in terms of their systemic strategies, principles of organization and processes**

**with the intention to find solutions and guidelines for the further sustainable development and the evaluation of technical and socio-economic systems.**



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**www.centreforeconics.org**



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## Characterizing The Goal

**If we are looking for sustainable development what exactly we want to learn from ecosystems?**

**The classical understanding based on the definition of the Brundtland Commission and the Enquete Commission of the German Parliament are strongly related to the anthropogenic realm.**

**In which way are ecosystems sustainable?**



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# Redefining Sustainability

**”Sustainable development is the process of creating, testing, and maintaining opportunity by balancing a system's efficiency and resilience without interruption, weakening or loss of quality and functionality.(*)”**

(*) Hobson, P., and Ibisch, P. (2012) Learning from nature for sustainability: an econical approach to (non-) knowledge management. Series for Econics and Ecosystem Management, 1: Global Change Management: Knowledge Gaps, Blindspots and Unknowables, 223 – 251.



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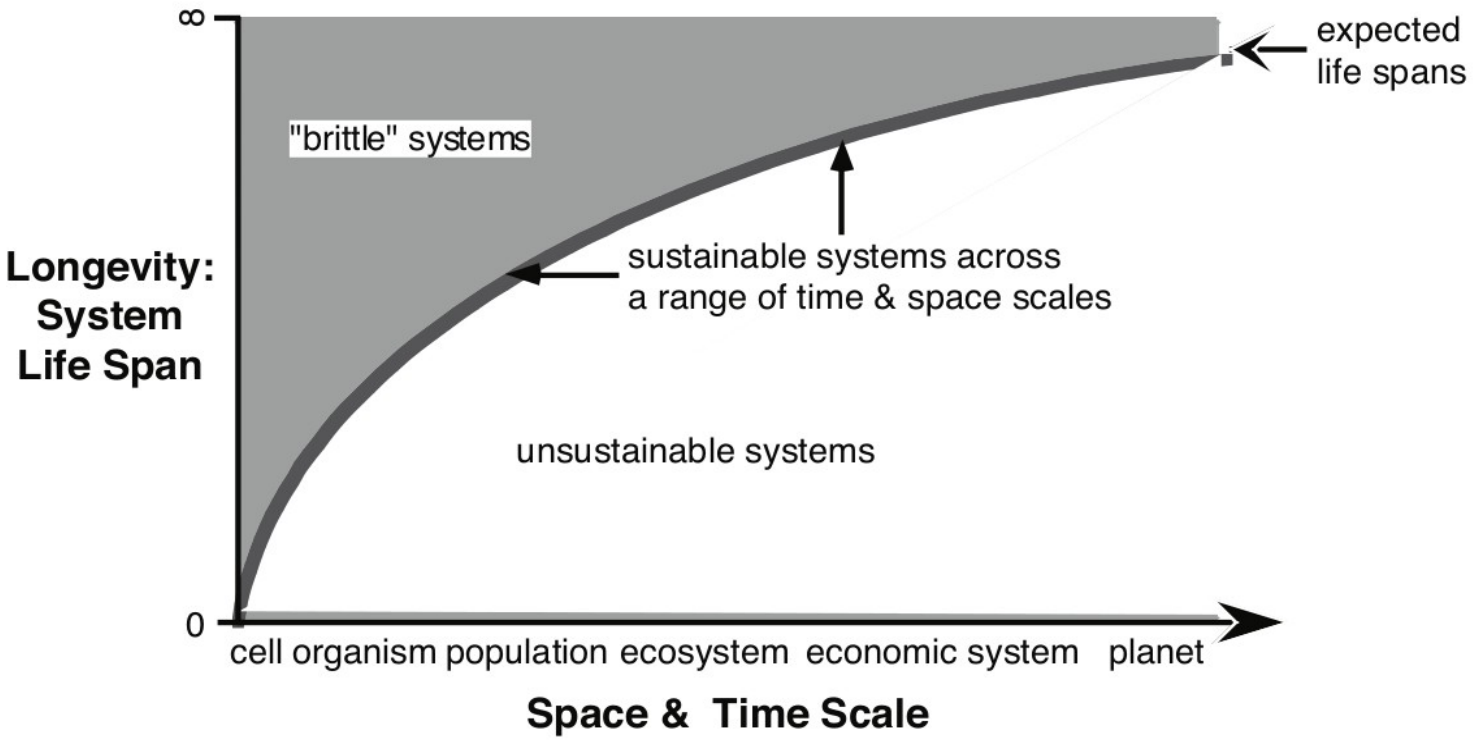
# But Nothing Is Permanent




Costanza, R., and Patten, B.C. (1995) Defining and predicting sustainability. Ecological Economics, 15, 193-196.



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## Redefining Sustainability

**Sustainable development is the process of creating, testing, and maintaining opportunity by balancing a system's efficiency and resilience without interruption, weakening or loss of quality and functionality ...**

**… within the scope of the system's expected life time.**



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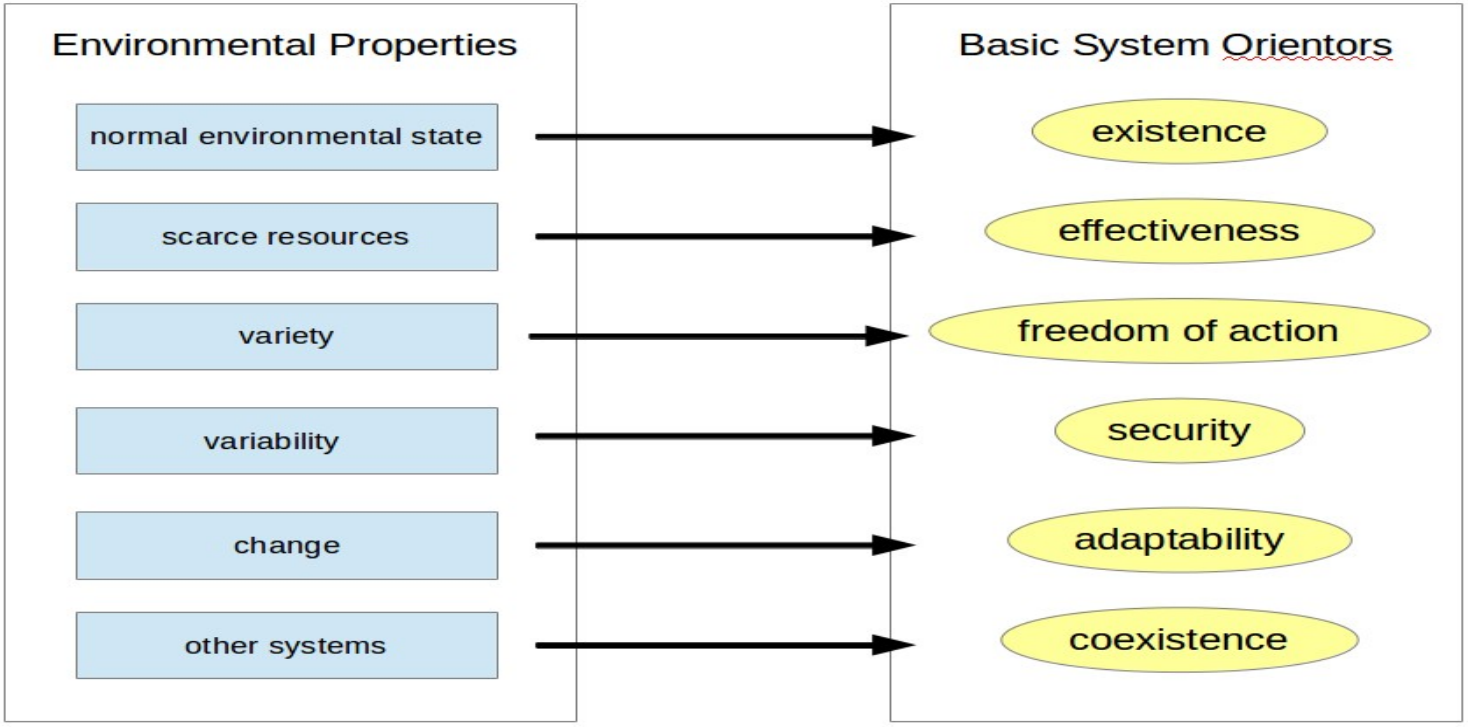
# A First Operationalism
# The 6 Basic Orientors of H. Bossel



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# Motivations For a New Approach

**There are some inconsistencies in Bossel's approach.**

**There are developments and insights in ecosystem theory that should be taken into account, like**

- **emergence**
- **ontic openness**
- **process ecology**



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# The General Idea

- consider ecosystems as processes
  → the process of life
- analyze their fundamental dynamic
  → the expansive dynamic of life
- define the dimensions of that dynamic
  → space, time and intensity
- derive the orientors from the interplay of the process with its environmental conditions



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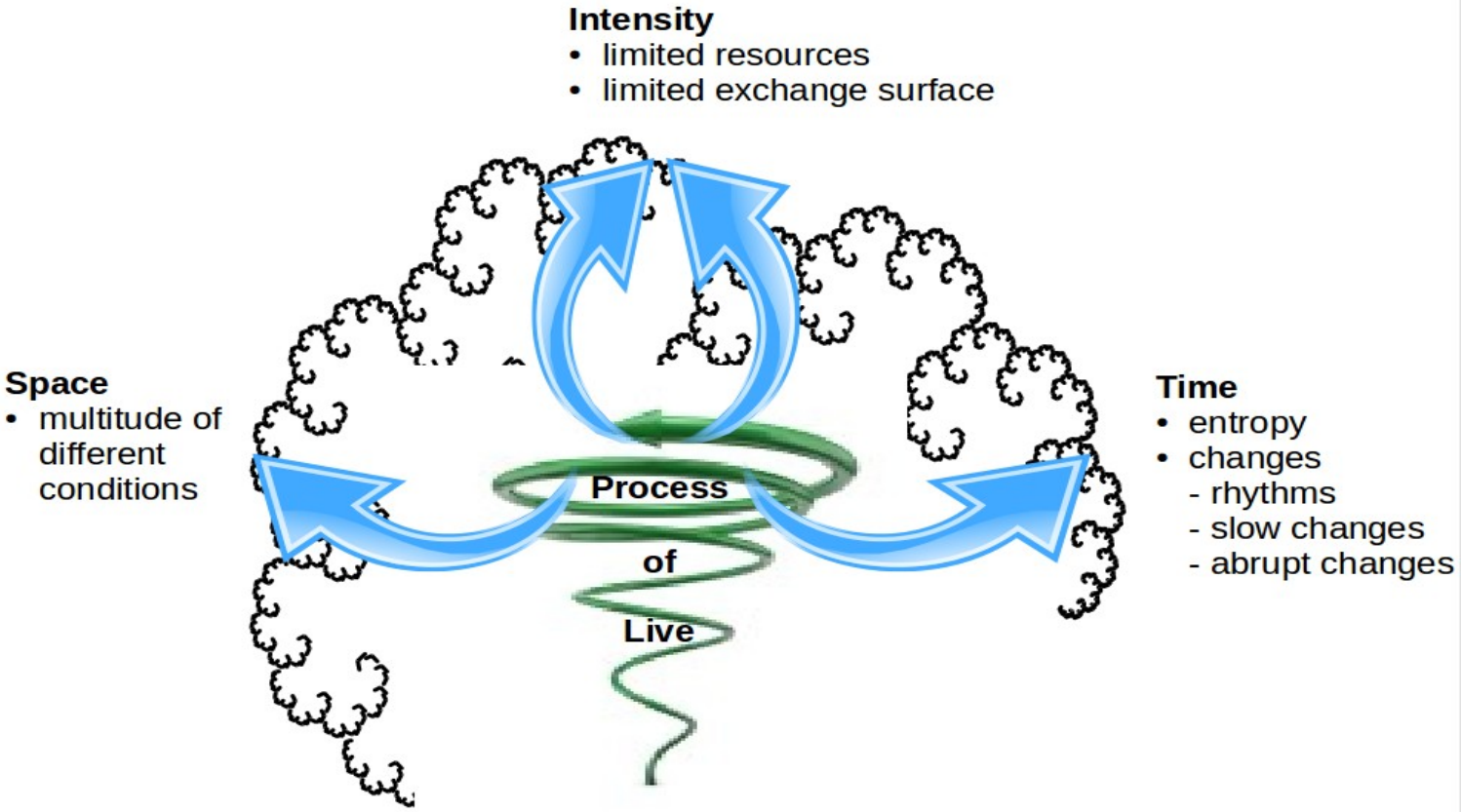
# Environmental Challenges



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# The Spatial Answers

**Space**
- multitude of different conditions

**Diversification of Species and Systems**
- evolution
- ontic openness

**Environmental shaping**
- slope stabilization
- introduction of OM in soils
- moderation of temperature and humidity

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## Ideas And Observations Out Of Space

**Ecosystems respond to the challenge of different environmental conditions mainly by diversification.**

**The emphasis of socio-economic-systems has shifted to shaping in the last two centuries based on fossil fuels.**



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# The Temporal Answers

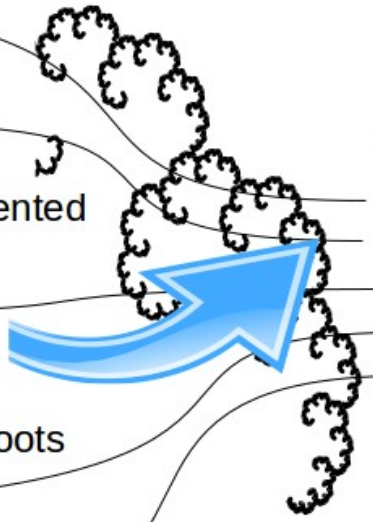
**Cycles**
- birth and death
- cycling of matter and energy

**Reserves / unused possibilities**
- Balance of efficiency and reserves like not used resources or not implemented relations / exchanges

**Buffering and Storage**
- buffering of temperature and humidity during day-night-cycle
- storage of water in soils or energy in roots

**Adaptability**
- evolution and co-evolution

**Resilience / network-cohesion**
- healing abilities
- robustness



**Time**
- entropy
- changes
  - rhythms
  - slow changes
  - abrupt changes



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## Ideas And Observations Out Of Time

**There is nearly no strategy of death (decomposing, recirculation) in technique and socio-economic-Systems.**
**The constructors are our heroes whereby the deconstructores nobody knows.**

**There must be a strong antagonistic force that prevent ecosystems from exploiting the potential completely. What is this force?**



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# The Intensity Answers

**Intensity**
- limited resources
- limited exchange surface

**Limitation of resources**
- efficiency
- mining

**Limitation of exchange surface**
- structure building
  roots, mycorrhiza, foliage structure



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## Ideas And Observations Out Of Intensity

**It is time for a paradigm shift in architecture. From clean and straight facades towards highly structured surfaces, with a multitude of ecological functions.**

## Ideas And Observations Out Of Process Thinking

**Instead of designing complete systems with fixed functions, managing of flexible process the may result in the desired system.**



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# 10 Poccessual Orientors

**The success of the expansion is the touchstone for the sustainability of the development.**

| Spatial | Temporal | Intensity |
|---|---|---|
| Diversification | Cycling | Efficiency |
| Environmental Shaping | Unused Possibilities | Mining |
| | Buffering & Storage | Structure Building |
| | Adaptability | |
| | Resilience | |



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# … something is sustainable, if it enables more life.(*)

* A. Weber, 2013: Enlivenment - Towards a fundamental shift in the concepts of nature, culture and politics ,Volume 31 of the Publication Series Ecology, Published by the Heinrich Böll Foundation 2013



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