

**WHAT DO THE ECOSYSTEM  
BOUNDARIES HAVE TO SAY TO THE  
FRAMEWORK FOR THE DEVELOPMENT  
OF ENVIRONMENT STATISTICS?**



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## Reasoning for the selection of this topic?

- The conclusions of the first Expert Group Meeting for the Revision of the Framework for the Development of Environment Statistics agreed that the ***ecosystem approach*** is a promising conceptual foundation for a future framework of environment statistics and should be considered as the basis for the revision of the framework.<sup>[1]</sup>

<sup>[1]</sup> (E/CN.3/2010/9, § 21).



## ... ecosystem approach?

- "...a strategy for the integrated management of land, water and living resources ... which encompass **the essential processes, functions and interactions** among organisms and their environment. It recognises that humans, with their cultural diversity, are an integral component of ecosystems."[1]
- An ecosystem approach is both **a framework** for planning and management decisions and **a process** by which decisions are made [2].

[1] Convention on Biological Diversity: <http://www.cbd.int/ecosystem/>

[2] Adopting an ecosystem approach: Local variability in... By: Kellogg, Wendy A., Society & Natural Resources, 08941920, Jul/Aug98, Vol. 11, Issue 5

## Variety of aspects versus the relevance

- Ecosystems are: a system of **complex interactions** of populations between themselves and with their environment".[\[1\]](#)
- However, from the viewpoint of maintaining the human and ecosystem balance (long-term goal of sustainable development) not the whole **variety of interactions is relevant.**

- [\[1\]](#) Odum, 1975; Odum, E.P. 1975. Ecology. New York. Rinehardt and Wilson

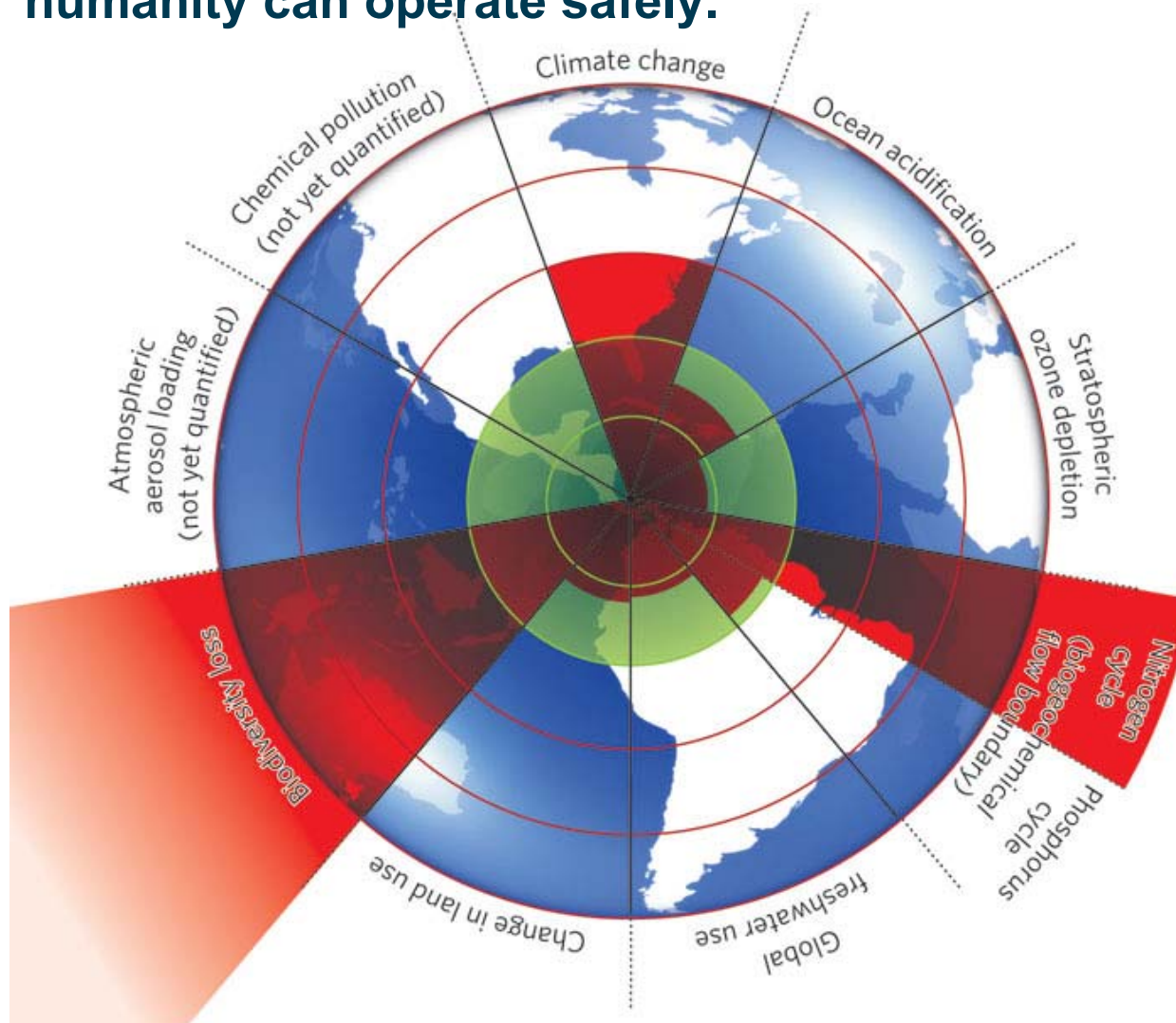
## **From the “ecosystem perspective” we can define human environment as humanity’s ecological niche**

- “niche” is an imaginary space with many dimensions, in which each dimension or axis represents the range of some environmental condition [1, G.E. Hutchinson]
- Our “niche” is related to the most important cycles that we are part of: phosphorus, nitrogen, carbon and water cycles

[1] Pidwirny, M. (2006). "Concept of Ecological Niche". Fundamentals of Physical Geography, 2nd Edition. <http://www.physicalgeography.net/fundamentals/9g.html>



**Resilience Alliance (a group of 28 internationally renowned scientists) proposed the thresholds in Earth's ecosystem or "planetary boundaries" [1] within which they expect that humanity can operate safely.**



[1] <http://www.ecologyandsociety.org/vol14/iss2/art32/> ).

## PLANETARY BOUNDARIES

Earth-system process	Parameters	Proposed boundary	Current status	Pre-industrial value
Climate change	(i) Atmospheric carbon dioxide concentration (parts per million by volume)	350	387	280
	(ii) Change in radiative forcing (watts per metre squared)	1	1.5	0
Rate of biodiversity loss	Extinction rate (number of species per million species per year)	10	>100	0.1-1
Nitrogen cycle (part of a boundary with the phosphorus cycle)	Amount of N <sub>2</sub> removed from the atmosphere for human use (millions of tonnes per year)	35	121	0
Phosphorus cycle (part of a boundary with the nitrogen cycle)	Quantity of P flowing into the oceans (millions of tonnes per year)	11	8.5-9.5	-1
Stratospheric ozone depletion	Concentration of ozone (Dobson unit)	276	283	290
Ocean acidification	Global mean saturation state of aragonite in surface sea water	2.75	2.90	3.44
Global freshwater use	Consumption of freshwater by humans (km <sup>3</sup> per year)	4,000	2,600	415
Change in land use	Percentage of global land cover converted to cropland	15	11.7	Low
Atmospheric aerosol loading	Overall particulate concentration in the atmosphere, on a regional basis		To be determined	
Chemical pollution	For example, amount emitted to, or concentration of persistent organic pollutants, plastics, endocrine disruptors, heavy metals and nuclear waste in, the global environment, or the effects on ecosystem and functioning of Earth system thereof		To be determined	

Boundaries for processes in red have been crossed. Data sources: ref. 10 and supplementary information

# The role of the statistical system

- Framework for environment statistics can be a part of the information system that will operate as a policy feedback loop for the implementing of the policies to maintain ecologically safe space.



## ES But still, why relate the feedback loop to the statistical system?

- Because the integration is important
- The aim of measuring environmental parameters and the impacts of relevant human activities has been and will be **short- and long-term sustainability**. Hence the need for the integration of key issues with other statistical accounts in the long run is obvious.

## **Components to focus on:**

Important is to identify :

- relevant DPSIR for each environmental pressure/driver which could lead to planetary thresholds being exceeded
- bridges (links) to economic and social statistics via environmental accounts

ES

**Users of statistics on the top of the pyramid are strategic developers and scientists. Practical decisions on environmental sustainability are probably made on the bases on simple quantitative data.**



**accounts, frameworks**

**indicators**

**basic statistics**

**basic data**



# GLOBAL ISSUES versus LOCAL ISSUES

# ES For the global level processes: basic data blocks for starting

- MDG environment
- 7.1 Proportion of land area covered by forest
- 7.2 **CO2 emissions, total, per capita and per \$1 GDP (PPP)**
- 7.3 **Consumption of ozone-depleting substances**
- 7.4 Proportion of fish stocks within safe biological limits
- 7.5 **Proportion of total water resources used**
- 7.6 Proportion of terrestrial and marine areas protected
- 7.7 Proportion of species threatened with extinction



## For the local-national level issues

- ...strategies for the information management
- ...”manual for producing statistics on important issues

# Conclusions

- What do the ecosystem boundaries have to say to the framework for the development of environment statistics?
- Boundaries are the state indicators which reflect the bottlenecks. They can/could/should be used for operationalizing of the ecosystem approach: eg for the framing of issues and tightening of the the focus for the development of environment statistics

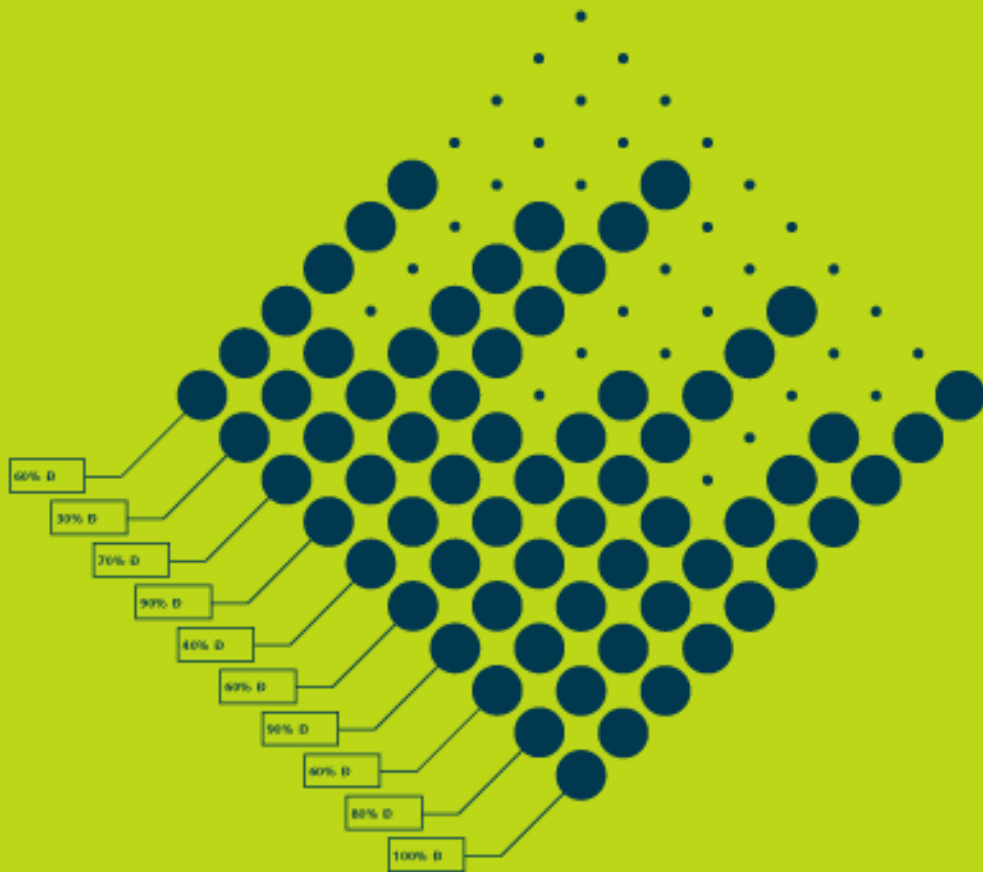


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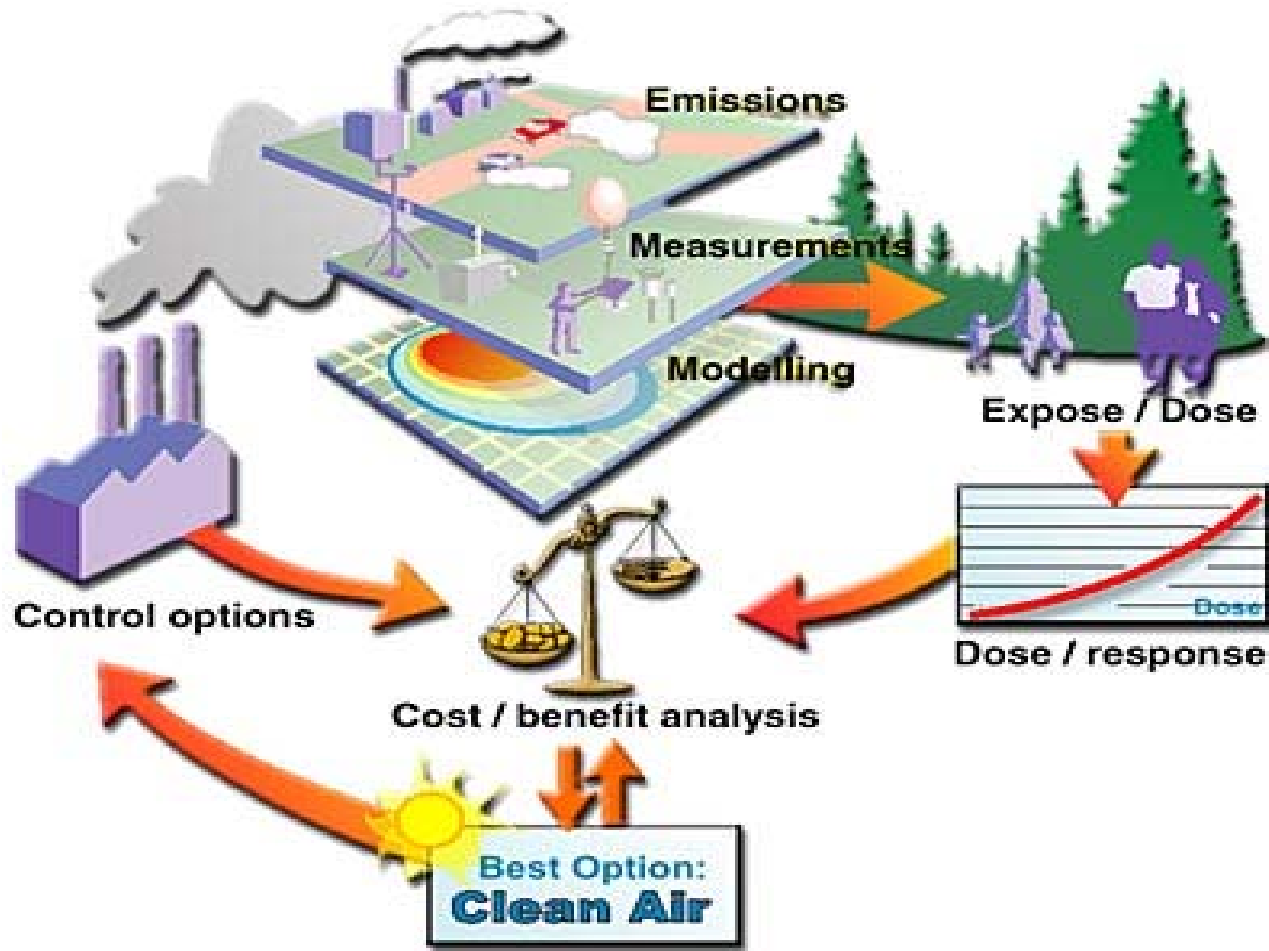
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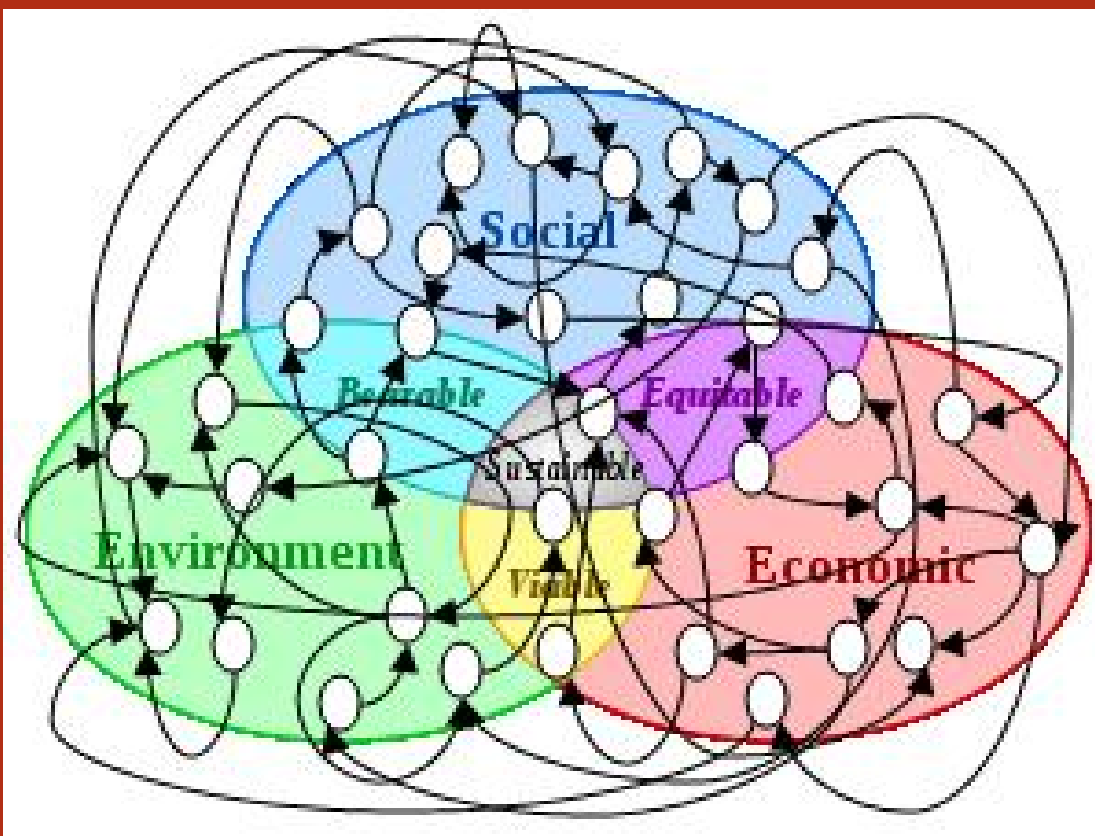




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# Feedback loop, Example: Consequence analysis (AirQUIS)





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