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Creating a New Prosperity: Fresh Approaches to Ecosystem Services and Human Well-being

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Reflections: Ecosystem Services and Sustainable Development

By

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Creating a New Prosperity:
Fresh approaches to ecosystem services and human well-being

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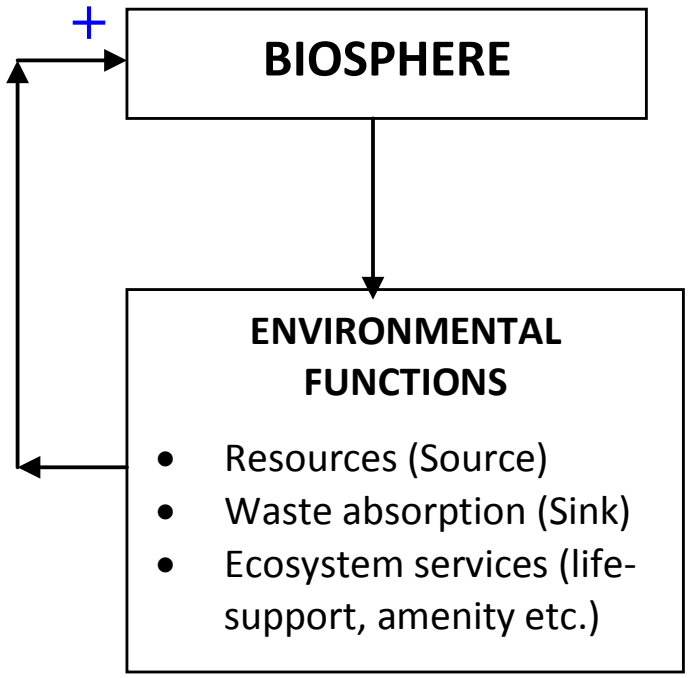
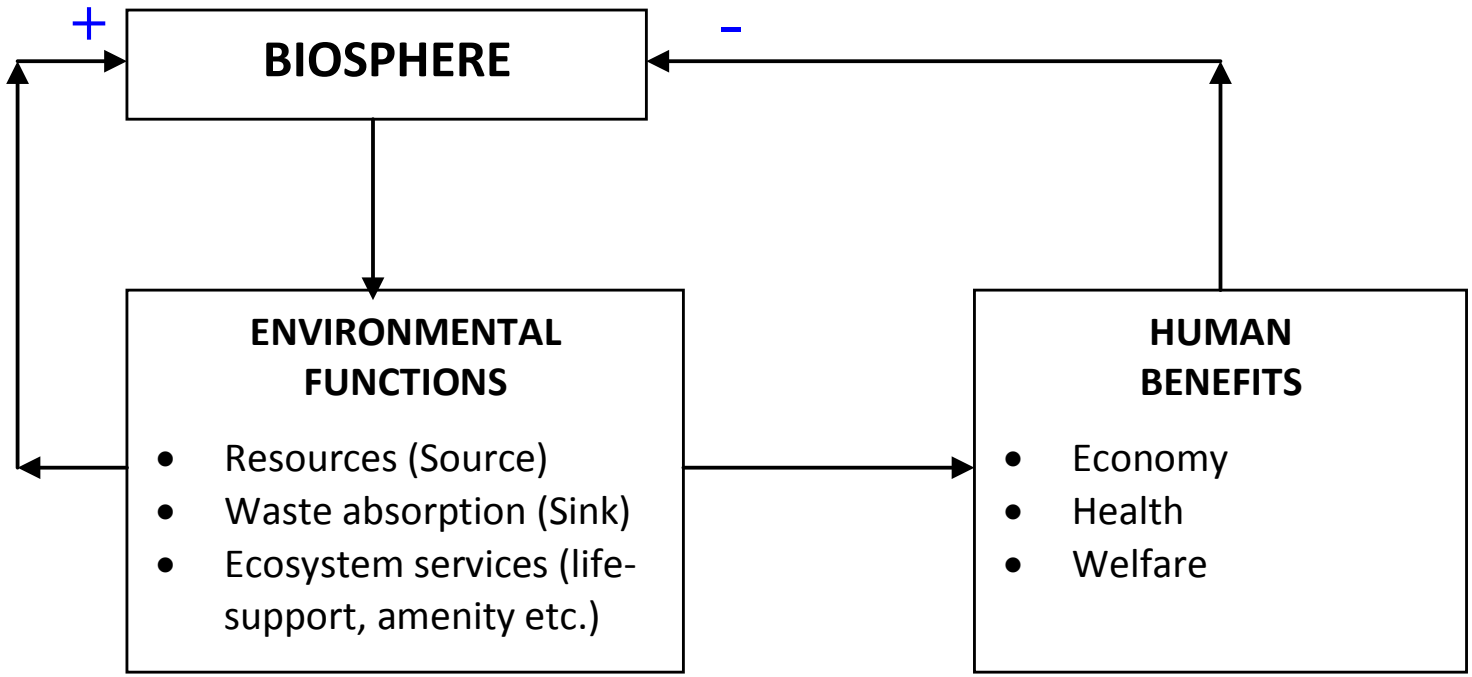
Ecosystems/Natural capital

- Climate science and the Millennium Ecosystem Assessment make clear that without a radical reform of the human-nature relation – in favour of nature – human civilisation is at grave threat
- Specifically, nine billion humans cannot live current Western lifestyles and maintain a habitable planet: the first thing to go will be climate stability, the whole biosphere may then start to unravel. Issue is saving the human, not the planet.
- Any aspiration for sustainable economic growth must start from the recognition of the need for the sustainable use of resources and ecosystems
- It must also be rooted in basic laws of physical science: indefinite physical expansion of the human economy on a finite planet is impossible; all use of non-solar forms of energy creates disorder, and potential disruption, in the natural world
- We must start by getting right the basic conception of how the human economy relates to the natural environment

The ecological cycle



The ecological cycle and human well-being



Comparing values

Increased economic activity and growth of human population is reducing/threatening environmental functions / ecosystem services

How can we compare the value of what we gain through economic activity with what we lose through environmental degradation?

Characteristics of serious environmental disruption/degradation

- Results very uncertain, but may be very large (catastrophic)
- Results may be irreversible
- Results will play out over the very long term
- Results affect every aspect of human life: mortality, morbidity, migration, water/food, cultural and spiritual values

Can techniques of environmental economic valuation adequately reflect such characteristics? (1)

- Valuation techniques are designed for *marginal, reversible* changes, cf frog in boiling water
- For some environmental effects, need to specify and assign values and probabilities to outcomes of catastrophe (perhaps even human extinction)
- Need to agree a discount rate
- Need to give monetary values to human life, health, cultures, holy places, even human survival: profound ethical implications

Can techniques of environmental economic valuation adequately reflect such characteristics? (2)

- In practice, monetisation of such categories is contested at practically every stage, increasing controversy rather than resolving it, destroying its value as a decision support tool
- Economic valuation of big environmental issues is infeasible. How to proceed?

CRITINC PROJECT

- Making Sustainability Operational: Critical Natural Capital And The Implications Of A Strong Sustainability Criterion (CRITINC)
- Ekins, P., Simon, S., Deutsch, L., Folke, C. & de Groot, R. 2003 'A Framework for the Practical Application of the Concepts of Critical Natural Capital and Strong Sustainability' in Special Section of *Ecological Economics*, edited by Paul Ekins, Carl Folke & Rudolf de Groot, Vol.44 No.2-3, pp.165-185

Four Capitals

- Natural, manufactured, human, social/organisational
- Capital and sustainability: in the provision of goods and services, capital depreciates; for sustainability it must be replenished (investment)
- Economic, social, environmental sustainability
- Weak and strong sustainability
- Natural capital: functions of nature

Characteristics, Functions and Values of Nature

- Characteristics: air, water, land, habitats
- Functions:
  - CRITINC: Life support, source of resources, sink for wastes, maintenance of human health, other contributions to human welfare (e.g. amenity)
  - de Groot: Regulation, Habitat, Production, Information
- Values: ecological (conservation, existence), social (human health, personal, community, option), economic (production, consumption, employment)

Criteria for Environmental Sustainability

- Non-substitutable, irreversible, immoderate cost (Ciracy-Wantrup); Safe minimum standard (Bishop)
- Daly
  - Limit the human scale (throughput) to the earth's carrying capacity.
  - Efficiency (not throughput) increasing technological progress
  - Renewable resource harvest less than regeneration rate; waste emissions less than assimilative capacities
  - Non-renewable resource exploitation rate less than the rate of creation of renewable substitutes.

Functions and Sustainability Principles

TYPE OF FUNCTION	*SUSTAINABILITY PRINCIPLE (related to an environmental theme)*
Sink	1. Prevent global warming, ozone depletion 5. Respect critical loads for ecosystems
Source	3. Renew renewable resources 4. Use non-renewables prudently
Life Support	2. Maintain biodiversity (especially species & ecosystems) 7. Apply the Precautionary Principle
Human Health and Welfare	5. Respect standards for human health 6. Conserve landscape/amenity

Measurement: Indicators and CRITINC Framework

- Indicators
  - Frameworks, e.g Quality of Life Counts, 15 Headline, 139 supporting indicators, economic, social, environmental
  - National wealth, weak sustainability, World Bank Genuine Savings (rich countries are sustainable)
  - ‘Top 60’ indicators in ten policy fields
- Sustainability Gaps
  - Physical standard, physical SGAP, monetary SGAP (MSGAP) (MSGAP/GDP - unsustainability intensity)
- CRITINC framework: SGAP plus economic and social indicators

Environmental sustainability: capacity for continuance

- Specify standards of environmental sustainability: physical sustainability gap
- Calculate cost of attaining standards: monetary sustainability gap (MSGAP)
- Political decision whether to implement policies to achieve standards, and how fast

Relating the environment to the National Economic Accounts

- Supplement NEAs with national environmental accounts (mass balance, resource productivity)
- Green GDP is a chimaera
- MSGAP/GDP gives idea of economic challenge of unsustainability
- Sustainable National Income can be modelled

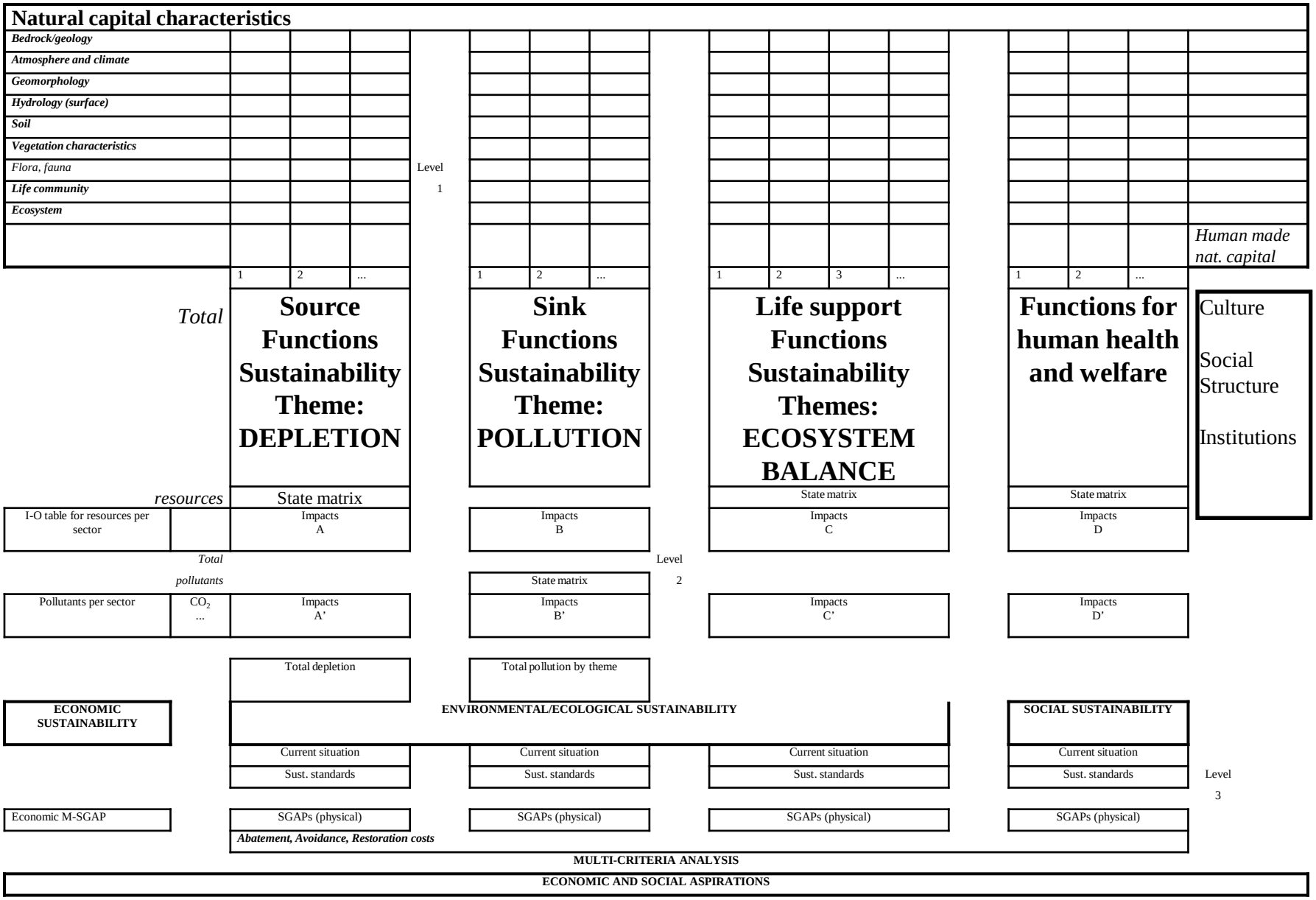
Sustainability Gap

	Environ-mental stress (ES)		Sustain-ability standard (SS)	Sustain-ability Gap (SGAP) (ES-SS)		Normalised SGAP (100*SGAP/SS), EPeq		Years to sustain-ability
	1980	1991		1980	1991	1980	1991	
Climate change, Ceq	286	239	10	276	229	2760 100	2290 83	54
Ozone depletion, Oeq	20000	8721	0	20000	8721	na	na	8.5
Acidification, Aeq	6700	4100	400	6300	3700	1575 100	925 59	16
Eutrophication, Eeq	302	273	86	216	187	251 100	217 86	71
Dispersion, Deq	251	222	12	239	210	1992 100	1750 88	80
Waste disposal, Weq	15.3	14.1	3	12.3	11.1	410 100	370 90	102
Disturbance, Neq	46	57	9	37	48	411 100	533 130	never
TOTAL	na	na	na	na	na	7399 100	6085 82	**51**

Table 3.2: Various Sustainability Measures for the Netherlands

Source: Ekins, P. & Simon, S. 2001 'Estimating Sustainability Gaps: Methods and Preliminary Applications for the UK and the Netherlands', *Ecological Economics*, Vol.37 No.1, pp.5-22

Figure 6.1 Overall view of the CRITINC framework



Final thoughts on environmental values

- Values are a moral as well as an economic category (e.g. justice, democracy, human rights, friends and family)
- If the environment is regarded as only having economic value it will continue to be traded off
- If it is only regarded as having (low) moral value, it will be ignored
- Resolving the environmental crisis will require a recognition that environmental sustainability has both high economic and moral value
- Only in this way will humans value survival enough (for large populations) to survive