Environmental Management as a Social and Political Process.
Part II: The Socio-Economics of the Environment

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Economics as a Science

- Very powerful and influential (► Policy advice; most politicians listen to economic argumentation; ‚money counts')
- Reason 1: Coherent body of theory, most basic assumptions shared by majority of the scientific community (rare in the social sciences!)
- Reason 2: Formalization, mathematics and modeling suggest credibility & scientific rigidity
- Reason 3: Old boys networks

$$\lambda^* = \frac{\frac{\partial u(x_1^*, x_2^*)}{\partial x_1}}{p_1} = \frac{\frac{\partial u(x_1^*, x_2^*)}{\partial x_2}}{p_2}$$

- In the domain of environmental problems & management, economics is also a very (if not: the most) influential social science.
- Intention: Make use of economic reasoning & instruments where useful, but be aware of limits.

Economics: Some history

- The term economics comes from Ancient Greek: for *οἶκος* (oikos: house) and *νόμος* (nomos: custom or law), hence "rules of the house(hold)".
- **Aristotle** (384-322 BC) identified and distinguished two activities which he referred to as *Oikonomia* and *Chrematistike*.
  - *Oikonomia*: Any activity that involved the management and running of the household on a day to day basis. For A., this is a 'natural' activity, as means are organized in order to meet group specific ends; and ends are ends in themselves (e.g. raising a child).
  - *Chrematistike*: The making of money, the accumulation of wealth, the mechanics of commerce, and other similar activities. For A., this is a 'counter-natural' activity, as means turn to ends in themselves (money-making); and ends are endless (e.g. profit seeking).

Economics: Some History

- Modern economics did not arise until the 18th century—despite the fact that some kind of economic activity had always existed since humans had evolved.
- The construction of the cognitive object ‚economy' emerged with thinkers like
  - David Hume
  - Richard Cantillon
  - French Physiocrats
  - Adam Smith
- Basic innovation: ‚the economy' evolves as a domain in its own right, and one can (and in fact has to) detect law-like regularities in complex socio-economic interactions (production and exchange), relatively detached from both management rules of private households and management rules of governments.
- Basic intuition: the idea of tracing out the unintended consequences of the intentional actions of individuals (the 'invisible hand' of the market)

One important Definition

- "Economics is the science which studies human behavior as a relation between scarce means having alternative uses." (Lionel Robbins, An Essay on the Nature and Significance of Economic Science, 1932)

Implications:

- Human behavior in general
- Scarcity (of means)
- Unsatiatable needs & wants
- Alternative uses (► tradeoffs, opportunity costs)

Consequence

'Scarcity' means that available resources are insufficient to satisfy all wants and needs; if there is no scarcity and no alternative uses of available resources, then there is no economic problem.

Institutional Prerequsites of Economic Activities: Property Rights I

- Every economic transaction implies (presupposes, but—accroding to many scholars–does not explain) the existence of (individual or collective) property rights of economic agents. Otherwise no transaction (market) would be possible.
- In pre-modern times, Western thought, heavily influenced by Christian religion, assumed that:
  - God had created and thus truly (i.e. originally and exclusively) owned the Earth and all its goods and services.
  - Man had been endowed with superior rights (some argue: also with obligations ► good stewardship) towards the Earth.
  - Humans had originally collectively been endowed with these rights; any individual private property was in need of a moral/legal justification (► social contract).
  - Christian tradition talks more about the limits and obligations of private property than of rights (► criticism of usury; Aristotle); role of original sin.
  - Christian variant during Absolutism: only the kings and emperors have original rights in nature (and people), due to their heritage relation to God via Adam/Noah (► Sir Robert Filmer, *Patriarcha*, 1680)

Institutional Prerequsites of Economic Activities: Property Rights II

- John Locke, Two Treatises on Government (1690), contradicts Filmer (Treaty I), and lays the ground for a new theory of (private) property.
- Arguments against Filmer:
  - Kings cannot trace back their descendence (veil of ignorance).
  - Property rights with regard to things are different than those with regard to persons.
  - God does play a role, but he gave all rational individuals private property in order to realize a good life and to fulfil His plan.
- Locke‘s theory
  - Property is a function of the relation between the individual and the world of (natural) things.
  - Basis: individuals own their own person and their abilities.
  - Property is gained through labor (people ‚mix‘ their labor with nature, and this gives them the right to own them).
  - Background assumption: natural resources (potential property) are unlimited or can be substituted (e.g. ‚living‘ instead of land).
  - Government has to protect private property, and thus is limited by it (constitutional, not absoulte government; liberal state)

Institutional Prerequsites of Economic Activities: Property Rights II

- Problems/Criticism
  - Natural resources are not limited, but finite.
  - Contradictions: the land that ‚my servant' is working on grows fruits that belong to ‚me'.
- Immanuel Kant, Metaphysische Anfangsgründe der Rechtslehre (Philosophy of Law) 1797
  - Natural resources are limited, and due to the physical character of the globe and the physical and social needs of humans, any kind of porperty regime is an arrangement between people.
  - Factual (empirical) appropriation does by no means constitute any legal (binding) status. Otherwise animals would be able to own land, food or instruments.
  - Any private property not only constitutes a relationship between the individual and the natural sphere, but also between the individual and the rest of the community (by cliaming legally a right in things I always claim legal exclusion or usage rules for others).
  - Property rights are social rights in the first place, i.e. they imply a social contract between people.
  - It does not suffice to assume empirical contracts. The institution of private property needs a ‚transcendental' (counter-factual, but conditional) justification. Rights and duties have to be symmetrical, thus we have to assume a (counter-factual) social contract that enables everybody equally to own property.
  - Only in a republic (i.e. constitutional state ruled by all) can property rights be defined. There is no way to justify property rights individually (e.g. as a state of nature).
  - This implies that every property regime is an empirical arrangement under a given (and hopefully: republican) state order. There is no legitimation for, say, a supreme court to defend individually defined private property rights against a democratically elected government—as has happend often (► Morris Cohen, Property and Sovereignity, 1927; legal basis for Roosevelt's New Deal)

Institutional Prerequsites of Economic Activities: Property Rights IV

Property is usually thought of in terms of a bundle of rights as defined and protected by the local sovereignty. Ownership, however, does not necessarily equate with sovereignty. If ownership gave supreme authority it would be sovereignty, not ownership. Traditionally, that bundle of rights includes:

1. control of the use of the property
2. the right to any benefit from the property (examples: mining rights and rent)
3. a right to transfer or sell the property
4. a right to exclude others from the property.

Various combinations are possible (Lawrence C. Becker, 1980: 4080 out of 13)

These rights need not be held by a single person or collective.

Property rights to a good must be defined, there use must be monitored, and possession of rights must be enforced. The costs of defining, monitoring, and enforcing property rights are termed transaction costs. Depending on the level of transaction costs, various forms of property rights institutions will develop. Each institutional form can be described by the distribution of rights. The following list is ordered from no property rights defined to all property rights being held by individuals

1. Open access (res nullius)
2. State Property
3. Common Property
4. Private Property

Reasons for Collapse

1. Failure of anticipation
   - Lack of experience (or memory)
   - Lack of scientific expertise
   - Ignorance, false analogy, false subjective probabilities (expectations)
2. Failure of perception
   - Lack of perceptibility
   - Distant managers
   - Trends concealed in fluctuations/noise (‚creeping normalcy‘; ‚landscape amnesia‘)
3. Failure of solution attempt
   - ‚Rational‘, but merely egoistic behavior (large profits for small groups, small losses for large groups; e.g. perverse subsidies)
   - Tragedy of the commons
4. Failure of solution
   - Unappropriate means
   - Unanticipated side-effects

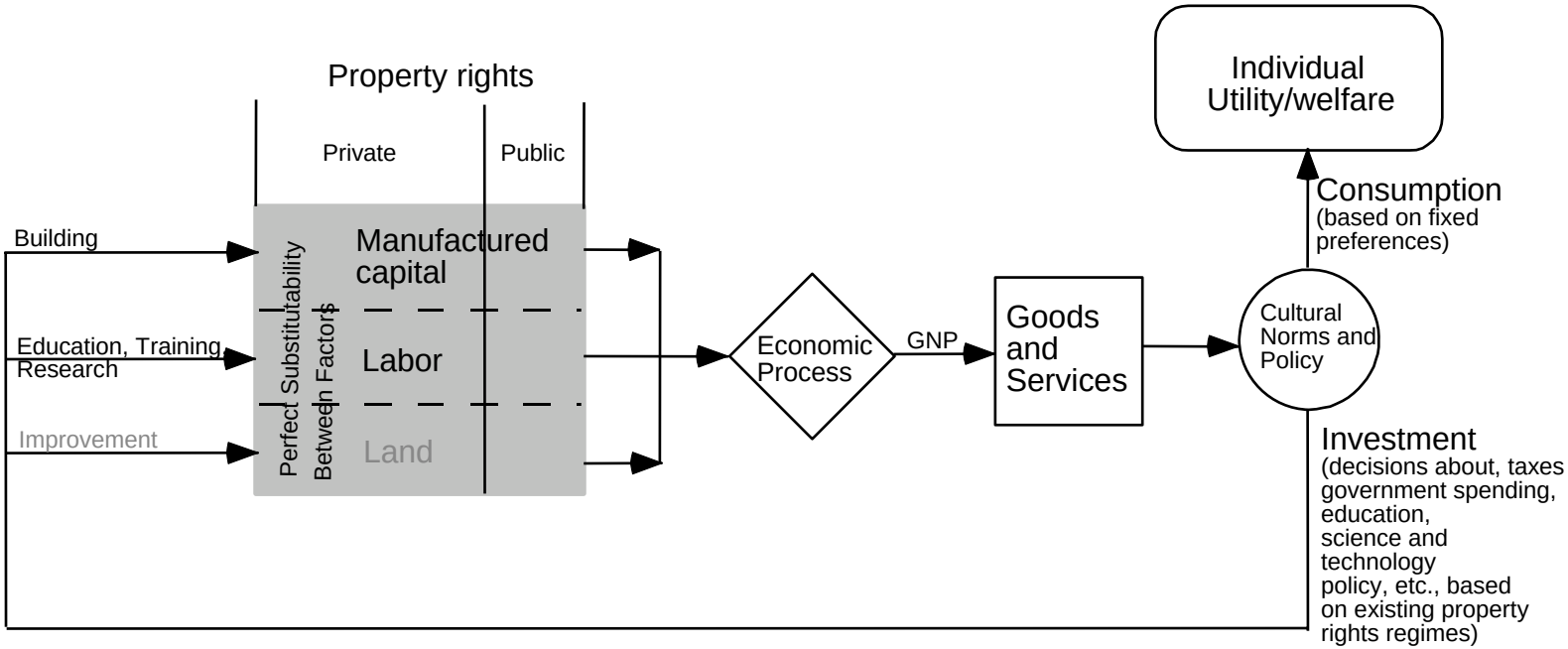
Instruments: Criteria

- Environmental Efficiency
  - How much environmental damage is avoided/reduced by the measure?
- Economic Efficiency
  - Does the output (e.g. efficiency) relate reasonably with the input (e.g. Implementation costs)?
- Applicability
  - How well is the measure adapted to the procedural routines of the political and administrative system?
  - If not: How could it be implemented, and at what costs?
- Reversibility and Flexibility
  - How easy is it to reverse the measure once the goal has been achieved or the circumstances change?
- Systems Conformity
  - How is the fit between the measure and the political and administrative system?
  - How does an instrument influence the market?

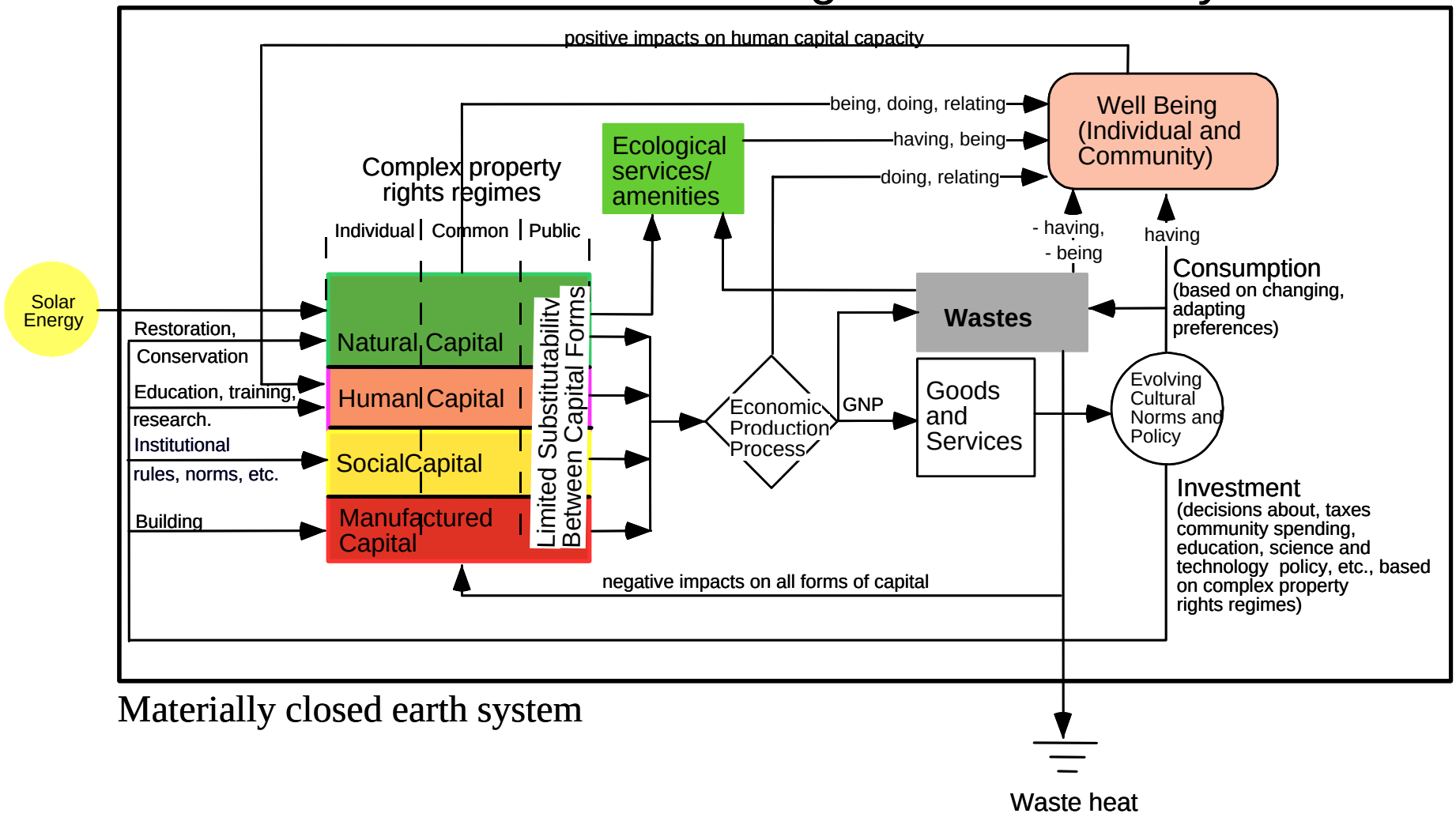
Instruments

- Command and Control
  - Emission levels
  - Prohibition of activities or materials
  - Legal technology standards
  - Quality and performance standards
- Levies
  - Levies independent of equivalent services
  - Fees as equivalents
  - Taxes (non-affectation principle; exceptions, e.g. Eco-tax)
- Certificates
  - ETS
  - Total emissions, participants, initial distribution (auctioning, grandfathering, giving away for free..)
- Subsidies & Refunding Schemes
  - Tax money for politically desirable developments (problem of foresight, lock-in, market distraction)
  - Feed-in tariffs
- Liabilities
  - Re-configuration of ownership
  - Insurances
- Self-commitments
  - Low cost, but risky (►German car industry and climate protection)
- Information/Communication
  - Education
  - Labels
  - Auditing

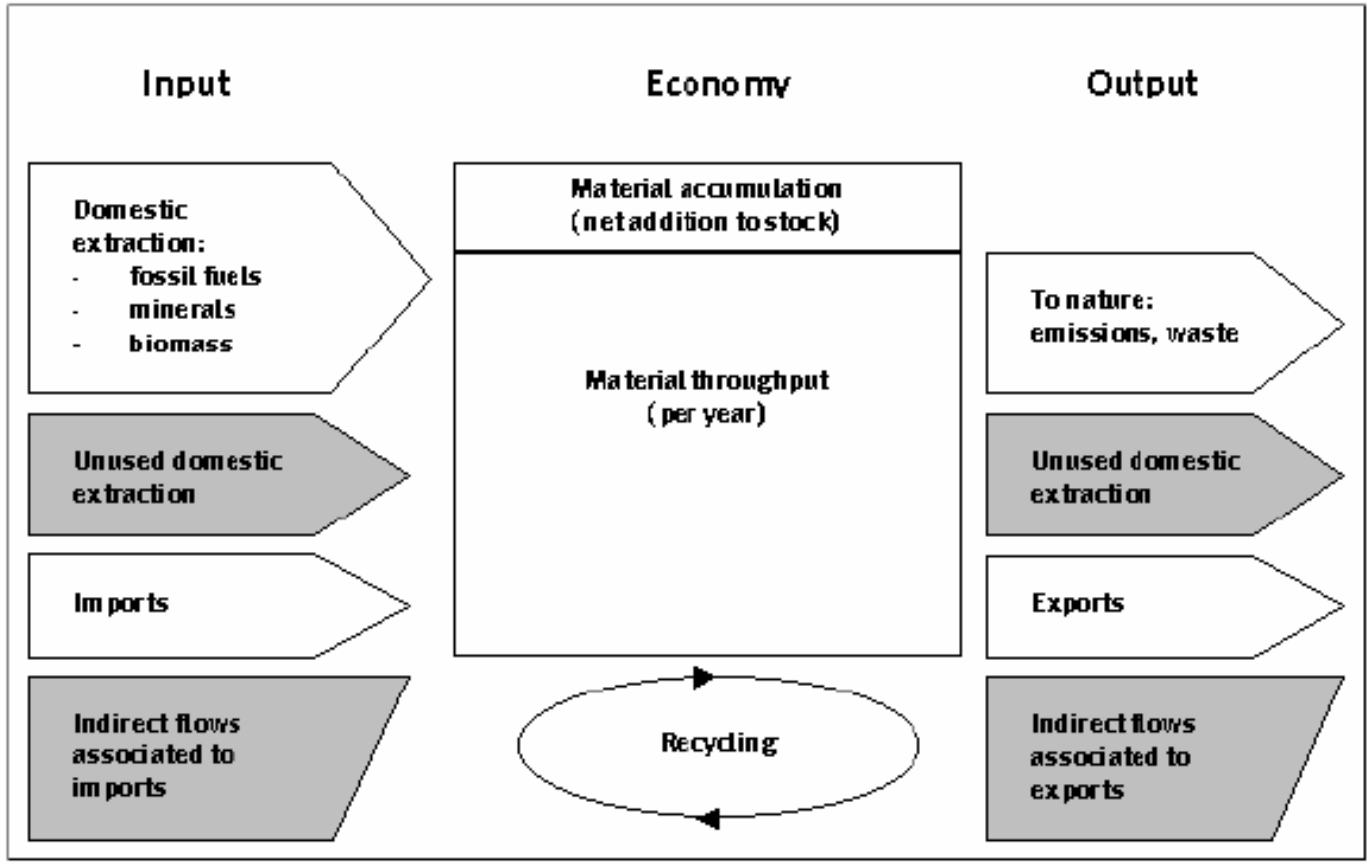
”Empty World" Model of the Economy

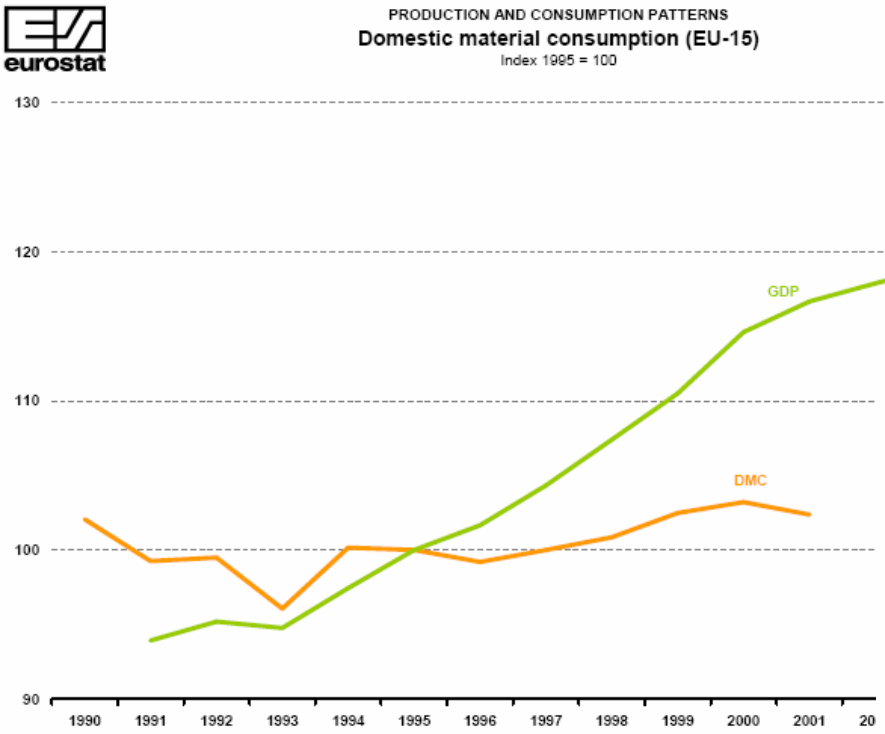


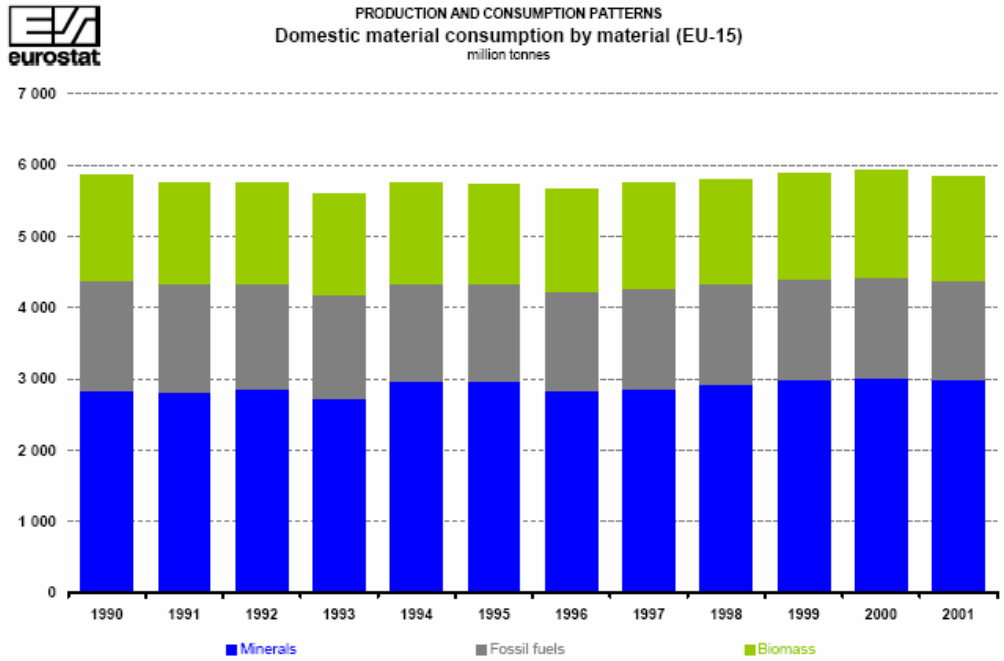
“Full World” Model of the Ecological Economic System



From: Costanza, R., J. C. Cumberland, H. E. Daly, R. Goodland, and R. Norgaard. 1997. An Introduction to Ecological Economics. St. Lucie Press, Boca Raton, 275 pp.


Input
Economy
Output
Domestic extraction:
- fossil fuels
- minerals
- biomass
Unused domestic extraction
Imports
Indirect flows associated to imports
Material accumulation (net addition to stock)
Material throughput (per year)
Recycling
To nature: emissions, waste
Unused domestic extraction
Exports
Indirect flows associated to exports



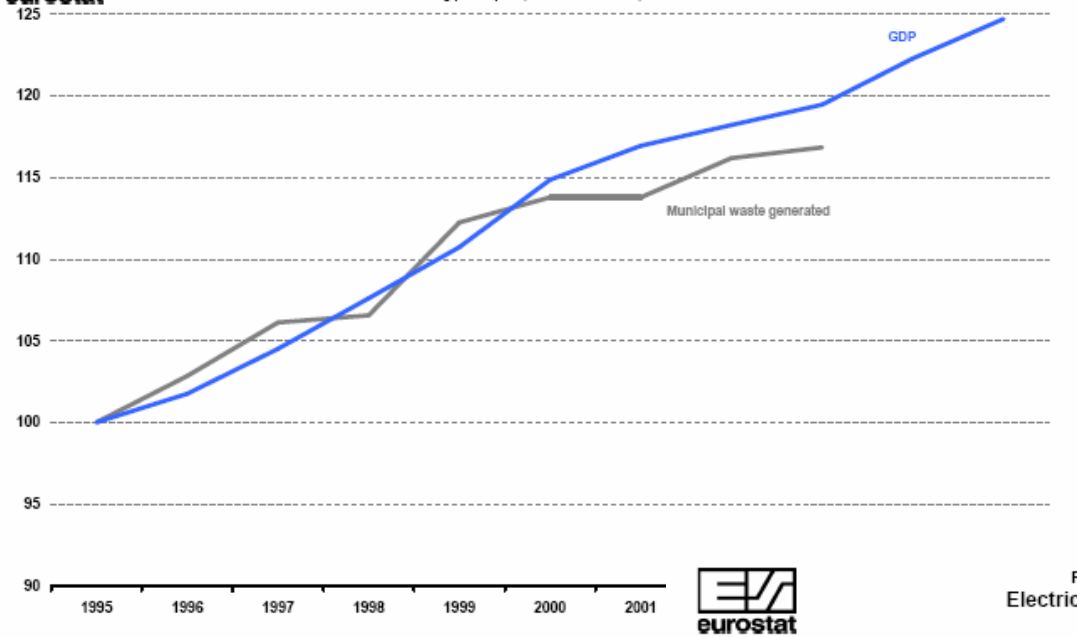


Domestic Material Consumption (DMC)=Direct Material Input (DMI) minus Exports=Domestic Extraction (DE) plus Imports

PRODUCTION AND CONSUMPTION PATERNS

Municipal waste generated (EU-25)

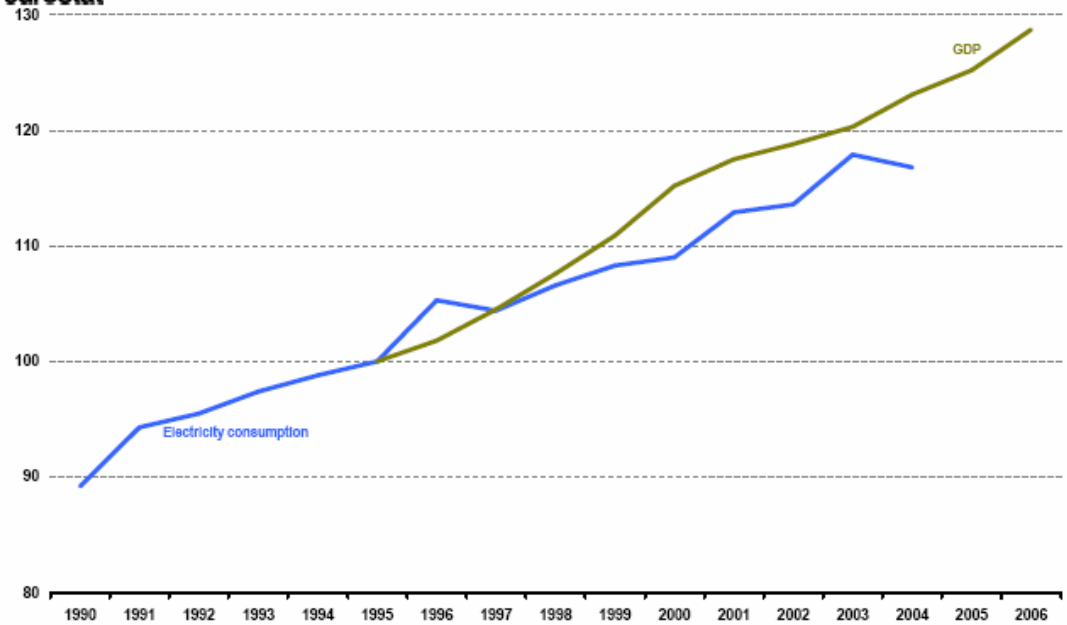
kg per capita (index 1995 = 100)

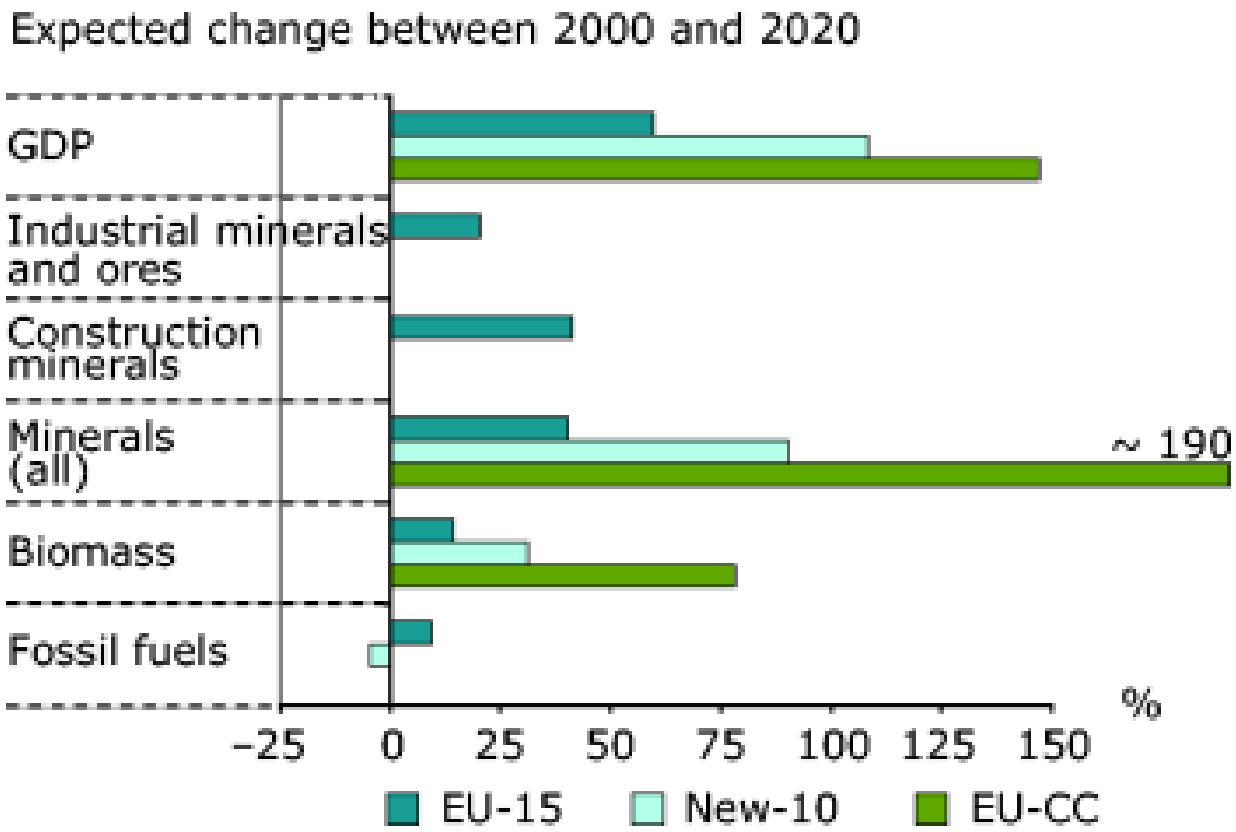


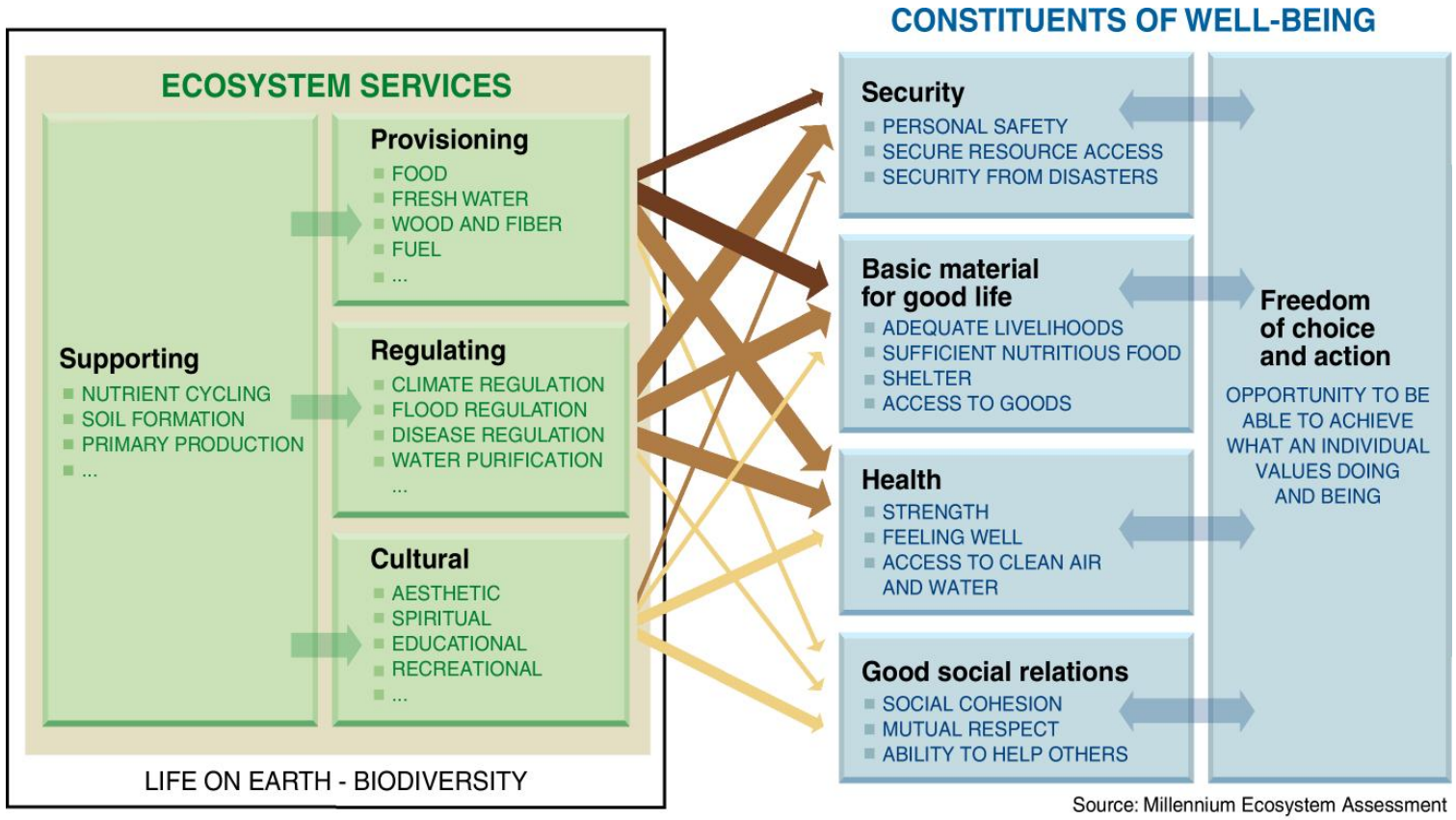
PRODUCTION AND CONSUMPTION PATTERNS

Electricity consumption by households (EU-25)

Index 1995 = 100




Expected change between 2000 and 2020
GDP
Industrial minerals and ores
Construction minerals
Minerals (all)
Biomass
Fossil fuels
~ 190
%
-25
0
25
50
75
100
125
150
EU-15
New-10
EU-CC



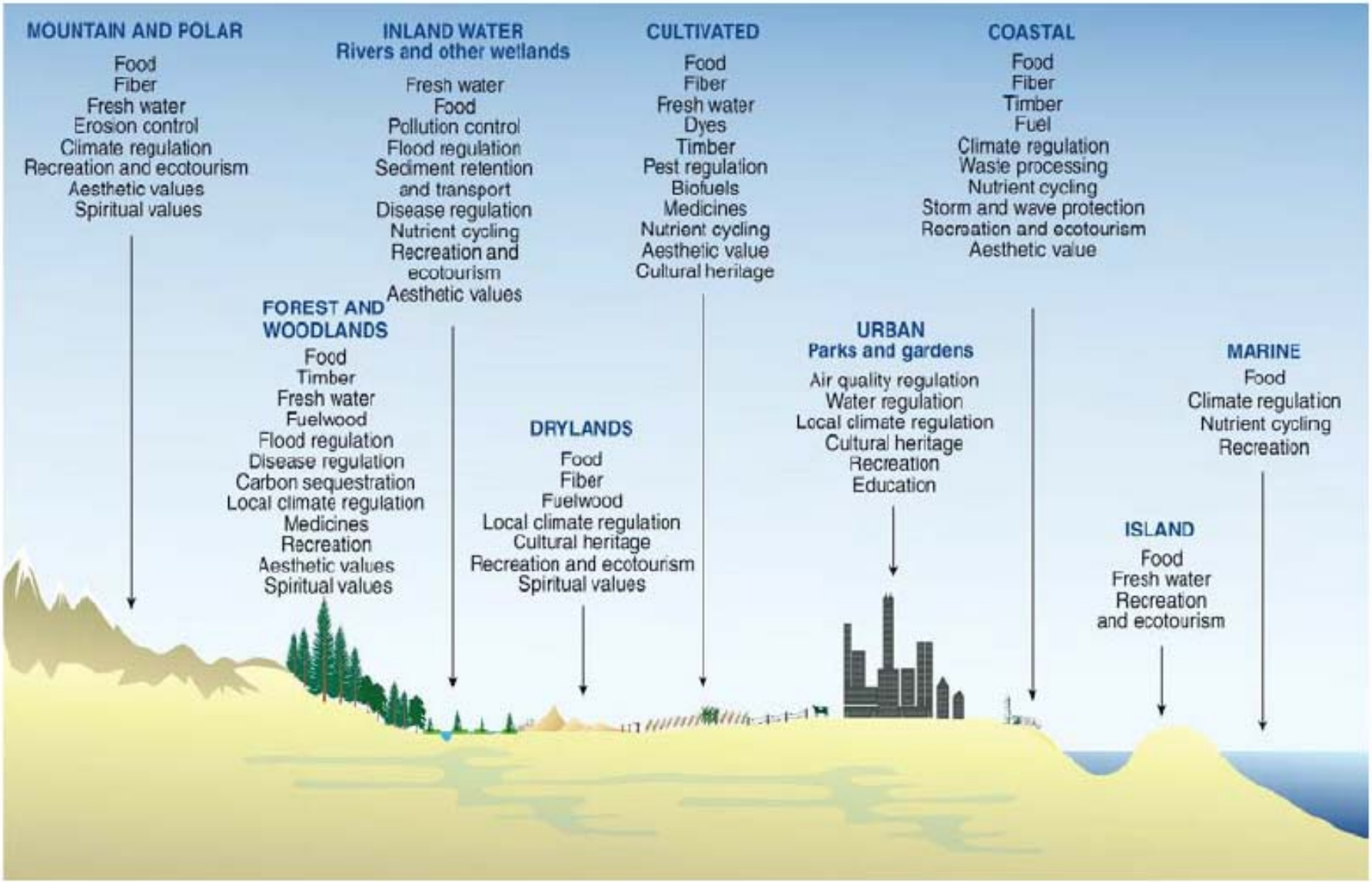
Source: Millennium Ecosystem Assessment

ARROW'S COLOR
Potential for mediation by socioeconomic factors

- Low
- Medium
- High

ARROW'S WIDTH
Intensity of linkages between ecosystem services and human well-being

- Weak
- Medium
- Strong


MOUNTAIN AND POLAR
Food
Fiber
Fresh water
Erosion control
Climate regulation
Recreation and ecotourism
Aesthetic values
Spiritual values
INLAND WATER
Rivers and other wetlands
Fresh water
Food
Pollution control
Flood regulation
Sediment retention and transport
Disease regulation
Nutrient cycling
Recreation and ecotourism
Aesthetic values
CULTIVATED
Food
Fiber
Fresh water
Dyes
Timber
Pest regulation
Biofuels
Medicines
Nutrient cycling
Aesthetic value
Cultural heritage
COASTAL
Food
Fiber
Timber
Fuel
Climate regulation
Waste processing
Nutrient cycling
Storm and wave protection
Recreation and ecotourism
Aesthetic value
FOREST AND WOODLANDS
Food
Timber
Fresh water
Fuelwood
Flood regulation
Disease regulation
Carbon sequestration
Local climate regulation
Medicines
Recreation
Aesthetic values
Spiritual values
DRYLANDS
Food
Fiber
Fuelwood
Local climate regulation
Cultural heritage
Recreation and ecotourism
Spiritual values
URBAN
Parks and gardens
Air quality regulation
Water regulation
Local climate regulation
Cultural heritage
Recreation
Education
MARINE
Food
Climate regulation
Nutrient cycling
Recreation
ISLAND
Food
Fresh water
Recreation and ecotourism

Valuation Techniques

•**Avoided Cost** (AC): services allow society to avoid costs that would have been incurred in the absence of those services; flood control provided by barrier islands avoids property damages along the coast.

•**Replacement Cost** (RC): services could be replaced with man-made systems; nutrient cycling waste treatment can be replaced with costly treatment systems.

•**Factor Income** (FI): services provide for the enhancement of incomes; water quality improvements increase commercial fisheries catch and incomes of fishermen.

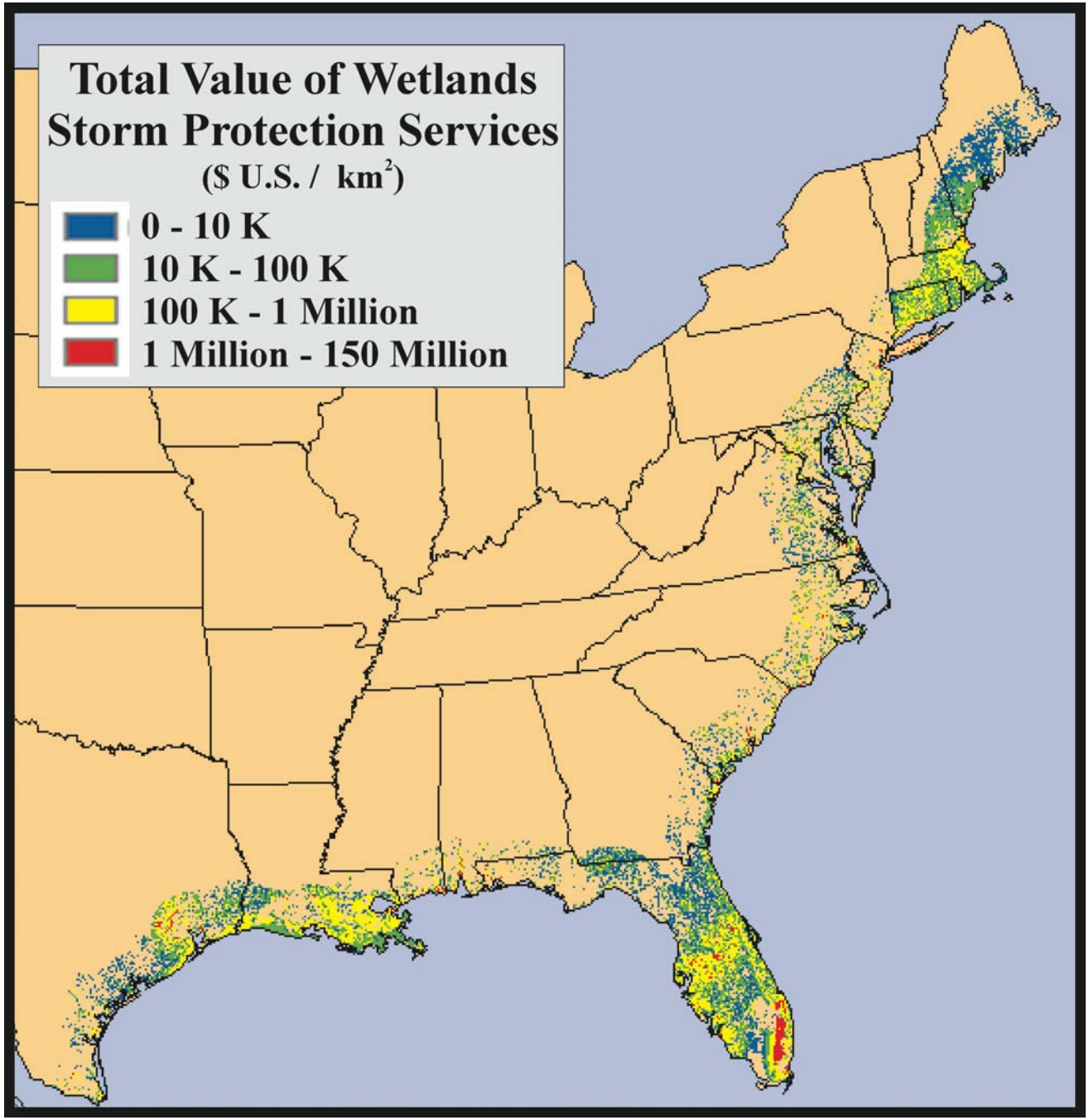
•**Travel Cost** (TC): service demand may require travel, whose costs can reflect the implied value of the service; recreation areas attract distant visitors whose value placed on that area must be at least what they were willing to pay to travel to it.

• **Hedonic Pricing** (HP): service demand may be reflected in the prices people will pay for associated goods: For example, housing prices along the coastline tend to exceed the prices of inland homes.

•**Marginal Product Estimation** (MP): Service demand is generated in a dynamic modeling environment using production function (i.e., Cobb-Douglas) to estimate value of output in response to corresponding material input.

•**Contingent Valuation** (CV): service demand may be elicited by posing hypothetical scenarios that involve some valuation of alternatives; people would be willing to pay for increased preservation of beaches and shoreline.

•**Group Valuation** (GV): This approach is based on principles of deliberative democracy and the assumption that public decision making should result, not from the aggregation of separately measured individual preferences, but from *open public debate.*


Total Value of Wetlands
Storm Protection Services
($ U.S. / km²)
0 - 10 K
10 K - 100 K
100 K - 1 Million
1 Million - 150 Million

Summary of global values of annual ecosystem services (From: Costanza et al. 1997)

Biome	Area (e6 ha)	Value per ha ($/ha/yr)	Global Flow Value (e12 $/yr)
Marine	**36,302**	**577**	**20.9**
Open Ocean	33,200	252	8.4
Coastal	3,102	4052	12.6
Estuaries	180	22832	4.1
Seagrass/Algae Beds	200	19004	3.8
Coral Reefs	62	6075	0.3
Shelf	2,660	1610	4.3
Terrestrial	**15,323**	**804**	**12.3**
Forest	4,855	969	4.7
Tropical	1,900	2007	3.8
Temperate/Boreal	2,955	302	0.9
Grass/Rangelands	3,898	232	0.9
Wetlands	330	14785	4.9
Tidal Marsh/Mangroves	165	9990	1.6
Swamps/Floodplains	165	19580	3.2
Lakes/Rivers	200	8498	1.7
Desert	1,925		
Tundra	743		
Ice/Rock	1,640		
Cropland	1,400	92	0.1
Urban	332		
Total	51,625		**33.3**

Topics for Term Papers

1. Collapse. The Mismanagement of Environmental Resources: Causes, Consequences, Lessons.
   - Diamond 2005. Collapse. How Societies Choose to Fail or Succeed.
   - Ponting 1991. A Green History of the World: The Environment and the Collapse of Great Civilizations.
   - Tainter 1988. The Collapse of Complex Societies.
2. Managing the Commons.
   - Ostrom 1990. Governing the Commons: The Evolution of Institutions for Collective Action
   - Ostrom 1999. Coping with Tragedies of the Commons.
   - Ostrom and Nagendra 2006. Insights on linking forests, trees, and people from the air, on the ground, and in the laboratory.
3. International Climate Policy and Development: The Role and Effect of the Kyoto Protocol‘s Clean Development Mechanism (CDM).
   - UNEP. Introduction to CDM
   - Michaelowa 2003. CDM Host Country Institution Building.
   - Haites et al. 2006. Technology Transfer by CDM Projects.
   - Olsen 2005. National ownership in the implementation of global climate policy in Uganda
4. Managing the City, Saving the Planet? Urban Environmental Management and its Global Implications.
   - Bai 2007. Integrating Global Environmental Concerns into Urban Management
   - Climate Alliance
   - Sassen 2000a,b. The Global City/Cities in a World Economy
   - Zhao et. Al. 2006. Ecological consequences of rapid urban expansion: Shanghai, China
5. Stakeholder, Process and Outcome Analysis of a Local Agenda 21.
   - Web based research
   - Interviews, own data collection