

Expert meeting on Ecosystem Accounting

EEA, UNSD and the World Bank

Copenhagen 11-13 May 2011

Classification of ecosystem services, the CICES proposal

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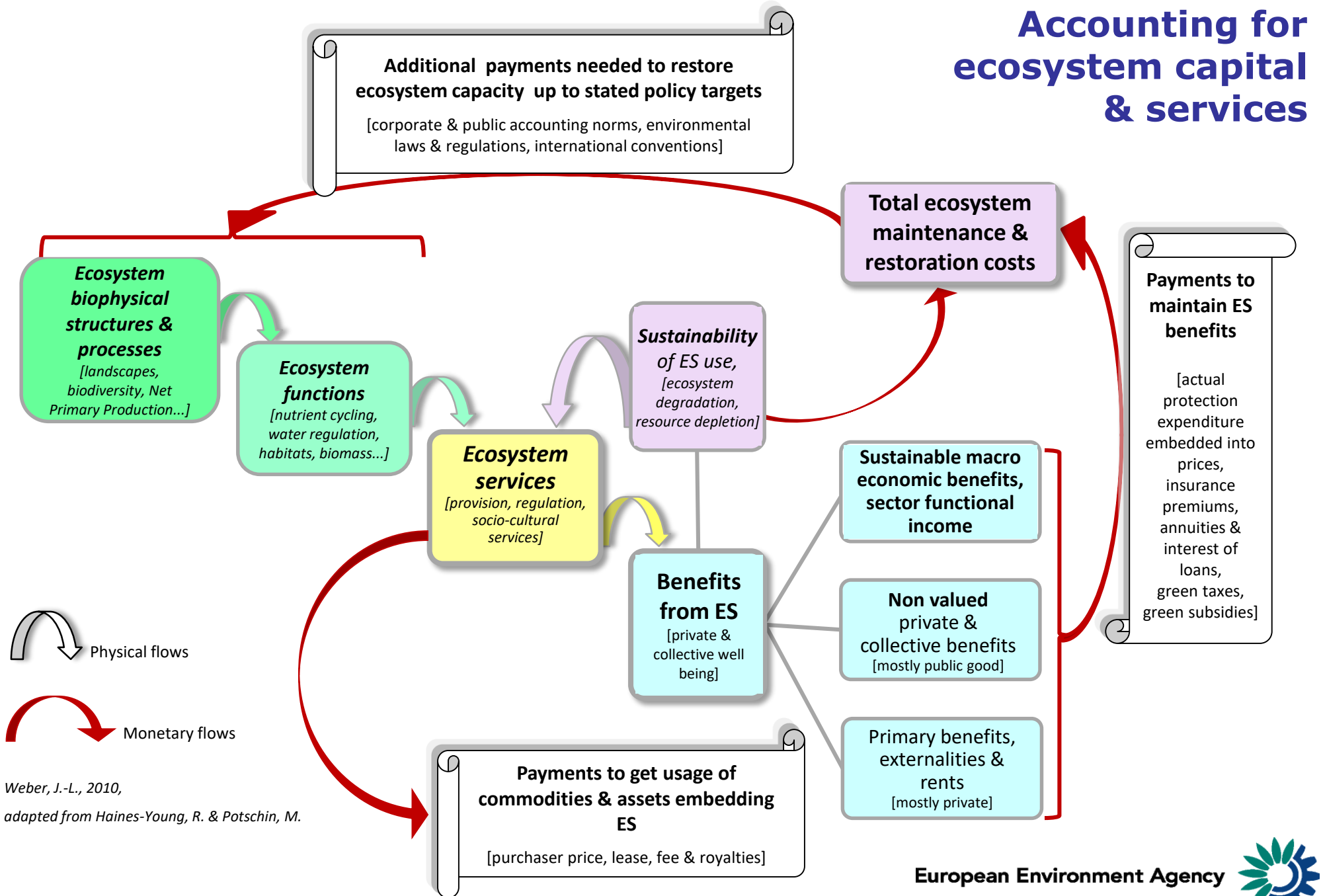
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Accounting for ecosystem capital & services



Weber, J.-L., 2010,
adapted from Haines-Young, R. & Potschin, M.

Origin of the CICES proposal

- In December 2008, the EEA, together with UNEP and the German Federal Ministry of Environment, has convened an international expert meeting on the project of a Common International Classification of Ecosystem Services (CICES).
- The need for such standard results from the multiple global initiatives related ecosystem services assessment and accounting such as IPBES, TEEB, MA-follow-up, Eureka!2012 the European ecosystem assessment, many national assessments, Green Economics, PES and IPES, SEBI2010, the SEEA2003 revision and the European Strategy on Environmental Accounting.
- CICES is expected foster synergies and bring together the diverse approaches taken to quantify and value ecosystem services.

CICES background

- Early work by Robert Costanza, Rudolf de Groot, Gretchen Daily et al...
- Millennium Ecosystem Assessment (MA 2005) first synthesis: ES defined as *'the benefits people obtain from ecosystems'*
 - **Provisioning Services:** which cover material or energetic outputs from ecosystems, including food, water and other resources;
 - • **Regulating Services:** which cover factors that affect the ambient biotic and abiotic environment, such as flood and disease control;
 - • **Cultural Services:** which cover non-material (intellectual/cognitive/symbolic) uses, such as spiritual, recreational, and cultural benefits; and,
 - • **Supporting Services,** such as nutrient cycling and primary productivity, that maintain the conditions for life on Earth.
- Further discussion, amendments, variants...: e.g. Costanza (scale dimension), Boyd (restrictive definition of end use services) and minor details...

Discussion of the CICES proposal

- First, discussions that took place at two international workshops on CICES hosted by the EEA in Copenhagen, December 2008 and 2009.
- Second, an e-forum organised on behalf of the EEA which ran from November 2009 to January 2010, which was designed to enable a wider international audience to comment on the issues relating to the CICES concept. Over 150 people registered for the forum; participants were invited members from the international community.




CICES proposal

Presented to UNCEEA, June 2010

**Proposal for a Common International Classification of
Ecosystem Goods and Services (CICES)
for Integrated Environmental and
Economic Accounting
(v1)**

21st March 2010

Report to the

European Environment Agency 

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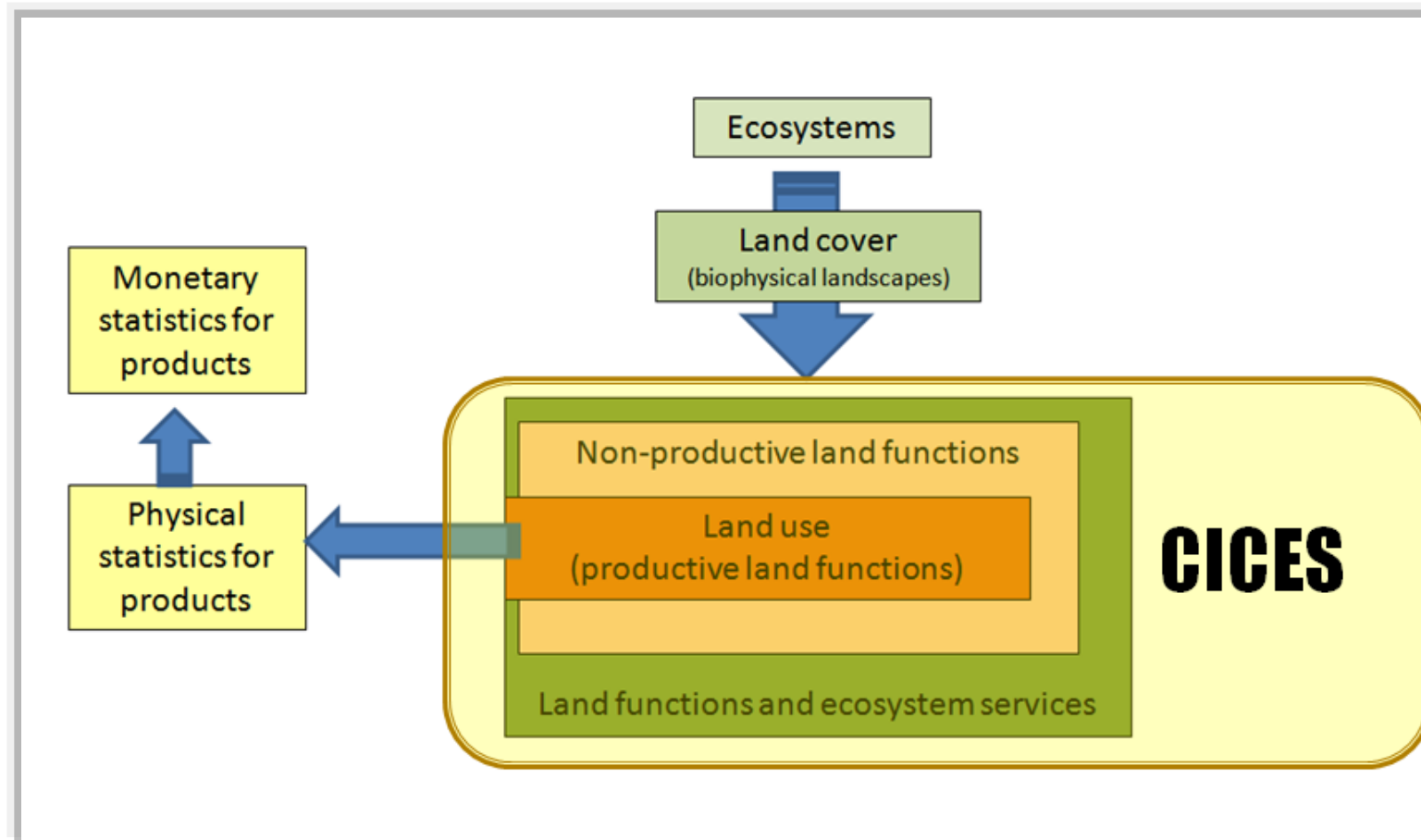


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Table E.2: Thematic, Class and Group Structure Proposed for CICES

Theme	Class	Group
Provisioning	Nutrition	Terrestrial plant and animal foodstuffs
		Freshwater plant and animal foodstuffs
		Marine plant and animal foodstuffs
		Potable water
	Materials	Biotic materials
		Abiotic materials
	Energy	Renewable biofuels
		Renewable abiotic energy sources
Regulation and Maintenance	Regulation of wastes	Bioremediation
		Dilution and sequestration
	Flow regulation	Air flow regulation
		Water flow regulation
		Mass flow regulation
	Regulation of physical environment	Atmospheric regulation
		Water quality regulation
		Pedogenesis and soil quality regulation
	Regulation of biotic environment	Lifecycle maintenance & habitat protection
		Pest and disease control
		Gene pool protection
	Cultural	Symbolic
Religious and spiritual		
Intellectual and Experiential		Recreation and community activities
		Information & knowledge

Services from inland ecosystems, land cover, use & functions



CICES cross-referencing/ other functions and services classifications

SEEA 2003function	CICES Theme	CICES Class	TEEB Categories			
resource	Provisioning	Food & Beverages	Food	Water		
resource		Materials	Raw Materials	Genetic resources	Medicinal resources	Ornamental resources
resource		Energy				
sink	Regulating and Maintenance	Regulation of waste assimilation processes	Air purification	Waste treatment (esp. water purification)		
service		Regulation against hazards	Disturbance prevention or moderation	Regulation of water flows	Erosion prevention	
service		Regulation of biophysical conditions	Climate regulation (incl. C-sequestration)	Maintaining soil fertility		
service		Regulation of biotic environment	Gene pool protection	Lifecycle maintenance	Pollination	Biological control
service	Cultural	Symbolic	Information for cognitive development			
service		Intellectual and Experiential	Aesthetic information	Inspiration for culture, art and design	Spiritual experience	Recreation & tourism



CICES cross-referencing/ economic classifications

- The generic naming of the proposed groups allows CICES to be cross referenced to the existing standard classifications for activities and products used in the SNA, namely: the Central Products Classification (CPC V2), the International Standard Industrial Classification of All Economic Activities (ISIC V4),, and the Classification of Individual Consumption by Purpose (COICOP). An indicative cross-tabulation for each of them is presented.
- The cross tabulation of CICES groups with CPC assists in identifying the 'final outputs' of ecosystems, and potentially helps overcome the problem of 'double counting' in valuation studies.
- By focusing on 'final products' arising from ecosystems, the classification does not cover supporting services, which are assumed to be embedded within each of the categories included in CICES.



Illustration of cross-referencing CPC-CICES

Level	Code	CPC Description	Food & Beverages	Materials	Energy	Regulation of waste assimilation processes	Regulation against hazards	Regulation of biophysical conditions	Regulation of biotic environment	Information	Symbolic	Experiential	Global, national, local	CICES Code
1	0	Agriculture, forestry and fishery products	x	x	x				x		x	x		111.0001.011
1	1	Products of agriculture, horticulture and market gardening	x	x	x				x		x	x		111.0001.011
1	2	Live animals and animal products (excluding meat)	x	x	x				x		x	x		111.0001.011
1	3	Forestry and logging products		x	x						x	x		011.0000.011
1	4	Fish and other fishing products	x		x									101.0000.000
1	1	Ores and minerals; electricity, gas and water	x	x	x									111.0000.000
1	2	Food products, beverages and tobacco; textiles, apparel and leather products	x	x										110.0000.000
1	3	Other transportable goods, except metal products, machinery and equipment		x										010.0000.000
1	4	Metal products, machinery and equipment												000.0000.000
1	5	Constructions and construction services		x										010.0000.000
1	6	Distributive trade services; accommodation, food and beverage serving services; transport services; and electricity, gas and water distribution services										x		000.0000.001
1	7	Financial and related services; real estate services; and rental and leasing services												000.0000.000
1	8	Business and production services								x		x		000.0000.101
1	9	Community, social and personal services					x	x	x	x		x		000.0111.101



Accounting for ecosystem services at different scales...

Global scale

National &
regional
government,
European
market

Action level,
local scale



**Amvrakikos, Greece:
Wetland management, Water & Fish**

Scales in L. Hein et al. (2006)

Most relevant ecological scales for the regulation services—note that some services may be relevant at more than one scale

Ecological scale	Dimensions (km ²)	Regulation services
Global	>1,000,000	Carbon sequestration Climate regulation through regulation of albedo, temperature and rainfall patterns
Biome–landscape	10,000–1000,000	Regulation of the timing and volume of river and ground water flows Protection against floods by coastal or riparian ecosystems Regulation of erosion and sedimentation Regulation of species reproduction (nursery service)
Ecosystem	1–10,000	Breakdown of excess nutrients and pollution Pollination (for most plants) Regulation of pests and pathogens
Plot–plant	<1	Protection against storms Protection against noise and dust Control of run-off Biological nitrogen fixation (BNF)

Based upon Hufschmidt et al. (1983), De Groot (1992), Kramer et al. (1995) and Van Beukering et al. (2003).

Scales in Costanza (2008)

Table 1 – EcoServices classified according to their spatial characteristics

1. *Global non-proximal (does not depend on proximity)*
 - 1&2. Climate regulation
 - Carbon sequestration (NEP)
 - Carbon storage
 17. Cultural/existence value
2. *Local proximal (depends on proximity)*
 3. Disturbance regulation/ storm protection
 9. Waste treatment
 10. Pollination
 11. Biological control
 12. Habitat/refugia
3. *Directional flow related: flow from point of production to point of use*
 4. Water regulation/flood protection
 5. Water supply
 6. Sediment regulation/erosion control
 8. Nutrient regulation
4. *In situ (point of use)*
 7. Soil formation
 13. Food production/non-timber forest products
 14. Raw materials
5. *User movement related: flow of people to unique natural features*
 15. Genetic resources
 16. Recreation potential
 17. Cultural/aesthetic



Add up scales attributes to CICES classes?

E.g.

- Global/ Continental
- Regional/National
- Local

CICES and TEEB classification

Table 3 Typology of ecosystem services in TEEB

Main service types	
PROVISIONING SERVICES	
1	Food (e.g. fish, game, fruit)
2	Water (e.g. for drinking, irrigation, cooling)
3	Raw Materials (e.g. fiber, timber, fuel wood, fodder, fertilizer)
4	Genetic resources (e.g. for crop-improvement and medicinal purposes)
5	Medicinal resources (e.g. biochemical products, models & test-organisms)
6	Ornamental resources (e.g. artisan work, decorative plants, pet animals, fashion)
REGULATING SERVICES	
7	Air quality regulation (e.g. capturing (fine)dust, chemicals, etc)
8	Climate regulation (incl. C-sequestration, influence of vegetation on rainfall, etc.)
9	Moderation of extreme events (eg. storm protection and flood prevention)
10	Regulation of water flows (e.g. natural drainage, irrigation and drought prevention)
11	Waste treatment (especially water purification)
12	Erosion prevention
13	Maintenance of soil fertility (incl. soil formation)
14	Pollination
15	Biological control (e.g. pest dispersal, pest and disease control)
HABITAT SERVICES	
16	Maintenance of life cycles of migratory species (incl. nursery service)
17	Maintenance of genetic diversity (especially in gene pool protection)
CULTURAL & AMENITY SERVICES	
18	Aesthetic information
19	Opportunities for recreation & tourism
20	Inspiration for culture, art and design
21	Spiritual experience
22	Information for cognitive development

Agreement: Pollination is regulating service (previously classified in Support services by MA 2003)

In CICES, habitat services are not separated from other regulating services

Source: based on/adapted (mainly) from Costanza et al. (1997), De Groot et al. (2002), MA (2005a), Daily, Ehrlich, Mooney, et al. (2008). See Appendix 2 for details.