

Classification of ecosystem services (EEA) (UNCEEA/5/7)

# Introduction to the CICES proposal

*Jean-Louis Weber,  
Advisor, European Environment Agency*

# Accounting for ecosystem capital & services

**Additional payments needed to restore ecosystem capacity up to stated policy targets**

[corporate & public accounting norms, environmental laws & regulations, international conventions]

**Total ecosystem maintenance & restoration costs**

**Payments to maintain ES benefits**

[actual protection expenditure embedded into prices, insurance premiums, annuities & interest of loans, green taxes, green subsidies]

**Ecosystem biophysical structures & processes**

[landscapes, biodiversity, Net Primary Production...]

**Ecosystem functions**

[nutrient cycling, water regulation, habitats, biomass...]

**Ecosystem services**

[provision, regulation, socio-cultural services]

**Sustainability of ES use,**  
[ecosystem degradation, resource depletion]

**Benefits from ES**

[private & collective well being]

**Sustainable macro economic benefits, sector functional income**

**Non valued private & collective benefits**  
[mostly public good]

**Primary benefits, externalities & rents**  
[mostly private]

**Payments to get usage of commodities & assets embedding ES**

[purchaser price, lease, fee & royalties]



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

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# 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

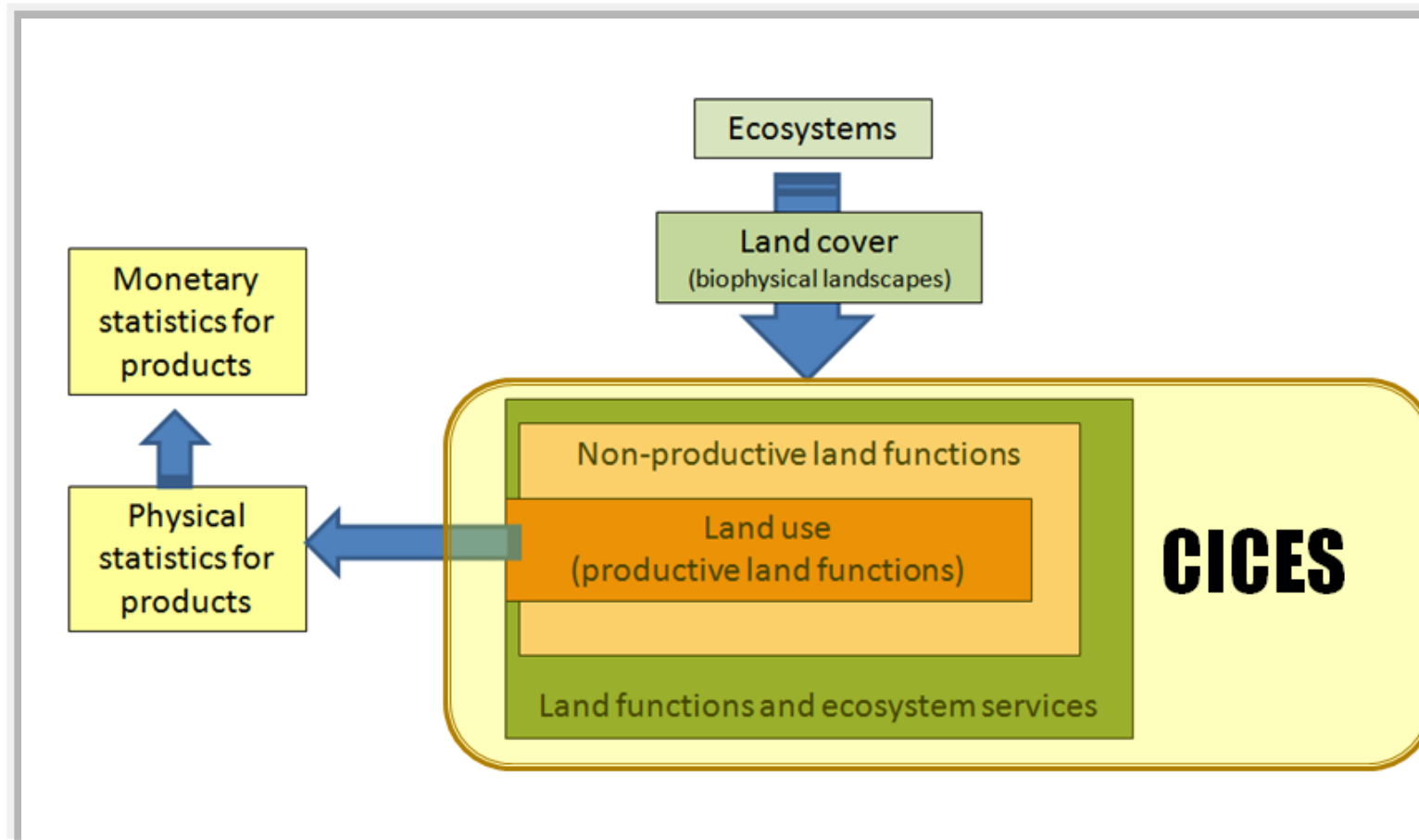
- First, discussions that took place at two international workshops on CICES hosted by the EEA in Copenhagen, December 2008 and 2009.
- Second, an e-forum organised on behalf of the EEA which ran from November 2009 to January 2010, which was designed to enable a wider international audience to comment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



# 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 International Standard Industrial Classification of All Economic Activities (ISIC V4), the Central Products Classification (CPC V2), 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 international standard classifications for products and activities 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.

# Just an illustration...

| 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 |

# Provisional conclusions/ issues

- Useful review and clarification of MA's classification, no major revolution
- Clarifications:
  - Support functions excluded from the list of ES (but still part of ecosystem balances = inputs)
  - Cycling services (e.g. water regulation) are part of ES, altogether with biological services
  - Subsoil resources (material, energy) are not part of ES
  - Hierarchical structure open enough to accommodate additional subdivisions (e.g. by scales...)
  - Cross-referencing with CPC and COICOP is feasible – but the current proposal needs to be validated
- Issues:
  - Cross-referencing with ISIC: how far should we go?
  - Formal presentation as UN standard classification
  - Secure consensus between international organisations