

Linking The Ecosystem Accounting Framework with Country-specific Indicators

Comments and questions prepared for discussion at the expert meeting on ecosystem accounts organised by the UNSD, the EEA and the World Bank, London, December 2011

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- (1) In its technical report No 13/2011 *An experimental framework for ecosystem capital accounting in Europe* (Weber 2011), the EEA outlined, amongst others, several indicators for ecosystem capital, such as the ecosystem resource accessible surplus, and the total ecosystem capital potential. It also makes recommendations on measuring the demand for (accessible) ecosystem services per capita as a measure of ecosystem contribution to well-being.
- (2) A prominent concept in this report is the concept of accessibility, which is considered "particularly important regarding the demand for ecosystem services and the definition of robust indicators with clear definitions of the limits of sustainable use."
- (3) The report also refers to CICES (Haines-Young and Potschin, 2010), a project for the classification of Ecosystem Services, which may serve as an umbrella for a broad set of ecosystem services. The proposal of Weber (2011) does not apply CICES in its experimental framework, but instead proposes to account for demand and accessibility of ecosystem services by
 - a. Carbon/Biomass
 - b. Fresh Water
 - c. Green Infrastructure Neighbourhood Ecosystem Services (GINES)
- (4) Several national environmental agencies, including those of Switzerland (FOEN), Austria (U) and Germany (BfN) have started to implement pragmatic indicators for those ecosystem services that have been considered as being relevant for these countries. For Switzerland, these indicator set has been published Staub et al. (2011). The Austrian indicator set concentrates on ecosystem services relevant for agriculture. Based on the work of the Swiss FOEN the Environment Agency Austria has established an inventory of final ecosystem goods and services for direct use by humans in the Austrian agricultural sector (e. g. C5: Existence of agricultural diversity at the level of species, genes, ecosystems and landscapes, R2: Protection from avalanches through agricultural vegetation on steep slopes). The indicators were taken from the Swiss inventory and complemented by agriculture-related indicators (e.g. C5: Farmland Bird Index, High Nature Value Farmland; R2: Protective agricultural land against avalanches). The publication of the inventory is in preparation. The German indicator set is in elaboration, as part of a broader assessment of Germany's natural capital.

- (5) Table 1 provides a synopsis of those indicators that are implemented or planned to be implemented soon in Switzerland and Austria and with the first proposals for the German indicator set.
- (6) This national catalogues of ecosystem goods and services are much more differentiated and also broader in the scope of services included than the three highly aggregated categories proposed in the framework of Weber 2011. Moreover, the indicator sets by national environmental agencies are better able to reflect reality in the sense that they are more concrete than the three indicators proposed by Weber (2011).
- (7) On the other hand, the framework by Weber (2011) is more comprehensive, in the sense that it takes into account e.g. depreciation and other aspects relevant for national accounting.
- (8) For this reason, the indicators presented in Table 1 have their strength by measuring ecosystem goods and services in function of real problems, while the potential of these indicators to be integrated into national accounts has not yet been analysed.
- (9) If ecosystem services are to be integrated into national accounts as fully as possible, recommendations are needed, on how the proposals by Weber (2011), indicators like those shown in Table 1, and the updated CICES framework can best be combined.
- (10) This raises the question on how such sets of indicators developed by national environmental agencies fit into the framework developed by Weber (2011), as well as the question of the future role for classification systems like CICES.
- (11) The paper *Common International Classification of Ecosystem Services (CICES): Update* (Haines-Young and Potschin 2011), addresses some of these questions. Like the national catalogues it is much broader in the scope of ecosystem goods and services.

For discussion:

How can existing sets of indicators for ecosystem goods and services be integrated into or related to the framework proposed by Weber (2011)? Above all, guidance is needed on how to deal with:

- *differences in scope (limited range of ecosystem services considered in the framework by Weber (2011) vs. broader scope / higher grade of differentiation of CICES and of indicator sets by national agencies) and*
- *differences in the geographical scale*

Table 1 Final Ecosystem Services: Indicators Implemented or Planned in Austria (A), Germany (D, first draft) resp. Switzerland (CH)

Final Ecosystem Goods and Services (FEGS)	Benefit	International Classification (CICES 2010 / MA 2005)	Indicators
C: Cultural services			
C1: Recreational services based on hunting, collecting and observation of species living in the wild	Recreation	Cultural services: experiential	I1: Number of people who go fishing in their free time (CH; A) Number of people, access-costs, number of "pray" (D)
C2: Recreational services based on urban green areas and open spaces as well as recreational areas both near to the place of residence and further away	Recreation	Cultural services: experiential	I1: Availability of green spaces and water courses within 4 km of residential homes (CH) Availability of green spaces (of different quality) within a distance of 2 to 4 km (D)
			I2: Accessibility of recreational spaces near to the home for the Swiss resident population (CH)
			I3: Accessibility of areas free from infrastructure (such as highways, buildings etc.) for the Swiss resident population (CH)
			I4: Accessibility of quiet areas for the resident population (CH)
			I5: Recreational use of landscapes (D); Effective recreational use of forest areas: proportion of areas with a frequency of at least 100 people per day on the test area (a circle with a radius of 100m) (CH)
C3: Recreational services based on recreational spaces in the residential environment (gardens etc.)	Recreation	Cultural services: experiential	I1: Area that could be used for private gardens or for sitting in, playing in and enjoying (CH)
C4: Chance to develop a sense of place through attractive and characteristic landscapes (natural and cultural heritage)	Wellbeing	Cultural services: symbolic	I1: Identification with the natural world among the resident population (CH)
C5: Existence of natural diversity at the level of species, genes, ecosystems and landscapes	Existence of natural diversity (value in addition to its significance for all ecosystem services)	Only partially covered under cultural services: symbolic (existence value) (TEEB: habitat services)	I1: Species diversity in Switzerland and in Swiss regions (Swiss Biodiversity monitoring BDM indicator Z3) (CH) Species diversity (D)
			I2: Species diversity in the countryside (BDM indicator Z7) (CH)
			I3: Species diversity in habitats (BDM indicator Z9) (CH)
			I4 Habitat quality (D), I5 Habitats for rare or endangered species (D)
C6: Availability of valuable natural and cultivated landscapes for commercial use in tourism	Contribution to value creation in tourism	Cultural services: experiential	I1: Number of passenger railway journeys by the mountain railways (CH; A)
			I2: Supplementary Indicator 2: number of passenger journeys by post vehicles (in tourist regions) and ships (on Swiss waters) (CH)

Final Ecosystem Goods and Services (FEGS)	Benefit	International Classification (CICES 2010 / MA 2005)	Indicators
R: Regulating services			
R1: Healthy air / local climate for the population	Prevention	Regulating services: regulation of biophysical conditions	I1: Number of people who are exposed to “good air” (below the emissions limit) or to “bad air” (above the emissions limit) near their place of residence in relation to pollution from fine particulate matter (CH)
			I2: Number of people who are exposed to “good air” (below the emissions limit) or to “bad air” (above the emissions limit) near their place of residence in relation to pollution from nitrogen dioxide (CH)
			I3: Number of people who are exposed to “good air” (below the emissions limit) or “bad air” (above the emissions limit) near their place of residence in relation to pollution from ozone levels (CH)
			I4: Number of people who are exposed to “good air” (soot-free air) or “bad air” near their place of residence in relation to pollution from soot (CH)
			I5: Urban Green index (D)
R2: Protection from avalanches, rockfalls and debris flows through vegetation on steep slopes	Protection of humans, animals and material assets	Regulating services: regulation against hazards	I1: Protective forest for protection against natural hazards as km ² or map (CH) Protective forests (D)
			I2: Protected values from protective forest in CHF (potential damage prevented) (CH)
R3: Flood protection	Protection of humans, animals and material assets	Regulating services: regulation against hazards	- downstream flood risk / area of active alluvial floodplains (D)
R4: Carbon sequestration	Protection of humans, animals and material assets	Regulating services: regulation of biophysical conditions	I1: Alteration in forests’ carbon storage per year in tonnes of CO ₂ -aeq. (negative values = emissions) (CH)
			I2: Alteration in landscapes’ carbon storage per year caused by land use and changes in land use, measured in tonnes of CO ₂ -aeq (negative values = emissions) (CH; A)
			I3: GHG-emissions / carbon sequestration by land-use types (D; A)

R5: Natural supply of production support services: pollination and biological pest control	Contribution to agriculture and forestry / food industry	Regulating services: regulation of biotic environment	I1: Number and quality of pollen and nectar producing plants per monitoring site (according to Hintermann & Weber 2009) (CH)
			I2: Average density of bees [populations per km ²] (CH; A)
R6: Maintenance of fertile soil for agricultural and forestry use	Contribution to agriculture and forestry / food industry	Supporting services: regulation of biophysical conditions	I1: Land used for agriculture in hectares (CH ; A)
			I2: Land not used for settlements and infrastructure (D)
			I3: Soil erosion risk / density of landscape elements that reduce soil erosion (D)
			I4: Density of land-use types with positive effects on soil fertility (D)

Final Ecosystem Goods and Services (FEGS)	Benefit	International Classification (CICES 2010 / MA 2005)	Indicators
P: Provisioning services			
P1: Natural supply of ground and surface water usable as drinking and process water (input factor for water management)	Water supply	Provisioning services: food and beverages	I1: Water supply from untreated spring and ground water in millions m ³ of water per year (CH)
			I2: Percentage of untreated spring and ground water in the whole water supply system (CH)
			I3: Watersheds with intensive land-use, high fertilizer inputs and polluted groundwater / density of low-input farming and natural and semi-natural habitats (D)
P2: Agricultural products		Provisioning services: food and beverages	- agricultural production (per ha) (D; A) - inputs (especially energy-inputs) per t output (D)
P3: Forage crops and organic fertilisers for agricultural use	Contribution to agriculture / food industry	Provisioning services: food and beverages	I1: Swiss feed grain used (in 1000s of tonnes per year) (CH)
			I2: Estimation of the amount (in tonnes) of agricultural feed produced from meadows and pastures (CH)
			I3: Estimation of the amount (in tonnes) of organic fertiliser used in agriculture (CH)
P4: Timber increment for forestry use	Contribution to forestry	Provisioning services: materials	I1: Annual timber increment in 1000 m ³ per year (CH; D)
			I2: Annual net timber increment in 1000 m ³ per year (timber increment minus usage and mortality) (CH)
			I3: Amount of timber used in 1000 m ³ per year (annual usage) (CH)
P5: Renewable energy sources: water power, wind power, biomass, solar energy	Contribution to energy economy	Provisioning services: energy	I1: Absolute amount and proportional share of renewable energy sources in final consumption of energy excluding electricity (CH)
P6: Genetic resources and biochemicals, as well as test and experimental organisms	Contribution to the pharmaceutical industry, agriculture and other industries	Provisioning services: materials	I1: Indicator of diversity of agricultural plant and animal varieties (CH)

References

Haines-Young Roy, Potschin Marion (2010) Proposal for a common international classification of ecosystem goods and services (CICES) for integrated environmental; and economic accounting. Paper presented at the fifth Meeting of the UN Committee of Experts on Environmental-Economic Accounting, New York, 23.-25 June, 2010.

Haines-Young Roy, Potschin Marion (2011): *Common International Classification of Ecosystem Services (CICES): Update*. EEA 2011.
<http://unstats.un.org/unsd/envaccounting/seeaLES/egm/Issue8a.pdf>

Staub Cornelia, Ott Walter, Heusi Franziska, Klingler Georg, Jenny Annette, Häcki Maurus, Hauser Andreas (2011): *Indicators for Ecosystem Goods and Services: Framework, methodology and recommendations for a welfare-related environmental reporting*. FOEN 2011
<http://www.bafu.admin.ch/publikationen/publikation/01587/index.html?lang=en>

Weber Jean-Louis (2011): An experimental framework for ecosystem capital accounting in Europe. EEA Technical report 13/2011.