



Expert meeting on Ecosystem Accounting

EEA, UNSD and the World Bank

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Accounting for ecosystems in Europe

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Fast Track Implementation of Simplified Ecosystem Capital Accounts in Europe (2009-2012)

- Need of a minimum common reference for multiple national initiatives in 35 EEA member countries (and further on, Eastern and Southern European neighborhoods)
- Feasible with existing data and statistics
- Responding main policy questions:
 - “resource efficiency”: sustainable use of ecosystem (agriculture, forestry, fishery...) – Europe’s 2020 horizon
 - Benefits from ecosystem services: starting with the sustainable benefits supported by ES in agriculture, forestry, fishery, tourism... and their distribution between all beneficiary sectors (not only the primary producers...); continuing with selected regulating services, broader human well-being...
 - “Beyond GDP”, the macro-economic dashboard: the true price of final consumption (including **consumption of ecosystem capital - CEC**), the real net national income (net of CEC), genuine saving including ecosystems
 - Ecosystem capital restoration costs as a measure of depreciation (CEC)
 - Europe’s global responsibility: CEC embedded into international trade
- Central indicator: ecosystem capital degradation

Characteristics of ecosystem capital accounts



- Meet the policy demand:
 - Measure resource efficiency: maximize benefits while maintaining capital
 - Indicators to supplement and/or adjust sector and macro-economic aggregates
 - Policy agenda: continuity, annual updates for year $t - 1$ are needed
 - National statements, internationally comparable...
- Physical accounts supporting monetary accounts:
 - Ecosystem services & sustainable benefits
 - Ecosystem capital state/degradation & depreciation (consumption of ecosystem capital)
- Accounts deep rooted into verifiable observation datasets:
 - Socio-economic statistics (agriculture, forestry, fisheries, tourism, population)
 - Monitoring by satellites (land cover, biomass, climate variables...)
 - Best available in situ monitoring data (water, biodiversity...)
- At the start, relevance matters more than accuracy:
 - Modeled or surrogate estimations are acceptable if based on verifiable datasets
 - Estimations need to be transparent and reproducible (for measuring change)
- Accounts need to be compiled at various scales:
 - National as well as Global, local government, business
 - Implementation: in parallel top-down and bottom-up

Approach to physical accounting of ecosystem degradation



- First diagnosis based on limited set of indexes:
 - Land cover balances → Landscape Ecological Potential (LEP)
 - Biomass/Carbon balances → Net Ecosystem Carbon Balance (NECB)
 - Water balances → Water Stress
 - Biodiversity balances → Biodiversity Multicriteria Index
 - Disease prevalence in ecosystems
 - Ecosystem dependency from artificial inputs
- Multicriteria diagnosis (BBN) → Total Ecosystem Potential
- Ecosystem services: one by one, explicitly related to origin and uses



Physical accounts for all ecosystems

- All ecosystems:
 - Inland systems,
 - Seas/oceans
 - Atmosphere
- Inland ecosystems include:
 - Land systems
 - Forests (natural or managed)
 - Other terrestrial systems (wetlands, shrubland, grassland...)
 - Agro-ecosystems
 - Urban systems
 - Inland water systems (rivers, lakes)
 - Below-surface systems functionally related to land
 - Soil
 - Aquifers



Physical accounts for ecosystems

- **Ecosystem capacity to deliver services in a sustainable way → change matters as much as state**
- Ecosystem capital state = quantity*health
- Ecosystem assets: basic balances of surface, length, volume, mass, energy, number of units...
- Ecosystem health (or distress syndrome): diagnostic approach based on a limited set of symptoms (*David J. Rapport*)
- Ecosystem services: material/energy resources and functional services
- Ecosystem resource (services) depletion is a subset of ecosystem degradation

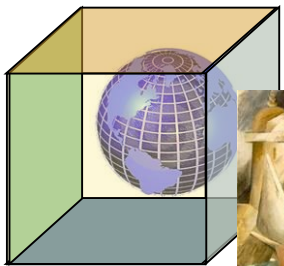


Scales

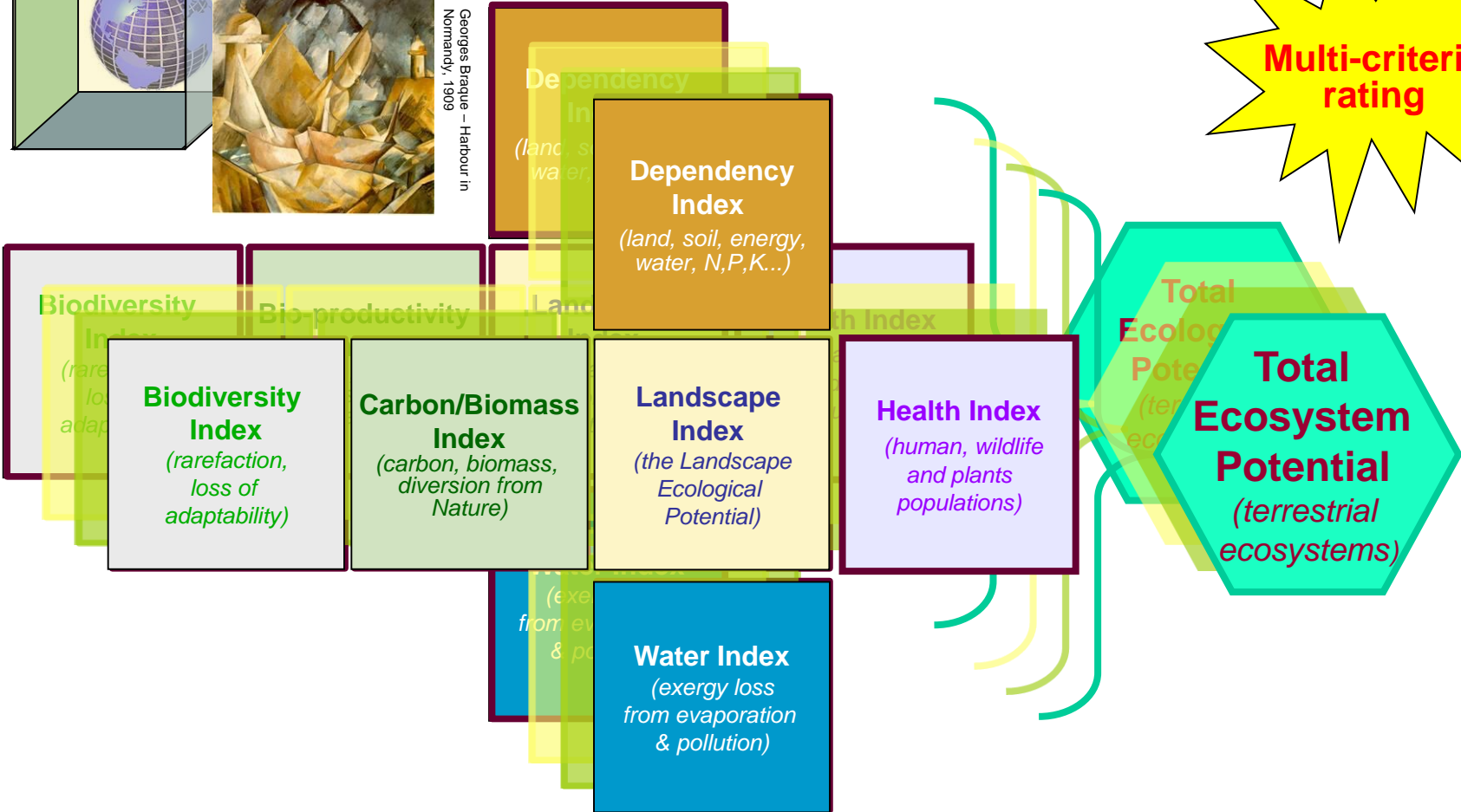
- In theory, ecosystems can be described at various scales, from the global to the microscopic.
- SEEA is an extension of the SNA → primary focus on the same typical scales (macro-economic accounting units): institutional units (e.g. companies, households or public organizations), functional units (e.g. establishments), commodities and assets.
- *Ecosystem accounts = the same + land use units (ownership) + land cover units + socio-ecological systems...*
- Geographical grouping: administrative units (countries, regions, protected areas), physical regions (river basins, mountains, coastal zones), bio-climatic zones...



Make it happen? Make it simple! : a "Cubist" approach of physical accounts



Georges Braque – Harbour in Normandy, 1909



Change in TEP = Ecosystem capital degradation or improvement

All indexes computed by 1 km² grid when possible and then aggregated into functional units (small catchments, socio-ecological systems, NUTS...)



Supply of ecosystem services by land cover types

Services	11	12	13	14	15	21	22	23	31	32	33	34	35
	Food	Materials	Forest trees-related	Flatt-related	Physical support	Amenity	Identity	Debate	Quality	Sink	Precision	Refugium	Breeding
Artificial surfaces/ Urban													
Arable land & permanent crops													
Grassland & mixed farmland													
Forests & woodland shrub													
Heathland, sclerophyllous veg.													
Open space with little/ no vegetation													
Wetlands													
Water bodies													

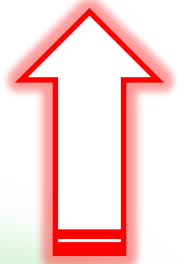
Approach to accounts in money



Valuation of ecosystem services: 3 different cases



GDP,
consumption,
trade...



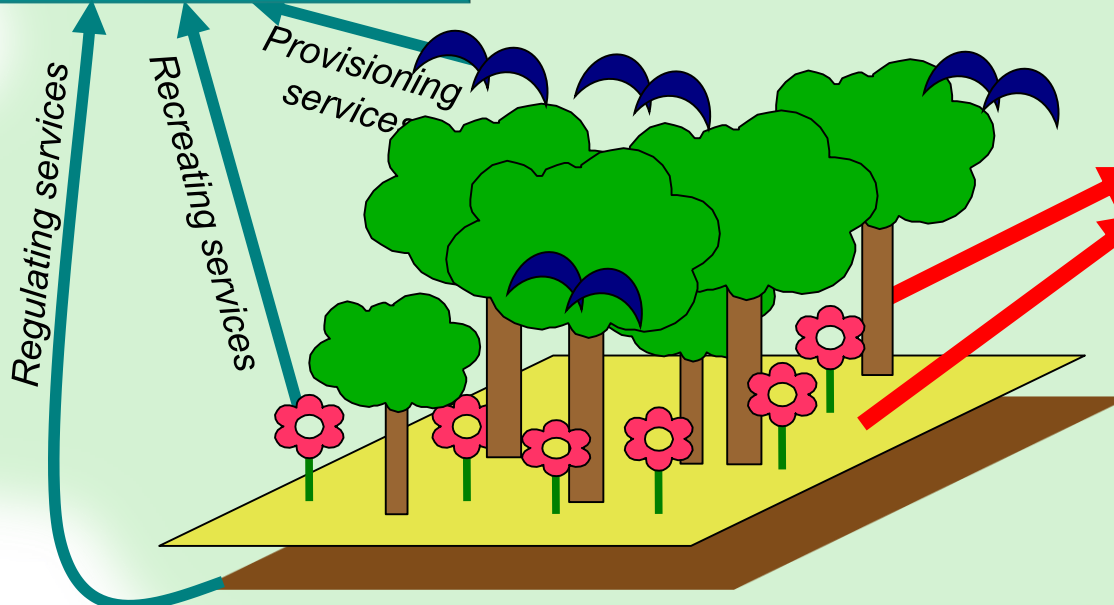
Services
valuation,
payments for
services

2 - Non valued services:
mostly common goods, tradable,
transferable rights

**1 - ES incorporated into
commodities &
economic assets:**
mostly private goods, market
prices

Payments for
restoring
ecosystem
potential

3 - Ecosystem good state: health, sustainable capacity
of delivering services, life-support functions, **Public Good:** non-
rival, non-exclusive use, non-transferable rights, taxes or lease
with covenants are possible





Wealth is not just about money

...but maintaining wealth may have a cost

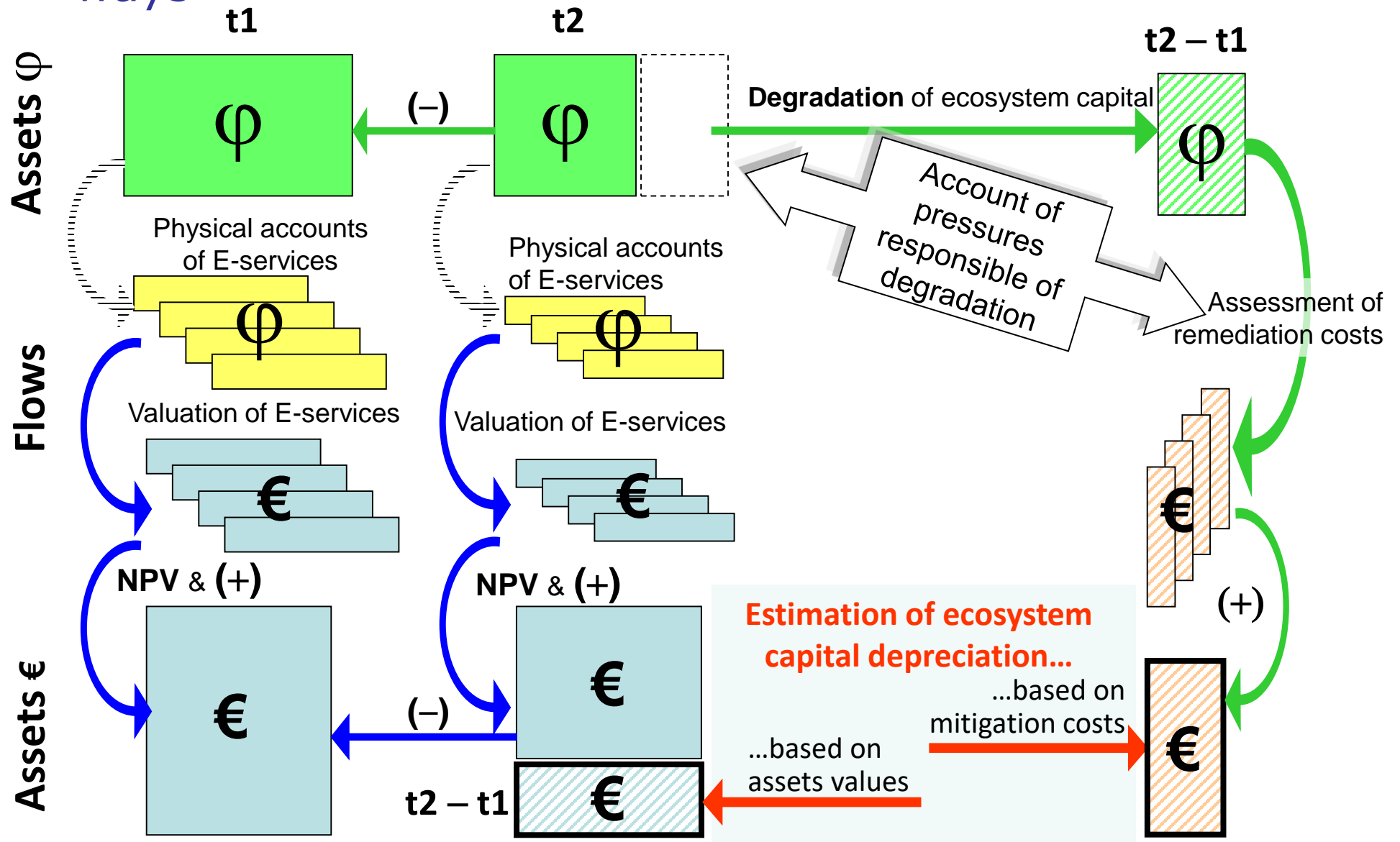
Invaluable asset
→ no monetary value...

**Paid maintenance/
restoration costs**



**Estimated cost of repairs (not yet paid) =
Measurement of asset depreciation**

Estimation of ecosystem capital depreciation: 2 possible ways



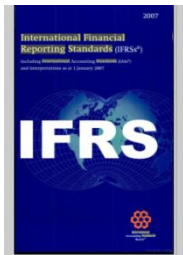
Ecosystem Capital Consumption or Depreciation



CEC is the monetary estimation of ecosystem depreciation resulting from physical degradation

- alike “fixed capital consumption” (UN System of National Accounts)
- alike “capital depreciation” in financial corporate accounts (International Financial Reporting Standard)

CEC measures altogether the depletion of the private or common good (the economic resource, such as timber or managed fish stocks) and the degradation of the public good (such as forest or fisheries)



“To be reliable, the information in financial statements must be complete within the bounds of materiality and cost. An omission can cause information to be false or misleading and thus unreliable and deficient in terms of its relevance”

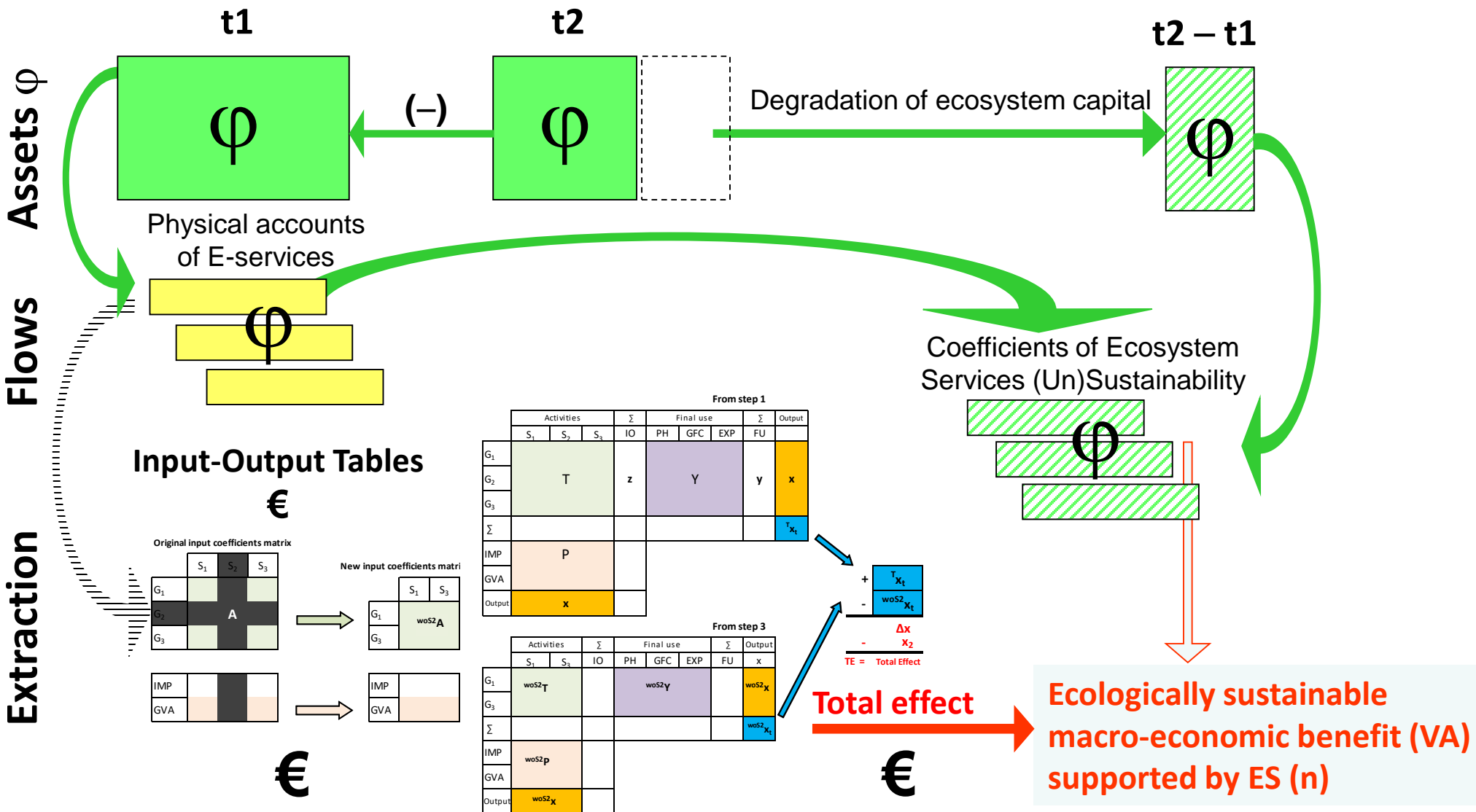
http://www.ifrs-portal.com/Texte_englisch/Framework/index.htm

Therefore, capital depreciation must be estimated and deducted when calculating profit. This is of highest importance for shareholders (dividends, stocks value...) as well as for the fiscal authority...

However, neither IFRS nor SNA record complete Consumption of Ecosystem Capital: IFRS resource only and SNA, nothing...

CEC is an unpaid cost. An unpaid cost is a debt. CEC is the measurement of the increase in ecological debts (to future generations) and should be recorded accordingly.

Ecologically sustainable benefits from ecosystem services: the macro-economic approach



Calculation of total effect on VA of extraction of ES (n)

(Source: Jose Acosta, Wuppertal Inst. and EEA-ETCSCP)