**Background paper to expert workshop on components of EEA Ecosystem Capital Accounts - focus on biomass carbon and biodiversity data**

1. **Introduction**

## The two main objectives of the workshop are as follows:

* Review methodological options for developing the component accounts on biomass carbon and biodiversity in EEA’s simplified ecosystem capital accounts (SECA)
* Discuss critical methodological choices with regard to modelling frameworks, the geo-referencing of input data layers and environmental interpretation of accounting results

In addition, it would be useful if we could review this third issue (if time allows):

* Provide advice to EEA on developing the long-term data foundation for these sub-accounts via an efficient combination of statistical data, in-situ ecosystem survey data and satellite observation programmes

This workshop will feed into EEA-internal discussions and provide input to the proposals to be developed for the ‘EU MAES ecosystem accounting approach’. This brief background paper sets out some questions to be tackled for the biomass carbon and biodiversity sub-accounts and then provides information on the proposal that has been shared with selected staff at DG ENV and Eurostat. EEA work is currently at a hiatus, which means that the technical EEA presentations at the workshop will present the methodological approaches that have been developed so far and this background paper setting out the currently proposed new framework (within which biodiversity and biomass carbon are to be developed).

There is a substantial discussion at EU level what the right approach is, with both Eurostat and DG ENV insisting that the SEEA handbook on experimental ecosystem accounting (‘SEEA-EEA’) should be the methodological foundation to use. The feedback from Eurostat on the proposal in section 2 was very positive, the comments from DG ENV indicate a more cautious welcome.

***Some pointers for the discussion:***

When making choices between different options it is always useful to have a set of criteria against which to evaluate them. The following list contains the key considerations proposed for the review of current and proposed SECA components**.** (Simplified) ecosystem capital accounts should be:

* Representative of key ecosystem functions / types of ecosystem capital stock
* Targeted on functional ecological units (water basins, ecosystem types etc.)
* Look at trends that are likely to show a clear signal
* Follow an analytical approach aligned with characteristics of data (i.e. avoiding analytical over-reach)
* As transparent and communicable as possible
* Aligned with key EU policy targets where relevant
* Nest within available ecosystem accounting guidance

In addition, to the criteria above it is suggested that the discussion tackles the following questions.

***For the biodiversity account:***

The hypothesis underlying this sub-account is that a decline in biodiversity/landscape structure implies a loss of ecosystem capital and also of related ecosystem services. So the questions are:

* What are the best indicators or parameters to monitor trends in biodiversity and in landscape structure (bearing in mind the criteria set out above)?
* Which data do we have on species and landscape characteristics that help us to measure the chosen trends?
* How do we best combine them for constructing a ‘biodiversity account’ ?

***For the biomass carbon account:***

The assumptions underlying the current (ENCA) proposal for this sub-account are debatable (it assumes that the higher the biomass carbon stock the better the condition of the related ecosystem capital; however, human influence via fertilisation and pollution on biomass carbon stocks and the exploitation of biomass stocks outside the EU are currently ignored). Hence it is necessary to ask more fundamental questions:

* What ecosystem functions or what use of ecosystem capital could we measure via a biomass carbon sub-account?
* What parameters or indicators do we have that would allow us to measure trends in the critical functions or ecosystem capital that we want to monitor?
* Which data do we that would allow us to measure the chosen trends?
* How do we account for the EU’s global impact on biomass carbon stocks?

There are many more questions and details that could be discussed but these are the proposed focus. These questions and the criterial above have already influenced the proposal set out in section 2 and annex 1. This proposal also needs to be critically reviewed, however.

1. **Current proposal to develop an ecosystem capital dashboard account**

There are quite a number of possible variations if one looks at the further development of SECA. However, it is probably best to distil them into two clear alternatives as basis for further discussion:

1. Dashboard on basis of previous accounting approach (aka technical report 2011 & ENCA, looking at ‘sustainability of use’ etc.) combined with some additional elements, such as ‘fish accounts’ & nutrient balance
2. Dashboard that focuses on key aspects of ecosystem status and use, building on simple accounts and indicator information across a wide range of ecosystem capital elements (this could also be a set of ‘mini-dashboards’ – see proposal further below).

Both of these options have one main difference with the previously proposed SECA methodology: instead of the ‘ECU method’ to calculating an overall index this is done via a dashboard approach.

Option 1 is otherwise quite close to the initial approach (as now codified in the ENCA QSP package) and has a focus on ecosystem capital accounting. This means it aims to demonstrate the feasibility and logic of the original concept, including net accessible ecosystem capacity. The original components have been augmented with elements relating to nutrient flow and the marine system to take account of the concept of planetary boundaries and the importance of marine ecosystems. Other versions of this approach are also possible, e.g. one where biomass carbon is not included (as there are concerns about the validity of the current methodological approach in an ecological/earth science perspective).

Option 2 focuses on capturing critical trends on the state of ecosystem capital and thus aims for a comprehensive coverage of different ecosystem capital components. It can be described as a bridge between the SEEA-EEA approach on ‘extent and condition of ecosystems’ and the ecosystem capital accounting concept. The wider coverage does not exclude completing components accounts to the same depth and methodology as proposed in ENCA-QSP but the priority for resource investment would be completeness rather than depth. This option is considered to correspond very well to the ‘natural capital’ priorities outlined in the 7EAP and key planetary boundaries. The component elements proposed in Option 2 have been chosen with regard to relevance and feasibility – this means this the different components under this option could be completed by end 2015.

***Proposal for moving forward (Jan-Erik’s perspective only for now)***

The recommendation is to focus efforts on Option 2 (though its design still needs peer review with EEA colleagues). For details see Annex 1.

As currently designed this contains component accounts on land, water and biodiversity/ landscape, so it continues a lot of the ‘old’ SECA approach anyway (minus the ‘accessible resource’ bit; except for fish stocks where data and scientific baselines seem in place).

‘Biomass carbon’ is tackled under forests via an indicator on the ratio of annual forest increment to total EU use of forest biomass (domestic and imported) – this gives a very direct signal of how much biomass we use in relation to the ‘sustainable’ forest re-growth every year and captures (one dimension of) our reliance on ecosystem capital abroad.

Option 2 thus aims at building an accounting system but starts with the elements that are feasible. It includes all major EU ecosystems and also tackles the dimension of EU use of biomass external to the EU territory. It is designed to build up different modules that develop ecosystem accounting without pretending to have a complete answer/accounting system already in place (as that would mean building on data sets and geo-spatial modelling that would lead to ‘false accuracy’).

**Option 1: Dashboard account focused on previous component-accounts with additional elements**

Sum up: average or median

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Year/**  **account** | **Land**  **(ENCA)** | **Water**  **(ENCA)** | **Carbon**  **(ENCA)** | **Agricultural nutrient**  **balance** | **Biodiversity/**  **Landscape**  **(ENCA)** | **Marine**  **(Fish stocks)** |
| **Year X** | **100** | **100** | **100** | **100** | **100** | **100** |
| **Year X + 1** | **98** | **97** | **103** | **102** | **97** | **101** |
| **Year X + 2** | **97** | **96** | **104** | **103** | **93** | **100** |
| **Accounting result/index** | **97%** | **96%** | **104%** | **Inverse of 103** | **93%** | **100%** |
|  |  |  |  |  |  |  |
| **Potential simplification** | **\*** | **\*\*** | **\*\*** | **\*** | **\*\*\*** | **0** |

Alternative sum up: red & green dots, % of trends, balance between red and green, ..

**Option 2: Dashboard account focused on major ecosystems, combining accounts and indicators**

Sum up: average or median

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Year/**  **account** | **Farm-land *(loss & HNV)*** | **Forests *(biomass use & ‘HNV’)*** | **Inland waters *(assets & quality)*** | **Marine *(Fish stocks & nutrient loading +?)*** | **Biodiversity *(NLEP rev & bird trends + Art. 17 ?)*** | **Urban *(Green areas & living space)*** | **Global *(CO2 levels & critical loads for N)*** |
| **Year X** | **100** | **100** | **100** | **100** | **100** | **100** | **100** |
| **Year X + 1** | **98** | **97** | **103** | **102** | **97** | **101** | **101** |
| **Year X + 2** | **97** | **96** | **104** | **103** | **93** | **100** | **102** |
| **Accounting result/index** | **97 %** | **96%** | **104%** | **103** | **93%** | **100%** | **102%** |
|  |  |  |  |  |  |  |  |
| **Potential simpli-fication** | **\*** | **\*\*** | **\*\*** | **\*** | **\*\*\*** | **0** | **\*** |

Alternative sum up: red & green dots, % of trends, balance between red and green, ..

Note: in this approach most of the ‘MAES’ ecosystems are represented via ‘mini dashboards’. The naming in the table uses shortcuts – for details on names + sub-components please consult annex 1.

**Annex 1: Complete list of component accounts and indicators for Option 2**

Option 2: Dashboard account focused on major ecosystems – short version

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Ecosystem** | **Dashboard components**  **(accounts or indicators)** | **Account (A) or indicator (I)** | **Planetary Boundary** | **Ready & Regular ?** | **Spatial dimension** |
| **Farmland** | Land conversion from forest/farmland to urban areas  Share of HNV farmland | **A**  **I** | **Land-system**  **Biosphere** | **Yes**  **(Yes)** | **‘CLC’**  **‘CLC’ / MS** |
| **Forests** | Total EU forest biomass use / annual domestic increment  Forest naturalness index | **?**  **I** | **Land & biosphere**  **Biosphere** | **(Yes)**  **(Yes)** | **EU / MS**  **EU / MS** |
| **Inland waters** | Water asset accounts (based on WEI +)  Water quality (accounts) | **A**  **A** | **Freshwater**  **Freshwater** | **(Yes)**  **(Not yet)** | **Water basins**  **Water basins** |
| **Marine** | Fish accounts  Nutrient loading  (Ocean acidification) 1 | **A**  **I**  **I** | **Biosphere**  **Nutrient flows**  **Ocean acidification** | **(Yes)**  **Yes**  **Yes** | **Per sea**  **Per sea**  **Per sea** |
| **Biodiversity** | NLEP+ revised  Trends in key species populations (e.g. birds) | **A**  **I** | **Biosphere**  **Biosphere** | **(Yes)**  **(Not yet)** | **‘CLC’**  **(large) ecosystem units** |
| **Urban systems** | Share of green areas  Living space (m2) per inhabitant 2 | **I**  **I** | **n/a**  **(land systems)** | **(Yes)**  **(Yes)** | **Per city**  **Per city** |
| **Global Impacts** | CO2 levels in atmosphere  % of ecosystems exposed to eutrophication > critical loads | **I**  **I** | **Land systems**  **Biosphere & Nutrients flows** | **(Yes)**  **Yes** | **EU / MS**  **(large) ecosystem units** |

1. Sea surface temperature is an alternative indicator here which probably provides a faster-moving signal. However, that would mean there is no link to the planetary boundary ocean acidification in the ‘dashboard account’
2. ‘Average urban temperatures’ could be an alternative to living space per inhabitant but would again link to climate change and does not have such a direct link to personal responsibility.

For the data column (‘Ready & regular’): ‘Yes’ means that data are available or will become so (with CLC 2012) and we know how to integrate them into the SECA framework or it is expected to be easy; ‘(Yes)’ means that regular data with good EU coverage are available for the indicator/parameter chosen but that some reflection and/or work is required how to integrate this layer into the SECA dashboard account.