### **Overview of (planned) ecosystem service accounts in the EU and selected Member States**

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### **KIP INCA Phase 1 report: Proposed selection of services for Phase 2**

KIP-INCA Phase 2 will produce experimental and pilot flow accounts for a selection of ecosystem services, experimenting with valuation approaches (see Table 1). For these services, either data or models are available to produce at least annually aggregated values of physical flows at EU and Member States level, which is a prior criterion for their selection (see Annex 4: JRC technical note on the available models to quantify ecosystem services flows at EU scale). Most of these services can also be aggregated to higher spatial units using the JRC's ESTIMAP model which is embedded in the LUISA model platform. Whether or not models are used to quantify supply, use and demand for ecosystem services, reliability of the results (or the associated uncertainty) is a critical issue which needs to be considered well in INCA. Quality assurance at the different steps of the INCA architecture (including model validation and data quality control) remains crucial. Three approaches to test models for their reliability can be considered when setting up ecosystem service accounts under INCA: comparing different models (see for instance earlier work of JRC[[1]](#footnote-1)); validating models results with field data (e.g. data on the distribution of pollinator species to validate pollination maps), and testing across spatial scales which includes interaction with the member states.

The initial focus of KIP-INCA will be the development of biophysical flow accounts of the services included in Table 1 while gradually monetary accounts will follow once agreement is reached on appropriate valuation methods. Even then, it needs to be stressed that the prototype ecosystem service accounts will be experimental accounts and will remain to be so until proper validation is done and agreement on procedure and methodology is reached.

Table 1: Services to be included in KIP-INCA Phase 2

|  |  |
| --- | --- |
| **Service** | **Physical unit** |
| **Provisioning services** | |
| Crops | Harvest (ton per ha) |
| Timber | Timber growth and harvest (ton per ha) |
| Marine fish | Catch (ton per fishing zone) |
| Water | Water abstraction for public, industrial and agricultural use (m3 per unit area) |
| Livestock | Amount of animal feed (grass) provided |
| **Regulating services** | |
| Pollination | Share of the crop harvest pollinated (ton per ha) |
| Erosion control (soil protection) | Avoided erosion in ton/ha/year compared to bare soil |
| Water purification | Removal of in-stream nitrogen (ton per km river) |
| Air filtration | Deposition of air pollutants (ton per ha) |
| Carbon sequestration (in vegetation and soil) | C sequestration in ton/ha/year |
| Flood control | Land area protected |
| **Cultural services** | |
| Recreation | Number of visits in ecosystems (person-days) / ha, include budget for surveys in some countries |
| Tourism | Number of overnight stays generated per ha/year |

The experimental and pilot accounts will be developed using the example of water purification. This involves a four step procedure when developing a physical and monetary asset and flow account for ecosystem services, which is in line with the principles of the SEEA EEA framework:

* Identify the ecosystem service classification and the underlying conceptual framework;
* Quantify in physical terms the targeted ecosystem service. The quantification procedure can range from simple to complex, or can be multi-tiered because there is presently no reference framework or standard to follow.
* Translate the quantitative assessment into monetary terms by choosing the most appropriate economic valuation technique;
* Populate the SEEA EEA consistent tables with the resulting data.

Given available (human) resources, the prototype development will be carried out service by service. Fast track physical flow accounts will be developed for ecosystem services which can directly be quantified in physical units (i.e. no proxy indicator is used) such as soil protection or air filtration. In a next phase focus can go to pollination and recreation. Models for these services are available but they still deliver proxy indicators (potential of ecosystems to host pollinator populations and potential of ecosystems for nature-based recreation). These indicators have no dimensions and are therefore less suitable for accounting. Further model development will be required to adapt these indicators so that they can deliver physical accounts including estimates of supply and use in physical units.

**Ecosystem service accounts elaborated or planned at country level:**

**The Netherlands**

Statistics Netherlands and Wageningen University have developed ecosystem service accounts (physical and monetary supply and use tables) as part of the Limburg Case Study:

<https://www.cbs.nl/nl-nl/publicatie/2016/09/maatwerk-rapport-natuurlijk-kapitaalrekeningen>

The tables below show a small part of the physical and monetary supply tables. A monetary use table was also developed.

Statistics Netherlands and Wageningen University have recently started a new, national scale project. Funding is guaranteed for the first project year, where emphasis will be placed on physical data. A second project year with emphasis on monetary valuation is planned. In the first project phase, the following topics will be addressed at country and provincial levels: 1) carbon account, 2) biodiversity account, 3) physical supply and use tables and 4) condition account.

Table Physical supply table for ecosystem services

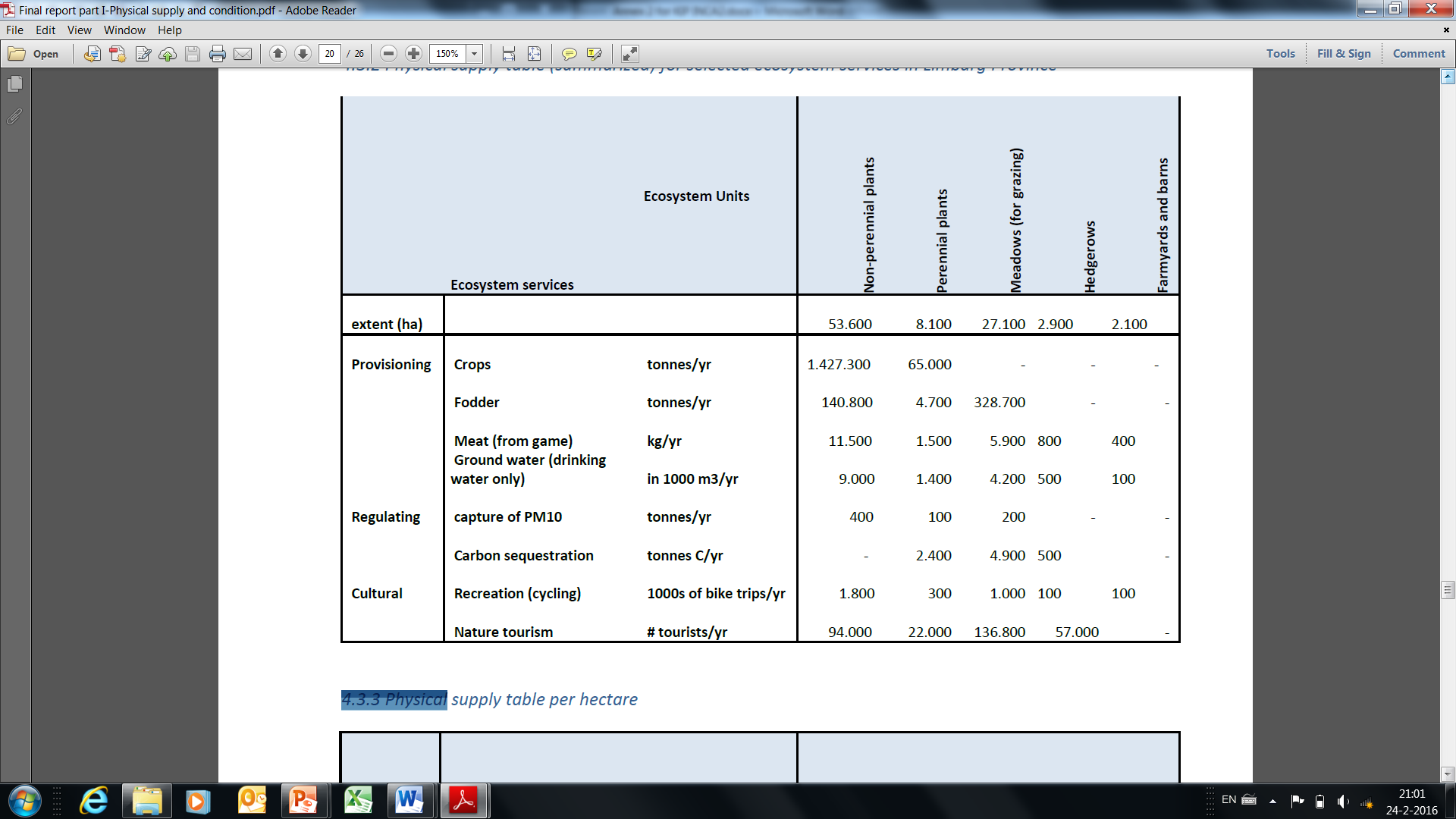


Table Monetary supply table for ecosystem services

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | 1 | 2 | 4 | 5 | 6 |
| **LIMBURG** |  |  | **Non-perennial plants** | **Perennial plants** | **Meadows (for grazing)** | **Hedgerows** | **Farmyards and barns** |
| **extent** |  | **ha** | **53.629** | **8.133** | **27.066** | **2.940** | **2.142** |
| **Provisioning** | **Crops** | **€** | 35.303.100 | 2.605.287 | - | - | - |
|  | **Fodder** | **€** | 1.960.900 | 66.000 | 4.587.100 | - | - |
|  | **Meat (from game)** | **€** | 817.700 | 112.900 | 223.400 | - | 9.600 |
|  | **Ground water** | **€** | 3.861.200 | 607.200 | 1.802.300 | 193.900 | 61.800 |
| **Regulating** | **capture of PM10** | **€** | 301.200 | 54.300 | 173.700 | 30.400 | 11.700 |
|  | **Carbon sequestration** | **€** | 300 | 80.200 | 165.700 | 18.000 | 100 |
| **Cultural** | **Nature tourism** | **€** | 4.410.000 | 1.042.600 | 6.349.100 | 2.357.700 | - |
|  | **Recreation (cycling)** | **€** | NA |  |  |  |  |
| **Totals** |  | **€** | **46.654.400** | **4.568.500** | **13.301.400** | **2.600.000** | **83.200** |
|  | **value per ha (excl. Amenity service)** | **€/ha** | **870** | **562** | **491** | **884** | **39** |
|  | **value per ha (incl. Amenity service)\*** | **€/ha** | **870** | **562** | **491** | **884** | **39** |

**United Kingdom**

The following table is an extract from the Natural Capital Accounting 2020 roadmap that was released by the UK Office of National Statistics in March 2015 – please see: <http://webarchive.nationalarchives.gov.uk/20160105160709/http://www.ons.gov.uk/ons/rel/environmental/uk-natural-capital/natural-capital-accounting-2020-roadmap--interim-review-and-forward-look/index.html>

The UKA NCA 2020 roadmap covers ecosystem assets as well as services. The overview table below only covers the ecosystem service component of the table published in the original roadmap. The roadmap table will be expanded and populated as the UK work on natural capital progresses.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Woodland | Public Forest Estate | Marine | Freshwater | Farmland | Peatland |
| Provisioning services | | | | | | |
| Timber | ✓ | ✓ |  |  |  |  |
| Fish |  |  | ✓ | ✓ |  |  |
| Peat extraction |  |  |  | ✓ |  | ✓ |
| Grass |  |  |  |  | ✓ |  |
| Crops |  |  |  |  | ✓ |  |
| Water |  |  |  | ✓ |  |  |
| Energy |  |  |  | ✓ |  |  |
| Regulating Services | | | | | | |
| GHG sequestration/ flux | ✓ | ✓ | ✓ | ✓ | tbd | ✓ |
| Water quality regulation |  |  |  | ✓ |  | ✓ |
| Water quantity |  |  |  |  |  |  |
| Water flow regulation | ✓ | ✓ |  | ✓ |  | ✓ |
| Erosion protection |  |  |  | ✓ |  |  |
| Air filtration |  |  |  |  |  |  |
| Cultural Services | | | | | | |
| Setting for outdoor recreation | ✓ | ✓ | ✓ | ✓ | ✓ |  |
| Education services | ✓ |  |  | ✓ |  |  |
| Landscape amenity |  |  |  |  |  |  |
| Archaeological preservation |  |  |  |  |  |  |

**Germany**

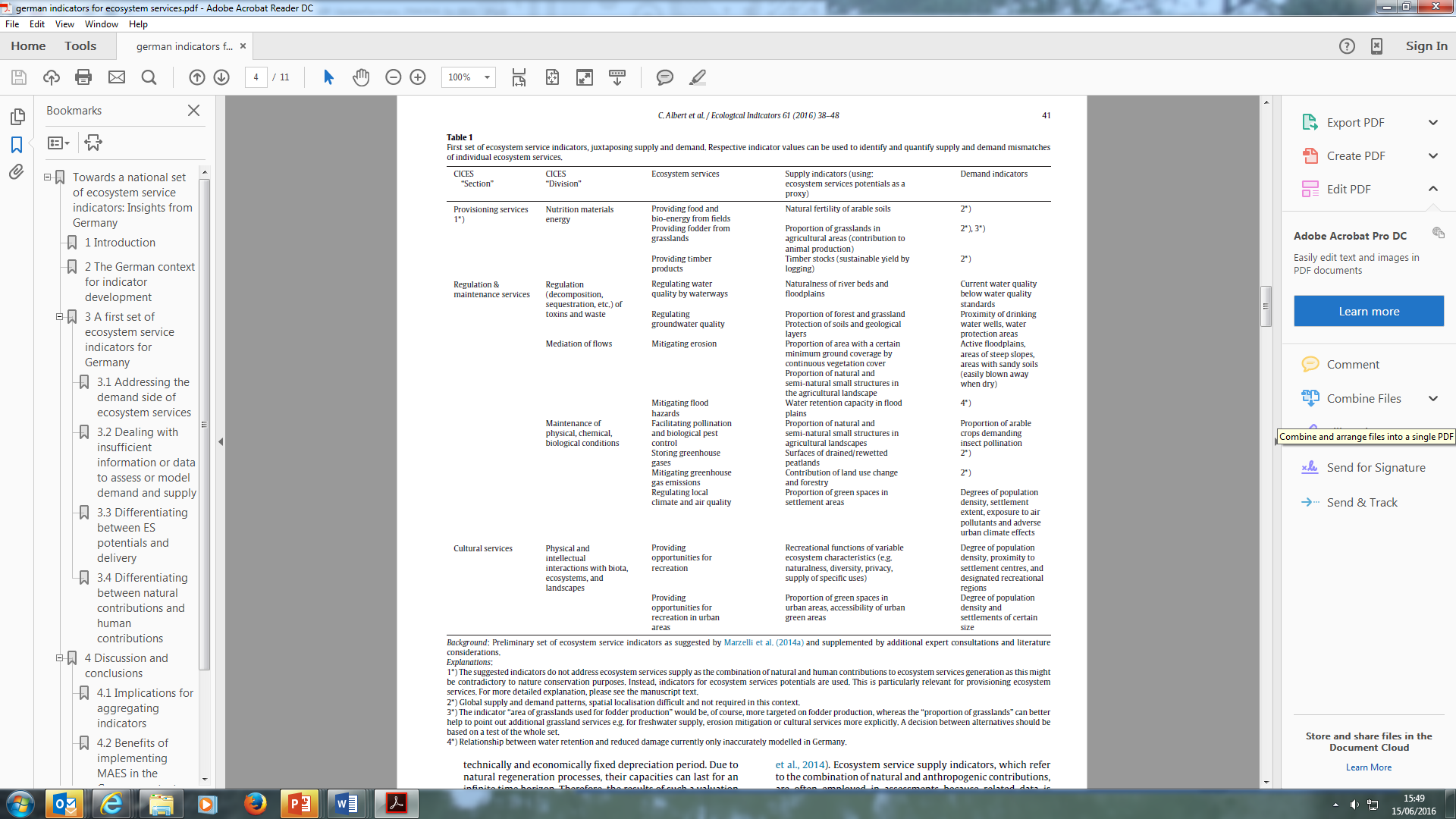
As part of the project “National Indicators for Ecosystem Services”, led by the IOER Dresden ‘(Leibniz Institute of Ecological Urban and Regional Development’), Germany has developed a set of national indicators for ecosystem services. The table below shows indicators for ecosystem services, categorized in the CICES sections provisioning services, regulation & maintenance services and cultural services.

Table national ecosystem service indicators

Please see the following paper for more information on the development of national indicators for ecosystem services in Germany: <http://ac.els-cdn.com/S1470160X15004823/1-s2.0-S1470160X15004823-main.pdf?_tid=8729382a-32ff-11e6-8c7f-00000aacb35e&acdnat=1465998554_e6e9d64544cc90817c8f5abb919a3027>.

**Finland:**

The Finish Environment Institute has been developing national ecosystem service indicators for nationally important provisioning services, regulating services and cultural services. The indicator framework was developed using CICES for classifying the ecosystem services:

Table indicators for provisioning services

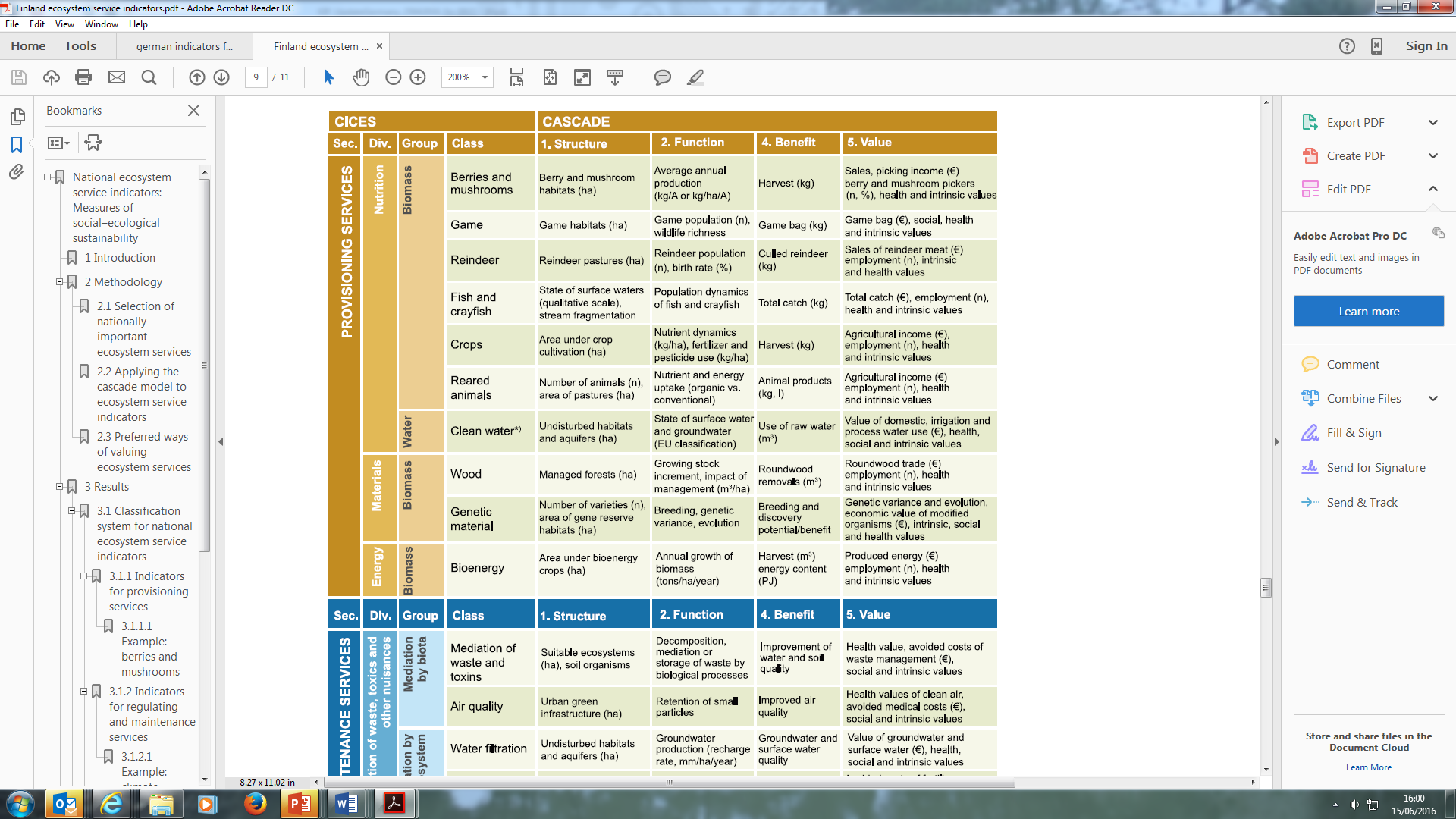


Table indicators for regulating services

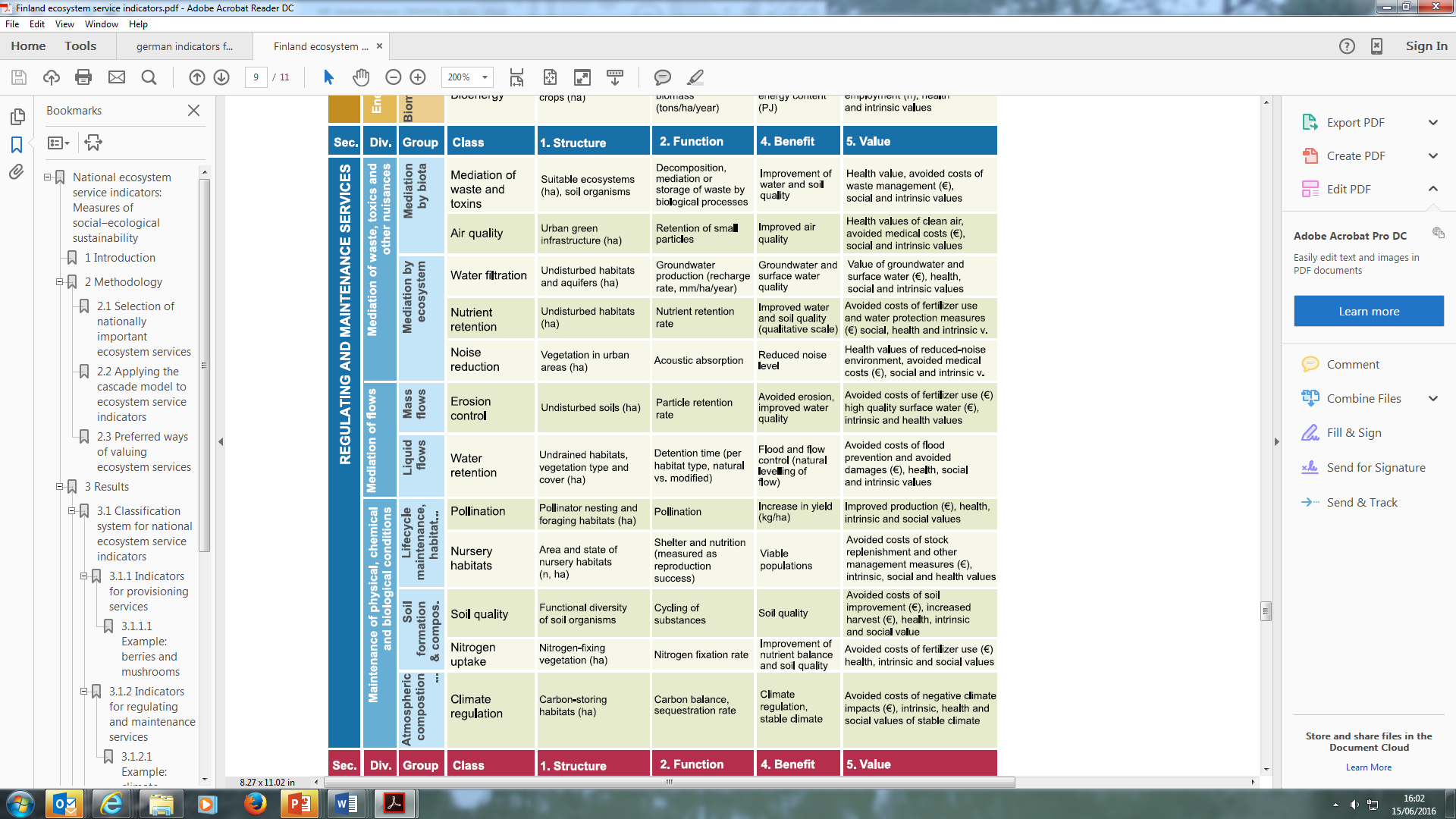
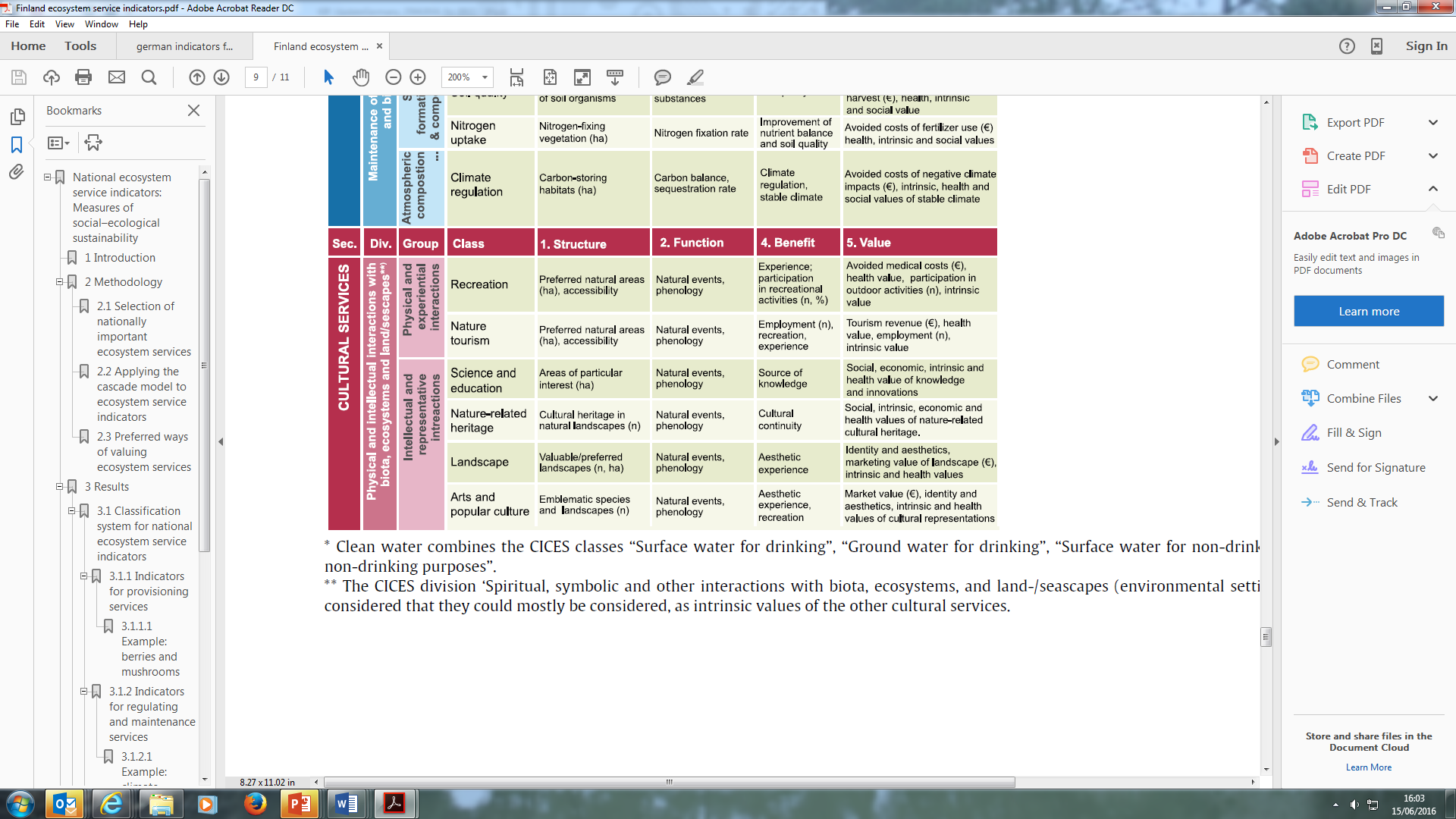


Table indicators for cultural services



Please see the paper ‘National ecosystem service indicators: Measures of social–ecological sustainability‘ by Mononen et al, 2014 for more information: <http://ac.els-cdn.com/S1470160X15001715/1-s2.0-S1470160X15001715-main.pdf?_tid=5714a8ca-3301-11e6-a429-00000aacb35e&acdnat=1465999334_968f0c4af46b3fde7a08cff0282a2090>

1. Schulp et al. (2014) Uncertainties in Ecosystem Service Maps: A Comparison on the European Scale. Plos One. [↑](#footnote-ref-1)