

# 29th Meeting of the London Group on Environmental Accounting

## Session 2: Accounting for ecosystem services in physical and monetary terms

### Challenges related to the communication of the ecosystem accounts

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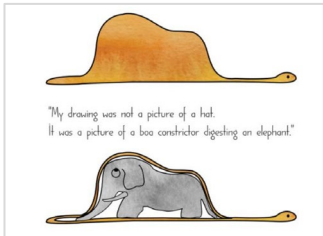
September 11-14, 2023

The analyses is based on the work done in the frame of Eurostat grants “Development of the land account and valuation of ecosystem services regarding grassland ecosystem” (831254-2018-EE-ECOSYSTEMS) and “Development of the ecosystem accounts” (881542-2019-ENVECO and 101022852-2020-EE-ENVACC).

## Purpose for presenting the work to the London Group

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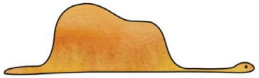
- Semantics is important as described and stated in the paper
- New stream of statistical literacy has appeared as the dissemination of ecosystem accounts has started.
- Field is still in development the concepts are not yet fixed
- The concepts of this statistics are not familiar to the users
- If some areas of ecosystem accounts do not face difficulties, then in other areas there are, for example valuation of ecosystem services.
- We think that we should discuss the guidelines on communication and to work further with the standards of SEEA EA (not enough case studies)
- The best practices how the communication on valuation could be done and what should be explained is needed
- Some concepts still lack the common understanding



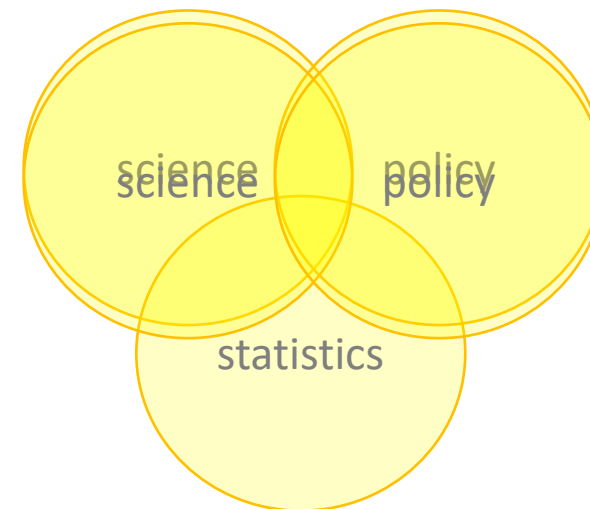
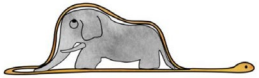
# The scope of the presentation

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- Communication on various components of ecosystem accounts
- Communication channels for ecosystem accounts
- Indicators
- Plural values
- Monetary valuation
- Some initial proposals



"My drawing was not a picture of a hat.  
It was a picture of a boa constrictor digesting an elephant."



# Communication channels for the statistics of ecosystem accounts

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We have started the dissemination and visualization\*

1. Tables on ecosystem accounts in Statistics Estonia database and webpage :

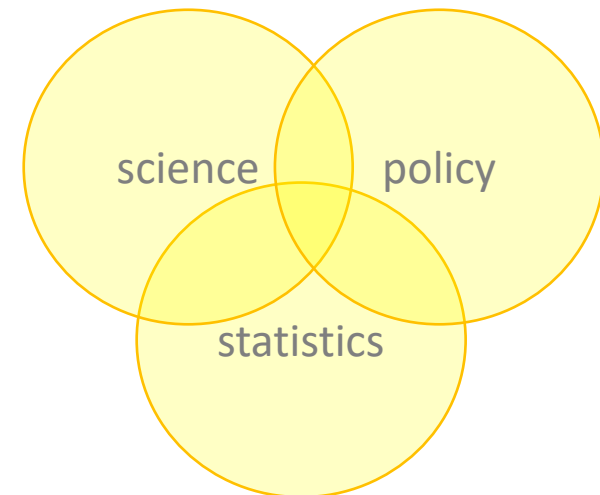
[KK090: ECOSYSTEM EXTENT BY OWNERSHIP CATEGORY AND ECOSYSTEM TYPE](#)

[KK091: SUPPLY OF ECOSYSTEM SERVICES \(MARKET PRICE, COSTS-BASED AND REVEALED PREFERENCES BASED METHODS\)](#)

[KK092: USE OF ECOSYSTEM SERVICES \(MARKET PRICE, COSTS-BASED AND REVEALED PREFERENCES BASED METHODS\)](#)

2. Dissemination and visualization using the [prototype](#) developed in ArcGIS Online

3. Methodological reports on [website](#)



\* - Thematic webpage of Statistics Estonia "[Environment – Biodiversity protection and land use](#)"

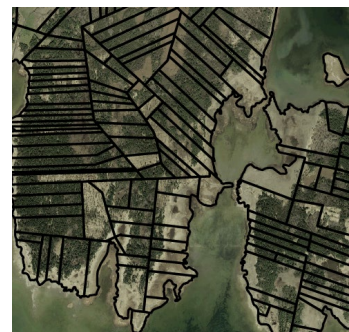
## Example: Ownership dimension of Estonian ecosystem extent account

### KK090: ECOSYSTEM EXTENT BY OWNERSHIP CATEGORY AND ECOSYSTEM TYPE

Ecosystem map



Land Cadastre

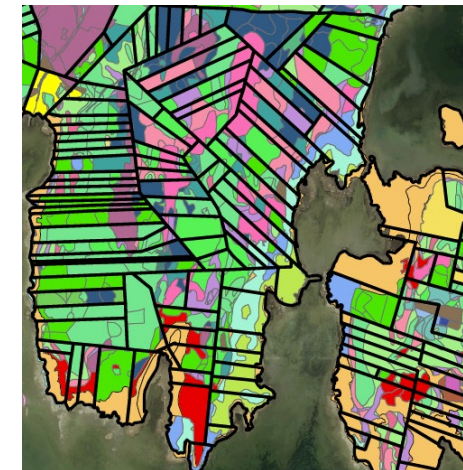


Statistical  
enterprise register



Ecosystem base map, Land Cadastre and statistical enterprise register data provided a basis for the creation of the ownership dimension in a merged dataset.

Merged dataset

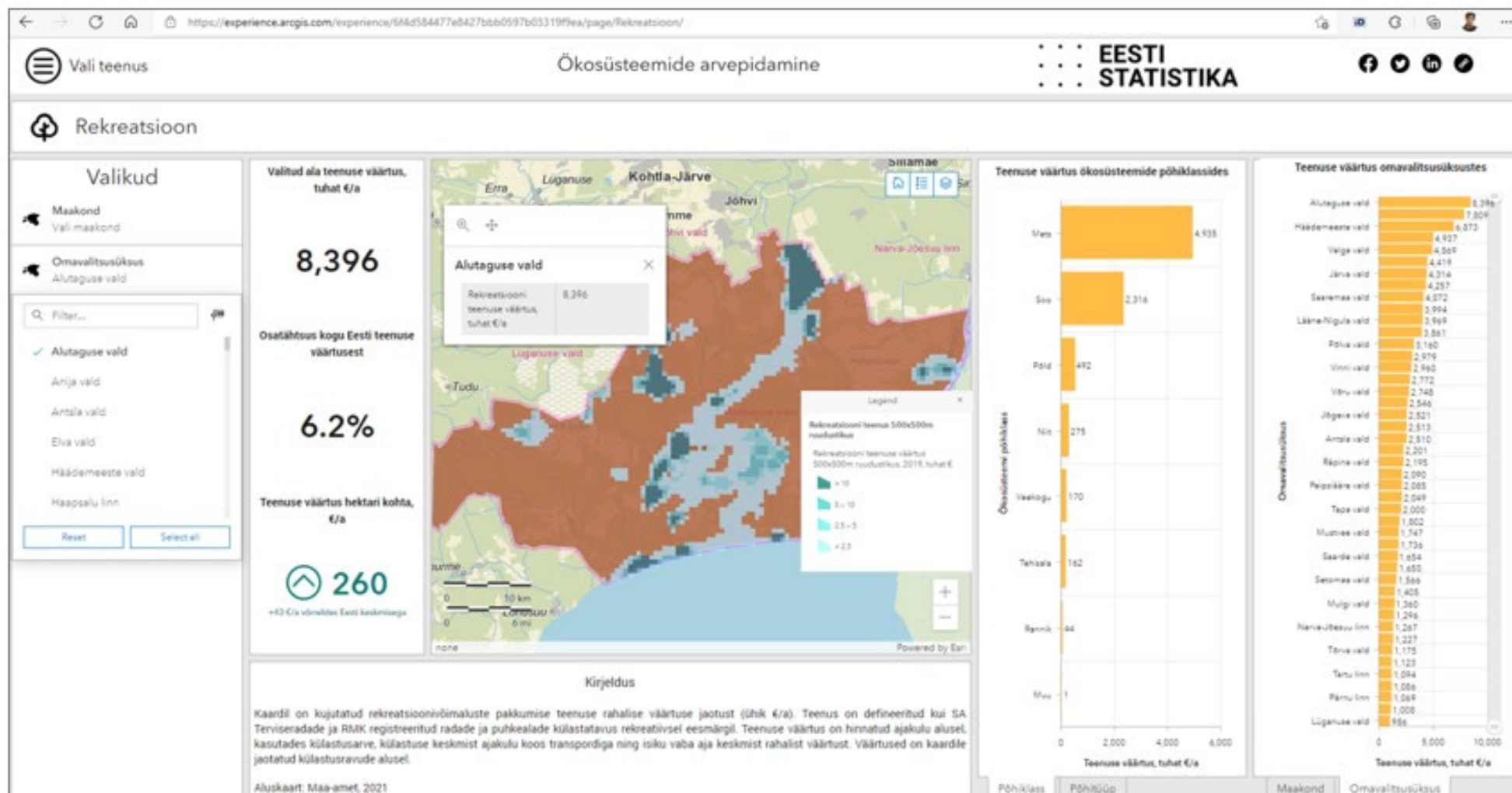


Opening extent account 2019, EUNIS Habitat classes and institutional sectors, ha

| Institutional sector/<br>EUNIS ecosystem classification               | General government | Corporations   | ...of which<br>State Forest<br>Management<br>Centre | Households       | Rest of<br>the world | Un-<br>known   | TOTAL            |
|---|--------------------|----------------|---|------------------|----------------------|----------------|------------------|
| Coastal   | 632                | 1556           | 1 353   | 644              | 100                  | 65             | 2 997            |
| Constructed, industrial and other artificial habitats                 | 55 190             | 20558          | 8 794   | 80 072           | 2 498                | 3 259          | 176 577          |
| Grasslands and lands dominated by forbs, mosses or lichens            | 29 224             | 67413          | 29 091  | 110 059          | 3 805                | 2 058          | 212 556          |
| Habitat complexes   | 5 739              | 4900           | 1 926   | 9 343            | 457                  | 178            | 20 618           |
| Heathland, scrub and tundra   | 3 333              | 5027           | 1 237   | 1 237            | 1 237                | 189            | 9 370            |
| Inland surface waters   | 11 354             | 21603          | 18 753  | 6 712            | 185                  | 1 242          | 43 095           |
| Inland vegetated or sparsely vegetated habitats                       | 19 420             | 27300          | 10 551  | 19 874           | 591                  | 1 709          | 68 894           |
| Marine  | 2 439              | 7576           | 1 500   | 1 197            | 1 197                | 132            | 10 507           |
| Mires, bogs and fens  | 17 413             | 208592         | 201 043   | 15 606           | 536                  | 19 281         | 261 428          |
| Regularly or recently cultivated agricultural, horticultural habitats | 103 232            | 323761         | 6 393   | 661 207          | 8 377                | 5 706          | 1 102 284        |
| Woodland, forest and other wooded land                                | 113 178            | 1328812        | 1 049 105   | 680 055          | 15 654               | 81 392         | 2 419 091        |
| NA  | 202                | 464            | 303   | 357              | 15                   | 23             | 1 062            |
| <b>TOTAL</b>  | <b>361 356</b>     | <b>2232562</b> | <b>1 334 720</b>                                    | <b>1 603 376</b> | <b>33 954</b>        | <b>115 232</b> | <b>4 346 480</b> |

More detailed levels  
are available in both  
dimensions

## Example: recreation service value in ArcGIS Online interactive dashboards



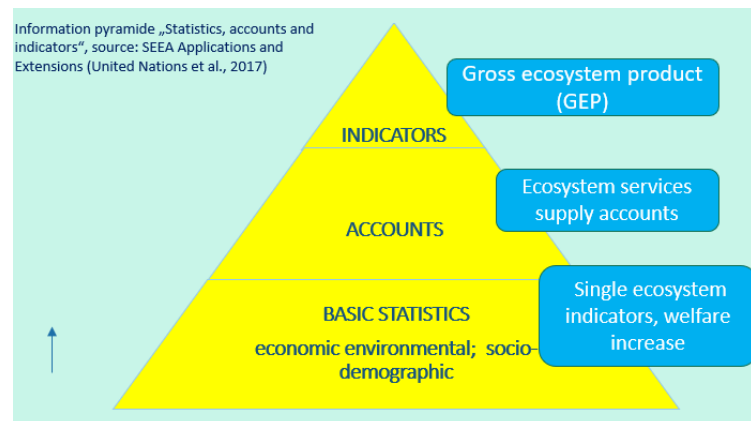
## Map application of ecosystem accounts in ArcGIS Online\*

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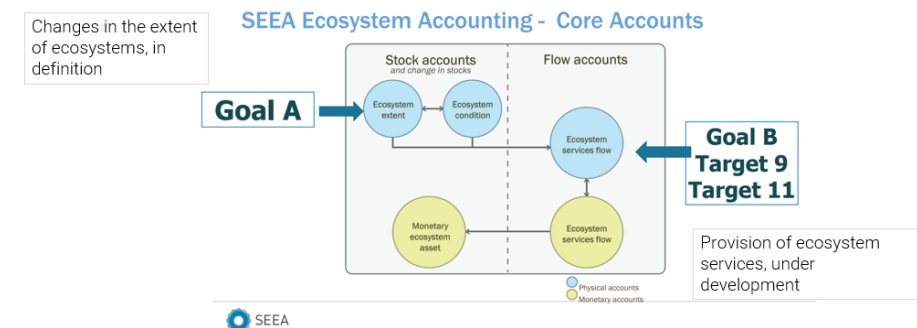
- ArcGIS Experience Builder was used to visualize ecosystem accounts spatially.
  - The application includes
    - ecosystem extent, data of 500x500m grid, Estonian counties and local municipalities
    - ecosystem services values (can be shown in different filters, e.g in LAU unit or certain ecosystem class/type)
  - Possibility to view and filter extent and services data by counties (LAU1) or local municipalities (LAU2).
  - Geospatial information is outlined, indicators and charts give mathematically aggregated information in addition. Are we content with how the values could be aggregated?
- 
- \*-Visit the application in dedicated section of the biodiversity and land use in a Statistical Office web : <https://experience.arcgis.com/experience/6f4d584477e8427bbb0597b03319f9ea/>

# Indicators: detailed and aggregated information on ecosystem service values

- Aggregated estimates are important as they are easy to use and can give a quick and good overview.
- However using aggregated indicators could have several restrictions due to the loss of information.
- The development of the headline indicators depends mostly on those who define the policy in the area related to ecosystem and habitat monitoring.
- Both detailed or aggregated values of ecosystem services dynamics per area or population could also be regarded as indicators depending on its relevance to users.
- Hence the **development of the semantics for all components of accounts is important.**



SEEA provides a framework for calculating indicators as well as creating scenarios, including biodiversity goals





# Challenges regarding communication for the monetary value of ecosystem services



„+“

Supply and use tables give a structured way to present and analyse calculated ecosystem values

„-“

- Scope of the services values to be included in supply and use tables? Influence of the definitions, methodology and prices.
- The interpretation of the trends in supply of ecosystem services. Is more better or less? What would be the optimum?
- How to reflect the multitude of indicators (other services and condition) related to the creation of ecosystem services?
- Alternative approaches to be considered: role of the models, visualization and storytelling?



# Challenges regarding communication for the monetary value of ecosystem service: methods applied

| Ecosystem service                          | Exchange value based methods                        | CVM forests | CVM wetlands | CVM grassland | CVM urban |
|--|---|-------------|--------------|---------------|-----------|
| Fodder                                     | Rent price  |             |              | X             |           |
| Medicinal herbs                            | Market price  | X           | X            | X             |           |
| Herbaceous biomass for bioenergy           | Rent price  |             |              |               |           |
| Agricultural production (crops)            | Market price  | X           | X            |               |           |
| Wild berries, mushrooms                    | Market price  |             |              |               |           |
| Wild game                                  | Stumpage price                                      |             |              |               |           |
| Timber                                     | Market price  |             |              |               |           |
| Peat                                       | Market price  |             |              |               |           |
| Forest seed                                | Market price  | X           | X            | X             |           |
| Organic waste used for compost             | Market price  |             |              |               |           |
| Flood protection                           |   |             |              | X             |           |
| Global climate regulation: C sequestration | Payment for Ecosystem services (PES) scheme, EU ETS | X           | X            | X             | X         |
| Air quality (PM <sub>x</sub> )             | Avoided damage, benefit transfer                    | X           | X            |               | X         |
| Photosynthesis (oxygen production)         |   | X           | X            | X             | X         |
| Pollination                                | Avoided damage                                      | X           |              | X             |           |
| Maintenance of soil fertility              |   | X           |              | X             |           |
| Habitat conservation for boil.species      |   | X           | X            | X             | X         |
| Water infiltration                         | Replacement cost                                    |             |              |               |           |
| Regulating microclimate (cooling, wind)    |   |             |              |               | X         |
| Noise mitigation                           |   |             |              |               | X         |
| Recreation                                 | Time use based                                      | X           | X            | X             | X         |
| Recreational hunting                       | Expenditure-based                                   |             |              |               |           |
| Nature education                           | Expenditure-based                                   | X           | X            | X             | X         |
| Ensuring landscape diversity               |   | X           | X            | X             | X         |
| Aesthetic experience                       |   |             |              |               | X         |

# Challenges regarding communication for the monetary value of ecosystem services, add the semantics as prices matter

EU ETS carbon  
price 5 – 100  
EUR CO<sub>2</sub>/t

social cost of  
carbon  
185 USD

avoided  
damage  
method  
5500 USD/t  
CO<sub>2</sub>

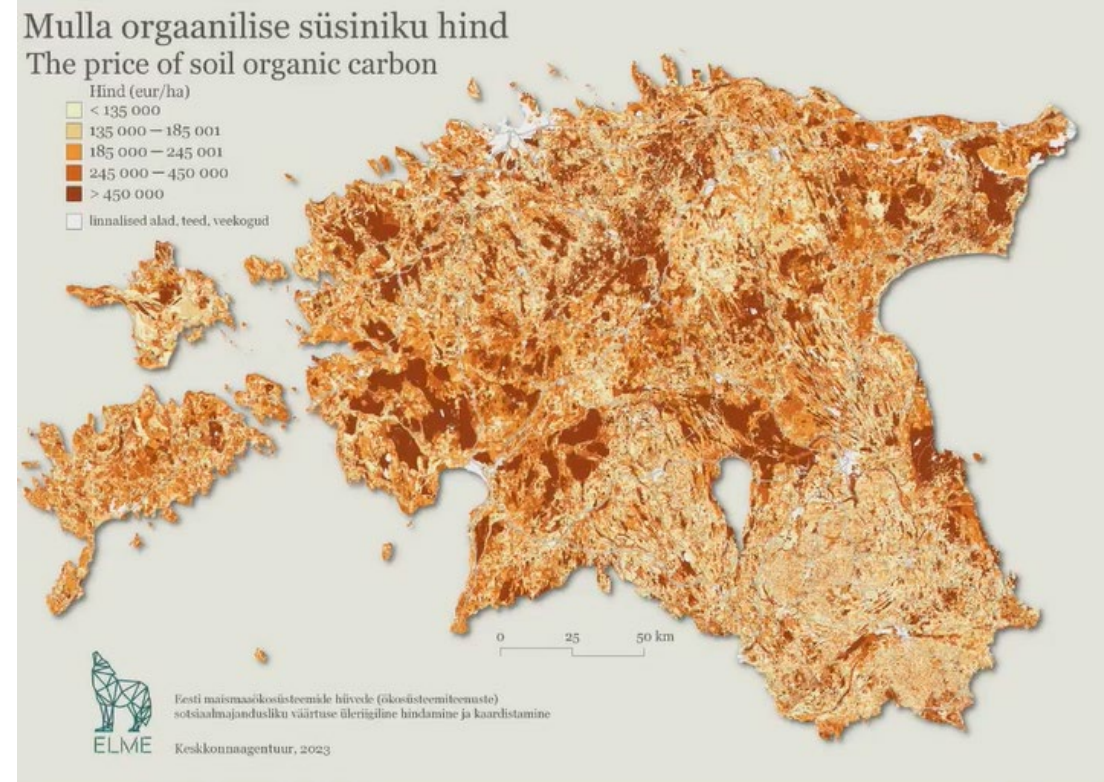
STATISTICS  
ESTONIA

Critics on monetary valuation. Example: the carbon retention service value highlights well how complicated and multiple the valuations might become.\*

EU ETS carbon price has varied quite a lot from 5 – 100 EUR CO<sub>2</sub>/t over the years. This price (now around 85 EUR CO<sub>2</sub>/t) gives the value of around **300 billion euros** for accumulated carbon in protected areas and **900 billion euros** in other assets in Estonia (see the distribution on the map)

Value of the ecosystem service based on social cost of carbon (which summarizes the costs related to climate changes) gives higher values as the price is higher: the average price is 185 USD CO<sub>2</sub>-SC/ton

When applying avoided damage method and using the price, which according to the IPCC is necessary in order to keep climate warming below 1.5 °C, then the price is up to 5500 USD/t CO<sub>2</sub> till 2030 and up to 13,000 USD/t CO<sub>2</sub> till 2050.



\*-<https://www.facebook.com/Keskkonnaagentuur/videos/177915928453601>, 4:00:00

# Challenges regarding communication of the values related to the ecosystem services

- Scope: how to reflect the plural values

The last assessment by IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services) about the values of nature indicated that a too shortsighted view on nature's contributions to people is a general **threat** and that a **broader range of economic values** has to be accounted .

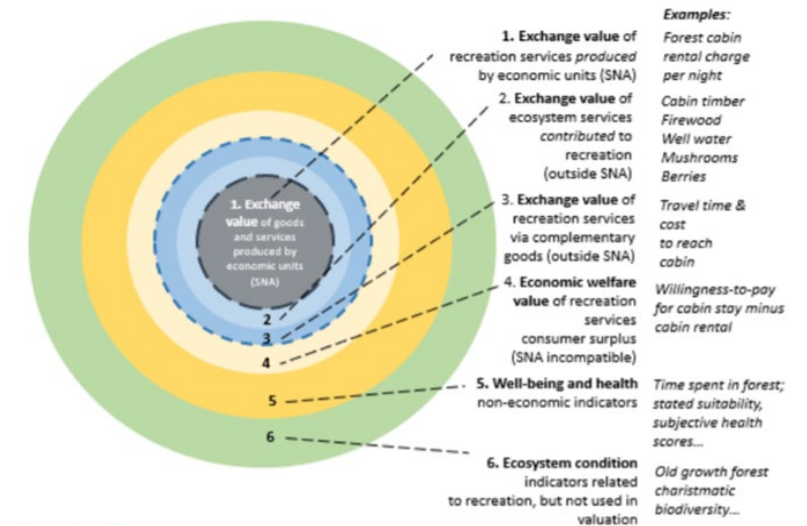
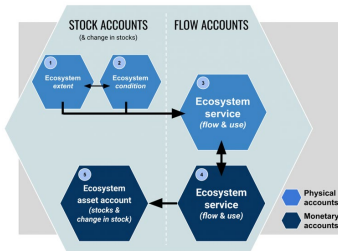


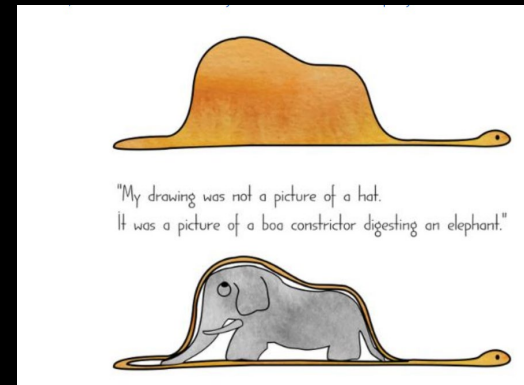
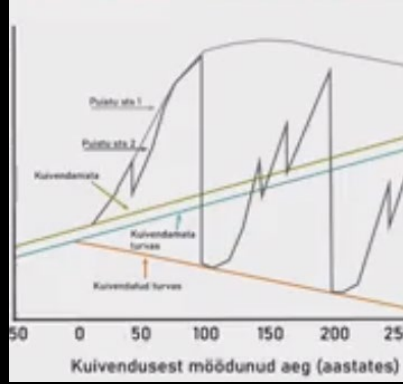
Figure 6.1 Plural values in the system of ecosystem accounts. Source: adapted from Barton et al., (2017).





Communication the interconnectedness of ecosystem features with the help of the models, visuals and stories:

- influence of the wetland drainage on carbon sequestration
- goose laying golden eggs, referring to the short-sighted destruction of a valuable resource\*
- boa constrictor digesting an elephant refers to the different perception of the world
- Little Prince taking care of the rose\*, different meanings





## Areas of further development: initial observations and proposal

MORE ADVANCED AREAS OF ECOSYSTEM ACCOUNTS (like ecosystem extent accounts) have no major issues regarding the communication

LESS ADVANCED AREAS OF ECOSYSTEM ACCOUNTS (like ecosystem services accounts valuation, especially monetary valuation) have major issues regarding the communication.

IN GENERAL:

1. There is a need to **accompany the figures on ecosystem service values with the notions on what they capture** and what they do not capture. Figures on ecosystem services values without the explanations are considered **a risk**: the meaning could be ambivalent on current stage of the knowledge.
2. The **direction of the trends** of the supply of ecosystem services should be indicated from the perspective of sustainability as suggested in IPBES report. This report suggests prioritizing the maintenance of the ecological features and biodiversity from the viewpoint of future values.

## Areas of further development

### REGARDING THE SCOPE OF ECOSYSTEM SERVICES

#### 3. Specify: where the ecosystem contribution begins?

underestimating the nature's contribution could send wrong signals to those who make the management and resource use decisions.

non-market ecosystem services values are missing from traditional accounting, these contributions will be missed out

4. If ecosystem services have different nature, this needs to be explained, for example describing provisioning services as the ones related to the use values and other services related more to the common goods "regulative services"

5. Typology (important as it is linked to semantics and methodology)

## Areas of further development

### **REGARDING THE INTERPRETATION OF MESSAGES**

6. Explaining of the results: as it is important not only for decision makers in policy but also for broader audience.
7. Aggregated indicators are important, but the oversimplification is a threat as well. How is feasible to aggregate?
8. The interpretation of the trends differs in case of the valuation of the ecosystem services in monetary or physical terms.

When evaluating the economic value, it must be taken into account that these are not constant quantities that depend on ecosystems alone. Influence of the prices on the value of ecosystem services and the relation to ecosystems needs explanation.



## Areas of further development

### REGARDING MONETARY VALUATION

9. The concepts and semantics of the monetary valuation of ecosystem services need to be **agreed upon**.

If published, the accounting figures should be published alongside with the **descriptions of used methods**.

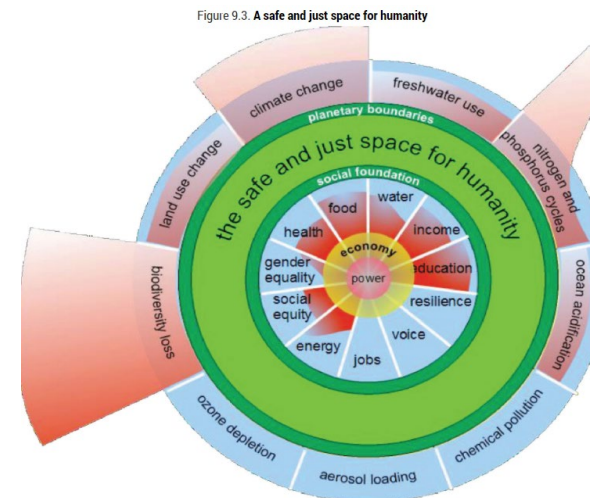
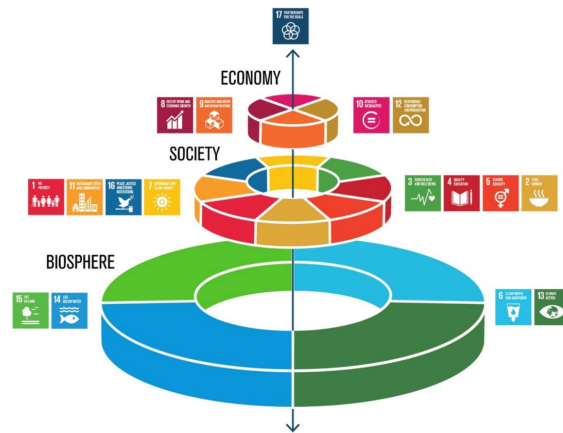
10. If the **broader range of the values** is important to consider, the inclusion of the wider scope of the welfare values should also be considered.

# Questions to the London Group

What could be seen as a main issue that needs improvement in communication?

On which questions the discussion and work could be taken up and the discussion opened?

Could some new format of the work be organized?



Read more:

[Aggregation of the ecosystem service values in urban ecosystem account, application of the principles of gross ecosystem product \(GEP\)](#), UN London Group on Environmental Accounting, September 2021;

[Comparison of methods for the valuation of the nature education ecosystem service](#), UN London Group on Environmental Accounting, October 2021

[Chance for Better Policy: Can Ecosystem Account Provide a Missing Link between the Services Provided by Ecosystems and the Land Owners](#); UN London Group on Environmental Accounting, 2020;

[Two Languages or Two Narratives: Comparison of the Selected Market Price and Revealed Preferences Valuation Methods to the Stated Preferences Method](#); UN London Group on Environmental Accounting, 2020

Ecosystem Services partnership 3<sup>rd</sup> conference, T17From assessment to accounting: how countries experience the development of NCA. Insights from applications. [Lessons learned on accounting for ecosystem services: bridging the values of services and measures taken](#). Juuni, 7-10, 2021

6thJoint OECD/UNECE Seminar on Implementation of SEEA. Session: [SEEA ecosystem accounts and its relevance in policy and decision making](#) March 9<sup>th</sup> 2021.

Dedicated website:

<https://www.stat.ee/en/find-statistics/statistics-theme/environment/biodiversity-protection-and-land-use>

Seminar „Development of ecosystem extent account and valuation of ecosystem services“  
June 11, 2021, Zoom meeting, click [here](#)

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Thank you!

