
European Commission
MAIA
Mapping and Assessment for Integrated ecosystem Accounting
MAIA webinar 11.01.2021
Spatial modelling for compiling Ecosystem Services biophysical accounts
Challenges of spatial modelling of selected ecosystem services
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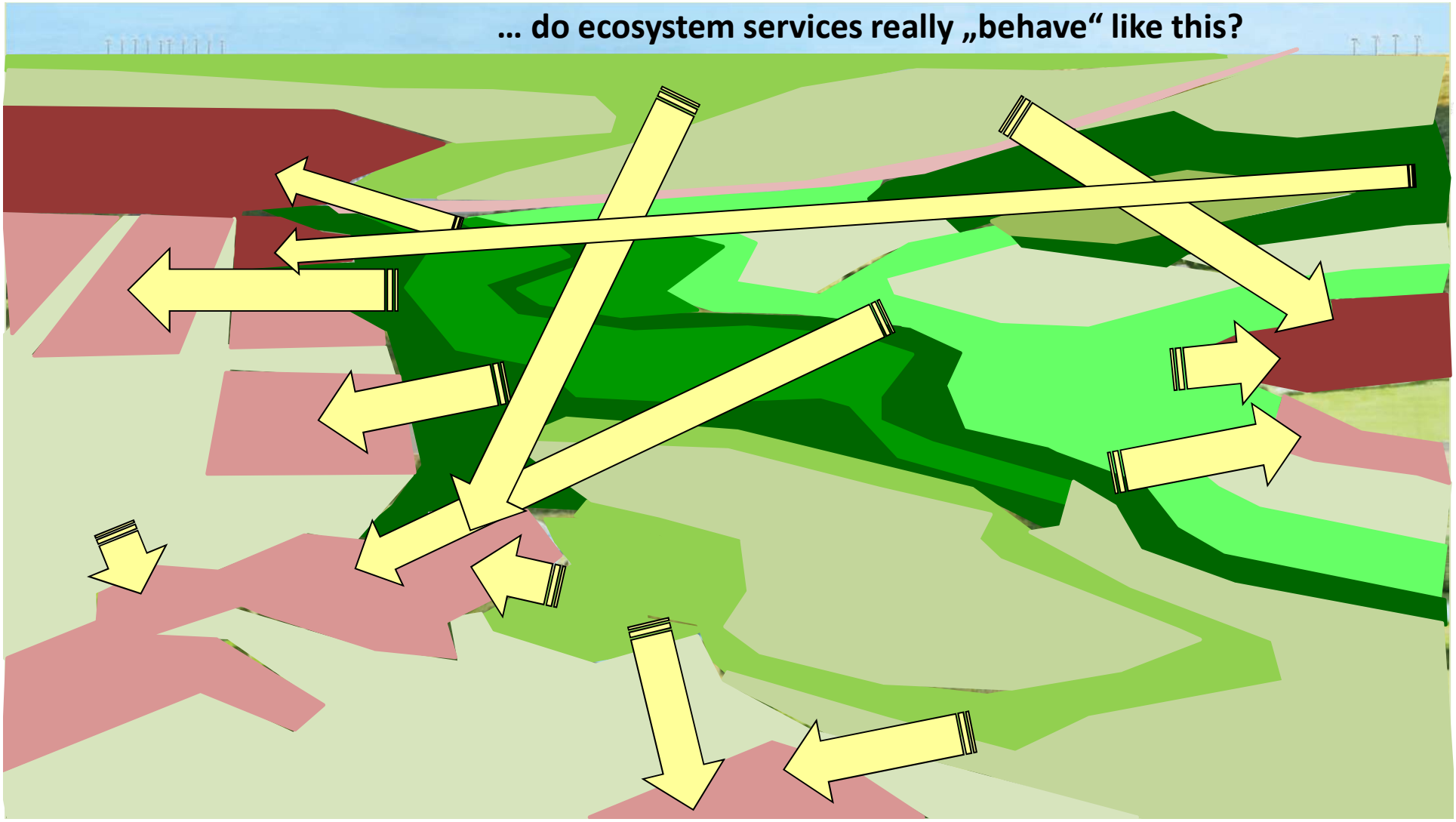
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 817527

Challenges of spatial modelling of selected ES

Key challenge:

- Ecosystems, ecosystem services and their use by humans are very complex


… do ecosystem services really „behave“ like this?

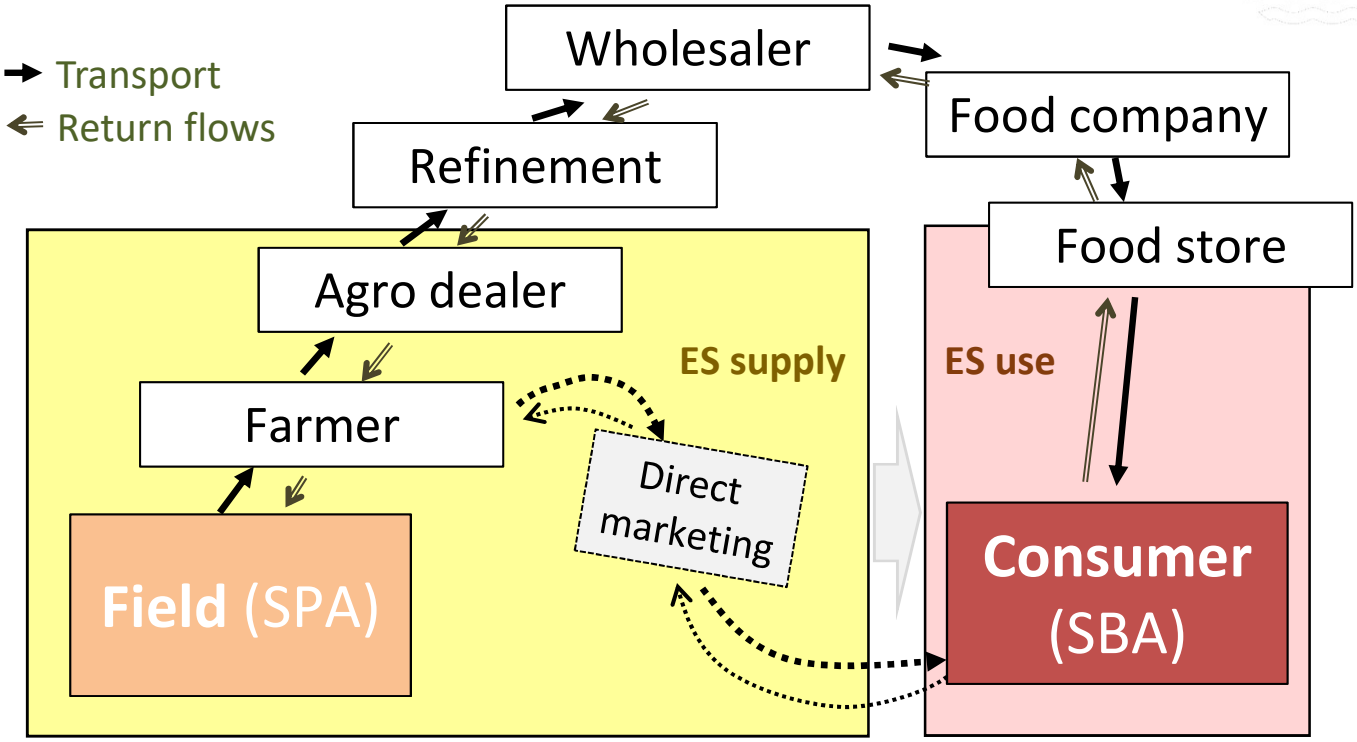
Challenges of spatial modelling of selected ES

Challenges for spatial modelling of ecosystem services for biophysical accounts

- **Provide information about ES supply and use patterns**
- **Be spatially and temporally explicit**
- **Be robust, consistent, transparent and logical**
- Harness and integrate information of different quality and quantity, resulting from various quantification approaches
- Be understandable for a broader, transdisciplinary audience
- Be policy-/decision-making problem-relevant

https://recreation.ucsd.edu/adventures/challenge-course

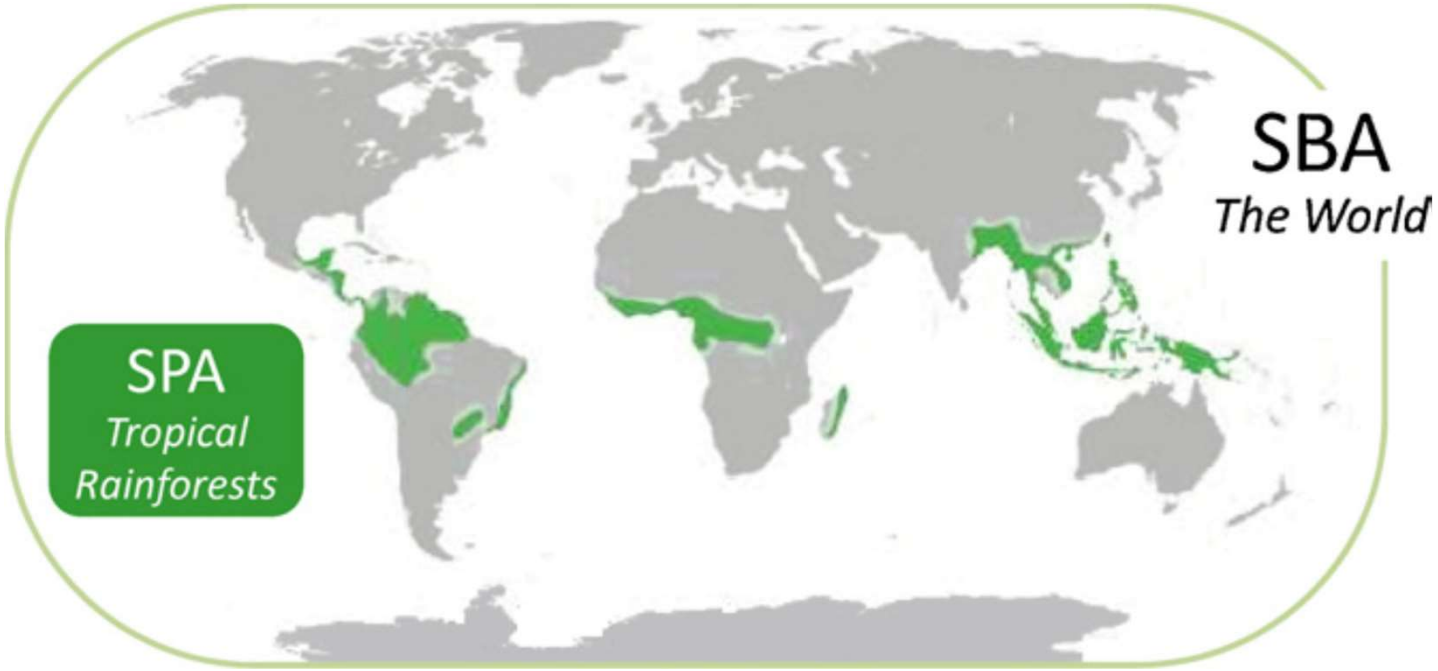
Challenge: complex ES supply and use patterns



(from Burkhard et al. 2014)

- Example: **food provisioning ES**: complex ES supply-use chains
- **Challenge**: Where to locate/map (final) ES supply and (final) ES use?
- **Solution**: Use best available spatially explicit information and (statistical) data.

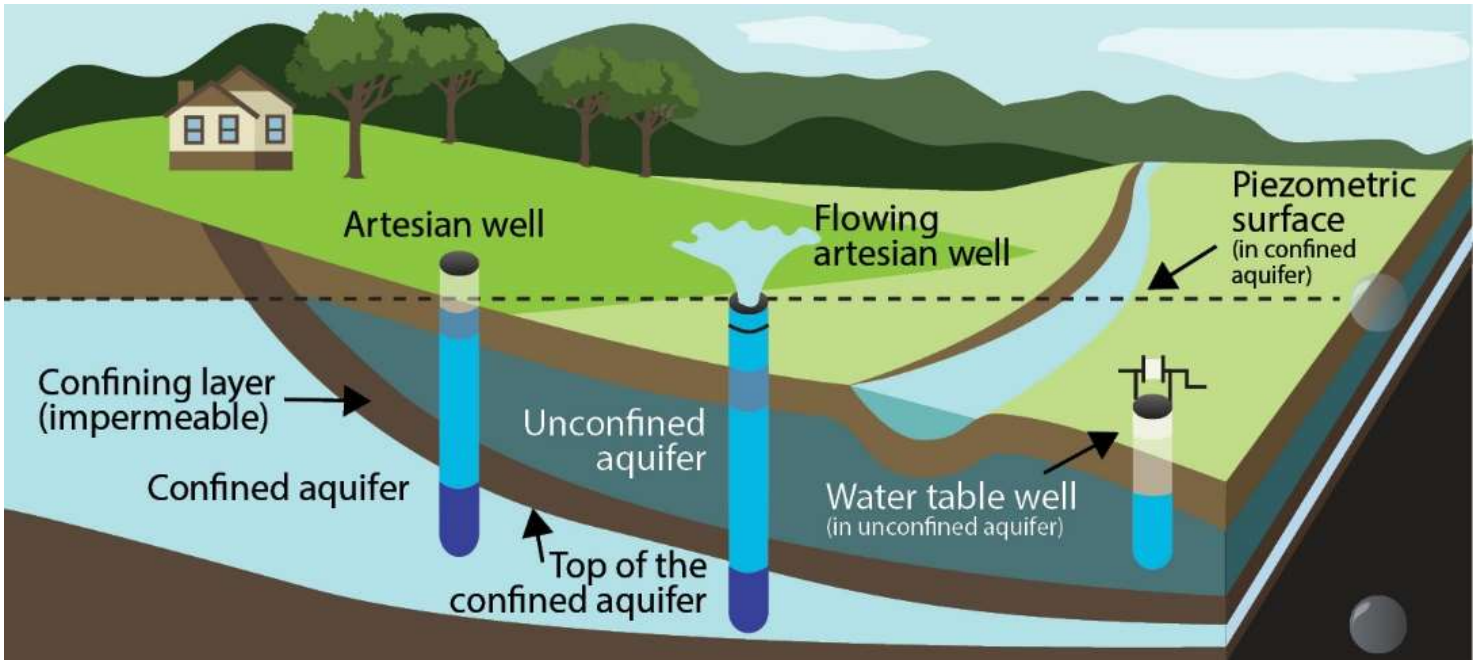
Challenge: complex ES supply and use patterns



www.nature-escapes-kuala-lumpur.com

- Example: **global climate regulating ES** with global supply-demand pattern
- **Challenge**: Omnidirectional SPA – SBA relation, where to map what?
- **Solution**: Overlay or intersect of SBA and SPA maps and data

Challenge: spatial and temporal explicitness



(from Burkhard & Maes 2017)

- Example: **water provisioning ES:** Subsurface SPAs; SBAs delocalised and point sources (wells, pipes)
- **Challenge**: Where exactly to map what?
- **Solution**: a) assign groundwater ES to ecosystems above the ground
  b) consider groundwater as a separate ecosystem or subsoil asset

Challenge: spatial and temporal explicitness

Vacation destination

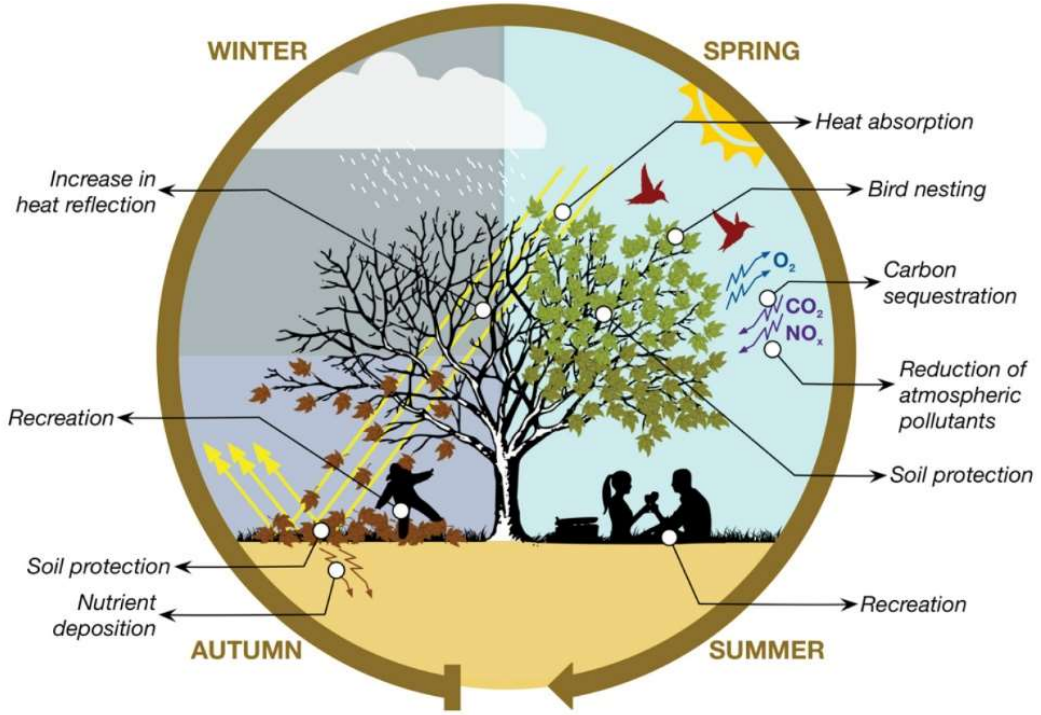
SPA = SBA (*in situ*)?

Home

SPA ≠ SBA? De-localised? Directional?

- Example: **recreational cultural ES**: Localisation of ES supply and use benefits
- **Challenge**: not easy to map: SPAs, SBAs and ES flows difficult to delineate
- **Solution**: Recreational Opportunity Spectrum (ROS) or PGIS approaches

Challenge: spatial and temporal explicitness



from Guerra et al. (2017)

- Example: **seasonal cycles** of ES supply and use
- **Challenge**: When to actually quantify ES supply and use?
- **Solution**: Consideration of annual or average values + long-term effects

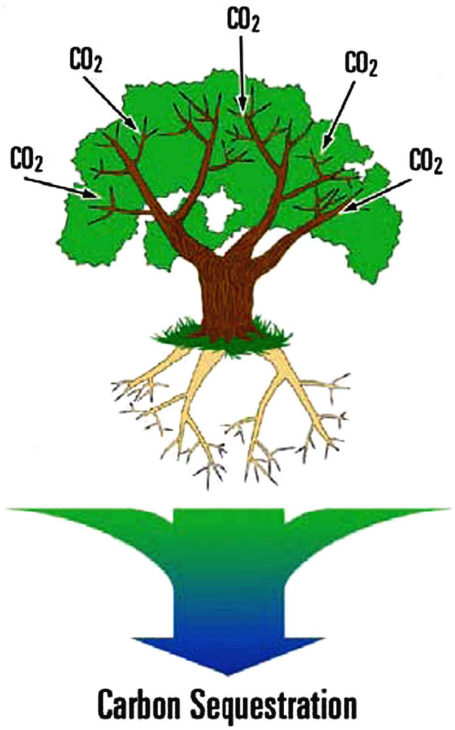
Challenge: be robust, consistent, transparent and logical

http://i.telegraph.co.uk/multimedia/archive/02405/weather-flood-sign_2405295b.jpg

http://upload.wikimedia.org/wikipedia/commons/e/e4/Drought_Swimming_Hole.JPG

- Example: **flood regulating ES**: flood and drought prevention
- **Challenge**: Human preferences of „constant flow of right amounts of water“ - how to quantify?
- **Solution**: Combine with respective spatio-temporal ES use maps

Challenge: be robust, consistent, transparent and logical



- Example: **regulating ES global climate regulation**
- **Challenge**: What to account for, carbon storage (stocks) or carbon sequestration (flows)?
- **Solution**: actual process behind this ES is removing C from the atmosphere, so removed C is relevant

Challenge: be robust, consistent, transparent and logical

potential ES supply (stock)

actual ES supply and use (flow)

- Example: **Timber provisioning ES**
- **Challenge**: What to account for as ES supply, stocks or actual use/flow?
- **Solution**: : Clear conceptual distinction between ES supply, dynamics and flows

Challenge: be robust, consistent, transparent and logical

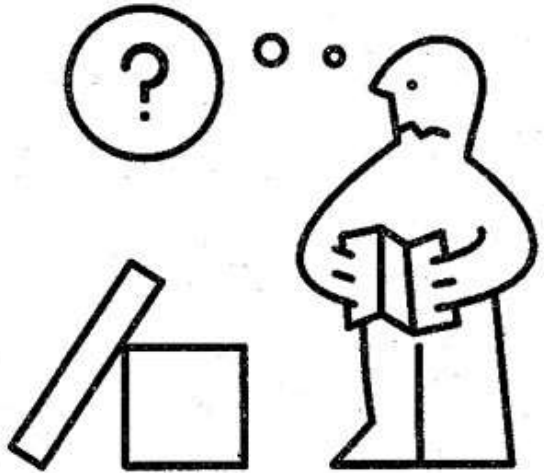
- Example: **agroecosystem services** and **livestock breeding**
- **Challenge**: Huge anthropogenic inputs involved in ES supply - what‘s the ‚eco‘system part?
- **Solution**: Where possible, indication of human contributions + external environmental effects

Challenge: be robust, consistent, transparent and logical

http://www.exposureguide.com/images/cityscape-photography-tips/photographing-cityscapes-2e.jpg

- Example: **landscape aesthetics cultural ES:** high subjectivity of preferences
- **Challenge**: how to quantify various preferences?
- **Solution**: pattern detection by Participatory GIS or Citizen science approaches

Challenge: be robust, consistent, transparent and logical

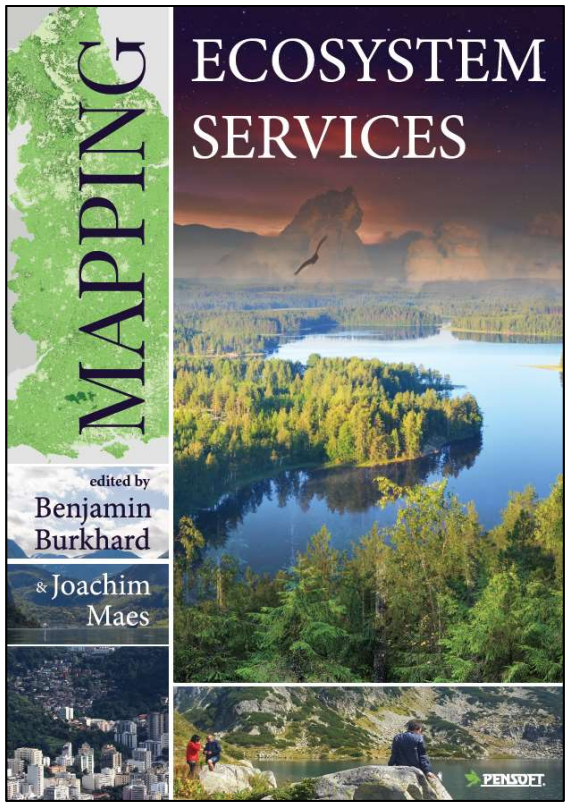


- Example: **provisioning ecosystem services** – complex goods and products
- **Challenge**: how to sum up and where to map all parts‘ supply and use?
- **Solution**: … take it easy and consider the actual purpose of your assessment!

Spatial aspects of ecosystem services supply and use

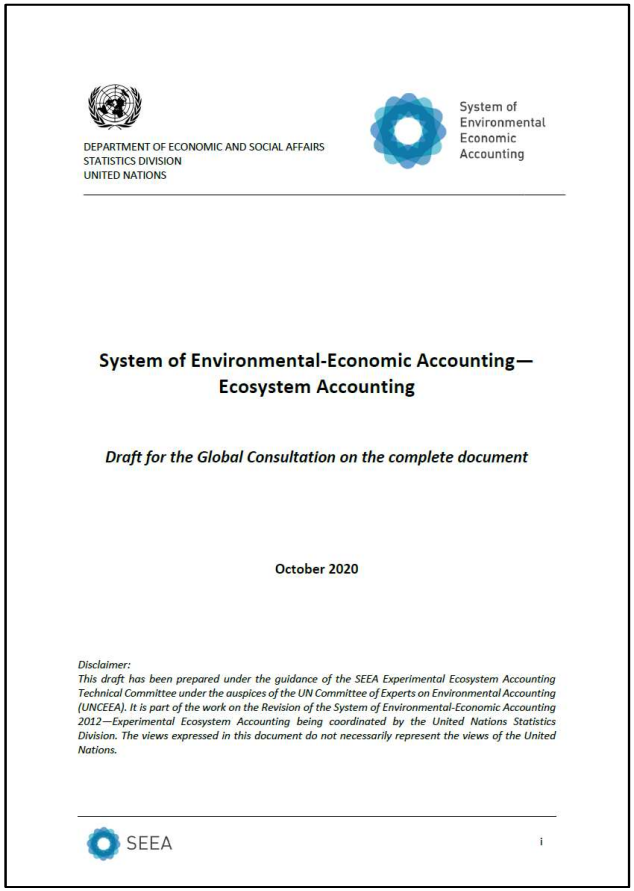
Find more examples in our Open Access textbook ….

“ … handbook including guidelines for ES mapping and assessment, … “



http://ab.pensoft.net/articles.php?id=12837

Spatial aspects of ecosystem services supply and use



DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS
STATISTICS DIVISION
UNITED NATIONS

System of Environmental Economic Accounting

System of Environmental-Economic Accounting—Ecosystem Accounting

Draft for the Global Consultation on the complete document

October 2020

Disclaimer:
This draft has been prepared under the guidance of the SEEA Experimental Ecosystem Accounting Technical Committee under the auspices of the UN Committee of Experts on Environmental Accounting (UNCEEA). It is part of the work on the Revision of the System of Environmental-Economic Accounting 2012—Experimental Ecosystem Accounting being coordinated by the United Nations Statistics Division. The views expressed in this document do not necessarily represent the views of the United Nations.

SEEA i

Check also the **SEEA EEA revision documents**

for the newest guidelines for ecosystem services accounting

https://seea.un.org/content/seea-experimental-ecosystem-accounting-revision

Challenges of spatial modelling of selected ES

Conclusions

- Ecosystems, ecosystem services and their use by humans are indeed **very complex**
- However, there are **broad experience** and **methods** available from decades of scientific development
- More recently developed tools, biophysical modelling and integrative transdisciplinary approaches can be **harnessed for ecosystem accounting** to quantify supply and use of various ES
- **Spatial modelling** and **mapping of ES** helps to reveal supply-use patterns, are a very useful addition to commonly (in accounting) used supply-use tables and are mandatory for spatial decision making and planning
- These tasks are very important to safeguard the **conservation and sustainable use of natural resources**, thus it is worth the efforts and further experts should be trained and methods improved

Thanks a lot for your attention!

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Mapping & Assessment for Integrated ecosystem Accounting
http://maiaportal.eu/

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