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Ecosystem services within the LIFE EISLEK project

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GOALS AND OBJECTIVES

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- *To develop a qualitative and quantitative socio-economic assessment exemplifying how the restorations from the LIFE+ EISLEK project will influence the local ecosystem services*

- Added value of an ecosystem service assessment:
  - influence stakeholder attitudes and support for the Natura 2000 network
  - attract more funding for conservation measures and other investment in and around sites
  - guide land-use (change) decisions
  - help in the integration of protected areas in regional development planning and practice.

ECOSYSTEM SERVICES

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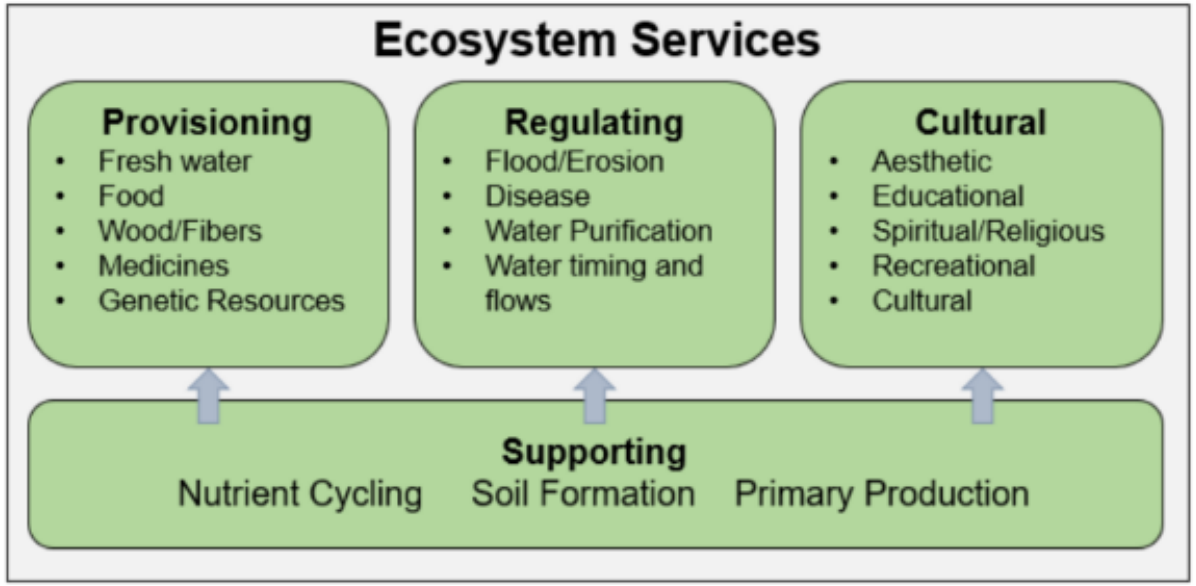
- «"[…] *the benefits people obtain from ecosystems*" (Millennium Ecosystem Assessment, 2005)

- 4 main categories:
  - Provisioning
  - Regulating
  - Cultural
  - Supporting



- Mapping and Assessment of Ecosystems and their Services (MAES)

ECOSYSTEM SERVICES INVESTIGATED

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- Pertinent services following the Common International Classification of Ecosystem Services (CICES) (Haines-Young & Potschin 2013) and the services evaluated in Luxembourg under the MAES framework (Becerra-Jurado, 2015)

Benefit category	Benefit description	Use/non-Use value of each service (Pascual et al., 2010b)
Reg	Erosion control	Use, indirect
Cul	Education	Use, direct, non-consumptive
Cul	Recreation	Use, direct, non-consumptive
Reg	Water quality	Use, indirect
Prov	Livestock rearing	Use, direct, consumptive
Reg	Flood protection	Use, indirect
Reg	Pollination	Use, indirect
Reg	Global Climate Regulation	Use, indirect
Cul	Employment, social engagement, business benefits	Use, direct, non-consumptive

VALUE OF ECOSYSTEM SERVICES IN THE EISLEK AREAS

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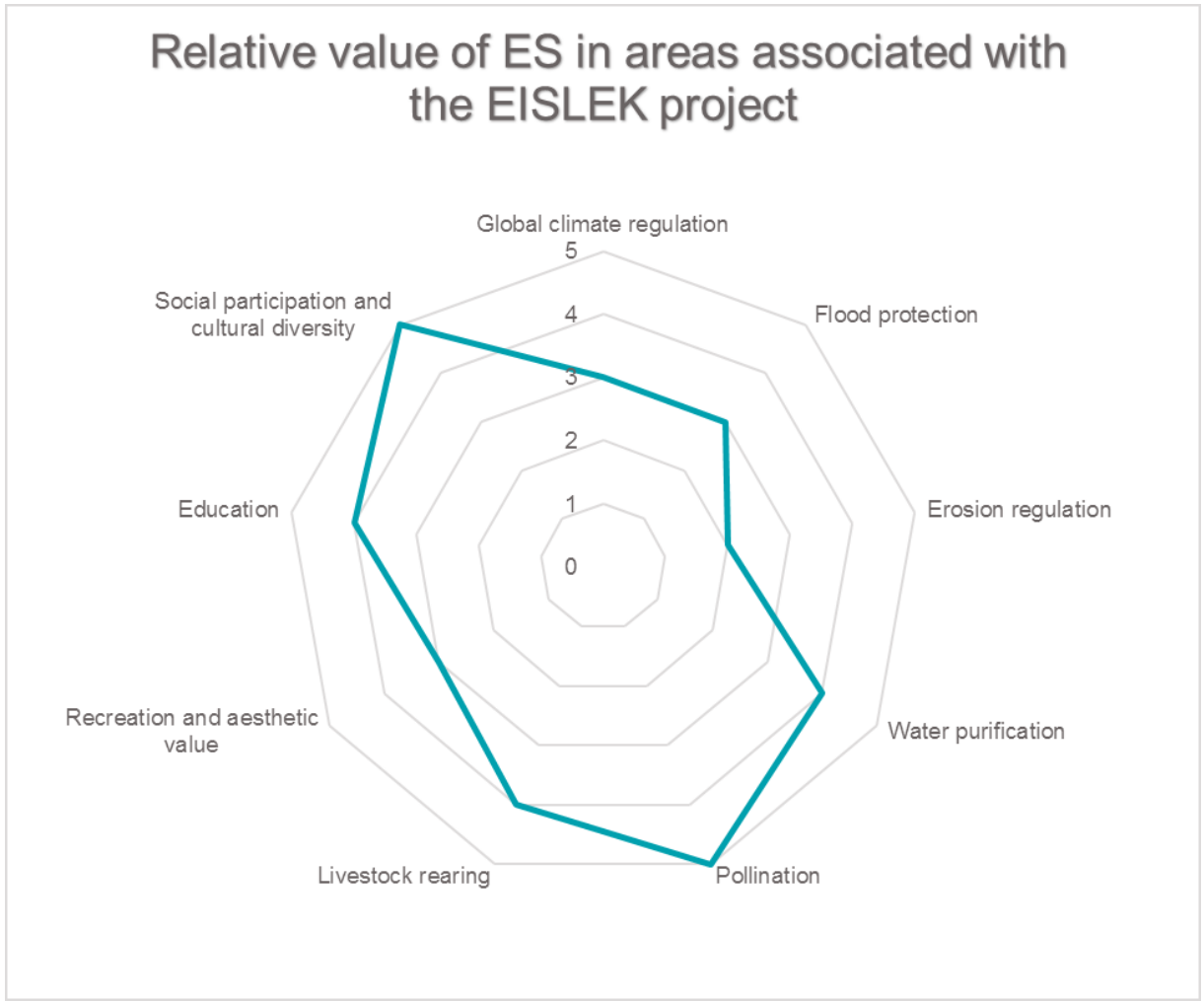
- Objective: Get an overview of ecosystem service importance in the area



5 = high
1 = low

METHODS OF EVALUATION - QUALITATIVE

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- Burkhard et al (2014) has classified ecosystem service potential per land cover types from CORINE land cover data

ID	CORINE Land Cover Type:	Regulating Services (Σ)	Global climate regulation	Flood protection	Erosion regulation	Water purification	Pollination	Provisioning Services (Σ)	Livestock rearing*	Cultural services (Σ)	Recreation and aesthetic value	Education	Social participation and cultural diversity
2	Discontinuous urban fabric	2	0	0	1	0	1	1	1	7	3	2	2
12	Non-irrigated arable land	4	1	2	0	0	1	0	0	6	1	2	3
18	Pastures	4	2	1	1	0	0	5	5	7	2	2	3
20	Complex cultivation patterns	5	1	1	1	0	2	1	1	7	2	2	3
21	Agriculture and natural vegetation	10	2	2	2	2	2	2	2	8	2	3	3
23	Broad-leaved forest	22	5	3	5	5	4	0	0	14	5	5	4
24	Coniferous forest	22	5	3	5	5	4	0	0	14	5	5	4
25	Mixed forest	22	5	3	5	5	4	0	0	14	5	5	4
40	Water courses	6	0	3	0	3	0	0	0	11	4	4	3
41	Water bodies	8	1	5	0	2	0	0	0	12	5	4	3

5 = high
1 = low
0 = not existing / not relevant

METHODS OF EVALUATION - QUANTITATIVE

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- InVEST – Integrated Valuation of Ecosystem Services and Tradeoffs
- Developed by The Natural Capital Project
- InVEST addresses changes in land cover to evaluate the trade-offs of select ecosystem services (absolute or relative values)
- Combines land use and land management information with data on environmental conditions (e.g., soil and climate information)
- See more at: https://www.naturalcapitalproject.org/

InVEST
integrated valuation of ecosystem services and tradeoffs

PRELIMINARY RESULTS:

Sediment Retention

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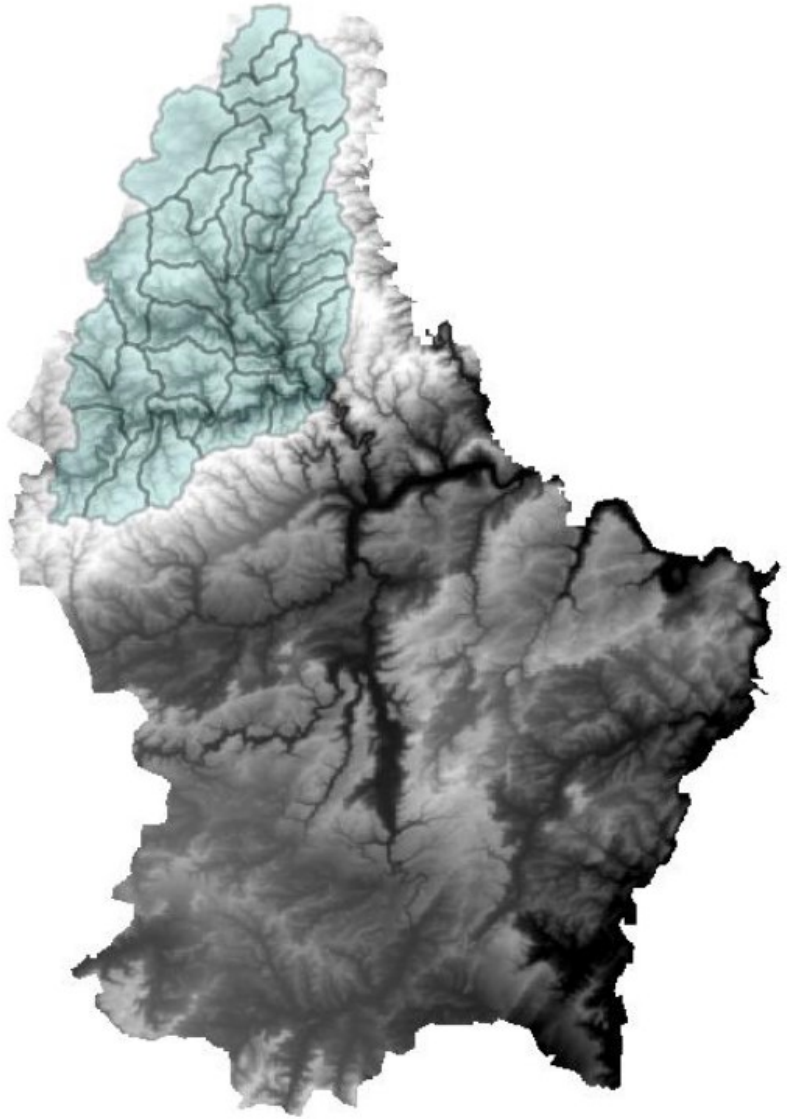
- Bottom later is a digital elevation map of Luxembourg
- Overlaying blue area shows water sub catchments
- This will be used for analysing sediment retention (erosion control and water quality)
- Currently we are using the Luxembourgish OBS land cover data for the calculations



PRELIMINARY RESULTS:

Sediment Retention

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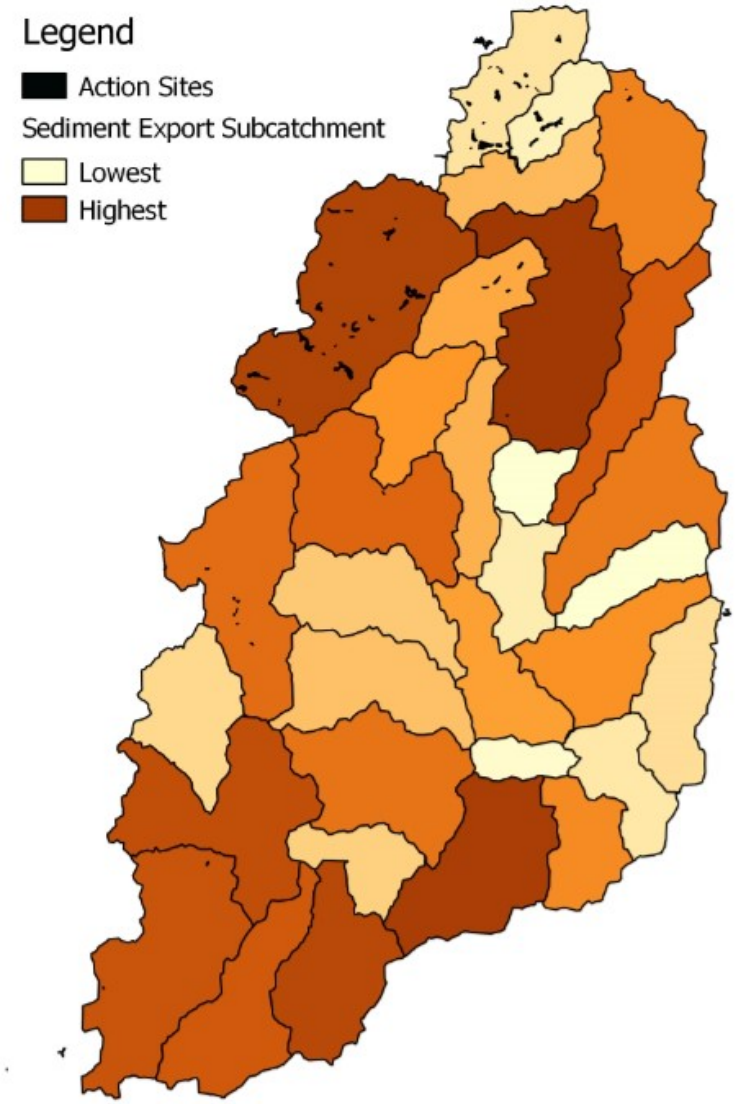
- Unit: Tonnes soil × watershed^{-1} × yr^{-1}
  - Darkest color is 100 tons of soil × yr^{-1}
  - Lightest color is 4 tons of soil × yr^{-1}
- From here, the percentage change in sediment retention (erosion control) based on the actions from LIFE+ EISLEK
- Input data: OBS land cover, soil erodability (k-factor), rainfall erosivity, biophysical inputs for universal soil loss equations (used InVEST defaults)



OTHER SERVICES TO BE EVALUATED

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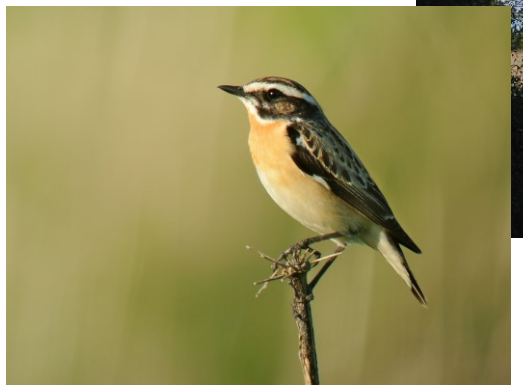
- In addition to sediment retention (erosion control and water quality proxies):
  - Water yield (flood control proxy)
  - Carbon sequestration (also known as climate regulation)
  - Pollination (provided data availability)

- Cultural (not in InVest)
- Livestock (not in InVest)



MOVING FORWARD…

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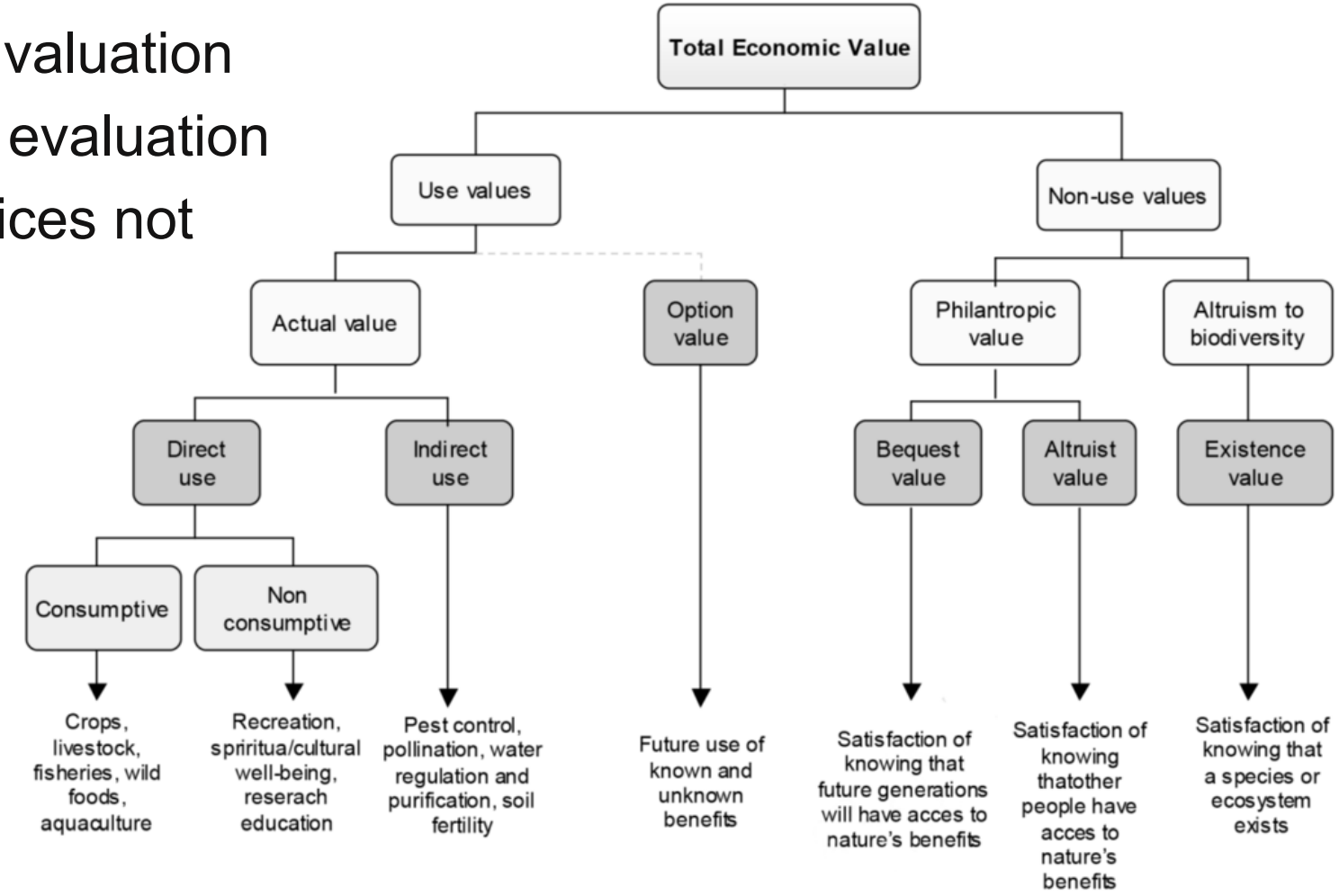
- Socio-economic valuation
  an alternative evaluation for those services not evaluated in INVEST
- TEEB valuation



Pascual et al (2010) and Eppink et al (2014)

THANK YOU!

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Questions?

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benedetto.rugani@list.lu (supervisor)

REFERENCES

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- Photos were sourced from Google Images Creative Commons search feature. InVEST logo from the website.