Accounting of forest related ecosystem services- Pilot accounts for habitat and species maintenance

Workshop on Public and Private Payments for Forest Ecosystem Services 31 March 2022

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SYSTEM OF ENVIRONMENTAL ECONOMIC ACCOUNTING

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The 52nd United Nations Statistical Commission, on March 2021, has adopted the **System of Environmental-Economic Accounting—Ecosystem Accounting (SEEA EA)**. This new statistical framework will enable countries to measure their natural capital and understand the immense contributions of nature to our prosperity and the importance of protecting it.

European Commission

What is INCA

Eurostat:
Coordination of INCA, data provider, SEEA EEA alignment/ testing

European Environment Agency:
Developing shared data platform and ecosystem extent and condition accounts, dat

INCA partners

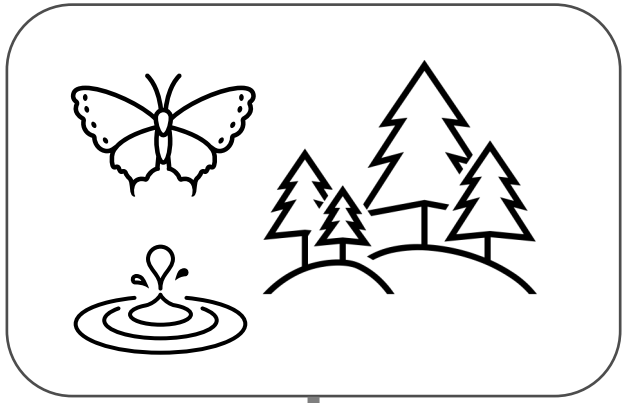
EC Joint Research Centre:
Operation of information systems, expertise in modelling ecosystem services, developing ecosystem services
unts

DG Environment:
Provides policy context, manages MAES, principal user of INC^ outputs

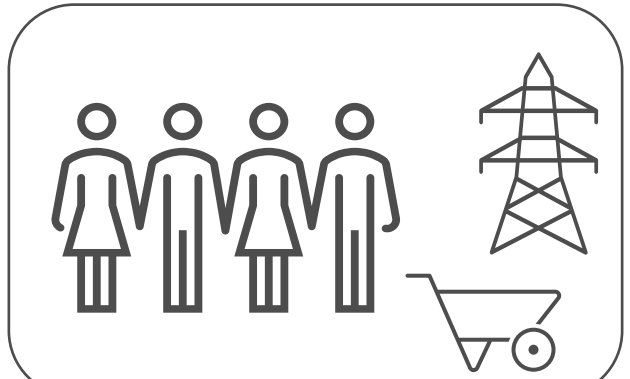
DG Research and Innovation:
Coordination between INCA and EU research activities

INCA approach on Ecosystem Services

Ecological side

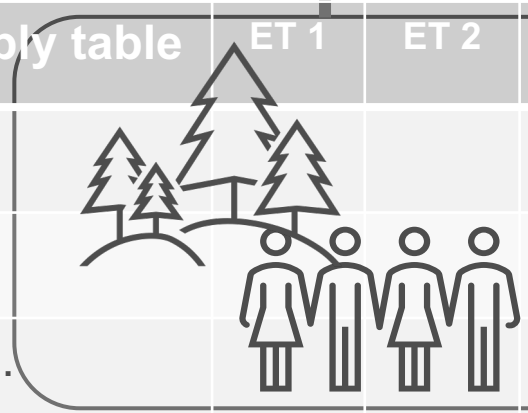


Socio-economic side



Match between the ecological and economic sides

Supply table	ET 1	ET 2	...
ES 1			
ES 2			
ES ...			



Use table	Primary	Secondary	...
ES 1			
ES 2			
ES ...			

Supply table

Use table

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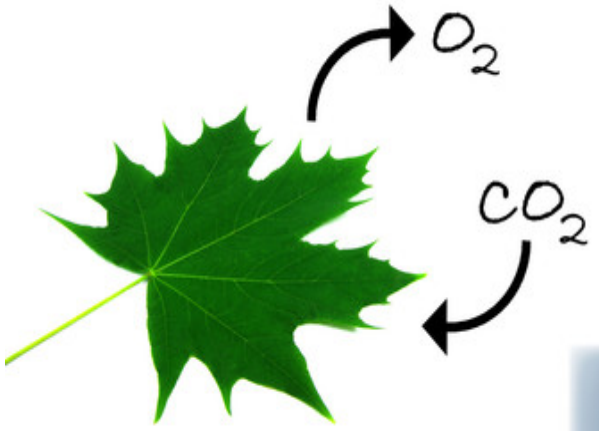
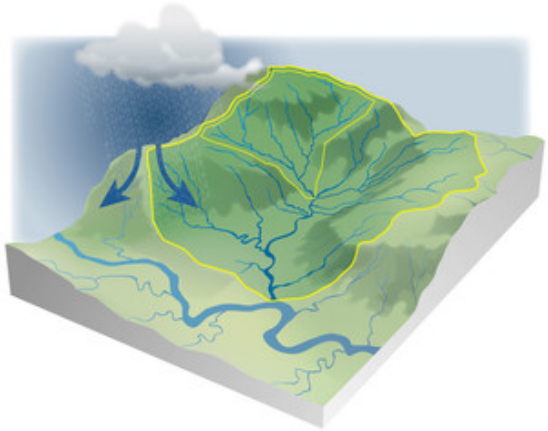
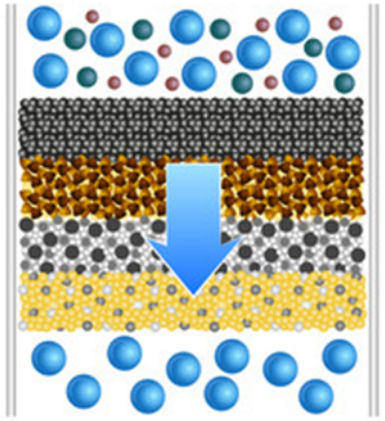
Ecosystem services provided by Forests

not only timber provision







Monetary valuation methods

SEEA EA: Chapter 9

Directly observable prices

- **Prices embodied in market transaction**
  - Resource rent
  - Productivity change
  - Hedonic pricing
- **Prices based on revealed expenditures**
  - Averting behavior
  - Travel cost
- **Prices based on expected expenditures**
  - Replacement cost
  - Avoided damage
  - Simulated Exchange Values
- **Prices for similar goods and services**

Value transfer

Other:

- Shadow project cost
- Opportunity costs of alternative uses
- Stated preference methods
- Prices from economic modelling
- Qualitative methods

Methods used in INCA outputs

Ecosystem services	Valuation method	Specifics
Crop provision	Market price	Price of crop type
Timber provision	Market price	Price of forest trees and price of exports (due to missing data cases)
Crop pollination	Market price	Price of crop type
Carbon sequestration	Carbon price	Effective carbon rates (OECD report)
Soil retention	Replacement cost	Price of fertilizers
Flood control	Avoided damage	Damage functions and use of look up tables
Water purification	Replacement cost	Cost of constructed wetland
Habitat and species maintenance	Choice experiment	WTPs for HSM key features
Nature-based tourism	Market price	/
Nature-based recreation	Travel cost method /Value transfer	Cost of fuel as proxy
Air quality (tentative)	Value transfer	Value of Statistical Life

Production function (tentative)

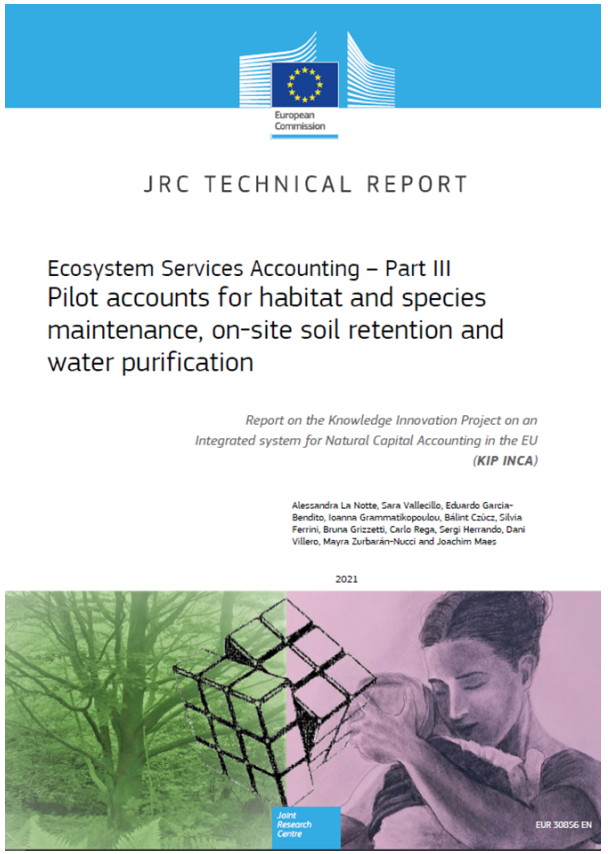
VT-Social Cost of Carbon (tentative)

VT-Meta-regression model (tentative)

Supply aggregated for year 2012

	Ecosystem type										
	Urban	Cropland	Grassland	Woodland and forest		Wetland	Heathland and shrubland	Sparsely vegetated land	Rivers and lakes	Coastal / intertidal area	**Total**
				Available for wood supply	Other						
(million EUR)											
Crop provision		11 407									11 407
Timber provision				22 714							22 714
Crop pollination		4 517									4 517
Soil retention		11 512									11 512
Carbon sequestration	—	—	—	9 189		—	—	—	NA	NA	9 189
Flood control	89	1 015	3 129	11 388		333	357	1	NA	NA	16 312
Water purification	1 105	31 041	4 128	15 374		330	312	170	3 114	NA	55 576
Habitat and species maintenance ([a])	NA	5 516	985	20 416		1 689	1 176	369	2 363	NA	32 515
Nature-based recreation	77	4 073	7 482	30 723		2 296	3 097	1 351	1 015	279	50 393
Total value	1 272	69 081	15 724	109 805		4 649	4 941	1 891	6 493	279	214 134
EUR/km^2	6 026	42 972	31 014	69 051		47 525	27 361	32 202	59 586	14 531	48 877
% ecosystem type	0.6 %	32.39 %	7.3 %	51.3 %		2.2 %	2.3 %	0.9 %	3.0 %	0.1 %	

([a]) Welfare value is reported for this ES.
NA: Not Available



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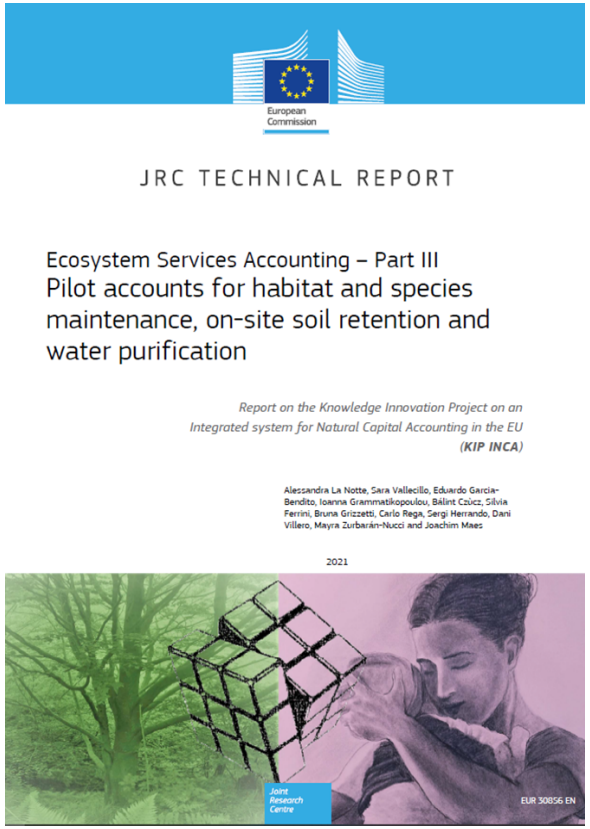
Use aggregated for year 2012

	Economic units					
	Primary sector		Secondary and tertiary sectors	Households	Global society	**Total**
	Agriculture	Forestry				
(million EUR)						
Crop provision	11 407					11 407
Timber provision		22 714				22 714
Crop pollination	4 517					4 517
Soil retention	11 512					11 512
Carbon sequestration					9 189	9 189
Flood control	799		3 786	11 726		16 312
Water purification	38 615		11 307	5 653		55 576
Habitat and species maintenance [a]					32 515	32 515
Nature-based recreation				50 393		50 393
Total value	66 851	22 714	15 093	67 773	41 704	214 314
% economic units	31.2 %	10.6 %	7.0 %	31.6 %	19.5 %	100 %

([a]) Welfare value is reported for this ES.
NA: Not Available



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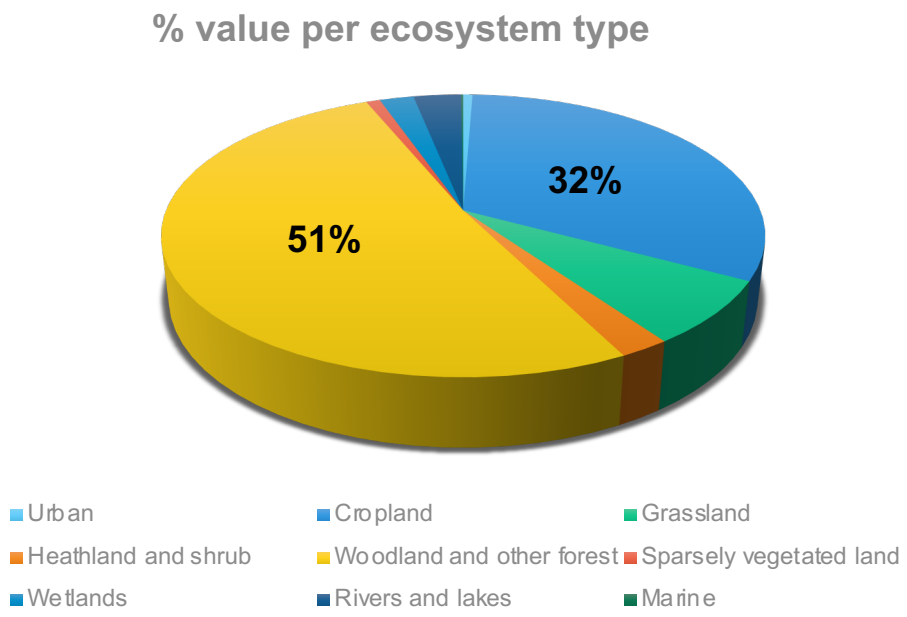
Indicators revealed from SUT tables (1)



Supply table:

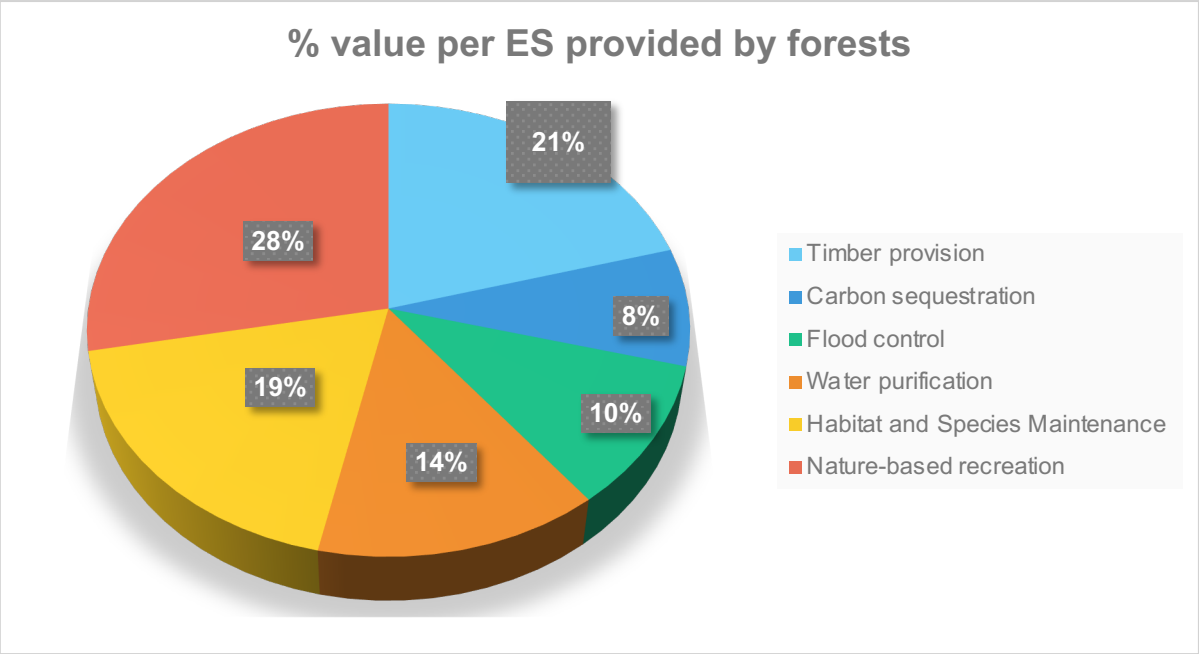
All ES per all ecosystem type

Contribution of forests

Total value: 214 billion Euro

European Commission

Indicators revealed from SUT tables (2)



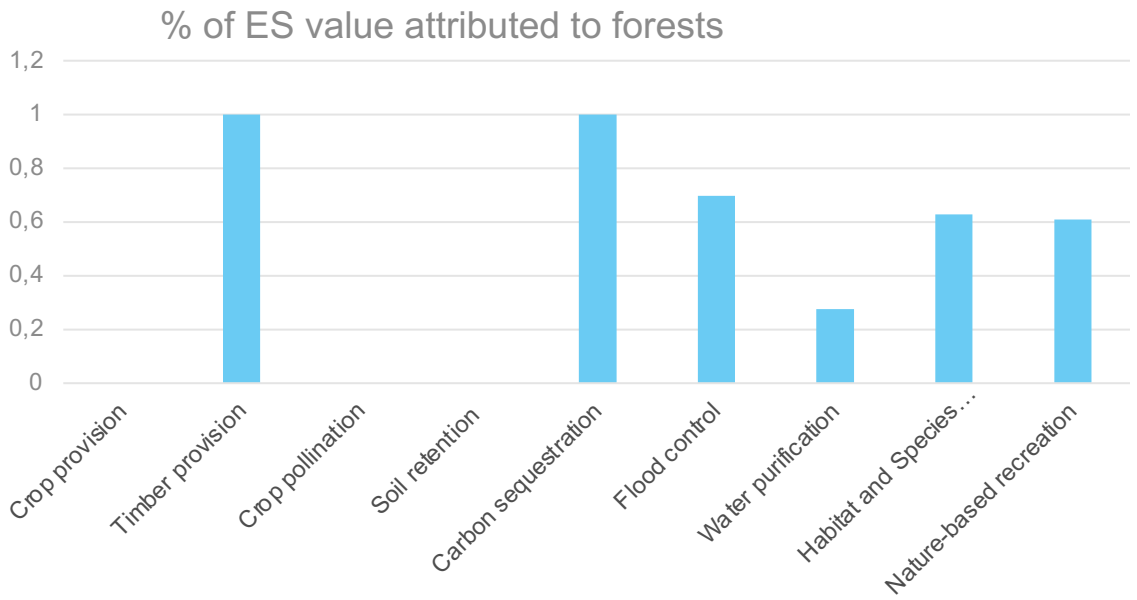
Total value: 109 billion Euro

Supply table:

All ES supplied by forests

Relative value of ES supplied by forests

Indicators revealed from SUT tables (3)

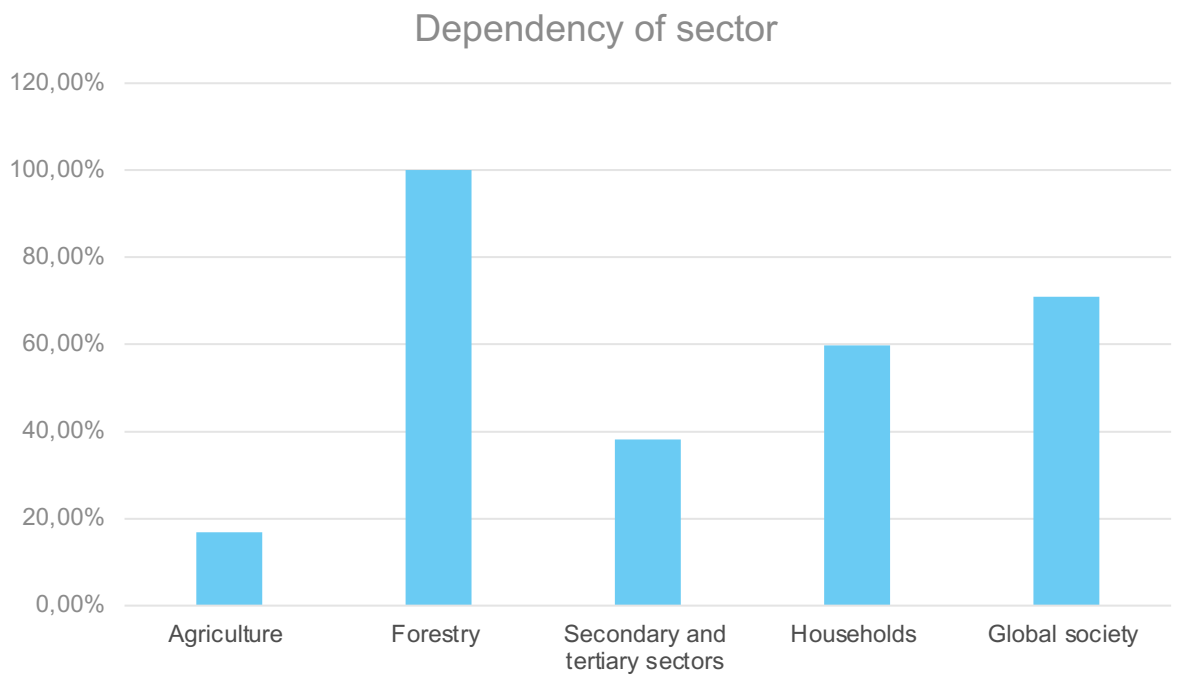


Supply table:

$$A_{forest} = \frac{value\ of\ ES_i}{\sum \text{value of } ES_i}$$

Attribution of value of ES to forests

Indicators revealed from SUT tables (4)



Supply and Use tables:

All ES supplied by forests to all economic units

$$D_{econ.sector} = \frac{\sum A_{forest} * value\ of\ ES_i}{\sum value\ ES_i}$$

Dependency of economic sector to forests

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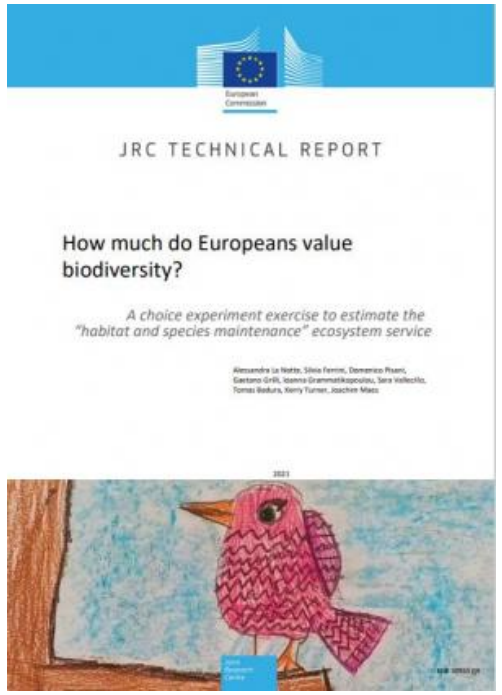
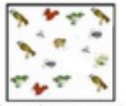
Habitat and Species Maintenance using CE method



Attributes

Land use type levels	
Chemicals reduction	25%, 50%, 75% 100%
Biodiversity	
Size	Small, medium, large
Price	Euro 25,50,75,150,200, 300

CE card

	Option A	Option B	No change
Land use			
Chemicals	Reduced by 50%	Reduced by 50%	
Impact on biodiversity	 Large improvement	 Medium improvement	
Size	 Large (100 hectare as 150 football pitches)	Small (14 hectare as 20 football pitches)	
Costs (annual tax)	€300	€25	
Which would you choose?	○	○	○

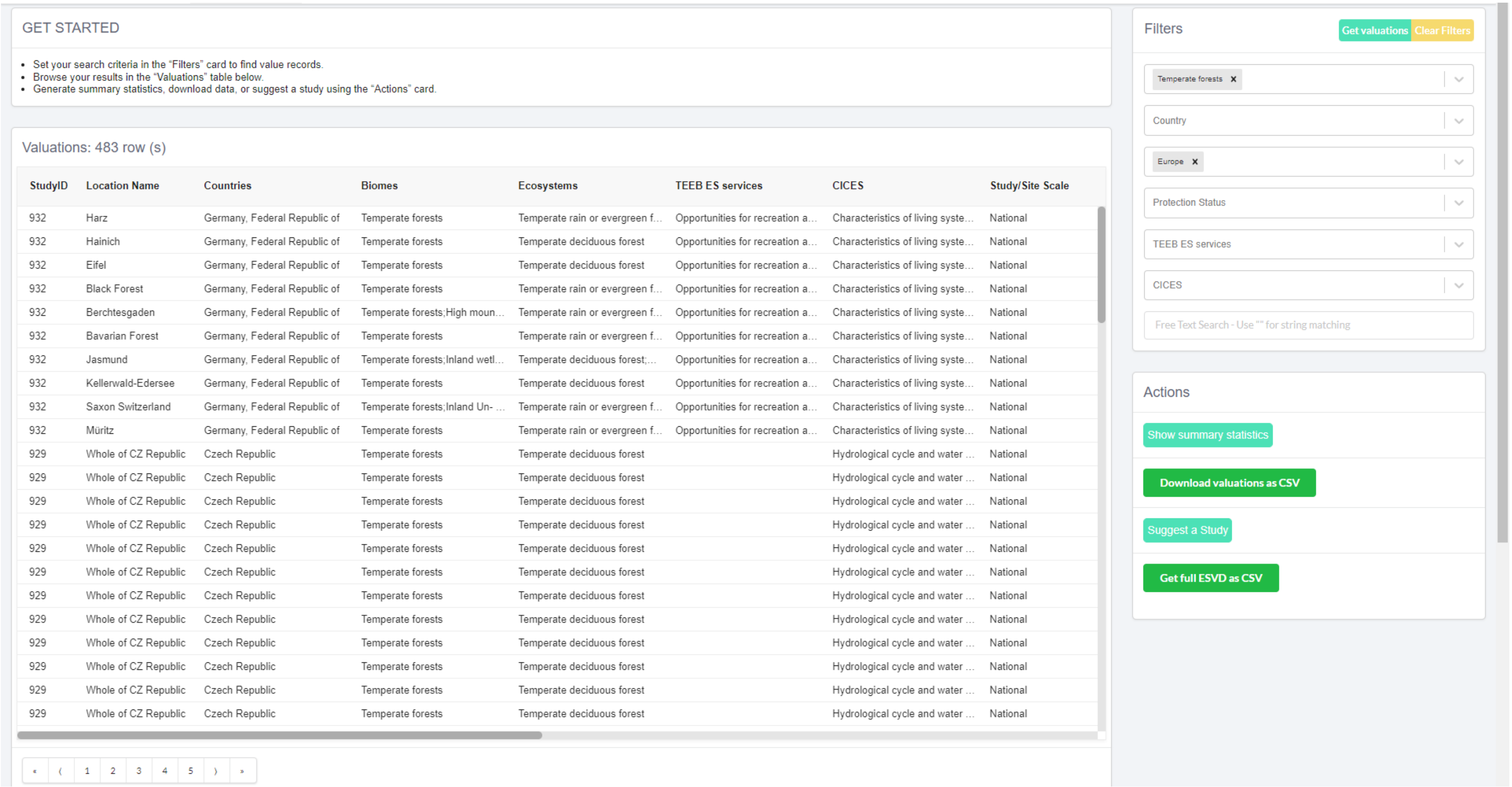
Value of HSM

- WTP estimates (euros/household/year):
- Aggregation: WTPs *number of households → ~30 billion euros/year (EU-27)
- Compare with the foreseen financial flow of

20 billion/year for biodiversity (in 2030 Biodiversity Strategy)

Source of values

- Primary studies
- Use of Value Transfer
  - Valuation databases
  - https://www.esvd.net/esvd



GET STARTED

- Set your search criteria in the "Filters" card to find value records.
- Browse your results in the "Valuations" table below.
- Generate summary statistics, download data, or suggest a study using the "Actions" card.

Valuations: 483 row (s)

StudyID	Location Name	Countries	Biomes	Ecosystems	TEEB ES services	CICES	Study/Site Scale
932	Harz	Germany, Federal Republic of	Temperate forests	Temperate rain or evergreen f...	Opportunities for recreation a...	Characteristics of living syste...	National
932	Hainich	Germany, Federal Republic of	Temperate forests	Temperate deciduous forest	Opportunities for recreation a...	Characteristics of living syste...	National
932	Eifel	Germany, Federal Republic of	Temperate forests	Temperate deciduous forest	Opportunities for recreation a...	Characteristics of living syste...	National
932	Black Forest	Germany, Federal Republic of	Temperate forests	Temperate rain or evergreen f...	Opportunities for recreation a...	Characteristics of living syste...	National
932	Berchtesgaden	Germany, Federal Republic of	Temperate forests;High moun...	Temperate rain or evergreen f...	Opportunities for recreation a...	Characteristics of living syste...	National
932	Bavarian Forest	Germany, Federal Republic of	Temperate forests	Temperate rain or evergreen f...	Opportunities for recreation a...	Characteristics of living syste...	National
932	Jasmund	Germany, Federal Republic of	Temperate forests;Inland wetl...	Temperate deciduous forest;...	Opportunities for recreation a...	Characteristics of living syste...	National
932	Kellerwald-Edersee	Germany, Federal Republic of	Temperate forests	Temperate deciduous forest	Opportunities for recreation a...	Characteristics of living syste...	National
932	Saxon Switzerland	Germany, Federal Republic of	Temperate forests;Inland Un- ...	Temperate rain or evergreen f...	Opportunities for recreation a...	Characteristics of living syste...	National
932	Müritz	Germany, Federal Republic of	Temperate forests	Temperate rain or evergreen f...	Opportunities for recreation a...	Characteristics of living syste...	National
929	Whole of CZ Republic	Czech Republic	Temperate forests	Temperate deciduous forest		Hydrological cycle and water ...	National
929	Whole of CZ Republic	Czech Republic	Temperate forests	Temperate deciduous forest		Hydrological cycle and water ...	National
929	Whole of CZ Republic	Czech Republic	Temperate forests	Temperate deciduous forest		Hydrological cycle and water ...	National
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929	Whole of CZ Republic	Czech Republic	Temperate forests	Temperate deciduous forest		Hydrological cycle and water ...	National
929	Whole of CZ Republic	Czech Republic	Temperate forests	Temperate deciduous forest		Hydrological cycle and water ...	National

« ‹ 1 2 3 4 5 › »

Filters
Get valuations Clear Filters
Temperate forests ×
Country
Europe ×
Protection Status
TEEB ES services
CICES
Free Text Search - Use "" for string matching

Actions
Show summary statistics
Download valuations as CSV
Suggest a Study
Get full ESVD as CSV

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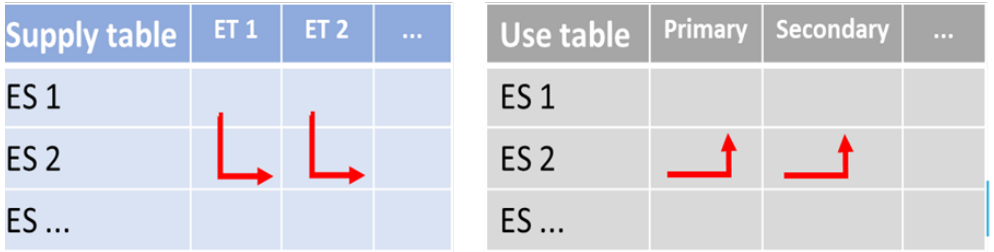
How accounts can be of use for PES design

- Identification and eventually assessment of ES provided by “woodland and forests”
- Availability of reference monetary value of each ES (Euro/ha) spatially explicit for tailored PES
- Identification of direct users: SUT explicitly link the ES provided by “woodland and forest” to economic sectors and households and provide monetary estimates
- Identification of indirect users: for overarching environmental targets (such as climate change and biodiversity loss) a monetary valuation of non-use values is provided



Thank you