

Empirical insights into the multiple economic values of ecosystems: applications and reflections

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System of
Environmental
Economic
Accounting

Empirical work: collaborative methodological mapping of the ecosystem services related valuation methods

	EE	NL
Area, km ²	45 339	41 850
Population	1.35 million	17.6 million
GDP	41 billion EUR	1 trillion EUR
GDP per capita	30 400 EUR	61 600 EUR



Scope:

Eurostat regulation on environmental accounts

Existing practices in Estonia and the Netherlands.

Aim: develop semantics, policy relevance and SNA/SEEA comparability.

How: Evaluation and interpretation of valuation methods and outcomes.

Work is also a response also to UN London Group of Environmental Economic Accounting in the frame of the SEEA EA methods.

The reference scheme for the treatment of multiple economic values connected to ecosystems

		Ecosystem service in scenario	
		Ecosystem service exists	Ecosystem service does not exist hypothesis
exists (scenario coincides with reality)	Ecosystem services are traded as private usage rights	Rent of the land, directly observable prices applied to actually traded volumes, observed value of actually observed transactions in tradable permits	
	Ecosystem services are potentially traded as private usage rights	Directly observable prices applied to potentially for sale permits of using the ES	
	ES is used for producing other goods or services	Resource rent, residual value, hedonic pricing	
	Other (outside or inside of SEEA-EA, within SEEA CF, other satellite accounts or SNA)	Travel cost method, effective carbon rates	
"would appear" (does not exist in reality, does in the scenario)	Economic activity that avoids the need for the ES		Abatement and substitution costs, averting behaviour
	ES restoration as economic activity*		Restoration costs
	Marketisation of the ES (with or without perfect price discrimination)	Prices applied to quantities of ES not actually traded or tradable under current institutional arrangements, WTP for maintaining ES	
"would disappear" (exists in reality, is lost in the scenario)	Existing economic activities can no longer thrive, and/or assets are damaged (-other negative changes in value*) because of the lack of the ES		Social cost of lacking ES, expected damages

- Framework facilitates the bringing together values from different perspectives
- Ecosystem marginal contributions can be placed in the same framework of hypothetical economic losses
- Work has mapped and referenced the methods applied for 7 services



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

Contributors:



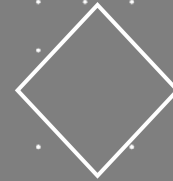
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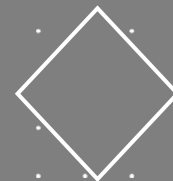
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Crop provision: rent on land and products' value

Estonian figures
Dutch figures
Further possible connected values

			Ecosystem service in scenario	
			Ecosystem service exists	Ecosystem service does not exist hypothesis
Connected monetary value (transaction/asset, etc.) in scenario	exists (scenario coincides with reality)	ES traded as a right of private usage (observed transactions volumes)	100 (land rent, use rights on assets)	
			590 (land rent, use rights on assets)	
		ES potentially traded as a right of private usage (observed prices applied to stocks)		
		ES is used for producing other goods or service	14.9 (resource rent of NACE A.1 agriculture activity)	
			959 (resource rent NACE A.1 agriculture activity)	
		Other (outside or inside of SEEA-EA, within SEEA CF, other satellite accounts or SNA)	300 (crops, final product)	
		4 769 (crops, final product)		
		agricultural subsidies (organic farming, general support scheme, etc)		
	"would appear" (does not exist in reality, does in the scenario)	Avoiding the need of the ES as economic activity		
		ES restoration as economic activity		1 500 (replacement of soil, NPV 3% DR, 50 years, total soil asset value 41 300).
Marketisation of the ES		1.4 (WTP for maintaining supply of agricultural production)		
"would disappear" (exists in reality, is lost in the scenario)	Existing economic activities can no longer thrive, and/or assets are damaged («other negative changes in value») because of the lack of the ES			

Unit: million euros, data refer for 2022 or last available year



Wood provision: the market value of a product

Estonian figures
Dutch figures
Further possible connected values

			Ecosystem service in scenario	
			Ecosystem service exists	Ecosystem service does not exist hypothesis
Connected monetary value (transaction/asset, etc.) in scenario	exists (scenario coincides with reality)	ES traded as a right of private usage (observed transactions volumes)		
		ES potentially traded as a right of private usage (observed prices applied to stocks)	Timber asset value 20 639 Net income (NPV) (a)	
			3 900 (land value) (a)	
		ES is used for producing other goods or services	86 (Land value annuity method - rent on land only)	
			171 (residual value, resource rent of forest activity A02)	
			20 (residual value of forest activity A02)	
		Other (outside or inside of SEEA-EA, within SEEA CF, other satellite accounts or SNA)	762 Harvest at stumpage prices	
	565 Net increment from FAWS plus removals from OWL and FNAWS in stumpage prices			
	99 harvest (timber felled /per year and in stumpage prices)			
	1,5 (reforestation subsidy 2022)			
	"would appear" (does not exist in reality, does in the scenario)	Avoiding the need of the ES as economic activity		
		ES restoration as economic activity		
		Marketisation of the ES		
	"would disappear" (exists in reality, is lost in the scenario)	Existing economic activities can no longer thrive, and/or assets are damaged (-other negative changes in value-) because of the lack of the ES		



Pollination: dependent values, and the costs of restoring its enabling conditions

Estonian figures
Dutch figures
Further possible connected values

			Ecosystem service in scenario		
			Ecosystem service exists	Ecosystem service does not exist hypothesis	
Connected monetary value (transaction/asset, etc.) in scenario	exists (scenario coincides with reality)	Ecosystem services are traded as private usage rights			
		Ecosystem services are potentially traded as private usage rights			
		ES is used for producing other goods or services			
		Other (outside or inside of SEEA-EA, within SEEA CF, other satellite accounts or SNA)	0.57 (payment for ecosystem services, subsidy on establishing fields that are attractive for foraging to pollinators)		
	"would appear" (does not exist in reality, does in the scenario)	Economic activity that avoids the need for the ES			Hand pollination/designated pollination by domesticated bee species (substitution cost - averting behaviour)
			ES restoration as economic activity*		256 €/ha (restoration cost), if applied to areas providing the service
		Marketisation of the ES	3.3 (WTP for enabling pollination and honey collection)		
		Existing economic activities can no longer thrive, and/or assets are damaged (-other negative changes in value-) because of the lack of the ES			62.4 (production change - dependency rate)
					134 (production change - dependency rate)
		"would disappear" (exists in reality, is lost in the scenario)			



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Global climate regulation: unpacking latent, emerging and risk-based economic values

Estonian figures
Dutch figures
Further possible connected values

			Ecosystem service in scenario	
			Ecosystem service exists	Ecosystem service does not exist hypothesis
Connected monetary value (transaction/asset, etc.) in scenario	exists (scenario coincides with reality)	Ecosystem services are traded as private usage rights	249 (Directly observed volume of actual transactions in tradable permits)	
		Ecosystem services are traded as potentially private usage rights	Directly observable prices applied to the existing stock of tradable permits held by economic units	
		ES is used for producing other goods or services		
		Other (outside or inside of SEEA-EA, within SEEA CF, other satellite accounts or SNA)	Effective carbon rate payments, total	
	"would appear" (does not exist in reality, does in the scenario)	Economic activity that avoids the need for the ES		Abatement cost 1 681 788 (C stock)
		ES restoration as economic activity		Efficient carbon rate - averting behaviour 184 (C sequestration)
		Marketisation of the ES	Directly observable prices (EU ETS price) 1 259 582 of which: 1 259 427 stock, 154 sequestration	Cost of planting and raising trees
			Contingent valuation (WTP for maintaining ecosyst. C capture) 13 (sequestration)	
	"would disappear" (exists in reality, is lost in the scenario)	Existing economic activities can no longer thrive, and/or assets are damaged (-other negative changes in value-) because of the lack of the ES		Social cost of carbon (cost of having C in atmosphere) 2 514 829 (C stock)
				Social cost of carbon 36.3 – 185.7 (C sequestration)



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Local climate regulation: the importance of green infrastructure

Estonian figures
Dutch figures
Further possible connected values

			Ecosystem service in scenario	
			Ecosystem service exists	Ecosystem service does not exist hypothesis
Connected monetary value (transaction/asset, etc.) in scenario	exists (scenario coincides with reality)	Ecosystem services are traded as private usage rights		
		Ecosystem services are potentially traded as private usage rights		
		ES is used for producing other goods or services	3-10% higher real estate prices (hedonic pricing)	
		Other (outside or inside of SEEA-EA, within SEEA CF, other satellite accounts or SNA)		
	"would appear" (does not exist in reality, does in the scenario)	Economic activity that avoids the need for the ES		Cooling, shading by artificial means (substitution cost - averting behaviour)
		Ecosystem service restoration as economic activity*		
		Marketisation of the ecosystem service	1.7 (WTP for preservation and maintenance of urban green spaces that provide microclimate regulation)	
	"would disappear" (exists in reality, is lost in the scenario)	Existing economic activities can no longer thrive, and/or assets are damaged («other negative changes in value») because of the lack of the ES		Avoided health damage costs



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Air filtration: avoiding health costs

Estonian figures
Dutch figures
Further possible connected values

			Ecosystem service in scenario	
			Ecosystem service exists	Ecosystem service does not exist hypothesis
Connected monetary value (transaction/asset, etc.) in scenario	exists (scenario coincides with reality)	Ecosystem services are traded as private usage rights		
		The ES is appropriated and potentially traded as a right to use on its own		
		ES is used for producing other goods or services		
		Other (outside or inside of SEEA-EA, within SEEA CF, other satellite accounts or SNA)		
	"would appear" (does not exist in reality, does in the scenario)	Economic activity that avoids the need for the ES		
		ES restoration as economic activity		
		Marketisation of the ES	5 (WTP)	
	"would disappear" (exists in reality, is lost in the scenario)	Existing economic activities can no longer thrive, and/or assets are damaged («other negative changes in value») because of the lack of the ES		1,3 (Avoided health cost, value transfer)
				167 avoided health cost



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Nature-based tourism: economic resources allocated to enjoying nature

Estonian figures
Dutch figures
Further possible connected values

			Ecosystem service in scenario		
			Ecosystem service exists	Ecosystem service does not exist hypothesis	
Connected monetary value (transaction/asset, etc.) in scenario	exists (scenario coincides with reality)	The ES is appropriated and actually traded as a right to use on its own			
		The ES is appropriated and potentially traded as a right to use on its own			
		ES is used for producing other goods or services			
		Other (outside or inside of SEEA-EA, within SEEA CF, other satellite accounts or SNA)	576 (travel costs, accommodation costs, other costs)		
	"would appear" (does not exist in reality, does in the scenario)	Economic activity that avoids the need for the ES			
		ES restoration as economic activity		Restoration of the ecosystem regarding attractive characteristics for recreation	
		Marketisation of the ES	157 (alternative use of time)		
			25 (WTP for maintaining the infrastructure necessary for recreation in nature)		
		"would disappear" (exists in reality, is lost in the scenario)	Existing economic activities can no longer thrive, and/or assets are damaged («other negative changes in value») because of the lack of the ES		
			3 390 (travel costs, accommodation costs, other costs), of which 1 150 (travel cost)		



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Conclusions

- Framework facilitates the bringing together values from different perspectives
- Ecosystem marginal contributions can be placed in the same framework of hypothetical economic losses
- Work has mapped and referenced the methods applied for 7 services

Questions to the London Group

- Does this empirical work answer questions raised at LG30?
- How could this multi-layered approach to monetary values connected to ecosystems be further developed in order to include further relevant figures
- What values should be included in a dashboard of indicators on the economic importance of ES?



Thank you!

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