



MAIA
Mapping and Assessment for
Integrated ecosystem Accounting

Monetary Valuation in the SEEA - EA

Alejandro Caparrós
IPP-CSIC

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 817527

Ecosystem services in monetary terms

- Ecosystem services as contribution of nature (Edens and Hein 2013; Hein et al. 2020; Campos et al. 2019)
- Consistency with exchange values used in national accounts
- Exclude consumer surplus
- Obtain estimates of output and intermediate consumption

Ecosystem services

- Irrespectively of the method used, man-made inputs need to be deducted to arrive at the ecosystem service (as resource rent).
- Following the SEEA Central Framework:

Output (consumption final products)
less intermediate consumption
less compensation of employees
less other taxes on production
plus other subsidies on production
less consumption of fixed capital (depreciation)
less return on produced assets
less labour of self-employed persons
Equals resource rent

Methods for monetary valuation in SEEA - EA

Methods where the price for the ecosystem service is :

- Directly observable
 - Directly observed values
- Obtained from markets for similar goods and services
 - Prices from similar markets
- Embodied in a market transaction
 - Residual value and resource rent methods
 - Productivity change method
 - Hedonic pricing method

Preferred alternative, if available

ES as intermediate consumption,
out of SNA output

Decompose price,
not derive consumer surplus

Methods for monetary valuation in SEEA - EA

Methods where the price for the ecosystem service is :

- Based on revealed expenditures (costs) for related goods and services
 - Averting behaviour method (ABM)
 - Travel cost method (TCM)
 - Consumption expenditures (CEX)
- Based on hypothetical expenditures or markets
 - Replacement cost (RC)
 - Avoided damage costs (ADC)
 - Simulated Exchange Value (SEV) method

ABM, RC and ADC: need to show that WTP actually exists, not enough to assume

TCM only provides exchange value only when combined with SEV

TCM and “consumption expenditures” methods are different, see following slides

SEV, see following slides

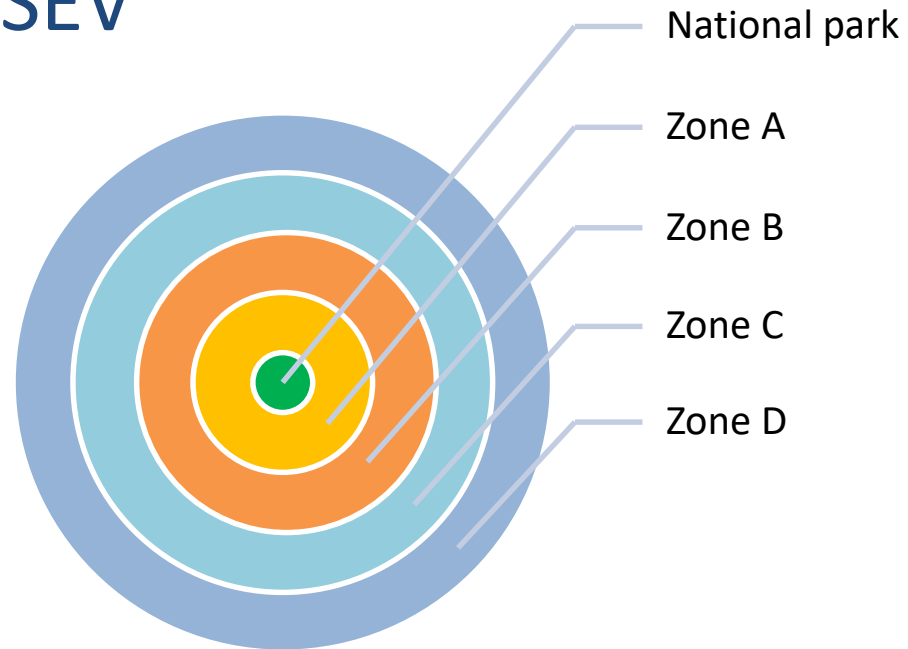
Methods for monetary valuation in SEEA - EA

- Although there are of course controversies around some of these methods, and refinements to be done, there is an (almost) general consensus that valuing ecosystem services at their exchange value and using NPV for assets is an adequate approach (also, hedonic method for assets)
- In addition to discussions on issues such as robustness of methods and data availability, there remain also more general critiques to monetary valuation which are not necessarily constraint to ecosystem accounting per se
- In the following slides I will focus on some of the more challenging, hence more interesting, methods discussed before

Travel Cost Method, Consumption Expenditures, Stated Preferences and Simulated Exchange Values

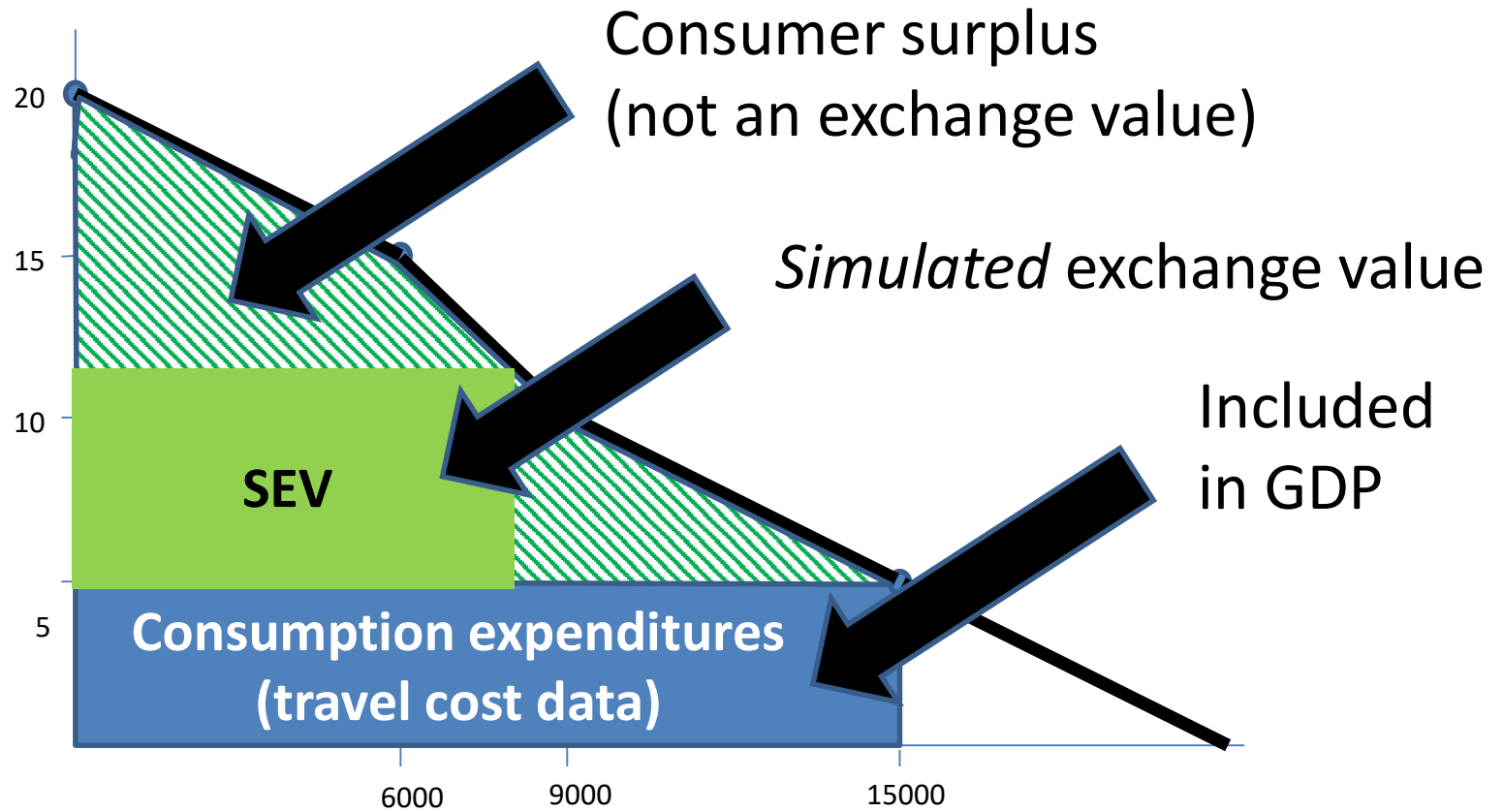
- Travel cost method (TCM), stated preferences methods (contingent valuation and choice experiments) all estimate a demand function. Typically, this is used to estimate the consumer surplus.
 - These estimates are not exchange values
- The Consumption Expenditures (CEX) method values the recreational use based on the expenditures incurred by consumers to reach the recreational area.
- The Simulated Exchange Value (SEV) method uses the estimated demand to calculate the price that would occur if the ecosystem service were actually marketed (Caparrós et al., 2003, 2017).
 - The SEV estimates the opportunity cost of not trading in the market the current use of the ecosystem asset, with the current objectives (using the demand, the supply function and the appropriate market structure).
 - E.g. if visitors to a National Park pay no entrance fee, the estimated opportunity costs are the foregone benefits of charging an entrance fee

TCM, CEX and SEV

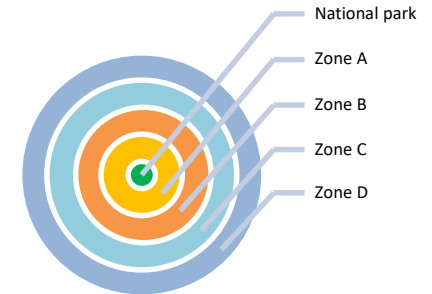


Zone	Travel cost	Population	Visitors from zone ...
A	5	25000	15000
B	10	25000	9000
C	15	25000	6000
D	20	25000	0
Total		100000	30000

TCM, CEX and SEV



TCM, TCD and SEV



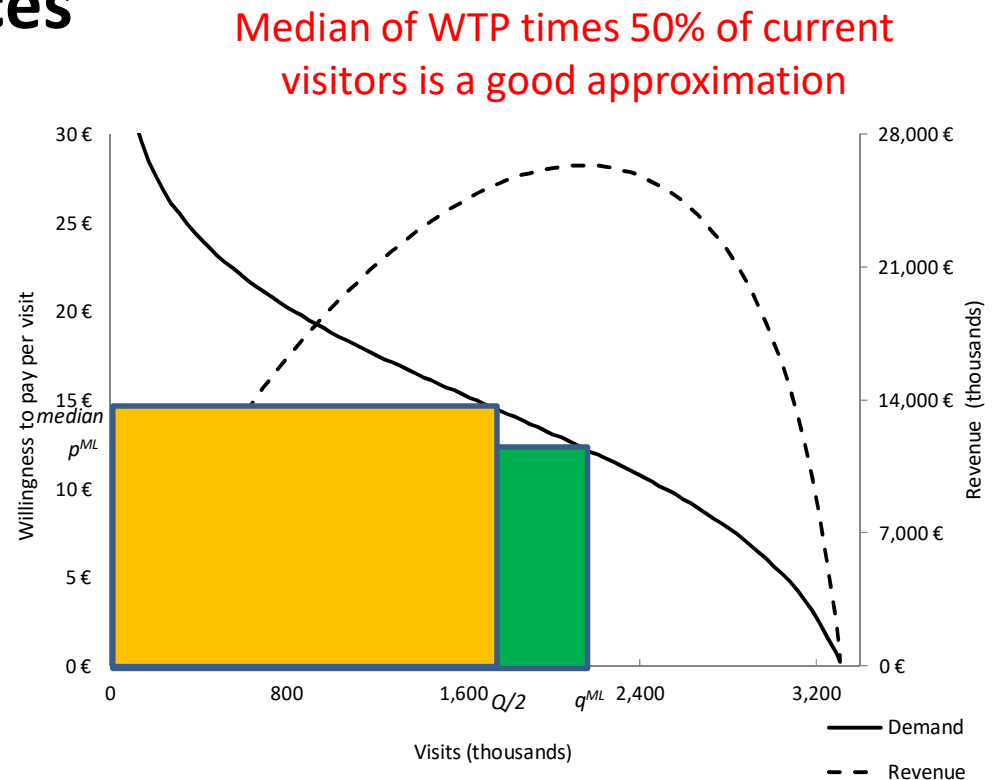
Zone	Travel cost	Population	Visitors from zone ...
A	5	25000	15000
B	10	25000	9000
C	15	25000	6000
D	20	25000	0
Total		100000	30000

Zone	Travel Cost Method (Consumer surplus)	Consumption expenditures (travel cost data)	Simulated exchange value (based on TCM)
A	112500	75000	52000
B	52500	90000	26000
C	15000	90000	0
D	0	0	0
Total	180000	255000	78000

SEV and Declared Preferences

Contingent valuation

- Iconic recreational sites (e.g. National Parks)
- Contingent valuation
- Monopolistic competition (example)
- 10 areas in Andalusia
- Costs are assumed to be constant
- Site-specific demand functions (Fig. Demand and revenue for recreation in Cazorla)
- Importance of assessing institutional feasibility



Source: Caparrós et al. (2017)
















SEV for Nature Based Recreation (Andalucía)

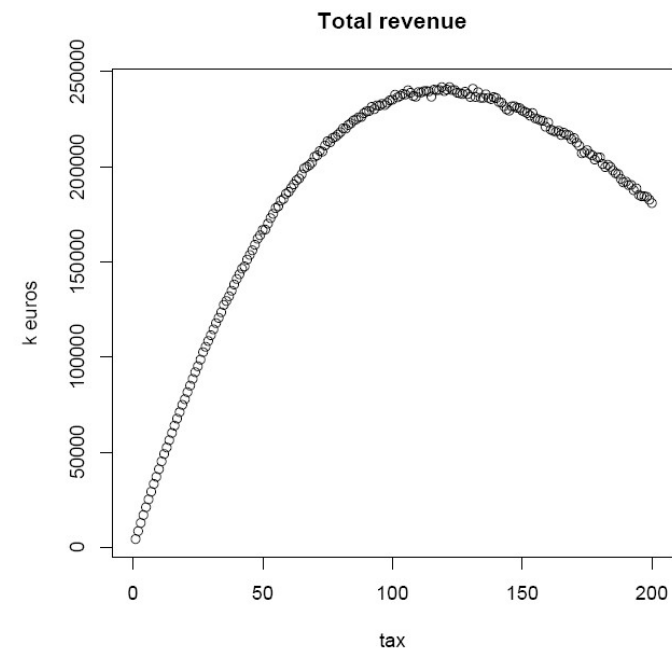
Model and estimated values	Per visit (€)	Aggregated values (€)	€/ha	
Logit (bid)				
Compensating variation	12.91	345,723,904	78.82	Median is good approximation
Simulated exchange value <i>(median as proxy)</i>	12.91	172,861,952	39.41	
Simulated exchange value <i>(short-term monopolistic competition)</i>	11.38	177,865,907	40.55	
Log-logit (log bid)				
Compensating variation	38.52	1,031,783,830	235.22	SEV is more robust than consumer surplus (Hicksian variations)
Simulated exchange value <i>(median as proxy)</i>	15.14	202,712,988	46.21	
Simulated exchange value <i>(short-term monopolistic competition)</i>	25.31	216,934,005	49.46	

Source: Caparrós et al. (2017)

SEV with choice experiments

- For nature based recreation: Oviedo et al. (2016)
- For landscape conservation and threatened biodiversity preservation, income that a PES would obtain if implemented: Campos et al. (2019)

BLOQUE 1 1	Sierra de Grazalema	Pinares de Doñana	Los Alcornocales	Ninguna
Especie	 Encina	 Pino	 Alcornoque	
Superficie arbolada	 Mantener la misma	 Aumento de un 20%	 Aumento de un 10%	 Disminuye un 10%
Biodiversidad	 12 especies amenazadas MAS	 IGUAL número de especies amenazadas, 235	 12 especies amenazadas MENOS	 12 especies amenazadas MAS
Tasa anual	 20€	 40€	 30€	 0€
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Source: Campos et al. (2019)

Methods for monetary valuation in SEEA - EA

- Although there are of course controversies around some of these methods, and refinements to be done, there is an (almost) general consensus that valuing ecosystem services at their exchange value and using NPV for assets is an adequate approach (also, hedonic method for assets)
- In addition to discussions on issues such as robustness of methods and data availability, there remain also more general critiques to monetary valuation which are not necessarily constraint to ecosystem accounting per se
- When applied properly, even some of the more challenging methods can provide meaningful and useful results
 - A meaningful first step: Collect data on free access recreation for
 - Travel Cost Data
 - SEV with Travel Cost Method
 - SEV with Contingent Valuation (Choice experiments)



MAIA
Mapping and Assessment for
Integrated ecosystem Accounting

Mapping & Assessment for Integrated ecosystem Accounting
Road Name, City Name, Post Code, Country
<http://maiaportal.eu/>

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 817527