



Economic valuation of ecosystem services in LMEs, purpose, methods and the GCLME experience applying the benefit transfer approach

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Session: 6

Day of presentation: 01 October 2015





Ecosystem Services

Provisioning Services

- **food** (including **seafood** and game), fibre, crops
- fresh water
- **genetic resources, bio-chemicals**
- **natural medicines**
- energy (hydropower, biomass)

Regulating Services

- **climate regulation, carbon sequestration**
- air quality regulation
- **water regulation and purification**
- **erosion regulation**
- disease regulation
- **hazard regulation**
- pollination, pest regulation



Ecosystem Services

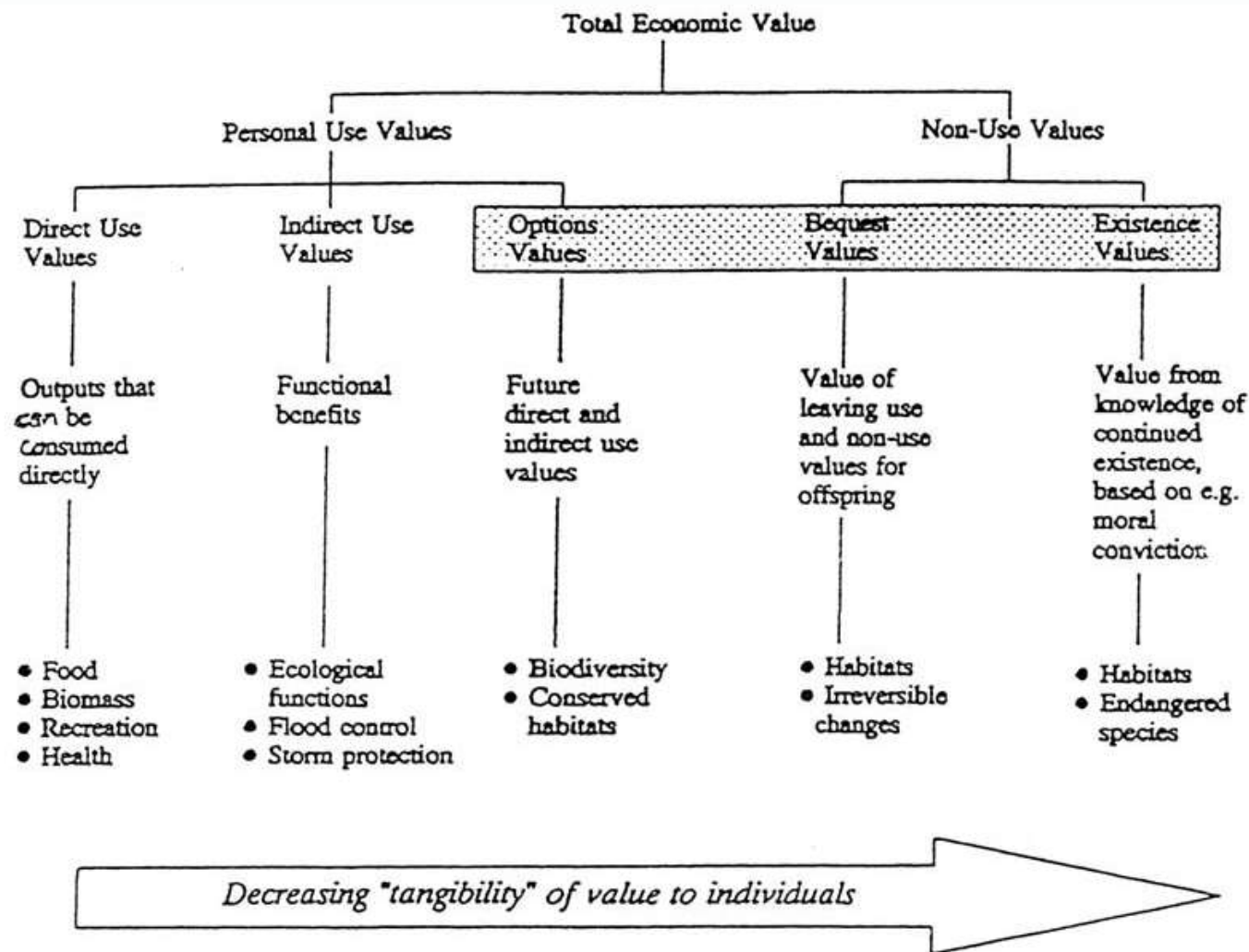
Cultural Services

- **spiritual enrichment**
- cognitive development
- **reflection**
- **recreation, amenity and aesthetic experiences**

Supporting Services

- soil formation
- photosynthesis
- **primary production**
- **nutrient cycling**
- water cycling
- **provision of habitat**
- soil formation and retention

Quantification of Total Economic Value



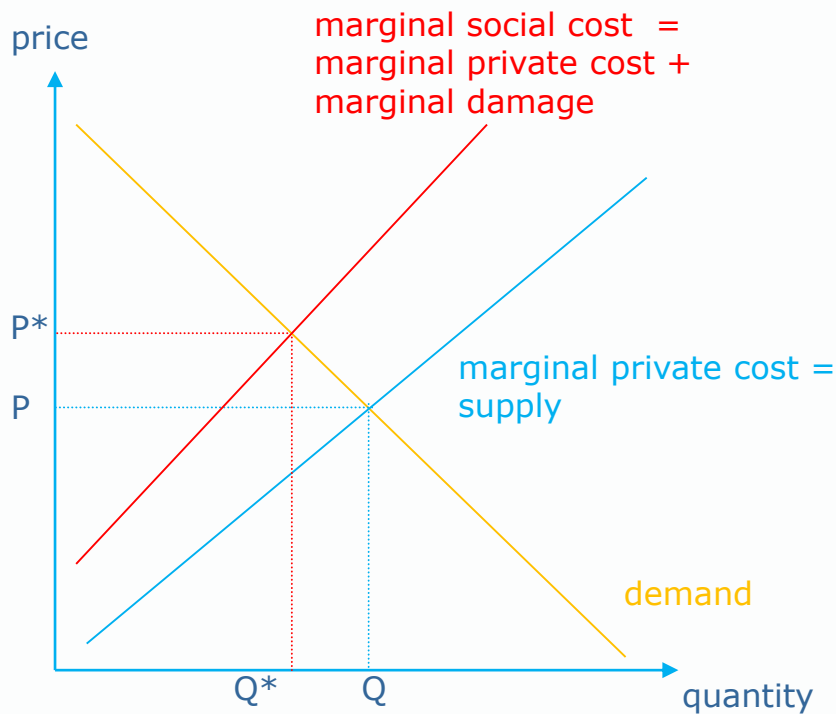
e.g. Total Economic Value of Forests

USE VALUE			NON-USE VALUE
Direct values	Indirect values	Option values	Existence values
Output that can be consumed directly, such as timber, medicine, food, recreation, non timber forest products, etc	Ecological services, such as watershed protection, flood control, storm protection, carbon sequestration, climatic control, etc	The premium placed on maintaining resources and landscapes for future possible direct and indirect uses, some of which may not be known now	The intrinsic value of resources and landscapes, irrespective of their use such as cultural, aesthetic, bequest significance, etc

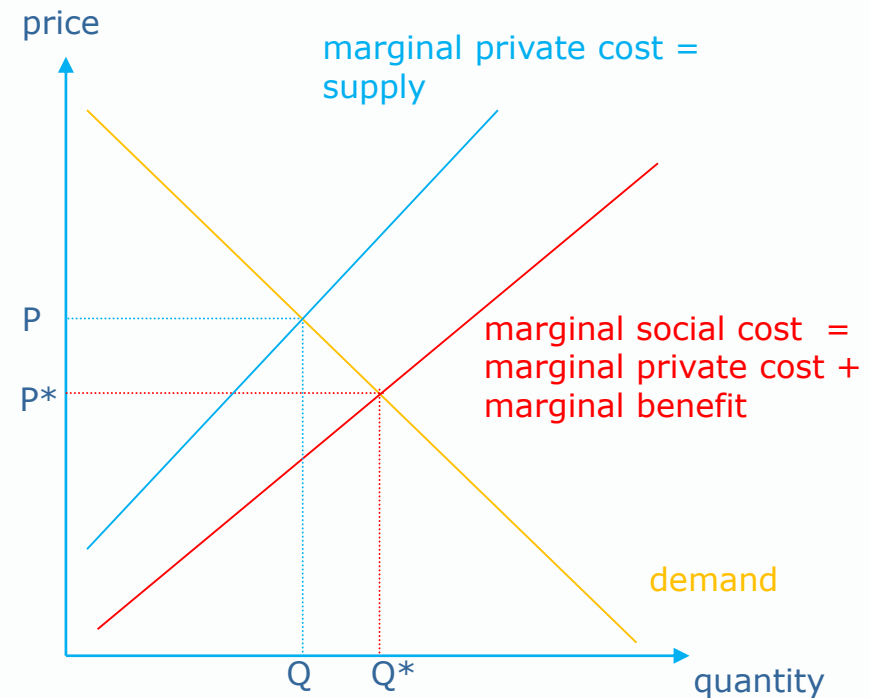
Quantification of Total Economic Value

Quantification of WTP/WTA through markets

- private goods: market price determined by supply and demand but externalities
- direct use value and to certain degree the indirect use value



Negative externality:
 $Q^*, P^* \dots$ social optimum
 $Q > Q^*$
 $P < P^*$



Positive externality:
 $Q^*, P^* \dots$ social optimum
 $Q < Q^*$
 $P > P^*$



Quantification of Total Economic Value

Quantification of WTP/WTA where markets fail

- most ecosystem services have public goods character
- no markets exists, not traded in markets
- “market failure”
- environmental valuation techniques to derive option and non-use value

Quantification of Total Economic Value

Environmental Valuation Methodologies

<i>Methodology</i>	<i>Approach</i>	<i>Applications</i>	<i>Data requirements</i>	<i>Limitations</i>
Revealed preference methods				
Production function (also known as 'change in productivity')	Trace impact of change in ecosystem services on produced goods	Any impact that affects produced goods	Change in service; impact on production; net value of produced goods	Data on change in service and consequent impact on production often lacking
Cost of illness, human capital	Trace impact of change in ecosystem services on morbidity and mortality	Any impact that affects health (e.g. air or water pollution)	Change in service; impact on health (dose-response functions); cost of illness or value of life	Dose-response functions linking environmental conditions to health often lacking; under-estimates, as omits preferences for health; value of life cannot be estimated easily
Replacement cost (and variants, such as relocation cost)	Use cost of replacing the lost good or service	Any loss of goods or services	Extent of loss of goods or services, cost of replacing them	Tends to over-estimate actual value; should be used with caution

Quantification of Total Economic Value

Environmental Valuation Methodologies

<i>Methodology</i>	<i>Approach</i>	<i>Applications</i>	<i>Data requirements</i>	<i>Limitations</i>
Revealed preference methods				
Travel cost (TCM)	Derive demand curve from data on actual travel costs	Recreation	Survey to collect monetary and time costs of travel to destination, distance traveled	Limited to recreational benefits; hard to use when trips are to multiple destinations
Hedonic pricing	Extract effect of environmental factors on price of goods that include those factors	Air quality, scenic beauty, cultural benefits	Prices and characteristics of goods	Requires vast quantities of data; very sensitive to specification
Stated preference methods				
Contingent valuation (CV)	Ask respondents directly their WTP for a specified service	Any service	Survey that presents scenario and elicits WTP for specified service	Many potential sources of bias in responses; guidelines exist for reliable application

Quantification of Total Economic Value

Environmental Valuation Methodologies

<i>Methodology</i>	<i>Approach</i>	<i>Applications</i>	<i>Data requirements</i>	<i>Limitations</i>
Stated preference methods				
Contingent valuation (CV)	Ask respondents directly their WTP for a specified service	Any service	Survey that presents scenario and elicits WTP for specified service	Many potential sources of bias in responses; guidelines exist for reliable application
Choice modeling	Ask respondents to choose their preferred option from a set of alternatives with particular attributes	Any service	Survey of respondents	Similar to CV; analysis of the data generated is complex
Other methods				
Benefits transfer	Use results obtained in one context in a different context	Any for which suitable comparison studies are available	Valuation exercises at another, similar site	Can be very inaccurate, as many factors vary even when contexts seem 'similar'; should be used with caution

Benefit transfer methodology

Principle

- transferring available information from studies already completed in another location and/or context

Steps

- Identify ecosystem services to be valued
- Identify existing valuations
- Determine transferability (context, quality)
- Decide whether existing values need to be adjusted

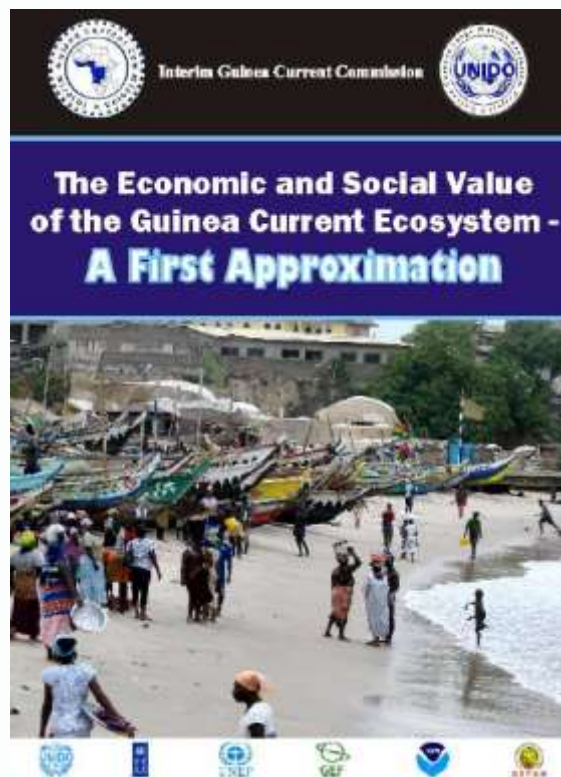
Pros

- Less costly
 - Less time consuming
- => easily and quickly be applied for making gross estimates

Limitations

- Accuracy
- Availability of good studies/valuations

The Economic & Social Value of the GCLME—A First Approximation



Ecosystems	Ecosystem Service	Value (US\$/ha/a)	Total Area (ha) (Marine/Mangroves)	Sub-Total	TEV/a
Marine	Fisheries	53.7	252,797,700	13,575,236,490	13,777,474,650
	Biodiversity	0.4		101,119,080	
	Other non-use values	0.4		101,119,080	
TEV Marine Ecosystems/ha		54.5			
Coastal	Timber	10.1	1,827,240	18,455,124	3,444,849,392
	Non-Timber Products	54		98,670,960	
	Tourism	*		720,800,00	
	Carbon Sequestration	83.5		152,574,540	
	Coastal Protection	465.9		851,311,116	
	Sewage Treatment	23.5		42,940,140	
	Drinking Water	5.2		9,501,648	
	Fish Nursery	828		1,512,954,720	
	Biodiversity	10.3		18,820,572	
	Other non-use values	10.3		18,820,572	
TEV Coastal Ecosystems/ha		1,490.8			

Economic Valuation what for?

- Advocacy and awareness creation
- Informed decision making
- Input for upstream-downstream use discussions
- Better governance of (transboundary) eco-systems

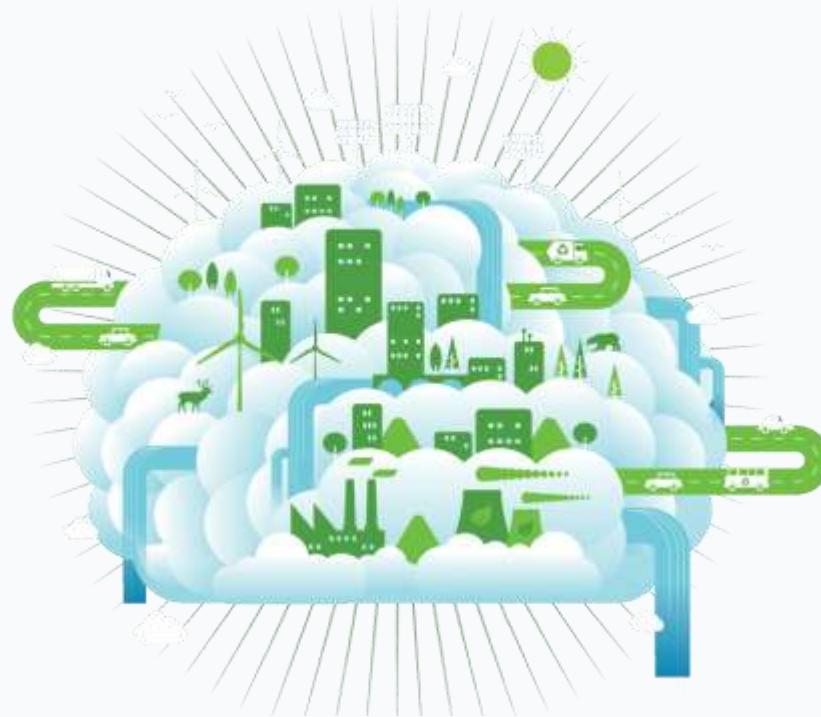
Economic Valuation in GEF IW:LEARN 4

Systematic consideration in TDA/SAP process

- Repository of EV documents as sound basis for benefit transfers
- Methodologies for EV and for inclusion into TDA/SAP processes
- Training materials and trainings for application by IW project managers



Thank You!



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