



# The Economics of Ecosystems and Biodiversity (TEEB): Water and Wetlands

*Approaches to assess the multiple benefits of protected areas*

*TEEB Water and Wetlands webinar:  
Transforming our approach to water and wetlands  
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### Key steps for assessing benefits of protected areas / protected wetlands:

1. Start with a question – define your purpose
2. Understand the basics of valuation
3. Approach the assessment in stages



### Start with a question – define your purpose

- What is the motive for / purpose of assessment ?  
→ This helps to determine scope, methods, communication etc.



## Possible purposes for assessment

Picture © SYKE kuvapankki SYKEkuva

- Understanding, awareness and advocacy
- Support to decision-making and management  
→ PA zoning, optimising benefits from multiple sites etc.
- Identifying and assessing social impacts  
→ Benefits with non-market value, equity between beneficiaries etc.
- Mobilising funds



### Understand the basics of valuation

- Different types of values
- Different indicators of value
- Different valuation methods
- “Geography of benefits”: who benefits and where, who maintains
- Benefits come with costs → net benefits ?

# A range of ecosystem services ...

Picture © SYKE kuvapankki SYKEkuva

## Supporting Services

(i.e. services necessary for the production of all other ecosystem services)

- Ecosystem process maintenance (soil formation, nutrient cycling, primary production etc.)
- Lifecycle maintenance (nursery habitats, seed dispersal, species interactions etc.)
- Biodiversity maintenance and protection (genetic, species and habitat diversity)

## Provisioning Services

(i.e. ecosystems' ability to provide resources)

- Food provisioning
- Water provisioning
- Provisioning of raw material (timber, wood, fuel, fibre)
- Provisioning of medicinal resources / biochemicals (natural medicines, cosmetics pharmaceuticals etc.)
- Provisioning of ornamental resources
- Provisioning of genetic resources

The use of provisioning service at protected areas often has (some) limitations.

## Regulating Services

(i.e. ecosystems' beneficial regulatory processes)

- Climate regulation
- Natural hazards regulation
- Purification and detoxification of water, air and soil
- Water / water flow regulation
- Erosion and soil fertility regulation
- Pollination
- Pest and disease regulation
- Noise regulation

## Cultural Services

(i.e. ecosystems' non-material benefits)

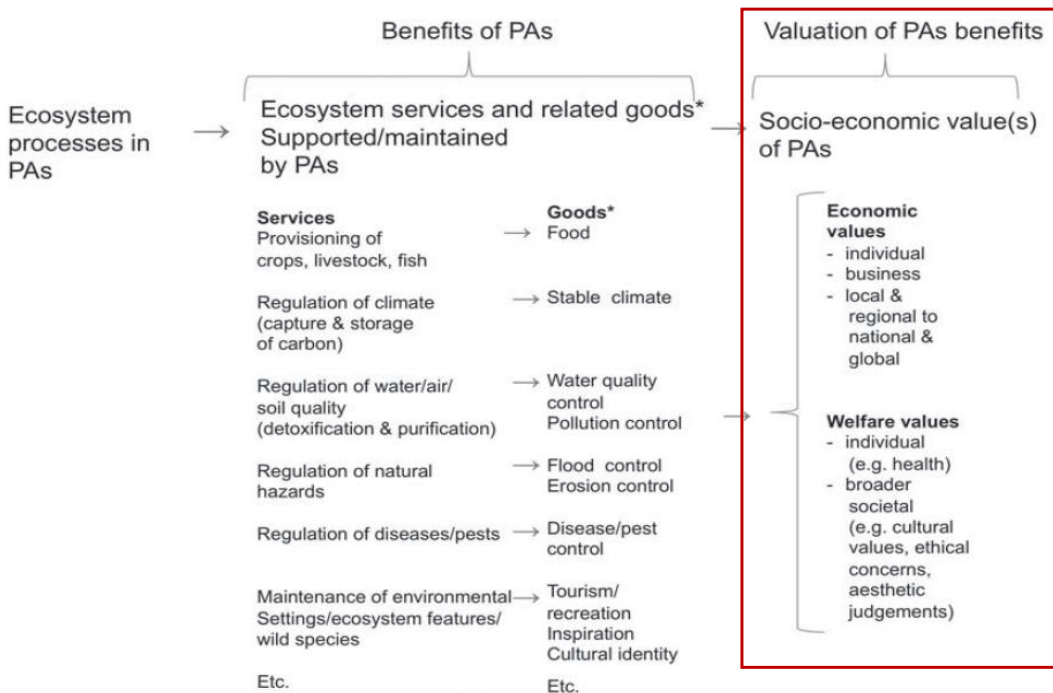
- Opportunities for recreation and tourism
- Aesthetic values
- Inspiration for arts, science and technology
- Information for education and research
- Spiritual and religious experience
- Cultural identity and heritage
- Mental and physical wellbeing supported by cultural services

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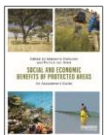


# ... leading to different concrete benefits and values

Picture © SYKE kuvapankki SYKEkuva



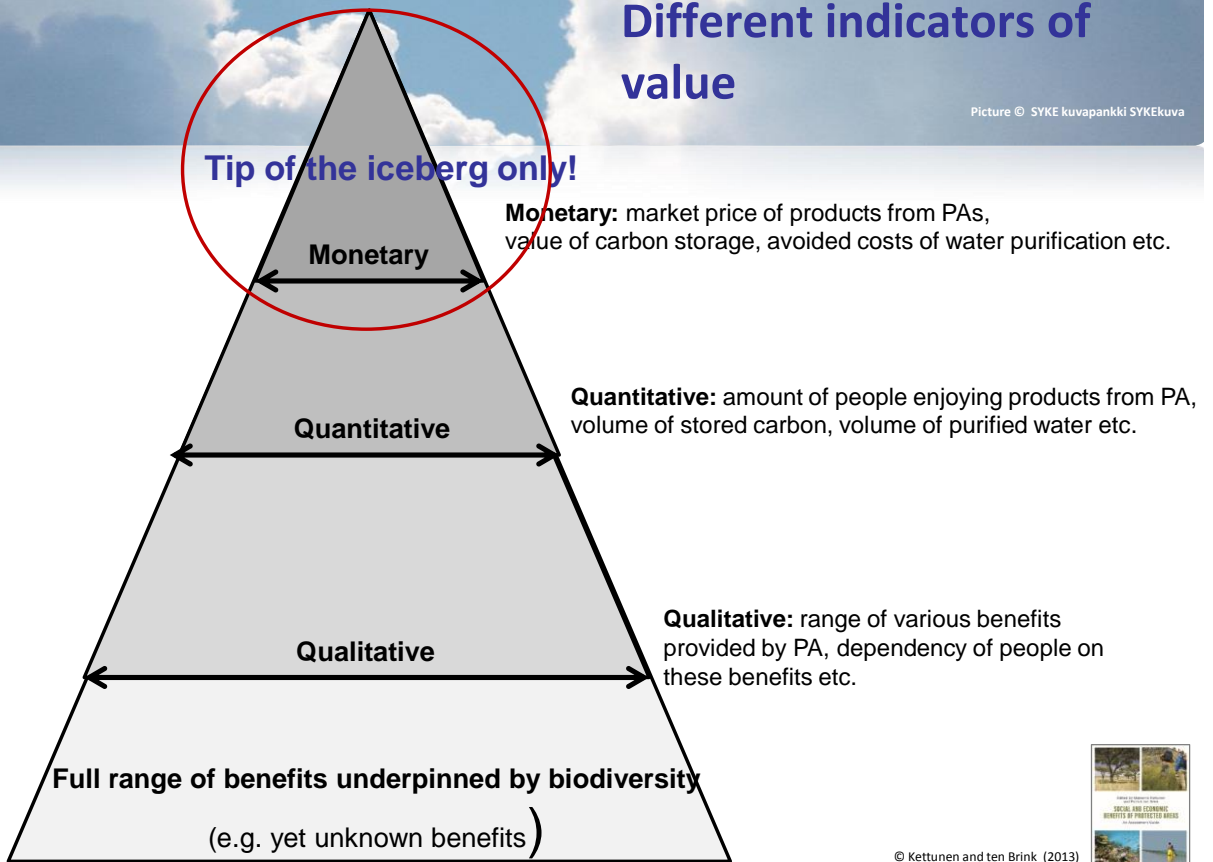
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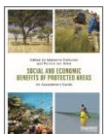
## Different indicators of value

Picture © SYKE kuvapankki SYKEkuva

Tip of the iceberg only!



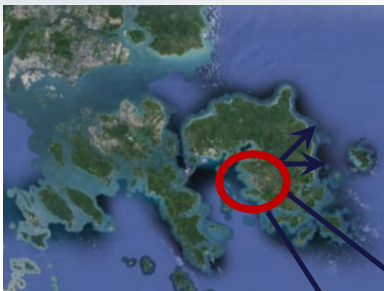
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## The geography of benefits & stakeholders

Picture © SYKE kuvapankki SYKEkuva



### Local benefits of wetlands:

- Food supply and security (fish)
- Protection against natural hazards (eg mangroves)
- Local community livelihood (fisheries, tourism ...)
- Purification of coastal water
- Etc.

### Regional and national benefits of wetlands:

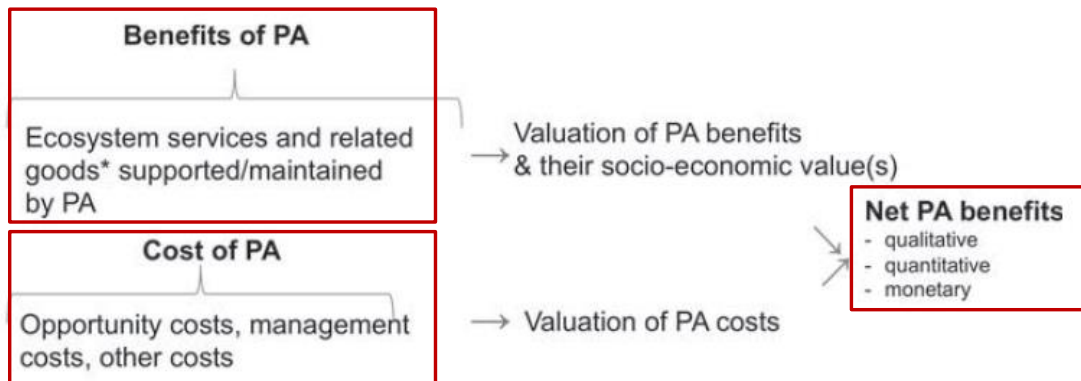
- National food supply and security
- Recreation and tourism
- National natural & cultural heritage
- Etc.

### Global benefits of wetlands:

- Carbon storage / sequestration
- Global food supply and security (fish)
- Recreation and tourism at global level
- Etc.



## Net benefits, ie benefits vs. costs



\* Good(s) includes all use and non-use, material and non-material outputs from ecosystems that have (direct) value for people.

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### Approach the assessment in stages

- Scoping assessment
- Detailed assessment (of certain key benefits)
- Interpretation of results
- Use of results
- Communication of results

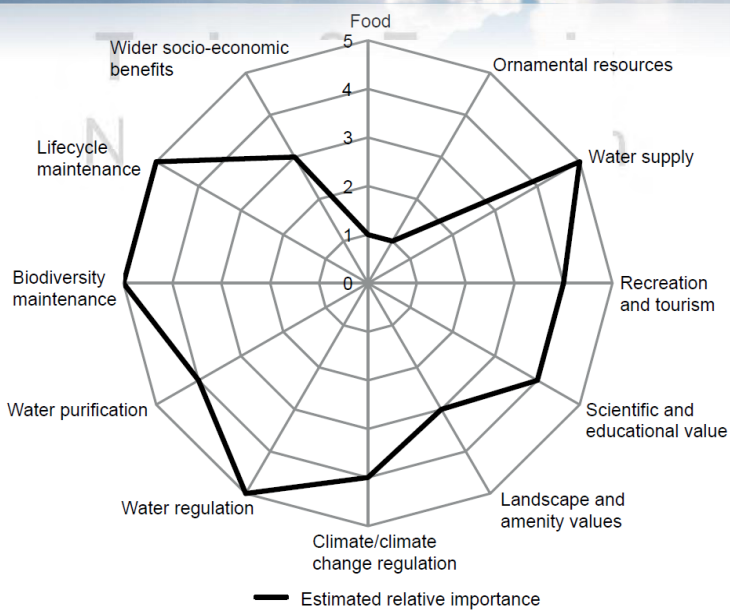
## Scoping of benefits

- Provides an overall picture of all benefits and values
- Ensures that no benefit is ignored, even if it has no economic (market) value
- Helps to identify existing information and gaps
  
- Provides an overall picture of all stakeholders
- Helps to raise awareness and engage stakeholders
  
- Helps to (further) identify the purpose and needs for assessment
- Helps to focus detailed valuation, inc. resources

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## Scoping of benefits

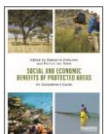


### Scoping in practise:

- Review and analysis of existing information
- Expert / stakeholder questionnaires or workshops
- Rapid (quantitative) overall assessment of benefits

FIGURE A1.1 Socio-economic benefits provided by PA of Pico da Vara/Ribeira do Guilherme, ranked according to their perceived importance on a scale of 1-5 (1 = low importance, 5 = high importance, see Chapter 4).

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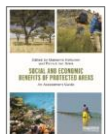
## Scoping of benefits

Example 2: PA playing an important role in regulating flow and quality of water in the area

Who helps to maintain benefits?	Who benefits?	What is the scale of benefit?
<i>PA staff/managers</i>	<i>Individuals:</i> access to clean water, reduced risk of flooding/water scarcity	Local Regional
<i>Communities within PA</i>	<i>Local communities:</i> access to clean water, reduced risk of flooding/water scarcity, possible payments to support land use practices that maintain PA's natural capacity to regulate water	Local Regional
<i>Landowners</i>	<i>Businesses and industries:</i> secured regular water supply for industry/business needs, reduced costs of water purification, reduced costs of water regulation for electricity and water companies	Local Regional National Global
<i>Farmers</i>	<i>Local, regional and national governments:</i> increased water security, decreased risk of flooding and droughts, reduced health costs related to lack of water and/or low water quality	Local Regional National
<i>Foresters</i>	<i>Global community:</i> improved global water and health security and (a contribution to) the mitigation of water related global environmental risks	Global

### Scoping in practise:

- Assessment of stakeholders
- Who benefits?
- Who maintains the benefits?
- Equity and fairness



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# Detailed assessment

Scoping →

Detail

Picture © SYKE kuvapankki SYKEkuva

Clear identified purpose  
Likely to be combination of qualitative, quantitative and monetary information

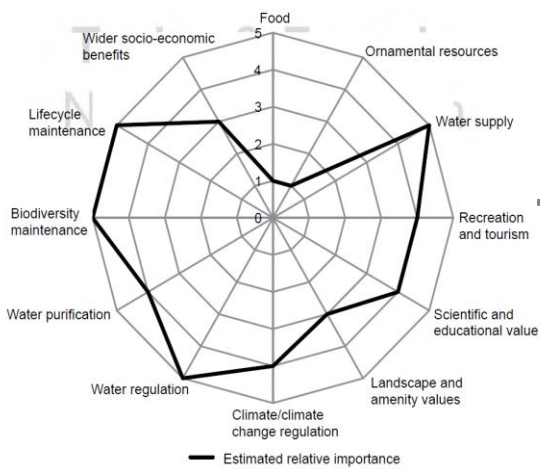
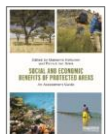


FIGURE A1.1 Socio-economic benefits provided by PA of Pico da Vara/Ribeira do Guilherme, ranked according to their perceived importance on a scale of 1-5 (1 = low importance, 5 = high importance, see Chapter 4).

Identified benefit	Scale	Estimated value
Landscape/amenity value and existence value of endemic species	Local/global	€500 to €800 per person for a total of €3,000,000 for the Povoação region alone
Carbon storage	Global	465,364 tC/year (vegetation) 223,667 tC/year (peat)
Water regulation (flood and landslides prevention)	Local	Costs of damage €20,000,000 in 1997
Water purification	Local	€46. €110



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## Quantitative assessment

Picture © SYKE kuvapankki SYKEkuva

### Example: Stoeng Treng Ramsar site (Cambodia)

→ Benefits and their relative importance identified based on focus group discussion

→ Wetland provides a range of different values to local people

<i>Identified benefits</i>	<i>Quantified importance</i>
Resource: fishing	5
Water: washing	5
Water: cooking and drinking	5 for each benefit
Water: transportation	4
Fibre: construction (sand and rock)	3
Fibre: fuel wood	3
Biodiversity resources: aquatic animals	2
Biodiversity resources: water birds	2
Biodiversity resources: reptiles	2
Biodiversity resources: traditional medicines	2
Water: irrigation	2
Resource: floodplain rice	1
Recreation: swimming	1
Other: dolphins	1

**Identified benefits and their quantified importance** Chong (2005) in [Kettunen and ten Brink 2013](#)



## Monetary assessment

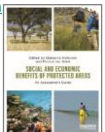
### Example: Stoeng Treng Ramsar site (Cambodia)

→The wetland play a crucial role in supporting local people's livelihoods

→Value of fish for subsistence forms a significant part of the total value

<i>Value of fisheries</i>	<i>Average household</i>	<i>Middle or rich household</i>	<i>Poor or very poor household</i>
Annual fish consumption for subsistence	180 kg	150 kg	210 kg
Annual fish sale	420 kg	190 kg	690 kg
Value of fish consumed for subsistence (non-market)	KHR500,000/ US\$125	KHR500,000/ US\$125	KHR600,000/ US\$150
Income from fish sale (market)	KHR1,200,000/ US\$300	KHR600,000/ US\$150	KHR2,000,000/ US\$500
Total monetary value of fish (market and non-market)	KHR1,700,000/ US\$425	KHR1,100,000/ US\$275	KHR2,600,000/ US\$650
Fish sale (market value) as a percentage of total fish value	70%	56%	77%

**Estimated monetary values of fisheries (market and non-market)** Chong (2005) in [Kettunen and ten Brink 2013](#)



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## Assessing net benefits

Picture © SYKE kuvapankki SYKEkuva

- **A comprehensive picture rather than one single figure**
- **Building on qualitative, quantitative and monetary data**
  - Multi-criteria benefit assessment rather than strict cost-benefit assessment
  - Putting economic / monetary assessments in the broader context
- **Trade-off / synergy analysis**
  - To facilitate the understanding of results and their effective and equitable up-take

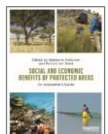


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## Interpretation, use and communication

- **Interpretation:** Providing the right context to the results
- **Audience:** Identifying target audience for communication and how to reach them
- **Strategy for use (short and long term):** Relevant processes, 'windows of opportunity' etc. for use in decision-making
- **Resources:** Ensuring appropriate resources for up-take and implementation of results (inc. in long-term)

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## The Economics of Ecosystems & Biodiversity



### The true value of nature is not a number with a pound sign in front



**George Monbiot**  
guardian.co.uk, Monday 6 June 2011 20.00 BST  
[Article history](#)

### Putting a price on nature can't be worse than giving it all away for free

The natural world gives us clean air and water, fertile soils and immense wellbeing. Putting a price tag on it might just stop us mistaking free for worthless

#### **DAMIANCARRINGTON'S ENVIRONMENTBLOG**

Posted by  
Damian Carrington  
Thursday 2 June 2011  
10.02 BST  
guardian.co.uk



**Yes:** there is a need to consider the wider socio-economic values and intrinsic value and to use different indicators of value

**Yes:** when wisely used, assessing, valuing and communicating socio-economic benefits can be a valuable support to protecting wetlands



## Thank you !

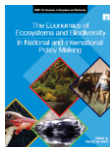
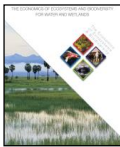
[TEEB Water and Wetlands](#), Russi et al. 2012

Kettunen & ten Brink (2013) [Social and Economic Benefits of Protected Areas - An Assessment Guide](#)

[TEEB for National and International Policy Makers](#) (ed Patrick ten Brink)

IEEP & Milieu : [Guide to Multi-benefits of Cohesion Policy Investments in Nature & GI](#)

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