

ELD CAMPUS

Module: Valuation of ecosystem services



In this module you will learn about:

- *Total economic value (TEV) concept*
- *Introduction and discussion of appropriate methods according to TEV*
- *Non demand-based methods*
- *Revealed preference methods*
- *Stated preference methods*
- *Benefit transfer*
- *Valuating the different types of ecosystem services*
- *Study design, sampling plan and survey instruments*

If you want to deepen your know-how on the valuation of ecosystem services, further information is provided in the script. Further links are provided at the end of this presentation.

Total Economic Value (TEV) Concept – ELD's 6+1 step approach

- How can ecosystem services be valued?

1. *Inception*

2. *Geographical characteristics*

3. *Types of ecosystem services*

4. *Role of ecosystem services and economic valuation*

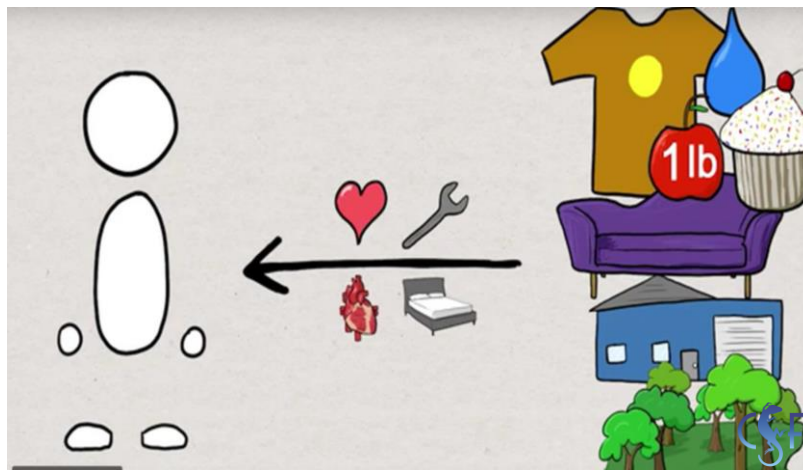
5. *Patterns and pressures*

6. *Cost-benefit analysis and decision-making*

+1 step: *Take action!*

Total Economic Value (TEV) Concept

- The Total Economic Value Framework is the most common framework used for environmental valuation
- It is **anthropocentric** because it is based on how society values goods and services
- When valuating ecosystem services, **changes in society's welfare** associated with the gain or loss of environmental goods and services are measured. The changes represent **benefits or costs to society** as a result of a change in environmental service provision.



Total Economic Value (TEV) Concept

- **provides a simple conceptualisation** of the different types of economic values
- **serves as basis for categorising** the different valuation methods
- can help **measure ecosystem services** that do not have a market price but still play indirect roles in the market
- some valuation methods capture **use value** and others capture use value plus varying proportions of **non-use values**
 - **holistic societal perspective** rather than a purely market-based financial one
 - can provide useful insights for **novel and alternative market** establishment and development

Total Economic Value (TEV) Concept

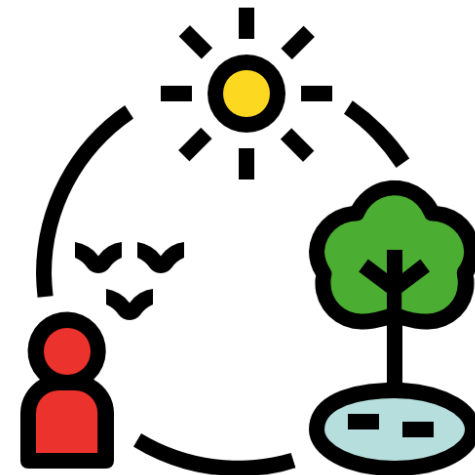
- Total Economic Value = Use Value + Non-use Value

Use value

- benefit derived from use of environmental good or service
- uses can be **direct**, **indirect**, or **optional**

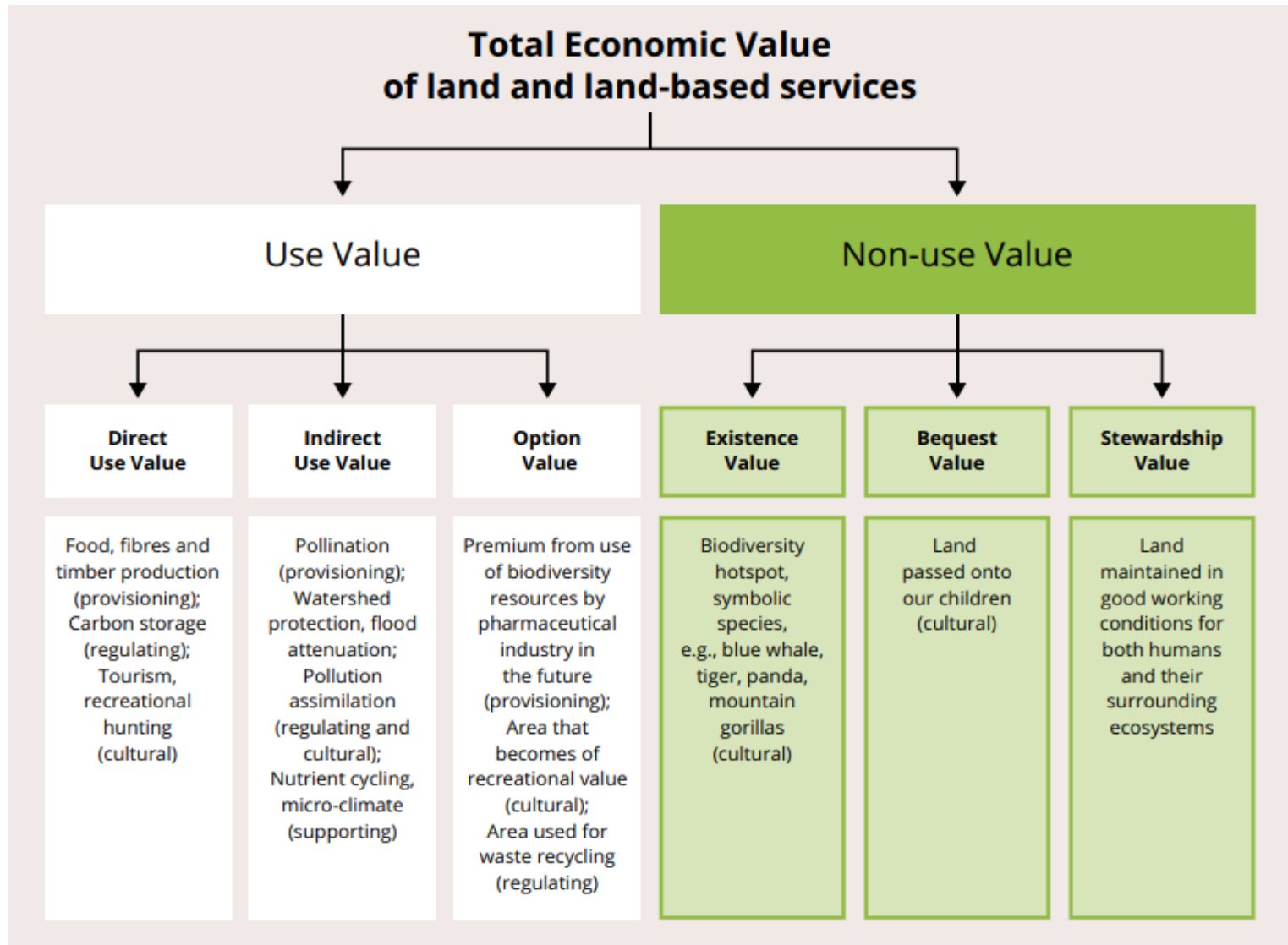
Non-use value

- values allocated by society to goods and services but do not stem from the use of these goods and services
- **existence value** (existence of environmental good or service), **bequest value** (environmental state passed onto next generation), **stewardship value** (maintenance of a healthy environment for all living organisms)



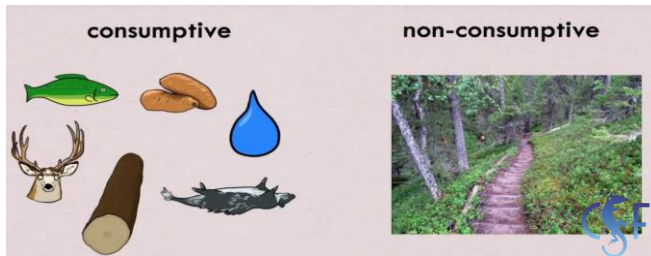
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Total Economic Value (TEV) Concept

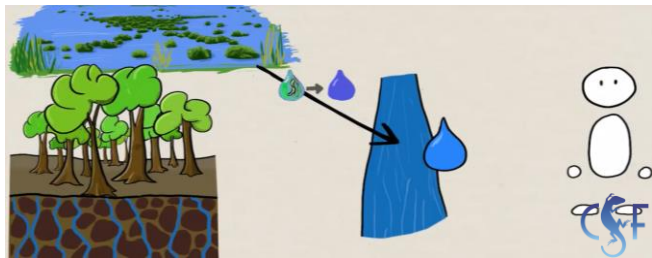


Total Economic Value (TEV) Concept - examples

Direct Use Value: e.g. wood, water, hunting animals; recreational use of forest



Indirect Use Value: e.g. water filtration and carbon sequestration in soils, pollination



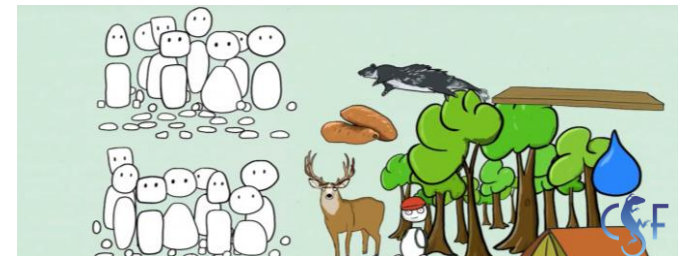
Option Value: option of being able to use e.g. a forest for hiking or fishing



Existence Value: knowing that e.g. rainforests, whales or Grand Canyon exist



Bequest Value: environmental state (e.g. forest) passed on to next generation



Stewardship Value: maintenance of a healthy environment for all living organisms



Total Economic Value (TEV) Concept – economic value types

Economic value types typically estimated for ecosystem services

(from ELD Initiative, 2013⁴, originally adapted from Quillérou & Thomas, 2012²³)

| | | Provisioning services | Regulating services | Cultural services | Supporting services |
|---------------|--------------|-----------------------|---------------------|-------------------|---------------------|
| Use value | Direct use | ✓ | ✓ | ✓ | |
| | Indirect use | | ✓ | ✓ | ✓ |
| | Option | ✓ | ✓ | ✓ | |
| Non-use value | Existence | | | ✓ | |
| | Bequest | | | | |
| | Stewardship | | | | |

Appropriate methods according to TEV

Three types of valuation methods exist:

1. Non demand-based methods
2. Demand-based revealed preference methods
3. Demand-based stated preference methods

1. Non demand-based methods

- **do not involve** the estimation of a **demand curve** (i.e., a graph that shows the relationship between the price of a service and the quantity of the service demanded for each service)
- consist in estimating the costs incurred from an increase (decrease) in environmental quality
- What is measured here is the **change in welfare associated with the change in the cost of provision**. These methods can be very useful for policy decisions in practice as cost data is often available, but they ignore the demand-side

Appropriate methods according to TEV

Demand-based methods are based on the **estimation of the demand curve**

You can find more details on demand curves in the script!

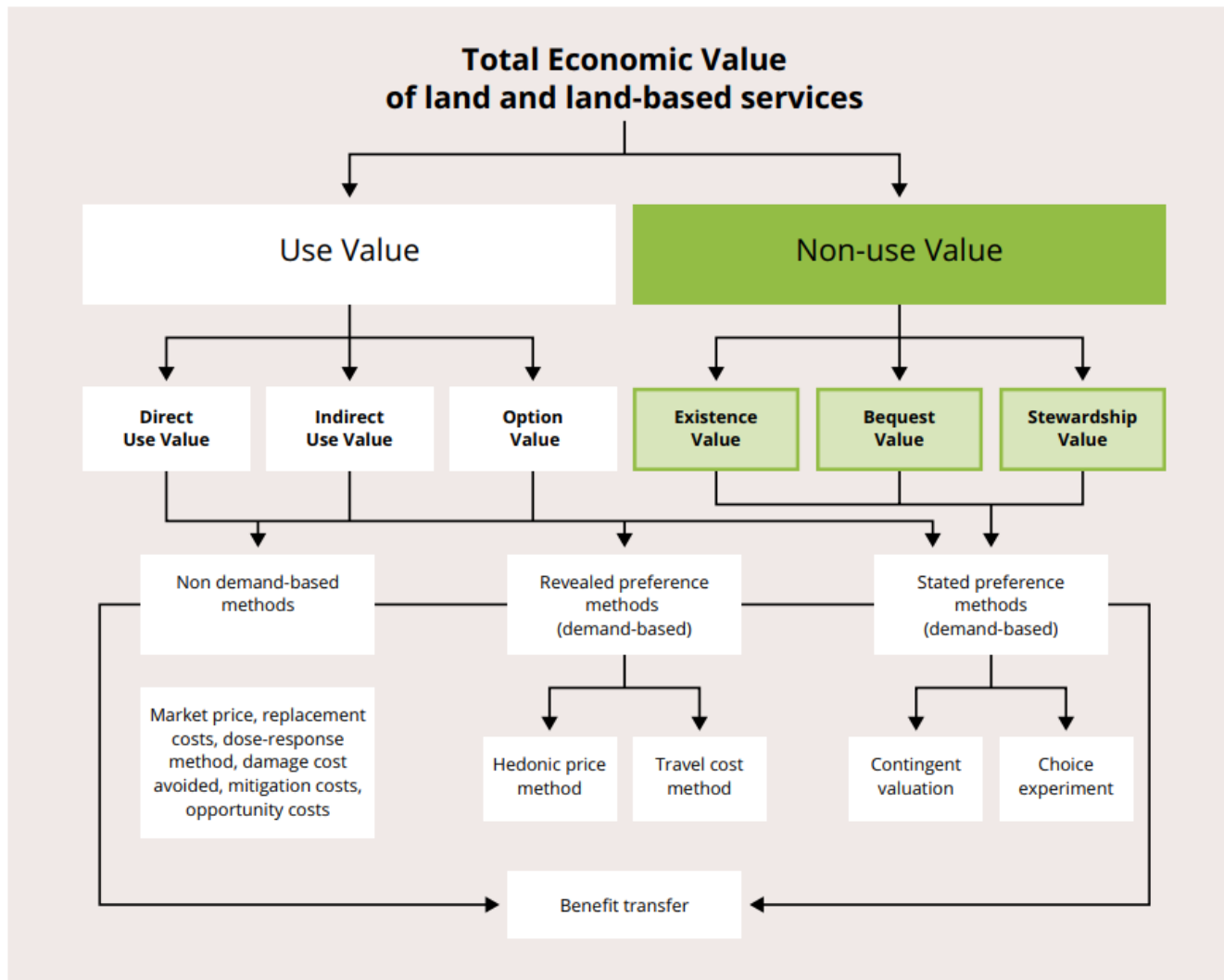
2. Demand-based revealed preference methods

- Revealed preference methods rely on actual behavior in existing markets
- Examples are the **hedonic price** and the **travel cost method**

3. Demand-based stated preference methods

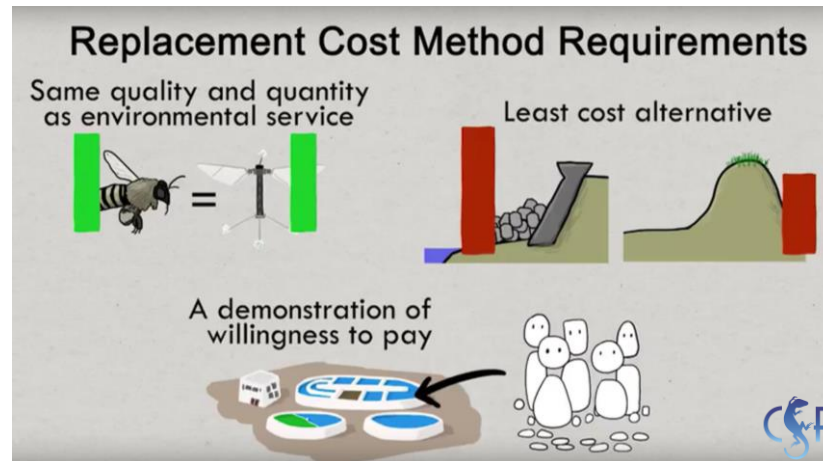
- Stated preference methods estimate the value of services not usually purchased and sold in actual markets
- Examples are **contingent valuation** (“willingness to pay/accept”) and **choice experiment**

Appropriate methods according to TEV



Non demand-based methods

- **Market price method:** estimates the economic value of ecosystem products or services that are bought and sold in commercial markets. The market price method can be used to value changes in either the quantity or quality of a good or service
- **Replacement cost method:** the value of an environmental services is measured by how much it would cost to replace it with man-made systems; e.g., nutrient cycling waste treatment can be replaced with costly treatment systems



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Non demand-based methods

- **Damage-cost avoided:** estimates the value of ecosystem services based on the costs of avoiding damages due to lost services
- **Dose-response methods (also called change in productivity approach)** consider the environment as a factor of production and measure for instance forgone profits due to decreased production (as cost of a decrease of an environmental service)



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How much does it cost to restore this piece of land?

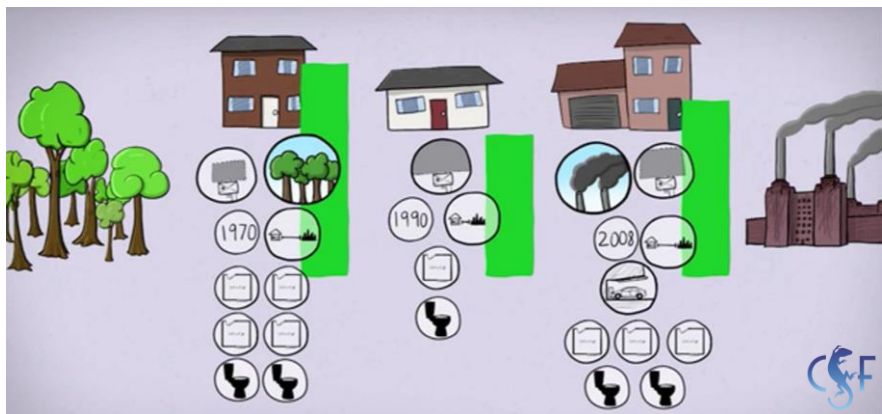


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How much did the productivity increase/decrease because of a change in the environment?

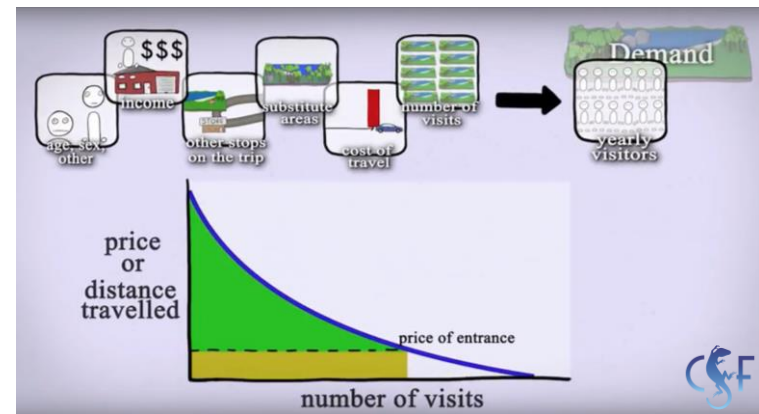
Demand-based methods – revealed preferences

- **Hedonic Pricing:** service demand may be reflected in the prices people will pay for associated goods: e.g., housing prices are higher aside of parks / where the environment is healthy
- **Travel Cost:** service demand may require travel, whose costs can reflect the implied values of the service; e.g., recreation areas attract distant visitors whose value placed on that area must be at least what they were willing to pay to travel to it



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How much does the environment influence the price of a house?

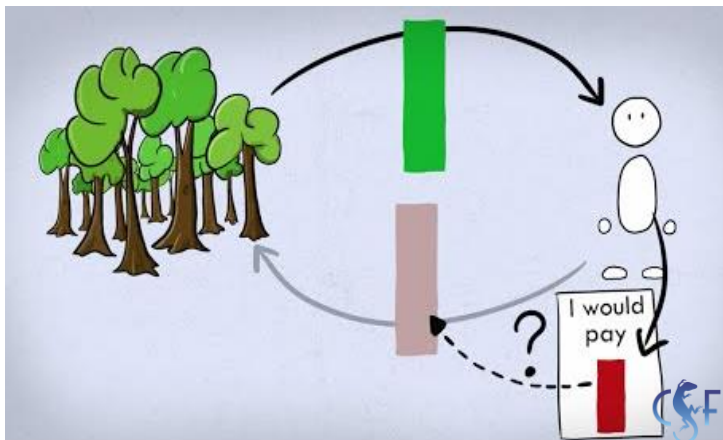


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How much do travellers spend for visiting a site?

Demand-based methods – stated preferences

- Contingent Valuation:** service demand may be elicited by posing hypothetical scenarios that involve some valuation of alternatives; e.g., people be willing to pay for increased forest preservation
- Choice Experiment:** also called choice modelling or conjoint analysis, makes respondents explicitly choose between alternative scenarios. These scenarios include levels of environmental or non-environmental attributes and a level of payment which varies between scenarios



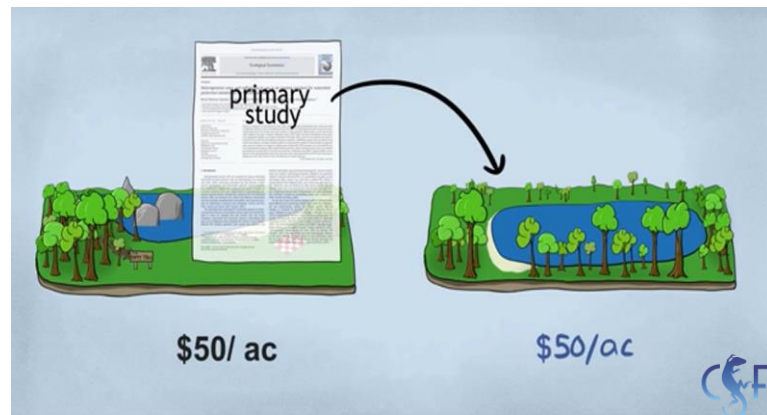
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| Choice set 13 | STATUS QUO | Future Alternative 1 | Future Alternative 2 |
|--|--|--|--|
| Windbreaks | 20% windbreaks  | No windbreaks left  | 20% windbreaks  |
| Crop residue management | Fire allowed  | Fire allowed  | Fire banned  |
| Land registration fee <small>Relative to what you pay today</small> | 87 Lari/ha 0 Lari/ha | 80 Lari/ha -7 Lari/ha | 110 Lari/ha +22 Lari/ha |
| Your choice | | | |

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Benefit transfer

- Offers a cheap alternative to other valuation methods by reusing already available information
- Consists of transferring economic values from one case study with a known non-market economic value to a similar site to be valued in economic terms
- The study should have valued the same goods and services within a similar geographical setting.



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Valuating the different types of ecosystem services

Valuation methods for the different types of ecosystem services

(from Farber et al., 2006)

| Ecosystem service | Amenability to economic valuation | Most appropriate method for valuation | Transferability across sites |
|------------------------|-----------------------------------|--|------------------------------|
| Gas regulation | Medium | Contingent valuation, avoided cost, replacement cost | High |
| Climate regulation | Low | Contingent valuation | High |
| Disturbance regulation | High | Avoided cost | Medium |
| Biological regulation | Medium | Avoided cost, production approach | High |
| Water regulation | High | Avoided cost, replacement cost, hedonic pricing, production approach, contingent valuation | Medium |
| Soil retention | Medium | Avoided cost, replacement cost, hedonic pricing | Medium |
| Waste regulation | High | Replacement cost, avoided cost, contingent valuation | Medium to high |
| Nutrient regulation | Medium | Avoided cost, contingent valuation | Medium |
| Water supply | High | Avoided cost, replacement cost, market pricing, travel cost | Medium |
| Food | High | Market pricing, production approach | High |
| Raw materials | High | Market pricing, production approach | High |
| Genetic resources | High | Market pricing, avoided cost | Low |
| Medicinal resources | High | Avoided cost, replacement cost, production approach | High |
| Ornamental resources | High | Avoided cost, replacement cost, hedonic pricing | Medium |
| Recreation | High | Travel cost, contingent valuation, ranking | Low |
| Aesthetics | High | Hedonic pricing, contingent valuation, travel cost, ranking | Low |
| Science and education | Low | Ranking | High |
| Spiritual and historic | Low | Contingent valuation, ranking | Low |

Valuating the different types of ecosystem services

- **Examples for each of the valuation methods and case studies** in which these are applied can be found in the **script** of this module and in the publications section of the **ELD Initiative's website**

www.eld-initiative.org

- You can also watch the video series of the Conservation Strategy Fund on valuation of ES!

https://www.conservation-strategy.org/en/csf-econ-video-lessons?term_node_tid_depth=380

<https://www.youtube.com/user/numbers4nature>



Study design, sampling and survey instruments

- You find a checklist of characteristics in order to choose the most appropriate method for you case in the **script of this module**
- Avoid double counting by not aggregating competing ES or by counting intermediate and final ES!

Before doing your research ask yourself again:

- **What** do I want to know?
- **Why** do I want to know this?
- **Who** am I going to ask?
- **How** do I go about to get my results?



Study design, sampling and survey method

Sampling plan

- The sample of participants should be representative for the whole population / all stakeholder groups need to be considered
- Variables on the participants side (income, age, level of education) should be considered
- Every member of the stakeholder population should have (in theory) the same chance of being picked for the survey (random selection)
 - ‘convenience sampling’ with interviews or surveys;
 - randomly draw names from a list with all potential stakeholders (e.g. phonebook)



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Study design, sampling plan and survey methods

Survey instruments - consider including either **questionnaires** or **face-to-face interviews** into your survey design!

- **Face-to-face interviews** often ensure a **higher level of responses** and help better assess the respondent's understanding and commitment to the problem of interest
- **Questionnaires** are often more **time and cost-efficient** since multiple participants can partake in a survey simultaneously or they can even be filled out online, but questionnaires facilitate collection of numbers for quantitative analysis



Be aware of critique regarding economic valuation!

- Non-use values are **not always easily materialised** in actual financial capital
- **Potential biases exist** in the assessment of economic values (e.g., estimates of the willingness to pay)
 - overly high expectations over future financial gains
 - loss of stakeholder motivation when promised/expected gains do not materialise
 - unable to fully capture the shared and cultural dimensions of sustainable land management
- The TEV concept:
 - is not as easy to apply in practice!
 - the difference between the types of values often “fuzzier” in real life

Further reflections on each appropriate method according to the TEV can be found in the script for this module!

Further information and reading:

Script for this module

Further resources

- <http://ecosystemvaluation.org/>

- Ecosystem valuation: Some principles and a partial application

<https://www.econstor.eu/obitstream/10419/48823/1/621201006.pdf>

- ELD Initiative. (2015). *The Value of Land: Prosperous lands and positive rewards through sustainable land management*. Available from www.eld-initiative.org
- TEEB Synthesis Report on the economic contribution of biodiversity and ecosystem services to human well-being

<http://www.teebweb.org/our-publications/teeb-study-reports/synthesis-report/>

Videos

Conservation Strategy Fund – Videos on Valuation of ES:

<https://www.conservation-strategy.org/en/csf-econ-video-lessons>

If you have questions, please contact us:
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You can find further information on our
website:
www.eld-initiative.org

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