

Value transfer method

Introduction

Benefits transfer (BT), or more generally - value transfer (VT) - refers to applying quantitative estimates of ecosystem service values from existing studies to another context. Value estimates from one 'study site' can be applied with adjustments to a 'policy site' where time or resource constraints preclude the possibility of doing a primary valuation study at that site. In the VT literature values have generally been understood to be monetary estimates of benefits or costs (Johnston et al., 2015). Often VT is used for screening in a benefit-cost analysis of project or policy alternatives. Value transfer is not one specific method, but a continuum of the following approaches depending on the information available:

- **Unit value transfer:** Value estimates are assumed to be correct 'on average' and transferred without any form of adjustment.
- **Adjusted unit value transfer:** Value estimates are transferred with simple adjustments typically for study and policy site differences in income and purchasing power.
- **Value function transfer:** Significant predictors at the study site of willingness-to-pay typically (from contingent valuation or choice experiment studies), are identified at the policy site. The average value of predictors at the 'policy site' are then 'plugged into' the 'study site' value-function to derive an adjusted WTP figure for the policy site.
- **Meta-analytic function transfer:** Similar to value function transfer, but the value function is generated from a meta-analysis of many valuation study sites instead of a single study site. The method assumes that there is a meta-value function (i.e. similar preferences) that apply across all the study sites.

Although 'value transfer' is generally reserved for monetary estimates, there is nothing in principle against transferring non-monetary estimates of the benefits of ES, such as the ranking of ecosystem services, from a study site to a policy site.

Keywords

Benefits transfer; Value transfer; Screening; Benefit-cost analysis; Uncertainty; Study site; Policy site.

Why would I chose this approach?

Value transfer is necessary when a decision context calls for monetary estimation of ecosystem services, but time and resources are insufficient to carry out a primary study on-site. VT can be applied to all types of ecosystem services, as long as monetary valuation is considered a valid basis for decision-making. If you believe that people hold pre-formed preferences for spending on the environment, and these preferences are quite stable across decision-context – you are likely to be more inclined to accept VT.

What are the main advantages of the approach?

Methodological advantages

- Ease of use, available valuation databases;
- Draws on existing data;

- Low cost.

Governance advantages

- Speed of use.

What are the constraints/limitations of the approach?**Methodological constraints**

- Potential ease of misuse;
- Transfer errors cannot be predicted (but can be inferred from similar cases);
- Not participatory;
- Uncertainty of transferred assessment often not assessed (see table A1 appendix);
- existing valuation studies often do not provide site context
- 'Context free' average values rather than context specific marginal values often employed.

Constraints in governance

- Decision-makers will often not know their own requirements for statistical reliability of valuation estimates;
- Insufficient benchmarking of cost uncertainty (as a basis for assessing acceptability of benefit uncertainty);
- Lacking credibility when on-site information is not used.

What types of value can the approach help me understand?

Monetary valuation methods have been applied to ecosystem services with many types of values. Value transfer applies to monetary valuation methods in general, across value types. The distinguishing feature is not the value type, but the reliability and accuracy requirements of the decision-context. Value transfer is inappropriate in cases where monetary value estimates are deemed unacceptable by constituencies and their representatives. Suitability will therefore vary from constituency/context to context.

How does the approach address uncertainty?

Are value transfer errors expected to be 'too large' relative to reliability required by the decision-maker? A benchmark is the level of confidence with which decision-makers require uncertain benefits to exceed uncertain costs of the policy/project. This will depend on the importance of the decision. For example, a routine decision with little conflict potential may be made if expected net benefits are positive with 90% confidence, while a conflictive decision may require expected benefits to exceed costs by several multiples in order to convince political opposition. VT can in principle be applied to any decision context (Figure 1), but the more a context requires reliable and accurate monetary valuation estimates, the less likely value transfer will serve the context purpose.

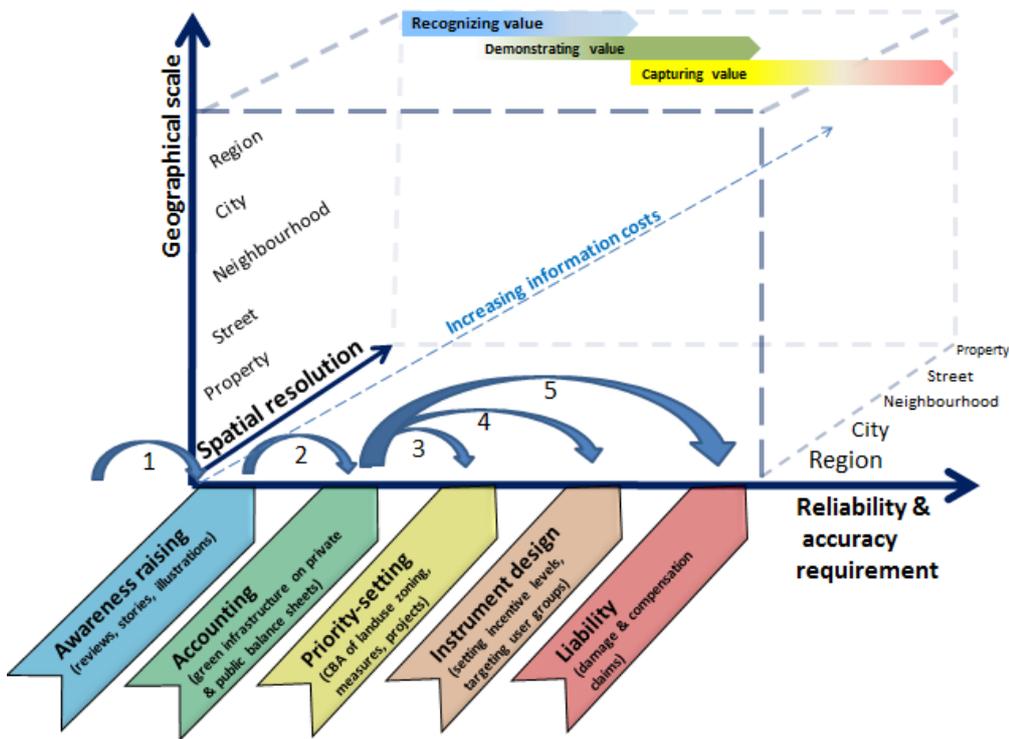


Figure 1. Value transfer is a stepwise updating of values for different contexts. Value transfer might start with the purpose of simple awareness-raising (1) and then get updated with new studies on-site information for more demanding decision contexts (2-5). Source: adapted from Gómez-Baggethun and Barton (2013)

Monetary value transfer is well known for its use in public *awareness raising* about the total economic value of natural capital, e.g. Braat and ten Brink (2008). In experimental ecosystem *accounting* (Obst et al., 2015), where monetary estimates must be applied across a landscape, some form of spatial extrapolation is needed - value transfer is also used here. As we move to *priority-setting* using benefit-cost analysis of projects in specific locations, requirements for on-site studies are likely to increase. Using valuation for setting incentive levels for specific stakeholders in policy instrument design, has even higher reliability requirements. Finally, liability for natural resource damage that occurred at a specific time and place, may be the most demanding and therefore the least appropriate context for value transfer. Because information costs increase with spatial resolution (figure 1), value transfer for awareness raising (1) or accounting (2) can be updated with progressively more site-specific information as the needs of decision-contexts require. For example, value function and meta-analytic function transfer include data on policy site characteristics such as demographics, accessibility and size of area which can be used to adjust original estimates.

All valuation of ecosystem services has at least some element of value transfer when estimates are applied to specific decision contexts (because each decision context is unique and therefore not identical to the decision context in which the ecosystem service values were generated in the original study).

How do I apply the approach?

The flowchart below provides a short description of the generic steps used in spatially explicit value transfer. Value transfer is embedded in decision analysis. A more detailed decision-tree for using VT for screening in benefit-cost analysis can be found in Table 1.

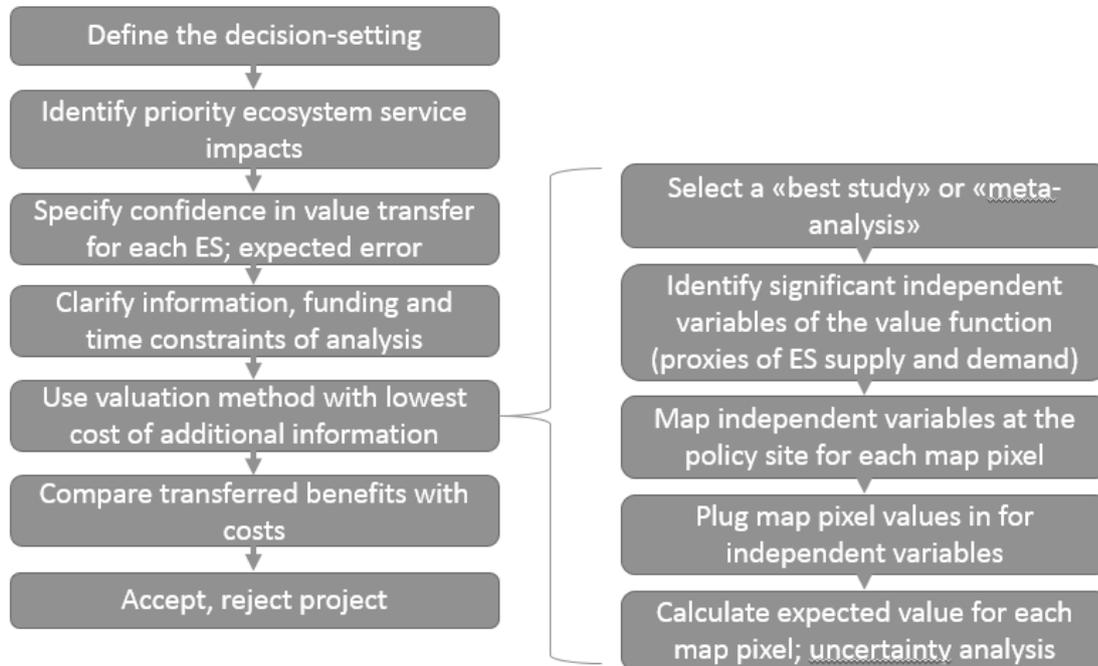


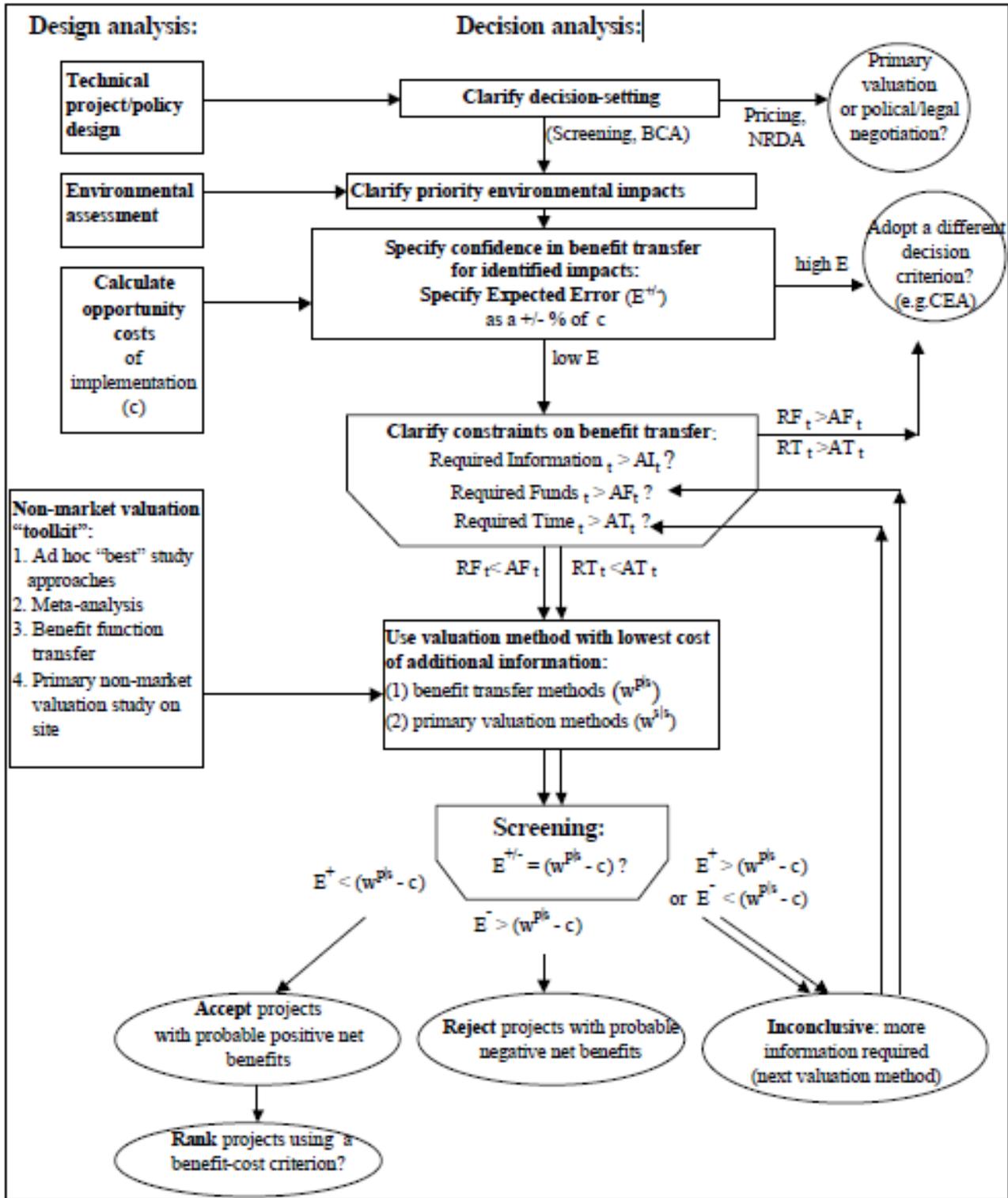
Figure 2. Stepwise process of value transfer

Some basic knowledge of potential errors is useful when reviewing value transfer studies. Awareness of the reliability of value transfer will make it clearer whether transferred values can be used for more demanding contexts such as priority-setting. Decision-makers can go through a check-list when assessing valuation results they have commissioned (Table 1, Figure 3).

Table 1. Value transfer checklist

Issue	Explanation
1. Marginal vs. average values?	If the purpose of the valuation is to inform a policy decision affecting a particular area the study should be sensitive to changing marginal values across the landscape. For simple informative uses such as awareness raising or natural capital accounting average values may be adequate.
2. Substitutes or complements?	Has the study considered the landscape configuration of green infrastructure and whether particular sites are substitutes or complements for one another in terms of ecosystem services delivery?
3. Aggregation, distance decay?	Does the value transfer make any particular assumptions about accessibility and potential user populations which may change across sites?
4. Distributional impacts and selection bias?	Is it important how costs and benefits are distributed spatially, for example because there are different socio-economic constituencies in the study area? Spatially differentiated transfers are necessary. Check that population characteristics in the original study site cover the range of characteristics at the policy site.
5. Equivalence of positive and negative impacts?	Is the value estimate at the study site generated for the same kind of environmental change as at the policy site? Research has shown that willingness-to-pay for an improvement in ecosystem services, can differ from WTP to avoid a loss, which in turn can be different from willingness-to-accept (WTA) compensation for a loss, or WTA compensation for not obtaining an improvement.
6. Reference levels and perceived rights?	In addition to the +/- direction of the impact on ES, the perception of rights to a reference level of ES determine values. The difference in WTP and WTA is in part explained by differences in the perception of rights to a particular reference level of ecosystem services. If the perception of environmental rights varies between the study and policy site there is further bias.
7. Adaptive behaviour?	If populations at a study and policy site adapt differently to an impact on ecosystem services, valuation can be expected to differ as well. Adaptive behaviour may mitigate realised impact. This also produces a difference between ex ante valuation estimates and actual change in welfare which is a common challenge in all economic benefit-cost analysis.
8. Compatible end-points?	Is the economic valuation estimate expressed in similar units to biophysical models quantifying the 'end-point' impact. This concerns the extent to which models in the ecosystem service cascade or cause-effect chain are well integrated. Making model end-points compatible often involves expert judgement and introduces uncertainty in the integrated valuation estimate.
9. Ad hoc variables?	More generally are variables in a meta-analysis function or value function theoretical justified or do they appear ad hoc?
10. Documentation of uncertainty?	If the original valuation studies document statistical accuracy and model reliability using sensitivity analysis, more rational decision-making approaches can be taken as illustrated in Figure 13 above.

Source: based on Barton (1999)



Note: total policy costs are expressed as a positive number ($c > 0$). In this Figure w^{pls} is the individual benefit estimate using any one or a combination of the methods in the non-market valuation "toolkit".

Figure 3. Detailed decision-tree for value transfer (Source: Barton 1999)

BCA: benefit-cost analysis, CEA: cost-effectiveness analysis, NRDA: natural resource damage assessment, AF/RF: available/required funds, AI/RI: available/required information, AT/RT: available/required time; w^{pls} : value estimate using policy site characteristics conditional study site parameters.

Requirements

Requirements		Comments
Data collection requirement	X Data is available X Need to collect some new data (e.g. participatory valuation) <ul style="list-style-type: none"> <input type="checkbox"/> Need to collect lots of new data (e.g. valuation based on surveys) 	Unit value transfer Value function transfer
Type of data required	X Quantitative <ul style="list-style-type: none"> <input type="checkbox"/> Qualitative 	Monetary
Expertise and production of knowledge needed	X Working with researchers within your own field <ul style="list-style-type: none"> <input type="checkbox"/> Working with researchers from other fields <input type="checkbox"/> Working of non-academic stakeholders 	"Quick, cheap and dirty" approach with minimal requirement for cross-disciplinary. GIS for policy site characteristics if value function transfer
Software requirements	X Freely available <ul style="list-style-type: none"> <input type="checkbox"/> License required <input type="checkbox"/> Advanced software knowledge required 	Spreadsheet
Time requirements	X Short-term (less than 1 year) <ul style="list-style-type: none"> <input type="checkbox"/> Medium-term (1-2 years) <input type="checkbox"/> Long-term (more than 2 years) 	Weeks
Economic resources	X Low-demanding (less than 6 PMs) <ul style="list-style-type: none"> <input type="checkbox"/> Medium-demanding (6-12 PMs) <input type="checkbox"/> High-demanding (more than 12 PMs) 	Weeks
Other requirements		

Where do I go for more information?

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