

## Time use studies

### Introduction

Time use study is an innovation of the conventional stated preference techniques taken from the contingent valuation approach. In this case, the payment vehicle is expressed in labour hours rather than monetary units (as used in the classical willingness to pay studies) (Kenter et al. 2011). Willingness to give up time (WTT) creates a hypothetical scenario using surveys to estimate the value of ecosystem services by directly asking people how much time they would be willing to invest for a change in the quantity or quality of a given ecosystem service or conservation (or restoration) plan. Besides being an appropriate approach in scenarios where people can invest time for particular activities related to nature; this approach is also useful in areas with income constraints where money is basically used for essential goods (Higuera et al. 2012). It also avoids issues resulting from the assignation of monetary value to ecosystem service properties that cannot be monetarily measured (García-Llorente et al. 2011).

### Keywords

Income constraints; Rural areas; Social preferences; Social Value, Willingness to give up time

### Why would I chose this approach?

The general purpose of time use studies is to capture the willingness to give up time (WTT) per individual to different ecosystem services. This technique is able to estimate the value of multiple ecosystem services (provisioning, regulating and cultural) through depicting scenarios which entail their restoration, management or conservation. It is also able to capture the social factors that determine social preferences.

In general, the main outputs obtained from its application are:

1. The WTT per ecosystem service to understand social demands and priorities for services conservation.
2. The socio-cultural factors or motivations influencing individual decisions around being willing to give up time.
3. A new indicator to measure social support towards conservation.
4. The economic value of ecosystem services though the translation of willingness to give up time into monetary units, multiplying stated WTT (in hours/month) by net income per month (Euros/month) expressed by each individual during the questionnaire (these values can even be aggregated).

These methods have been applied to a range of decision contexts, including: awareness raising and priority setting. It has been applied at county scales at the level of individuals, however the relevant spatial resolution is primarily determined by the specific service measured.

### What are the main advantages of the approach?



- Useful in contexts where severe income constraints makes WTP studies inappropriate (Higuera et al., 2012; Kenter et al., 2011);
- Avoids incommensurability issues resulted from the assignment of monetary value to service properties that cannot be monetarily measured (e.g. García-Llorente et al., 2011);
- Can be used to assess a range of ecosystem services at the same time, and to estimate the importance people attach to biodiversity in general (García-Llorente et al., 2016);
- When activities are well-defined, respondents do not need to have a fairly good understanding of the delivery of ecosystem services because this link can be done at a later time by researchers;
- WTT can be understood as a holistic indicator of human time-sharing initiatives in nature and, thereby, it is able to raise awareness about our ability to harmonize our lifestyles with the rhythms of nature (García-Llorente et al. 2016);
- Beyond the estimation of the value of ecosystem services through the WTT; its development can engage stakeholders with environmental activities, increase collaboration, social learning and knowledge co-generation (Higuera et al. 2012; García-Llorente et al. 2016).

### What are the constraints/limitations of the approach?

- WTT is unsuitable for application to cases in which the respondents have little time availability;
- Modeling WTT processes requires the inclusion of time available as an explanatory variable. Therefore, a daily time analysis should be included in the questionnaire, which is however time consuming and often tiring for respondents;
- Classical methodological biases from conventional stated preference methods can occur;
- It is important to provide a clear description of the activities (and how they relate to ecosystem services) in which time could be invested in the hypothetical scenario. If not, the activities might be selected because of respondents' preconceived ideas or because of the physical effort required for performing them.

### What types of value can the approach help me understand?

This method is suitable for uncovering and estimating socio-cultural values in quantitative terms. It is also useful for estimating the instrumental values of nature's benefits and how people might relate to nature through developing different activities (i.e. relational values). It can be also suitable for estimating use and non-use values of nature and ecosystem services.

### How does the approach address uncertainty?

The method aims at obtaining a representative sample of the population potentially affected. It generates a probability distribution of willingness-to-give up time for the population, which can be used to calculate confidence intervals. Multi-variate statistical methods can be used, which makes it possible to test whether variables explaining willingness-to-give up time are statistically significant.

## How do I apply the approach?

The method requires 6 basic steps as indicated in Figure 1: (1) to target the ecosystem services in the valuation exercise, (2) to select the specific methodologies which can be adopted within the approach, e.g. restoration initiatives or conservation activities related with ecosystem services, (3) to identify the targeted population, (4) to design the questionnaire, (5) to conduct the survey, and (6) to analyze the WTT metric through econometric analyses.

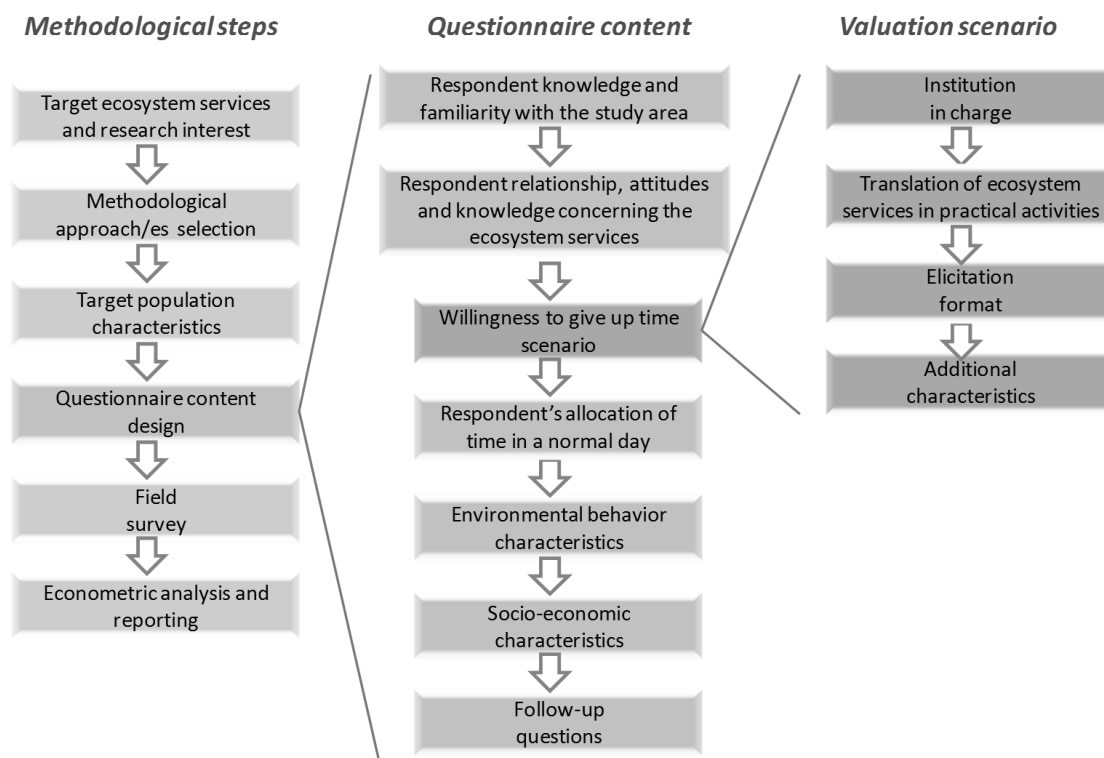


Figure 1. The basic steps to be employed in Time use studies.

## Requirements

Requirements		Comments
<b>Data</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Data is available</li> <li><input type="checkbox"/> Need to collect some new data (e.g. participatory valuation)</li> <li><input type="checkbox"/> <b>Need to collect lots of new data (e.g. valuation based on surveys)</b></li> </ul>	
<b>Type of data</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> <b>Quantitative</b></li> <li><input type="checkbox"/> Qualitative</li> </ul>	
<b>Expertise and production of knowledge</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> <b>Working with researchers within your own field</b></li> <li><input type="checkbox"/> Working with researchers from other fields</li> <li><input type="checkbox"/> <b>Working with non-academic stakeholders</b></li> </ul>	
<b>Software</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> <b>Freely available</b></li> <li><input type="checkbox"/> <b>License required</b></li> <li><input type="checkbox"/> <b>Advanced software knowledge required</b></li> </ul>	The software requirement will depend on the case and the scientists' skills.
<b>Time resources</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Short-term (less than 1 year)</li> <li><input type="checkbox"/> <b>Medium-term (1-2 years)</b></li> </ul>	

	<input type="checkbox"/> Long-term (more than 2 years)	
<b>Economic resources</b>	<input type="checkbox"/> Low-demanding (less than 6 PMs) <input type="checkbox"/> <b>Medium-demanding (6-12 PMs)</b> <input type="checkbox"/> High-demanding (more than 12 PMs)	
<b>Other requirements</b>	Statistical knowledge and econometric modelling skills could be needed	

## Where do I go for more information?

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