

## Selecting the economic valuation method

Estimating the value of the various services and benefits that ecosystems generate may be done with a variety of valuation approaches and methods. This diversity is an inevitable consequence of the diversity of FES and the conditions under which they are provided as well as different types of valuation questions addressed. Some of the valuation techniques are broadly applicable, some are applicable to specific cases, and some are tailored to particular data sources.

While market price methods as well as revealed and stated preference methods are theory-driven and consistent with economic welfare theory, cost-based approaches rely on empirical and pragmatic considerations.

Several issues should be considered when selecting valuation methods to be applied. The general recommendation is, first, that it must fit to the given valuation problem (e.g. services to be valued, valuation context and geographical scope); and second, that it should be manageable with available resources (in terms of data, time, analysis skills, and other requirements). However, the final selection of a valuation method is also determined by a number of other factors and conditions and should be consulted with experienced economists.

A point that should be discussed is the reliability of valuation methods and sometimes high uncertainty implicit in the results of these methods. There could be the case that different valuation methods provide divergent results. It is, hence, difficult to compare results which are produced by different methods.

The challenge is also appropriate application of valuation methods to particular ecosystem services. Different ecosystem services require different valuation methods. Provisioning services usually produce goods that are physically tradable, such as timber, therefore the market based methods are most appropriate to measure their values. Examples of market based methods are the use of direct market prices, production function methods, calculation of replacement costs, defensive expenditures etc.

As many ecosystem services (e.g. regulating services) are not usually traded in markets and their values are not indicated by market prices, it is necessary to assess the relative economic worth of these services using non-market valuation techniques.

The values of cultural ecosystem services only emerge through their (subjective) effect on the wellbeing of people, such as through the perceived value of recreation, and are best measured with revealed and stated preference methods.

Economic valuation of forest ecosystem services usually relies on the notion of consumers' willingness to pay. Some of the respective methods rely on the revealed behaviour of the users for these services (i.e. revealed preference approaches), while others use surveys and directly ask users about their willingness to pay for certain services (i.e. stated preference approaches).

The advantage of revealed preference approach is that they are based on actually observed behaviour. The value of forest services in question can be either derived directly (e.g. from market prices) or indirectly from surrogate markets that have a relationship with the forest service of interest. However, the applicability of these methods is limited only to a few forest ecosystem services (e.g. recreation, tourism and amenities). The most used revealed preference method is the hedonic pricing method and the travel cost method.

Stated preference methods are based on hypothetical rather than actual behaviour data. The value of a forest service is derived from people's responses to questions/choices describing hypothetical markets or situations. The methods in this group can be applied to all types of forest ecosystem services and allow to estimate both use and non-use values. However, their main disadvantages are that they are based on hypothetical situations (no real market transaction is performed and the received answer might not reflect the real situation). Methods can be limited by the ability of respondents to understand the nature of the service. Respondents in a valuation exercise may well not appreciate the impact that an ecosystem service might have on their wellbeing. As it is well known in the valuation literature, large

impacts can result from the hypothetical nature of valuation questions as respondents may overestimate what they would be prepared to pay where they do not actually have to make a payment. The most used stated preference methods include the contingent valuation method and choice modelling techniques.