EVTool

To widen the application of environmental economics methodologies, the systematized economic valuation tool (EVTool) was developed within MARBEFES. EVTool is not a valuation method, but a simplified instrument that allows us to obtain an estimation of the value of ecosystem services adapted to the available information.

The tool estimates the economic value of key ecosystem services within three categories: provisioning (wild fish), regulating and maintenance (global climate regulation), and cultural (recreation and visual amenity). For all cases, the tool provides three tiers of precision for estimating the economic value of ecosystem services, depending on the quality of available data: 'cutting-edge' estimates, which require detailed, location-specific data; 'advanced' estimates, which are based either on detailed data from a different location (advanced-detailed, not local) or on general data from the same location (advanced-local, not detailed); and 'entry-level' estimates, which rely on general data from a different location.

As such, in the cases of 'advanced' and 'entry-level' estimates, EVTool could be classified as a simplified way of applying a Benefit Transfer technique (see Section 4.2.3). See also Box below for an application example.

Provisioning Services – Wild Fish

For provisioning services, the EVTool valuation approach employs the residual value method, which estimates the net economic value by subtracting fishing-related costs from the revenues generated through the first sale of catches. Accurate and reliable data on both revenues and costs are essential, as their quality directly influences the robustness and precision of the valuation results.

At the 'cutting-edge' information tier, the method requires annual landing data (kg) and unit prices (€/kg) for each commercial fish species caught at every port, which are combined to calculate revenue by taxon and port and then summed to determine total fishing revenue. For the cost estimation, vessels are grouped by gear type — each linked to specific taxa — and for each category, average costs (fuel, operations, repairs, labor, depreciation, and interest) are calculated, and then aggregated across the fleet to yield total fishing costs.

Within the 'advanced' estimates category, we find two further sub-divisions. At the 'advanced-detailed' (non-local) information tier, revenue and cost estimation methods follow the same approach as the cutting-edge tier, but the available data are from a different location, requiring the use of a transfer function or adjustment factors. The 'advanced-local' (non-detailed) tier is applied when detailed data by taxon and port are unavailable and, the average revenue from first sales at ports, as well as the average cost per ton of catch, are used directly.

The 'entry-level' information tier applies when neither detailed nor local data are available, requiring value estimates to be transferred from other case studies using appropriate adjustment factors.

Regulating and Maintenance Services – Climate Regulation

Following SEEA-EA conception, EVTool considers both carbon retention (carbon stock, or storage) and carbon sequestration (increase in the carbon stock) in the measurement of global climate regulation services, valued by market price.

At the 'Cutting-edge' information tier, the valuation process involves several key steps. First, the specific ecosystems capable of carbon sequestration and retention are identified. Next, data must be collected on the area occupied by each ecosystem (unit of measure can be ha or km^2), the amount of CO_2 annually sequestered per hectare, and the total amount of CO_2 retained per hectare, all measured in tons of CO_2 equivalent. This information is then used to calculate both CO_2 annual sequestration and CO_2 retained and by multiplying the per-hectare figures by the number of hectares each ecosystem occupies. Subsequently, the total CO_2 quantities are multiplied by the prevailing market price per ton of CO_2 equivalent (it could be ETS market price for the EU, according to SEEA-EA guidelines) to determine the economic value of the ecosystem service benefit of carbon sequestration and retention associated with each ecosystem. Finally, the individual values are summed up to yield the total economic value of global climate regulation services (carbon sequestration and retention).

Within the 'advanced' estimates category, we find two further sub-divisions. At the 'advanced-detailed' information tier, the valuation method mirrors the approach used at the 'cutting-edge' tier, using data for the same sort of ecosystems but from a different location. In contrast, the 'advanced-local' tier is used when the ecosystems in the area have not been mapped but there is enough information on local parameters to estimate CO_2 sequestration or retention figures. In both cases, the application of a transfer function or adjustment factors is needed to account for differences.

The 'entry-level' information tier applies when neither local nor detailed data are available, requiring value estimates to be transferred from other case studies all together, using appropriate adjustment factors.

Cultural Services – Recreation and Visual Amenity

In valuing cultural ecosystem services, tourists and residents are considered separately, drawing on travel cost data obtained through direct surveys for the former (see Section 4.2.1.1), and hedonic pricing techniques for the latter (see Section 4.2.1.2).

To estimate the economic value of a specific area to tourists, at the 'cutting-edge' information tier, using travel cost data, the process begins by calculating total expenditures on activities directly tied to environmental enjoyment, such as entry fees to natural sites. This is followed by incorporating additional travel-related expenses, including accommodation and transportation. These broader expenses require careful adjustment, as they may be only partially attributable to nature-based activities, with the remainder linked to cultural or recreational experiences unrelated to the natural environment.

At the 'advanced-detailed' information tier, the valuation method follows the same general approach as in the cutting-edge tier; however, it draws on data from a different location, requiring the use of transfer functions or adjustment factors to account for regional variations. In contrast, the 'advanced-local' tier applies when local information is available but lacks the specificity needed for a detailed analysis. In such cases, the allocation of value to nature-related components must be based on local but non-specific data used as weighting factors — for example, the relative presence of natural features in geotagged Google Maps photographs.

The ‘entry-level’ information tier applies when neither detailed nor local data are available, requiring value estimates to be transferred from other case studies using appropriate adjustment factors.

To estimate the economic value of a specific area to residents, at the ‘cutting-edge’ information tier, using hedonic pricing data, the process begins with identifying the properties to be analyzed. Property prices are then compiled along with detailed characteristics such as area, age, number of rooms, and bathrooms. A hedonic pricing function is developed, where the property price as the dependent variable and various property features as independent variables — most notably, proximity to and views of natural environments. Through statistical analysis, the portion of property value attributable to these environmental features is estimated, allowing for the calculation of the economic value of cultural ecosystem services.

At the ‘advanced-detailed’ information tier, hedonic pricing data is sourced from a different location, requiring the application of a transfer function or adjustment factor to adapt the values to the target area. In the ‘advanced-local’ information tier, the allocation of values to nature relies on local but non-specific data used as weighting factors — for example, general information on typical variations in real estate prices based on location and views.

The ‘entry-level’ information tier applies when neither detailed nor local information is available, so value estimations must be transferred from other case studies, applying the corresponding adjustment.