

Introduction to Factsheets on economic valuation

Economic Values in IWM Evaluation May 2023

Economic Values in IWM evaluation factsheets provide guidance on the selection of values for estimating the economic value of common benefits derived from integrated water management (IWM) projects. There are five Factsheets covering these topics:

- Potable water substitution;
- Alternative water supply;
- Greening of public open space;
- Waterways and the bay, and;
- New to economic evaluation and transfer

If you are new to using economic evaluation for IWM evaluation, or are looking for a refresher on these concepts this factsheet recommends useful resources and tips.

This is a joint initiative between Melbourne Water, Greater Western Water, South East Water, Yarra Valley Water and Barwon Water in supporting a common IWM evaluation framework.

Guidance on economic evaluation

Water utilities help protect and grow communities by providing essential water supply and wastewater disposal services, stormwater and flood management and protection of waterways and the environment – activities that contribute to better quality spaces, healthier ecosystems and waterways, and more resilient communities today and in the future.

The Department of Treasury and Finance recommends that investments that contribute to societal well-being and generate quadruple bottom line (social, environmental, economic and cultural) outcomes should be examined based on the value they provide to the community.

The Victorian Government's economic evaluation guidelines clearly state that the total economic value - all relevant costs, benefits and externalities – of a project need to be counted in investment appraisal. Figure 1 (right) outlines the economic evaluation process for a project.

For decision makers and economic regulators, all the economic costs, benefits and externalities created by an investment should be first identified qualitatively and economic values should ideally be measured and monetized using the same unit of measure for investment costs and benefits, where possible.

When the benefits of investments and activities are measured in dollars they can be assessed directly against the costs of the investments and activities. This allows the

case for or against the investment clear, and comparable with other potential investments.

Multi-criteria analysis, cost benefit analysis and cost-effectiveness analysis are the most common comparison methods adopted.

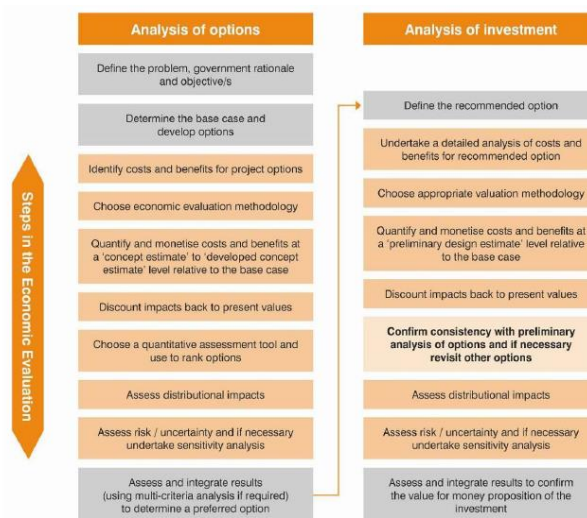


Figure 1: Steps in economic evaluations¹

Monetising social and environmental goods and services

Economic valuation involves measuring the value of goods and services in monetary terms. In simple terms, the economic value of a good or service is measured by what people are willing to pay to have the good or service provided. [2]

¹ Economic Evaluation for Business Cases – Technical guidelines, Department of Treasury and Finance, August 2013.

The way we value many of the goods and services shown in Figure 1 is the same as the way we value other things. For example, the economic value of a cup of coffee or a house is measured by the maximum amount someone is willing to pay to purchase it. The same approach is used to value environmental goods and services, like habitat for wildlife and improved amenity.

The difference between knowing the value of a cup of coffee or a house and habitat for wildlife or improved amenity is that cups of coffee and houses are traded in an open market. Many environmental and social goods and services are not. Without market observed prices for environmental and social goods and services we need other approaches to estimate these values. These approaches are known as quasi-market and non-market valuation approaches.

Over the past couple of decades environmental valuation has grown as a discipline. Market and non-market environmental valuation methods have been developed and refined. Valuation methods are advanced to the point that the Productivity Commission [3] and Office of Best Practice Regulation [4] now recognise that market and non-market environmental valuation methods generally provide objective estimates of the value that the community places on environmental outcomes.

In Victoria, the Essential Services Commission is now making regulatory decisions using evidence from environmental valuation studies [5]. The Victorian Government economic evaluation guidelines recommend valuing environmental and social benefits using market and non-market valuation when these values are likely to be important to the outcome of the economic evaluation [1]. Recognising the importance of market and non-market values, Victorian Departments have developed guidance material on how to monetise environmental and social benefits in economic analyses [6].

The case for using monetised environmental and social impacts varies according to circumstances. The case for using monetised environmental and social values is strongest and value estimates most accurate when [3]:

- **The environmental or social value being created, or lost**, is the driver and a main impact of the project – for example enhanced liveability or the benefits associated with waterway management and protection activities.
- **There is a clear way to attribute the** impacts of the investment or activity on the monetised social or environmental outcome being valued.

Monetising social and environmental impacts and outcomes in these types of situations, while difficult and sometimes contentious, will typically help with making trade-offs and decisions in a more considered, transparent, and defensible way.

Benefit Value transfer

In an ideal world, we would monetise environmental and social values for each proposed investment, considering all details of the specific investment.

Valuing how changes to an environmental asset affect the welfare of the community, involves describing how the community values that asset, and how changes to the environmental asset will affect those values. This involves four basic steps shown in Table 1 and it is often difficult especially for environmental assets which can offer multiple services.

The use of primary research to monetise environmental and social values can be costly and time consuming. The time and money required is often not available [3].

‘Benefit Value transfer’ is the process of estimating monetised environmental and social values for a location of interest (the new investment site) by transferring monetised values from studies already completed in another location (the primary study site). This removes the need for primary research.

For example, it is possible to estimate the monetised environmental and social value of improving 1km of urban waterway for a part of Melbourne using monetised values taken from a study that valued improving urban waterways in Sydney, if the context and characteristics of the two sites are similar. To do this, adjustments to the monetised value being transferred from the study site to adjust for differences in things like stream condition, the condition it is being improved to, how long it will take to make the improvement, and any differences between the characteristics of the urban areas the monetised value is being transferred from and to.

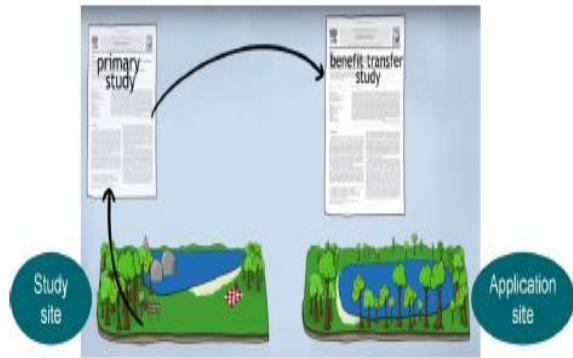


Figure 2: Schematics of study and application sites Source: Conservation Strategy Fund, <https://www.youtube.com/watch?v=xpXvnbNeOEo>.²

There is a need to exercise care transferring data from one study to another. Transferring estimates from one context to another is likely very imprecise (and likely misleading) unless there is a high degree of similarity between the study and policy contexts³.

‘A major issue with all non-market valuation methods is that studies almost invariably relate to a specific site at a specific point in time’². Therefore the older the study is or if the context (biophysical, socio-economic, population characteristics, nature or magnitude of change, policy) differ, the greater the chance that community attitudes and preferences may differ compared to the primary study.

Therefore it is critical to be transparent in the benefit value transfer process and to document assumptions, data sources and limitations².

Value transfer requires judgement and analysis of both the source study and the policy site. Errors in value transfer can be minimised by considering the Steps in Table 2.

Interpretation of values from the Factsheets and from value databases

The values in the factsheets and the databases when used in benefit transfer provide an initial rough estimate for use in preliminary benefit assessment. Typically they provide an initial indication of the magnitude of the value of a benefit.

As a business case is refined, an economist may search for a more locally appropriate value or conduct a new study for the site to improve the valuation.

There are limitations in the availability and type of studies in the Factsheets and in the databases, for example for cultural values or iconic species values are not found. In such case, a new study may be needed.

Finally, the values from a willingness to pay study for a specific benefit is not necessarily the equivalent as the price that the community is willing to pay in their bill or rates. Other investigations are needed to determine pricing impacts and customer/rate payer support.

Further information

If you are new to using economic values in IWM evaluation and value transfer, or are looking for a refresher on these concepts, we recommend you review the guidance on valuing non-market impacts in economic assessments developed by the Victorian Department of Economic Development, Jobs, Transport and Resources and / or the guidance on shown below.

This practical and relatively short resource includes sections on Introductory Concepts, Benefit Transfer and step-by-step guidance for working through how to include non-market impacts in economic assessment.

You can access this free resource at [DEDJTR Guidance-on-valuing-non-market-impacts](#)

Useful resources on economic evaluation

Economic Evaluation for Business cases – Technical guidelines, Department of Treasury and Finance, August (2013).

Melbourne Water monetised social and environmental economic value guidance – A Marsden Jacob Associates draft report, 2020, prepared for Melbourne Water.

SEVT (2021) Social and Environmental Values Table, developed by Marsden Jacob Associates for Melbourne Water Economic Benefit values for recommended for the Melbourne context)

CRC Water Sensitive Cities Economic evaluation resources (found at <https://watersensitivecities.org.au/research/our-research-focus-2016-2021/integrated-research/irp2-resources/>)

- Iftekhhar, M.S, Gunawardena, A., Fogarty, F., Pannell, D. and Rogers, A. (2023). INFFEWS Value tool: Guideline (Version 4: IRP2 Comprehensive Economic Evaluation Framework (2017 – 2019). Melbourne,

Framework (2017 – 2019). Melbourne, Australia: Cooperative Research Centre for Water Sensitive Cities.

² Iftekhhar, M.S, Gunawardena, A., Fogarty, F., Pannell, D. and Rogers, A. (2020). INFFEWS Value tool: Guideline (Version 3): IRP2 Comprehensive Economic Evaluation

Australia: Cooperative Research Centre for Water Sensitive Cities (An overview on the use and selection of non-market values for benefit transfer).

- Iftekhhar, S, Gunawardena, A, Fogart, J.(2018) INFFEWS Value Tool Benefit:Cost analysis of urban water and green infrastructure projects (version 2019-12), Cooperative Research Centre for Water Sensitive Cities.
- Pannell, D.J. (2019). Benefit: Cost Analysis and strategic decision making for water-sensitive cities, Cooperative Research Centre for Water Sensitive Cities, Melbourne (excellent guidance on the why and how to prepare cost benefit analysis for better whole of community outcomes).

WSAA (2019) Willingness to Pay: Principles for a robust study, August 2019, prepared by Marsden Jacob Associates and Centre for International Economics for Water Services Association of Australia.

Need more information?

The Metropolitan Investment Evaluation Group (MIEG) is an IWM economic valuation community of practice within Metro Water utilities. If you have questions about these Fact Sheets, how to access to the recommended resources contact your MIEG representative.

Table 1: Basic steps in environmental valuation³

| Step | Description |
|---|--|
| Describe the environmental asset | <p>The basic idea here is to gain a good understanding of the asset in question and, by considering how it links in with other parts of the natural and man-made environment, determine the appropriate scope of the analysis of environmental impacts.</p> <p>This first step involves describing the environmental asset in question, in qualitative and quantitative terms. Key attributes include its scale and its physical and environmental characteristics. This includes condition, location relative to key populations, key flora and fauna that live in the area and their land use, the ways in which the (human) community use the area in its current form and their land use patterns in the areas vicinity.</p> <p>This process will involve reviews of scientific literature and discussions with experts in the field. In determining the appropriate boundaries of the environmental asset in question, you may need to consider the underlying physical and biological process; how ‘connected’ is the area in question to other environmental assets, and do they need to be considered together?</p> |
| Describe how the asset benefits the community via endpoints | <p>The next step is to consider how the community – local, national and potentially international – values the environmental asset. In other words, how the existence of the asset makes the community better (or worse) off.</p> <p>The environment can be viewed as producing a range of ‘goods and services’ which are in turn valued by people. In identifying how changes in a particular environmental asset will impact on community wellbeing therefore, it is important to draw out the nature of the goods and services provided by that particular asset.</p> <p>In order to relate an ecosystems services framework to economic valuation, we need to define a further term – ‘ecological endpoint’ (Boyd and Krupnick 2009). Ecological endpoints are the environmental goods and services that are directly valued by individuals.</p> <p>For example, a waterway could be polluted by agricultural runoff and sedimentation. This could cause overgrowth of algae, eutrophication and reduce sunlight penetration through the water column. People will have a difficult time valuing these impacts directly because most people’s knowledge of environmental processes are generally not good enough to assign values to these impacts. Instead, endpoints need to be identified that people can relate to and value directly. In this case outputs could include things like less odour, a more aesthetically pleasing view, better water quality for recreation and drinking, and greater species abundance for angling.</p> |

³ Melbourne Water monetised social and environmental economic value guidance – A Marsden Jacob Associates draft report, 2020.

| Step | Description |
|---|--|
| Describe how these endpoint benefits are likely to change | <p>The third step in describing the environmental impacts of an environmental change is to determine the likely effect of a policy change or an alternative intervention on the identified environmental endpoints, compared with a business-as-usual ‘baseline’.</p> <p>Determining an environmental baseline for the asset in question is necessary as it is against this that the impacts of a policy change will be assessed. Starting with the description of the current state of the environmental asset (as discussed earlier) the baseline describes what is likely to happen to the asset – and the identified endpoints – under the existing policy arrangements. It is important to note that the baseline is not just the existing state of the asset, but also expectations about the likely state of the asset, and endpoints, into the future.</p> <p>Once a baseline scenario has been established, alternative scenarios, representing alternative policy settings, need to be identified. Essentially, the alternative scenarios examine the impact on the identified endpoints of changing important assumptions about the future. Importantly, developing alternative scenarios will depend not only on policy changes and ecological responses, but also on how individuals will respond to the policy changes.</p> <p>The assessment also needs to reflect any knowledge gaps or uncertainties in the analysis. While this is true whether you are making a qualitative or quantitative assessment, it is also the case that the use of quantitative assessments without identification any of the uncertainties involved in their estimation may create the impression of false accuracy. As result, it is particularly important to be clear about any assumptions or caveats underlying such estimates</p> |
| Value the environmental endpoint changes | <p>The economic value of something is different from its financial price. For example, it’s free to go for a run along the Tarago Trail (i.e. the financial price is zero) but the fact that you are choosing to run along the trail rather than do something else shows that it has (economic) value to you. Another way of thinking about value is that it’s the amount of ‘wellbeing’ or ‘utility’ you get from going for the run.</p> <p>In environmental valuation for investment analysis using benefit cost analysis or regulatory impact assessments, we are primarily interested in economic value, not just price.</p> <p>Like all goods and services, environmental endpoints can be valued in different ways. The sum of these values is referred to as the total economic value (TEV). The TEV of something is the sum of its:</p> <p>Use values, including:</p> <p>direct use values – resulting from the direct human use of the environment. These uses can be consumptive, such as via crops, mining, livestock or fishing; or non-consumptive, such as recreational use of the environment, or spiritual/cultural uses.</p> <p>indirect use values – these are the values that people hold for the regulation services provided by species and ecosystems. Specific examples include pest control, water purification and soil fertility.</p> <p>Non-use values, including:</p> <p>altruism/bequest value – this is the value that individual attaches to the fact that others (whether in this generation or future generations) will be able to benefit from the environment.</p> <p>existence value – this is satisfaction gained by the knowledge that an environmental asset exists.</p> |

Table 23: Value transfer best-practices

| Practice | Summary points |
|-------------------------------|---|
| Select ‘good quality’ studies | <p>The key tests here is whether the study does what it purports to do, which is to estimate the willingness to pay for a particular environmental good. Our criteria for selecting good quality environmental valuation studies include that they are:</p> <ul style="list-style-type: none"> in peer-reviewed journals or books. This implies the study is more likely to have been well conducted and the appropriate statistical techniques used |

| Practice | Summary points |
|--|--|
| | <ul style="list-style-type: none"> • are done after 2000. This reflects that valuation methodologies (in particular stated preference valuation studies) have been improving over time • sample sizes >500 respondents selected from the general population (for survey-based valuation methods). Larger and more representative samples mean we can generalise values with more confidence • location appropriate studies. Generally, we look for studies that have similar site-specific characteristics, and similar proximity to populations. More broadly, for Victorian valuation work we look in the order of: studies from Victoria, other regions in South East Australia, other Australia, then high-income OECD countries • limited to values that can be readily transferred. Generally, this means environmental values are expressed in \$ per hectare or \$ per household data. • Not engineering cost estimates (not costs or avoided cost estimates) |
| Minimise transfer errors | <p>Adapting estimates from one context to another requires technical skills as well as an understanding of the key drivers of values, how they differ between sites, and a good dollop of common sense. In any value transfer exercise, the person doing the transfer should compare the primary study to the project outcomes they are expecting (for example water quality, or riparian rehabilitation). They should consider whether adjustments should be made for the following:</p> <ul style="list-style-type: none"> • the type and extent of environmental change (for example, estimates of the value of improvements to a specific wetland should not be extrapolated to an entire river basin) • the type and extent of change from the status quo (for example, estimates of the value of creating a new wetland in a degraded site should not be transferred to a wetland improvement project where the site is much less degraded) • substitution effects. For example if one recreation activity is being substituted for another at a site, the economic value is lower than if there is no activity occurring, all other factors constant • Distance decay impacts. People are generally willing to pay more for a (positive) good or service if they are located closer to it. For example, houses that are located near a park generally fetch a higher price in the market than otherwise identical houses further away. • Non-response rates. Non-response rates are important in stated preference surveys. Non-responses include people who (1) drop out of the survey while completing it and (2) do not accept the invite to attend. Value transfer should adjust for the non-response rate. • the population impacted (for example, estimates of the value of wetlands in Europe should not be transferred to Australia without making adjustments for differences in standards of living) • the timing of the provision of the good or service. For example, people are typically willing to pay more for an asset to receive it sooner rather than later (for example healthy waterways tomorrow versus 25 years in the future). Stated preference studies typically tell respondents when they will receive the good. If there is a big difference between your study and the SP study you are transferring, you should adjust for this timing difference in the WTP estimates. This is because individual discount rates are often much higher than discount rates used in cost-benefit analysis. • the time (for example, values should be adjusted for CPI. In addition, you should also consider for example whether a study from 25 years ago is still relevant to today, or whether community preferences, and therefore values for environmental values, are likely to have changed over that time) • confidence intervals. The confidence intervals from the original study should be applied, where available. This will give a valuation range that the real value is likely to fall within. This is better than reporting point estimates. |
| Report value ranges not point estimates, and be clear on limitations | <ul style="list-style-type: none"> • Present a range of estimates – your analysis should not rely on a point estimate of the value of the environmental asset in question. Value transfer is not an exact science, and differences between the value estimated by value transfer and the ‘true’ valuation have been found to be up to 100 per cent, even in the best examples of value transfer (eftec 2009b). As such, the evaluation should contain a sensitivity analysis of the transferred value; ranges of values may be based on confidence levels in the source study or based on the ranges found in similar studies (eftec 2009a). • This includes clearly pointing out that the values transferred were not estimated with reference to the specific environmental changes being examined in the study, and that as a result there remains some |

Practice**Summary points**

uncertainty about the community's willingness to pay. At best, value transfer can provide an indication of the order of magnitude of the community's willingness to pay for environmental services.

Source: Marsden Jacob (2000)

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For more information about this factsheet please contact your water utility representative

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