Participatory and deliberative techniques to support the monetary and non-monetary valuation of ecosystem services:

An introductory guide

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Key messages

i Ecosystem services are fundamental to human well being. They play an instrumental role in meeting basic human needs, such as the provision of clean water and nutritious food. They also underpin wider quality of life, supporting activities that provide for secure economic livelihoods, and endowing us with the resources to lead fulfilling and active lives, such as by providing opportunities for leisure and recreation.

ii Ensuring the value of ecosystems services is fully reflected in decision making is therefore a guiding principle of an ecosystems approach (EsA). The general argument of an EsA is that engaging with a plurality of values is integral to good decision making processes, and are the basis for more robust and resilient decision outcomes.

iii Participatory and deliberative techniques (PDTs) provide decision makers and analysts with a set of tools to inform and enhance valuation when considering policies, plans and projects that impact on ecosystem services and their management. This guide explains how these techniques can be utilised within the context of policy appraisal across government, with specific reference to Treasury Green Book and Impact Assessment guidance.

iv A range of survey and discussion based techniques are available to decision makers to elicit valuation information from stakeholders. Basic techniques include the use of structured questionnaires and focus groups. More deliberative techniques focus on discussion, debate and learning between stakeholders and include the use of in-depth discussion groups and the citizens’ jury.

v PDTs can be used to explore values and preferences in both monetary and non-monetary terms. They complement and extend desk based approaches where there are weaknesses in available evidence and understanding.

- In monetary terms, survey and deliberative approaches elicit willingness to pay/accept values from stakeholders. These commonly focus on individual preferences. However, ecosystem services also have collective meaning and significance. Monetary expressions of shared values can also be used to complement conventional stated preference approaches.
PDTs are able to inform aspects of IA where monetisation is considered difficult or felt to be inappropriate. Survey and deliberative approaches may therefore be directly helpful in providing both qualitative and quantitative descriptions of the costs and benefits of proposals and how different recipients of ecosystem service benefits stand to win and lose from change.

At their most advanced analysts may consider the use of deliberative multi-criteria analysis techniques to appraise costs and benefits that would otherwise remain unvalued.

The choice and mix of participatory and deliberative techniques will be dictated by issues of proportionality, the quality of available evidence, the temporal and spatial scale of decision making, as well as resource constraints. Where impacts on the future provision of ecosystem services are high, the case for incorporating these techniques is particularly strong.

General experimentation and innovation in this area is of underlying importance to help embed the principles of an ecosystems approach.

Messages in detail

The Millennium Ecosystem Assessment (2005) identifies four broad categories of ecosystem services:

- **Provisioning services**: the products we obtain from ecosystems such as food, fibre and medicines.
- **Regulating services**: we derive benefits from the way ecosystem processes are regulated such as water purification, air quality maintenance and climate regulation.
- **Cultural services**: services providing non-material benefits from ecosystems such as spiritual enrichment, cognitive development, reflection, recreation and aesthetic experiences.
- **Supporting services**: there are many ecosystem services that are necessary for the production of all other ecosystem services from which we benefit, such as soil formation and nutrient cycling.

Participatory and deliberative techniques (PDTs) are a set of tools available to decision makers to account for these services by directly engaging with the values and preferences of stakeholders. The conventional focus is on ‘final’ services: the provisioning, regulating and cultural services from which
individuals derive benefits. There is always a consequent danger that these supporting services will be overlooked within appraisal techniques, such as cost-benefit analysis, leading to a consequent policy and management failure. Such a failure would manifest itself in terms of over-exploitation of ecosystem services and benefits with the risk of system change or collapse.

General rationales for stakeholder engagement within environmental decision making are well established. They centre on strengthening the democratic legitimacy of decision making institutions and ensuring that a problem or issue is opened up to variety of opinions, views and perspectives, as well as bringing to decision making a broader and deeper expertise. (See Main Guide – Section One)

From the practical perspective of the decision maker and analyst a participatory approach serves to provide information that can supplement insight derived from desk-based approaches, for example, where there are perceived gaps in available evidence or insight or where relying on desk top analysis appears insufficient. Thus PDTs can be contrasted with desk-based analytic approaches; that is, techniques relying on interpreting documented evidence alone, such as the use of benefits transfer. There are three key groupings of PDT:

- **Survey techniques**: where values about ecosystem service are elicited through the direct questioning of people. *Structured questionnaires, semi-structured interviews and focus groups* are example of survey techniques.

- **Deliberative techniques**: where values are elicited through a process of extended group discussion, debate and learning. *In-depth discussion groups and citizen juries* are examples of deliberative techniques.

- **Analytic-deliberative techniques**: where group based deliberation is integrated with technical approaches to policy appraisal. *Deliberative monetary valuation and deliberative multi-criteria analysis* are examples.

PDTS and desk based analysis provide for different levels of engagement with decision making though all can be used to elicit monetary and non monetary values for ecosystem services. An overall schematic of the relationship between values expressed and level of engagement is depicted in the table overleaf, with some indicative examples.
From the perspective of an ecosystems approach participatory processes should be understood as of general importance to decision makers and analysts where the impacts associated with the future provision of ecosystem services are expected to be significant or where understanding of impacts is uncertain. More generally a participatory approach is practically important where the management of impacts is potentially complex, for instance, where interventions cut across a range of ecosystem services. An understanding of these areas may itself depend on consultation with stakeholders at an early stage in the policy cycle.

Engagement and Values: Key analytical distinctions with example techniques

<table>
<thead>
<tr>
<th>Type of Value</th>
<th>Monetary</th>
<th>Non-monetary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Benefits transfer</td>
<td>Analysis of published social research</td>
</tr>
<tr>
<td>Level of engagement</td>
<td>Desk-based analytic</td>
<td>Survey Based</td>
</tr>
<tr>
<td>Desk-based analytic</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Survey Based</td>
<td>Deliberative monetary valuation</td>
<td>NA</td>
</tr>
<tr>
<td>Deliberative</td>
<td>Deliberative multi-criteria analysis (though primarily non monetary)</td>
<td></td>
</tr>
<tr>
<td>Analytic-deliberative</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Within impact assessment and policy appraisal, economic analysis using the framework of Total Economic Value (TEV), is a common approach to valuing ecosystem services. This is designed to be consistent with Cost Benefit Analysis (CBA), and Green Book guidance. The focus is on monetary valuation of the changes in benefits provided by ecosystems services as this is what affects welfare directly. This includes consideration of actual or potential use values, as well as non-use values.

In terms of the monetary valuation of costs and benefits stated preference (SP) techniques - which use surveys to determine ‘willingness-to-pay’ estimates for ecosystem services where markets do not exist - may be necessary if valuation information (such as that used in benefits transfer techniques) is either not available or of poor quality.

SP techniques are typically used to elicit values based on individual preferences. The use of questionnaires is the common method for eliciting
‘individual willingness to pay/accept’ values. Focus groups may be used in conjunction with them as a quality assurance check, such as improving the nature and format of questioning. Alternatively surveys may be administered in the context of a group based discussion to enhance understanding of options for which values are then being expressed.

Valuing the contribution that ecosystem services make to human well-being cannot be reduced to individual preferences and motivations alone. Ecosystem services have collective meaning and significance. These shared values therefore concern the values people hold for ecosystem services as ‘citizens’. It has been argued that the non-use benefit values that people associate with ecosystem services – bequest, existence and altruistic - are closely associated with citizen-type behaviours and motivations.

Consideration of collective values requires a more interpretative approach to valuation. The primary focus is on qualitative expressions of value for ecosystem services. Evidence for these values may be explored textually, such as through the interpretation of documents and media, but also through the values people hold about ecosystem services which can be ascertained via group discussion, learning and deliberation. As such, there is a natural overlap between these techniques and non-monetary forms of valuation. However, the use of deliberation within decision-making can also be used to link social values to quantitative and monetary valuation techniques.

Methods that generate monetary values for change in group based environments are collectively termed deliberative monetary valuation (DMV). This is an area of potential methodological innovation, though practical applications remain at the experimental stage. In principle there are four key types of DMV exercise which can be considered alongside the conventional contingent valuation survey. A fundamental distinction within DMV is whether the process is designed to elicit the same values as the conventional SP technique (i.e. individual WTP/A estimates), or those based on an aggregate social value for change (i.e. social WTP/A estimates). Both of these pathways have variants dictated by whether it is a group or an individual expressing the WTP/A values.
### Survey based and deliberative monetary valuation: key variations

<table>
<thead>
<tr>
<th>Valuation Objective</th>
<th>Individual benefit values: Individual willingness to pay/accept</th>
<th>Collective benefit values: Social willingness to pay/accept</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Engagement Level</strong></td>
<td><strong>Survey</strong></td>
<td><strong>Deliberative monetary valuation (Group-based)</strong></td>
</tr>
<tr>
<td><strong>Techniques</strong></td>
<td><strong>Questionnaire/interview format – (Optional quality check via one off focus group)</strong></td>
<td><strong>In-depth discussion/workshop</strong></td>
</tr>
<tr>
<td><strong>Value expression</strong></td>
<td><strong>Individuals express a value for what they—personally—would pay/accept</strong></td>
<td><strong>Individuals express a value for what they believe individuals should pay/accept</strong></td>
</tr>
</tbody>
</table>
An emerging technique that may considered useful in the context of different levels of impact assessment, including formal valuation, is deliberative multi-criteria analysis. This is a technique for systematically evaluating the costs and benefits of options against a range of non monetary and monetary criteria. Criteria are used to judge the performance of options using a standardised non monetary scale of values. Criteria are weighted to reflect stakeholder priorities. Deliberative multi-criteria analysis encourages stakeholders and decision makers to examine the full range of criteria that are important to varying degrees to a decision situation. The technique is a way of screening and ranking options in a systematic way and should be regarded as complementary to cost-benefit analysis.

An overall characterisation of key PDTS and their relationship to policy appraisal and IA is provided in the Table overleaf.
### Overview of key techniques and their contexts of application in valuation

<table>
<thead>
<tr>
<th>Key Techniques</th>
<th>Time/ money inputs</th>
<th>Expertise inputs</th>
<th>Type of Data/ Values</th>
<th>Contribution to IA analysis</th>
<th>Stage in Policy Cycle</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Analytic-Deliberative</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Deliberative multi-criteria analysis</em> – A technique for evaluating the costs and benefits of options against a range of non monetary and monetary criteria</td>
<td>High</td>
<td>Technical, Social</td>
<td>Monetary &amp; non-monetary combined into a quantitative non-monetary scale of values.</td>
<td>Monetary &amp; non-monetary valuation of costs and benefits</td>
<td>Formulating options and technical appraisal of options.</td>
</tr>
<tr>
<td><em>Deliberative monetary valuation</em> – A technique for deriving monetary values in group setting.</td>
<td>Medium to High</td>
<td>Technical, Social, Economic</td>
<td>Monetary expressed in terms of ‘self’ and ‘other’ regarding preferences.</td>
<td>Monetisation of costs and benefits</td>
<td></td>
</tr>
<tr>
<td><strong>Deliberative approaches</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>In-depth discussion groups</em> – group based assessments of an issue; open and exploratory in structure. Participants can shape the terms of the discussion, developing themes in ways relevant to their own needs and priorities.</td>
<td>Medium to High</td>
<td>Social</td>
<td>Qualitative &amp; non-monetary</td>
<td>Identifying winners and losers; describing costs and benefits</td>
<td>All stages; though technique tends to open up issues rather than close down.</td>
</tr>
<tr>
<td><em>Citizen Juries</em> – Group based assessment of an issue based on exposing citizens to evidence base by way of expert witnesses and different stakeholder perspectives</td>
<td>Medium to High</td>
<td>Social</td>
<td>Qualitative &amp; non-monetary</td>
<td>Identifying winners and losers; describing costs and benefits</td>
<td>Testing of options</td>
</tr>
<tr>
<td><strong>Survey techniques</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Structured questionnaires</em>, Technique to elicit information from individuals using a consistent approach to the content and phrasing of questions.</td>
<td>Low to High</td>
<td>Social, Technical, Economic</td>
<td>Quantitative monetary or non-monetary</td>
<td>Identifying winners and losers; describing costs and benefits; quantifying impacts; monetisation of costs and benefits;</td>
<td>Option formulation Technical appraisal of options</td>
</tr>
<tr>
<td><em>Semi-structured interviews</em>, Technique putting open-ended questions to individuals on a similar topic. Phrasing of questions varies between interviews.</td>
<td>Low to high</td>
<td>Social</td>
<td>Qualitative &amp; non-monetary</td>
<td>Identifying winners and losers; describing costs and benefits</td>
<td>Option formulation</td>
</tr>
<tr>
<td><em>Focus groups</em>, A semi structured interview in a group format.</td>
<td>Low to med.</td>
<td>Social</td>
<td>Qualitative &amp; non-monetary</td>
<td>Identifying winners and losers; describing costs and benefits</td>
<td>Testing of options</td>
</tr>
</tbody>
</table>
Participatory and deliberative techniques to support the monetary and non-monetary valuation of ecosystem services

An Introductory Guide
Aims and objectives

1.1 The purpose of this guide is to provide an introduction to the use of participatory and deliberative techniques (PDTs) for deriving monetary and non-monetary values for ecosystem services within policy appraisal, with specific reference to Treasury Green Book\(^1\) and Regulatory Impact Assessment\(^2\) (IA) guidance.

1.2 Ecosystem services are those aspects of ecosystems which are utilised, actively or passively, to produce benefits to human well-being. According to the 2005 Millennium Ecosystem Assessment\(^3\) they encompass:

- **Provisioning services**: the products we obtain from ecosystems such as food, fibre and medicines;

- **Regulating services**: we derive benefits from the way ecosystem processes are regulated such as water purification, air quality maintenance and climate regulation;

- **Cultural services**: services providing non-material benefits from ecosystems such as spiritual enrichment, cognitive development, reflection, recreation and aesthetic experiences;

- **Supporting services**: there are many ecosystem services that are necessary for the production of all other ecosystem services from which we benefit, such as soil formation and nutrient cycling.

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\(^2\) BIS (2010) *Impact Assessment Guidance*

Box 1. Definition of key terms used in guide

**What is a stakeholder?**

In this guide the term ‘stakeholder’ is interpreted broadly. It is taken to refer to *any organization, group or individual affected by, with an interest in, or influence over, a decision making issue*. In an EsA this may include scientific experts, policy experts and representatives from public, private or third sector organisations in the decision process, as well as members of the wider public, that is, those who do not necessarily represent any formal or informal organisation in civil society.

**What is participation?**

There are a variety of ways in which stakeholders can be engaged in decision making. The focus of this guide is on a participatory approach to engagement. Participation can be weakly or strongly conceived, but for an engagement process to be considered participatory it should involve some exchange, interaction and reciprocity of information and ideas between stakeholders and those responsible for the decision process. Participatory processes can be distinguished from ‘information dissemination’ and desk based processes.

**What are participatory and deliberative techniques?**

Participatory and deliberative techniques (PDTs) are understood in this guide as the tools available to decision makers to inform valuation through interaction with stakeholders. This may be through survey, such as the use of interviews and stated preference questionnaires, but also more elaborate techniques based on the principle of group debate and shared learning, such as *deliberative monetary valuation* and *deliberative multi-criteria analysis*.

1.3 Valuing these services can contribute towards better decision-making by helping to ensure that policy appraisals fully take into account the costs and benefits of changes to the natural environment.

1.4 Guidance makes provision for engaging stakeholders across the whole policy appraisal cycle. In practical terms PDTs can be used to complement and extend analytical information for appraisal through desk-based research, for example, where gaps in evidence and understanding are thought to exist. Stakeholders can help inform, for instance, a better understanding of winners and losers, basic qualitative descriptions of costs and benefits and
quantification of impacts, as well as monetary valuation. PDTs provide a ‘toolbox’ for helping to achieve this. The guide explains the circumstances in which PDTs may be usefully deployed in relation to these issues and what information decision makers and analysts can expect to derive. An overview of key terms informing the scope of the guide is provided in **Box 1**.

**Context**

1.5 In 2007 Defra published an *Introductory Guide to Valuing Ecosystem Services* (IGVES)*. This document describes some of the technical steps involved in valuing ecosystem services. It develops an *impact-pathway approach* to determine the value of marginal changes in service provision arising from a proposed action.

1.6 IGVES’s approach is consistent with cost-benefit analysis (CBA), which represents the most comprehensive approach to public policy appraisal. CBA attempts to identify and compare the full range of gains and losses in human welfare for competing policy options.

1.7 In the IGVES the particular focus is on approaches to economic valuation and techniques to elicit, in monetary terms, the cost and benefits of changes in the state of the environment. Valuation is approached in terms of an individual person (or household) and their preferences and motivations. Determining the economic costs and benefits associated with changes in ecosystem service provision means incorporating into decision making both market and non market values and employing a combination of Revealed Preference (RP) and Stated Preference (SP) methods.

1.8 The use of PDTs is one way in which analysts can elicit monetary values for changes in ecosystems service provision. Survey techniques, for instance, are integral to SP methods, and guidance on the use of these already exists*. In this guide, we consider and evaluate this approach and how it can be further enhanced through the use of deliberative – group based – techniques, both instrumentally and substantively. An important aspect of this is that economic analysis is offering further possibilities for the monetary valuation of ecosystem services based on deriving values for ecosystem services based on *collective* as well as *individual* preferences. This is called *deliberative monetary valuation* and the guide outlines the dimensions of this approach.

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*Defra (2007) *Introductory Guide to Valuing Ecosystem Services*

1.9 IGVES also explains that in some cases it may be not possible or practical to monetise all costs and benefits associated with changes in ecosystem service provision and neither may it possible to quantify them. It is for this reason that the IGVES emphasises that “the choice is not a case of economic or non-economic valuation methods, but of using a combination of both, as required by the context of the decision” (Defra, 2007: 25)⁶. The need for a pluralistic approach to the valuation of ecosystem services, exploring complementary alternative approaches within decision making, is thus recognised. The thrust of this argument is consistent with the Green Book, which states more generally with regards to appraisal in Government that,

“costs and benefits that have not been valued should also be appraised; they should not be ignored simply because they cannot easily be valued. All costs and benefits must therefore be clearly described in an appraisal, and should be quantified where this is possible and meaningful” (34)⁷.

1.10 The use of multi-criteria analysis techniques have been advocated as one way in which consideration of unvalued costs and benefits in decision making can be achieved. These employ non-monetary measures to quantify and assess criteria that may otherwise be overlooked. The potential for developing this novel aspect of PDTs in the context of evaluating and appraising change is also considered.

Audience and structure of this guide

1.11 This supplementary guide has been written for an audience with expertise in economic appraisal methodologies but which is likely to be less familiar with participatory and deliberative methods to support valuation.

1.12 The insights presented should be viewed in the context of the wider Defra work exploring different theoretical and applied dimensions of an embedding an EsA into policy and decision making⁸, and in particular, as a companion to ideas developed in Defra’s related work in this area, namely its:

- *Introductory Guide to Valuing Ecosystem Services*⁹; and
- *Practical Guidelines for the Use of Value Transfer in Policy and Project Appraisal*¹⁰

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⁸ For a latest review of progress see Defra (2010) Delivering a healthy natural environment: An update to ‘Securing a healthy natural environment:An action plan for embedding an ecosystems approach’
This guide represents supplementary materials to the general guide (hitherto the Main Guide) on the use of PDTs and participatory processes in the context of an ecosystems approach to decision making generally. Cross references to this document are made where appropriate.

1.13 The structure of this guide is as follows:

Section 2: Participatory and deliberative approach to the valuation of ecosystem services: overview of key arguments.

*This section offers a general overview of the role of participation and deliberation in the valuation of ecosystem services.*

Section 3: Participatory and deliberative approaches to the monetary valuation of ecosystem services

*This section illustrates how participatory and deliberative approaches can be used to underpin monetary valuation using survey and group based techniques.*

Section 4: Participation and deliberative approaches to non-monetary valuation of ecosystem services

*This section illustrates how participatory and deliberative techniques can be used to inform valuation using non monetary approaches from desk based analysis to multi-criteria techniques.*

A glossary terms and follow up references is provided, together with criteria for assessing quality in valuation studies.

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10 Defra (2010) *Practical Guidelines for the Use of Value Transfer in Policy and Project Appraisal*
Section 2: Participatory and deliberative approaches to the valuation of ecosystem services: overview of key arguments

- This section offers a general overview of the role of participation and deliberation in the valuation of ecosystem services. The focus is on the needs of policy appraisal with particular reference to Impact Assessment.
- A participatory approach serves to provide information that can complement and extend insight derived from desk-based research that is, where there are perceived gaps in available evidence or insight, or where relying on desk top analysis appears insufficient.
- Engagement should be understood as of general importance where the impacts associated with the future provision of ecosystem services are potentially significant.
- Existing guidance on valuation focuses on economic analysis using the framework of Total Economic Value. Basic levels of engagement are already built into the use of stated preference techniques using survey methods. Eliciting these values may be enhanced through group based deliberation and provide new and complementary types of value based on assessing ‘collective benefits’. A participatory and deliberative approach may also be useful in assuring that non monetised cost and benefits are taken into account.

Introduction

2.1 Participation and deliberative techniques (PDTS) are a practical means by which stakeholders can be involved in the monetary and non monetary valuation of ecosystem services within policy appraisal and Impact Assessment (IA). This section offers an overview of the key arguments associated with complementing and supplementing desk based study through the involvement of stakeholders.

Impact assessment and the policy cycle

2.2 Revised Impact Assessment Guidance was published by Government in April 2010. It defines Impact Assessment as:
- A tool used by policy makers to assess and present the likely costs and benefits (monetised as far as possible) and the associated risks of a proposal that might have an impact on the public, private or third sector; and

A *continuous process*, consistent with the policy appraisal cycle, to help policy makers to fully think through the reasons for government intervention, to weigh up various options for achieving an objective and to understand the consequences of a proposed intervention.

2.3 Five levels of analysis are possible in an IA, as shown in **Figure 1**.

![Figure 1. Levels of analysis that could be completed during Impact Assessment](image)

2.4 Guidance specifies that the effort applied to each stage of completing an IA should be *proportionate* to the scale of the costs and benefits, outcomes at stake, sensitivity of the proposal and the time available. Only Levels 1 and 2 - ‘identifying winners and losers’; ‘full description of costs and benefits, and associated risks’ - are required for every IA undertaken. Levels 3-5 are problem-specific and to be undertaken only if the scale, importance and/or sensitivity of the problem justifies the expenditure of resources. These levels involve the quantification of impacts, partial valuation of costs and benefits, and, at level 5, full monetisation.

2.5 The general stages in the IA Process are illustrated in **Figure 2**. It follows, and is informed by, the ROAMEF (Rationale, Objectives, Appraisal, Monitoring, Evaluation and Feedback) model of the policy cycle described in the Green Book.
2.6 Evidence and analysis informing an IA is subject to extension and refinement as policy-makers move through the cycle and as understanding of a policy challenge broadens and deepens. IA is therefore an iterative process with a strong learning aspect to it.

Stakeholder involvement in policy appraisal and impact assessment

2.7 Treasury Green Book guidance on policy appraisal makes generic provision for engaging with stakeholders and this is encouraged within related guidance on IA. Formal and informal consultation with interested parties across the policy cycle may assist in the identification and development of options and the assessment of impacts, and in informing and reviewing cost-benefit estimates. In principle, this may include consultation with scientific experts, policy experts, representatives from public, private or third sector organisations, as well as members of the wider public.

2.8 A concern to work with, and learn about, the views of stakeholders within environmental decision making is a well established feature of agendas for sustainable development. For example it is fundamental to the 1992 Rio Declaration on Environment and Development and international conventions that have developed from this including the Aarhus Convention12, and the Convention on Biological Diversity13 (CBD).

12 See http://www.unece.org/env/pp/
13 See http://www.cbd.int/ecosystem/
2.9 Arguments centre partly on strengthening the democratic legitimacy of decision making institutions; not only do people have the right to participate in decision making processes that have bearing on them but individuals, organisations and groups may also be more accepting and tolerant of decisions if they have been involved in the reasoning behind them. More substantively, advocates argue, by taking a more participatory approach the outputs and outcomes of decision making will be more informed. It ensures that a problem or issue is opened up to variety of opinions, views and perspectives, and brings to decision making a broader and deeper expertise. (See Main Guide – Section Two)

2.10 From the practical perspective of the decision maker and analyst a participatory approach serves to provide information that can supplement insight derived from desk-based approaches, that is, where there are perceived gaps in available evidence or insight, or where relying on desk top analysis appears insufficient. In principle, a range of monetary and non monetary information is potentially available that involves no recourse to stakeholders at all. This may include the use of:

- environmental datasets to inform base line assessments of ecosystem service provision and the qualitative and quantitative impacts of change;
- documentary evidence and social research studies to gauge how people think about, and utilize well being benefits from, ecosystem services affected by policy proposals, as the basis for identifying potential winners and losers;
- real or proxy market data, as well as existing valuation studies, to inform cost-benefit estimates associated with ecosystem service change.

2.11 Sources of information and insight such as these are the logical starting point for decision makers and analysts seeking to inform IA from the perspective of ecosystem services, so it is important to understand the ‘added value’ of taking a participatory approach.

2.12 An overall conceptualisation of the relationship between ecosystem structure and processes, corresponding services provided, and the benefit values that may be assigned to them in ecosystem services appraisal is presented in Figure 3. These relationships and components provide a context in which the value of a participatory approach can begin to be understood vis a vis desk based approaches.
Figure 3: Simplified Ecosystem Values Typology

ECOSYSTEM STRUCTURE AND PROCESSES

ECOSYSTEM FUNCTIONING AND SERVICE PROVISION

FINAL SERVICES / BENEFITS

INDIVIDUAL BENEFIT VALUES (Total Econ. Value)  COLLECTIVE BENEFIT SHARED VALUES

MULTIPLE DIMENSIONS OF ECOSYSTEM VALUE

PRIMARY OR GLUE VALUE OF OVERALL HEALTHY SYSTEM

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Screening impacts

2.13 Defra’s (2007) Introductory Guide to Valuing Ecosystem Services (IGVES) recommends that any given proposal is initially screened against an ecosystems services framework to highlight, using a qualitative scoring system, potentially significant effects on service delivery and other related considerations [see Main Guide - Section 3]. The typology of ecosystem services developed by the Millennium Ecosystem Assessment\textsuperscript{15} can act as a useful starting point for this task. Key considerations for screening a decision issue are provided in Box 2

Box 2. Screening a decision issue: indicative questions

1. Would interventions in this issue involve a change in the \textit{quantity} or \textit{quality} of service provision?
2. What is the anticipated direction of change? For example:
   - \textit{Quantity} - increase or decrease?
   - \textit{Quality} - degradation or enhancement?
3. Where would change be occurring?
4. Over what time scales will the changes occur?
5. Are anticipated changes significant? For example:
   - \textit{Will changes be marginal/non marginal}?
   - \textit{Will changes be permanent/irreversible}?
6. Do anticipated changes imply complexities of management? For instance:
   - \textit{Will management cut across a range of ecosystem services}?
   - \textit{Will management involve working across different spatial and temporal scale}?
7. Are there uncertainties/gaps in understanding in any of the above?

2.14 These assessments are important to an IA because they can provide information that can directly inform requirements to “identify winners and losers” and “describe costs and benefits”. A short example is depicted in Table 1. It takes as its hypothetical example watershed management to improve bathing and drinking water standards. The proposed intervention is a government-led agri-environmental scheme, cross subsidised by industry beneficiaries, to pay farmers to reduce stocking densities on livestock farms.

\textsuperscript{15} MA (2005) Op. Cit. 3
The aim is to improve water quality to reduce potential pathogenic presences transferring from agricultural land to watercourses.

2.15 In order to understand who stands to gain or lose, the proposal is screened against the ecosystems services framework. In this hypothetical example, the proposed intervention not only has important impacts on water quality, but also associated ‘knock on’ effects for other ecosystem services, such as a recreation and food production.

2.16 In the context of meeting minimum IA requirements this process of preliminary assessment allows analysts to determine effects on human well being (both positive and negative) across categories of relevant stakeholder. In other words, winners and losers are those stakeholders (individuals, groups or organisations) whose well being is affected in some way by these marginal changes in service provision (such as ‘drinking water consumers’ and ‘food producers’). Mapping these relationships between service provision, stakeholders and human welfare therefore allows costs and benefits to be defined. These qualitative descriptions may include both monetary and non monetary dimensions of change.

2.17 From the perspective of an ecosystems approach (EsA) the involvement of stakeholders should be understood as of general importance to decision makers and analysts where the impacts associated with the future provision of ecosystem services are potentially high. As Turner et al. (2010) explain, the focus of an ecosystems approach should ideally be on “relatively small, incremental changes rather than large state changing impacts”. However, in circumstances where interventions suggest high impacts on the future provision of ecosystem services, and risk crossing ecological thresholds/tipping points for system change, the more proportionate it would be to commit resources to a programme of participation that allows stakeholders to actively contribute to, and shape understanding of proposals and their value. (See also Main Guide – Section 3)

Table 1: Mapping Ecosystem Services onto stakeholder costs and benefits

<table>
<thead>
<tr>
<th>1. Issue &amp; proposed Intervention</th>
<th>2. Services impacted</th>
<th>3. Stakeholders whose well being is affected</th>
<th>4. Impacts on human welfare</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Service Category</td>
<td>Service Impacts</td>
<td>Change*</td>
</tr>
<tr>
<td>Issue:</td>
<td>Provisioning services</td>
<td>Water quality</td>
<td>+</td>
</tr>
<tr>
<td>High levels of microbial water course pollution in Catchment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Option:</td>
<td>Payments to land manager to reduce stocking densities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cultural services</td>
<td>Recreation</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Food quantity</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Food quality</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>*(+) Significant positive effect (–) Significant negative effect</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

T
2.18 It is important to recognise that these assessments should be taken to include not only an understanding of the impact of changes on “final” ecosystems services (i.e. those services directly consumed, such as nutritious food or clean water), but also underpinning ecosystem functioning. Since valuation within ecosystem services appraisal is restricted to the flow of service benefits there is always a danger that these will be overlooked within appraisal techniques such as cost-benefit analysis leading to a consequent policy and management failure. Such a failure would manifest itself in terms of an over-concentration on those ecosystem services and benefits of direct and indirect use/non use to humans, with the risk of over-exploitation and system change or collapse. In other words, healthy ecosystems, anchored to a sufficient configuration of structure and process, have ‘prior’ value (sometimes termed ‘primary’, ‘glue’ or ‘infrastructure’ value) in the sense that the continued existence of the system’s ‘integrity’ determines the flow of all the instrumental and intrinsic values related to final ecosystem services and benefits. Thus, total system value is always greater than total economic value\(^{17}\).

2.19 Initial understanding of impacts may itself depend on consultation with stakeholders at an early stage in the policy cycle. Specialist input may be necessary to grasp the nature of impacts especially when we reflect that changes in ecosystem service provision and their associated benefits are context specific. As Turner et al (2010: 81)\(^{18}\) explain there is a need within ecosystems services appraisal for basic “contextual analysis that can link ecosystem services supply to demand side beneficiaries” and to do this in a spatially explicit way. This means marrying technical and scientific understanding of ecosystems processes and services production with an assessment of change in particular places and localities, and within this, recognising that the importance of the costs and benefits associated with change are highly relative, for instance, they will vary according to the spatial and temporal scale of interpretation and the perspective of the individuals (see Main guide - Section 3).

2.20 Desk top analysis provides a useful starting point for making judgements but this insight may not be revealed fully within published documentation and

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may enhanced by drawing on the relevant expertise from private, public or third-sectors.

Valuing cost and benefits through a participatory approach

2.21 A participatory approach provides decision makers and analysts with sources of information and insight that can directly inform valuation within impact assessment and policy appraisal.

2.22 Given the inherent complexity of nature, a number of dimensions of nature-based value can be discerned and evaluated in different ways. These include in monetary terms via economic analysis and the concept of TEV (where TEV = use value + non-use value); in biophysical and geochemical terms via natural science; and in cultural terms via the more interpretative social sciences, arts and humanities.

2.23 In the IGVES, the framework of Total Economic Value (TEV) is employed to value changes. This is consistent with Cost Benefit Analysis (CBA), and Green Book guidance. The focus is on valuing the changes in benefits provided by ecosystems services as this is what affects welfare directly. This includes consideration of actual or potential use values, as well as non-use values (See Box 3).

2.24 The TEV approach reflects aspects of a wider generic value typology devised by environmental philosophers. Four key categories have been proposed:

- **anthropocentric instrumental value**: the contribution of something toward some goal of benefit to humans. Nature has value because it serves and satisfies human beings. This value category maps closely on to the economic concepts of use value (i.e. direct, indirect and option values) and most non-use values (i.e. bequest and altruistic values).

- **anthropocentric intrinsic value**: a culturally dependant concept expressing ethical and aesthetic principles of human stewardship of nature and which requires humans to ascribe intrinsic value to non-human nature. The economist’s concept of ‘existence value’ can overlap into this value category. That is, individuals may feel a benefit from knowing that, for example, an ecosystem and/or its component parts, does exist and will continue to exist somewhere on the planet.
Box 3: Key Dimensions of Total Economic Value\textsuperscript{19}

**Total economic value** comprises a range of use and non-use values. These are expressed diagrammatically below.

Use value includes direct use, indirect use and option value:

- **Direct use value**: where individuals make actual or planned use of an ecosystem service.
- **Indirect use value**: where individuals benefit from ecosystem services supported by a resource rather than directly using it.
- **Option value**: the value that people place on having the option to use a resource in the future even if they are not current users. These future uses may be either direct or indirect.

Non-use value (also known as passive use) is derived simply from the knowledge that the natural environment is maintained. There are three main components:

- **Bequest value**: where individuals attach value from the fact that the ecosystem resource will be passed on to future generations.
- **Altruistic value**: where individuals attach values to the availability of the ecosystem resource to others in the current generation.
- **Existence value**: derived from the existence of an ecosystem resource, even though an individual has no actual or planned use of it.

\textsuperscript{19} Defra (2007) Opt. Cit. 4
It is these two categories that provide the focus for assessing the value of ecosystem services within policy and decision making. The other two value categories - non-anthropocentric instrumental value and non-anthropocentric intrinsic value are less directly relevant to ecosystem policy appraisal unless a different ethical position is accepted, which allows for the agency of the non-human environment\textsuperscript{20}. This is currently not the case.

2.25 There are a number of techniques available to decision makers to begin the process of eliciting monetary values for changes in ecosystem services using the TEV framework. Some ecosystem services have real markets for them from which monetary values can be derived. For example, the provisioning service of ‘food’ has a direct market price. Others are more problematical and it may be necessary to impute monetary values by identifying surrogate markets where values change as a consequence of their relationship to the ecosystem service. For instance, estimating the monetary value of changes of regulating services such as ‘air quality’ or the cultural service of ‘aesthetic value’ may rely on observing market prices where these services have an impact, such on house prices. A variety of methods are available to decision makers to do this including hedonic pricing approaches and the travel cost method. Valuations derived in these real and proxy markets are collectively termed ‘revealed preferences’.

2.26 However, in valuation techniques underpinning the framework of Total Economic Value (TEV) revealed preference techniques also stand alongside ‘stated preference’ (SP) techniques. These techniques are an increasingly common way of deriving monetary values for ecosystem services under CBA. In essence, SPTs are based on the principle of eliciting values through constructed (hypothetical) markets. They generate values where conventional markets do not exist, or where conventional and proxy markets are considered an inadequate guide to values.

2.27 At a technical level an important distinction within SPTs exists between Contingent Valuation (CV) and Choice modelling (CM). In simple terms CV techniques concentrate insight on deriving the monetary value of a good (for instance, the value of an upland landscape), where as CM techniques derive values by rating and ranking the different characteristic of a good (for instance, which aspects of an upland landscape are more or less important).

In different senses, both are suited to an ecosystem approach’s principle of integrated decision making. So for instance, whereas we might use CV to assess whether an upland landscape should be protected in the context of alternative priorities, CM might be deployed to use monetary values to explore trade-offs between different options for management (such as managing for access or food production).

**Monetary valuation in a participatory context**

2.28 In operational terms SP techniques contain a basic level of stakeholder engagement. CV techniques, for instance, generate monetary values by directly questioning people for willingness-to-pay/accept values, typically through structured survey. Analysts and decision makers may commission primary SP studies or they may use of benefits transfer to derive from values in analogous settings and circumstances. In general terms, the case for primary research of this kind should follow an assessment of the availability and adequacy of existing desk-based evidence. On the grounds of availability alone original stated preference studies may be necessary. On the grounds of adequacy, care must be taken to assess the quality of the studies being potentially used in benefits transfer – such as evidence of measurement errors - and this may reinforce the need for the new studies to be undertaken.

2.29 A further emerging approach is to elicit WTP/A values through group debate. This is partly about the use of group deliberation to enhance the quality of the monetary valuation procedure. The rationale is that individual preferences will be more informed as they learn more about the issue.

2.30 However, group based methodologies are also about bringing other complementary types of value into the valuation process. It is important to recognise that economic analysis using the TEV framework focuses on the individual person (or household) and their preferences and motivations. Conventional CBA thus approaches issues of resource allocation by viewing society as the sum of isolated individuals with many and diverse wants/needs. Preferences and behaviours are understood primarily to be dominated by self-interest or ‘self-regarding’ motives and it is these that yield ‘real’ values within decision making.

2.31 These conventional economic assumptions about human motivations and behaviour can be seen as quite restrictive. Many contend that the issue is

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complicated by consumer-citizen distinctions in that individuals may assume a common good (citizen) as well as utility-maximising (consumer) role. It has been argued that collective society is more than the aggregation of individuals and that other social welfare functions have validity22: self-interest is not the only ‘rational’ motivation; there are ‘other regarding’ preferences towards humans and other entities in nature. Findings from behavioural economics and psychology are extending the somewhat limited understanding within environmental economics of cognitive behaviour, as well as the influence of social and political networks of individuals, groups, institutions and governments) on environmental values. It seems that bequest, existence and altruistic motives may all be relevant and real in certain environmental loss contexts.

2.32 The idea of citizen defined values suggests that motivations and preferences can be assigned to social groups, culturally transmitted and assimilated over time as social norms. Cultural values demonstrate that human well-being and quality of life is a function both of individual wants satisfaction, and the fulfilment of a variety of social, health-related, and cultural collective needs:

“Individuals may act to affect the welfare of others – they can make different decisions as citizens rather than consumers, in isolation or in a collective social context, and the process by which decisions are made (e.g. is it fair?) may be influential”


Similarly, making decisions about ecosystem services incorporates issues of social equity both intra and inter-generationally. They are therefore:

“inherently objects of ethical and normative concern...what is done to them can be discussed not simply in terms of individual costs and benefits, but in terms of social rights and wrongs”

Wilson and Howarth (2002: 432)24

2.33 The economic valuation literature has yet to reach a comprehensive consensus on whether use and non-use values can be formally distinguished using standard welfare economic measures. Some argue that it is necessary to consider the adoption of techniques which offer opportunities for wider public and stakeholder participation, using methods which encourage

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dialogue and debate to arrive either at consensus about which, for instance, bequest and existence values can be elicited, or agreement to differ in which the reasons for divergence are clarified. The argument is that through a deliberative process individuals are encouraged to:

“extend beyond their own personal welfare so that the resulting values, judgments will reflect a more complete and socially equitable assessment of the issue at hand”

Turner, et al. (2010: 94)\textsuperscript{25}

2.34 The valuation of ecosystem services based on collective argument, idea and information sharing are thus seen as important mechanisms by which decision makers can be complement conventional valuation approaches. This is giving rise to SP methods that are combined with deliberative process monetary valuation to elicit ‘social willingness to pay/accept values; – so called \textit{deliberative monetary valuation} (see Section 3).

\textbf{Appraising non-monetary values through participation}

2.35 In the published literature on ecosystem service valuation, a related key debate concerns the extent to which full monetisation of costs and benefits is either possible or desirable. Turner \textit{et al.}, (2010: 79-80)\textsuperscript{26} state for example that:

“the full commodification of the environment and the assignment of monetary values to all aspects of its complex functioning and existence is not a sound scientific or moral basis for sustainable environmental management and policy”

2.36 Nonetheless the authors argue that trade-offs do have to be made and the challenge for policy-makers is to ensure the “correct and appropriate application of economic valuation techniques, alongside other valuation methods” (\textit{Ibid}: 80).

2.37 Eliciting values for the non-use dimensions of ecosystem services is generally considered a challenging area for conventional economic valuation. As Defra’s (2007)\textsuperscript{27} valuation guide puts it, “individuals find it hard to put a price on such values’ and people may be reluctant to do so”. For example, in an ecosystem valuation of the impacts of a new road building programme in an area of open countryside, it would be possible to monetise the costs and

\textsuperscript{27} Defra (2007)Opt. Cit. 4
benefits of the proposal in terms of its impacts on provisioning and regulating ecosystem services. It is far more difficult to infer monetary values relating to aesthetic and ethical judgements of worth, such as the affect of the proposal on the beauty of a habitat or landscape, or the rights of human and other living species. The need to encompass both monetary and other equally valid dimensions of ‘value’ within decision making is a recognised dimension of taking an ecosystems approach.

2.38 Participatory and deliberative techniques are able to inform aspects of IA where monetisation is considered difficult or felt to be inappropriate. The potential for qualitative expressions of value through techniques such as interview, focus group and discussion forums is an important aspect of this. However, where costs and benefits of changes cannot be valued in monetary terms, IGVES also follows Green Book and related guidance in recommending the use of multi-criteria analysis (MCA). This technique allows otherwise unvalued criteria to considered alongside monetized costs and benefits through a more formal process of weighting and scoring. The use of participatory and deliberative techniques are central to the application of a MCA process (see Section 4).

Summary

2.39 The purpose of this section has been to scope out some of the grounds on which decision makers and analyst should consider deploying participatory and deliberative techniques to assist understanding of ecosystem services and their valuation within IA. In the next section we illustrate in more detail the practical dimensions of the monetary valuation of ecosystem services through participatory and deliberative techniques.

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28 See especially CLG (2009) *Multi-criteria analysis: a manual* (CLG: London) The manual was originally commissioned by DETR in 2000 - and there have been methodological developments since. Key recent work is summarised in Section 4.
Section 3: Participatory and deliberative approaches to the monetary valuation of ecosystem services

- This section considers in more detail how participatory and deliberative approaches can be used to underpin monetary valuation.

<table>
<thead>
<tr>
<th>Valuation Objective</th>
<th>Individual benefit values: Individual willingness to pay/accept</th>
<th>Collective benefit values: Social willingness to pay/accept</th>
</tr>
</thead>
</table>

- Along standard survey based methodologies, deliberative approaches provide a way in which individual willingness to accept/pay values can be elicited and may address perceived instrumental weaknesses in existing approaches.

- The use of a group setting can also be used to elicit collective values based on the idea of 'social willingness accept/pay'; that is, an aggregate social value of an environmental change. This provides a further and complementary dimension of existing valuation approaches and is highly relevant to an ecosystems approach.

Introduction

3.1 This section expands on arguments developed in the previous section by demonstrating how participatory and deliberative techniques (PDTs) can be employed to elicit monetary values for ecosystem services. The primary focus here is on eliciting values in a deliberative setting. In essence, the argument is that a deliberative context to valuation can strengthen conventional stated preference (SP) techniques but also bring new and complementary expressions of preferences based on aggregate social values for change. Key operational principles are described and illustrated.

Deliberative monetary valuation of ecosystems services: overview

3.2 Survey and group based processes provide methodological contexts in which a range of values can be expressed. The key choices are summarised in Table 2 overleaf.

3.3 On the far left of the Table the standard stated preference technique is represented: a structured survey in which individuals express a value for what they believe they should pay/accept. A range of survey based approaches are potentially available, such as postal and web based questionnaires, and structured telephone and face to face interview survey. The process of executing these surveys raises its own particular complexities regarding identifying the target population and choosing the sample. These are issues
that have been considered adequately in the wider published literature and are not considered in detail here\textsuperscript{29}. At a practical level, these methods carry with them a number of strengths and weaknesses. A general overview of these is provided in Table 3.

3.4 The development of DMV techniques reflects economists’ concerns to strengthen the validity of monetary values elicited through standard stated preference methods. This has both CV and CM variants, though there are a number of general parameters and principles (Box 4).

3.5 In methodological terms, DVM combines stated-preference with small-group deliberation though the type of deliberative technique will vary according to the approach to valuation. There are four key types of DMV exercise. A fundamental distinction within DMV is whether the process is designed to elicit the same values as conventional SP techniques (i.e. individual WTP/A estimates) or those based on an aggregate social value for change (i.e. social WTP/A estimates).

Table 3. Survey methods for Stated Preference Techniques

<table>
<thead>
<tr>
<th>Method</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mail surveys &lt;br&gt; Printed questionnaires are posted to potential</td>
<td>Lack of interviewer bias &lt;br&gt; Easier to answer sensitive questions &lt;br&gt; Can be completed at respondent’s own pace</td>
<td>Low response rates 25-50 &lt;br&gt; Self-selection bias &lt;br&gt; Time-consuming &lt;br&gt; Little control over who fills in the questionnaire &lt;br&gt; Fixed question order &lt;br&gt; No clarification or probing possible &lt;br&gt; Restricts the use of visual aids &lt;br&gt; Respondent can alter earlier responses</td>
</tr>
<tr>
<td>respondents</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Telephone interviews &lt;br&gt; Interviewers call potential respondents</td>
<td>Complex questionnaire structures are possible &lt;br&gt; Cheaper than face to face interviews &lt;br&gt; Permits probing and clarification &lt;br&gt; Relatively quick to administer &lt;br&gt; Easy to monitor &lt;br&gt; 60-75% response rates</td>
<td>No use of visual aids &lt;br&gt; Restricts use of lengthy scales &lt;br&gt; Respondent may get tired &lt;br&gt; Respondents may not answer sensitive questions &lt;br&gt; Non-telephone or non-listed respondents not sampled</td>
</tr>
<tr>
<td>Face-to-face interviews &lt;br&gt; Interviews take place one-to-one between</td>
<td>Highly flexible &lt;br&gt; Complex questions and questionnaire structures are possible &lt;br&gt; Permits probing and clarification &lt;br&gt; Larger quantity of data can be collected &lt;br&gt; Potential for extensive use of visual and demonstration aids &lt;br&gt; High response rates 70%+ &lt;br&gt; Greatest sample control</td>
<td>Relatively expensive &lt;br&gt; Possible interviewer bias &lt;br&gt; Intercept surveys: samples normally not representative and self-selection bias &lt;br&gt; Intercept surveys: questionnaires have to be short</td>
</tr>
<tr>
<td>the interviewer and the respondent either at home or another location</td>
<td></td>
<td></td>
</tr>
<tr>
<td>relevant to the study (intercept survey)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mixed methods: drop off survey &lt;br&gt; The questionnaire is mailed prior</td>
<td>Initial personal contact gives survey a ‘human face’ &lt;br&gt; Shares the advantages of mail and face-to-face methods</td>
<td>Survey form may be lost in interval before calling back Expensive</td>
</tr>
<tr>
<td>to a visit by the interviewer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mixed methods: Mail + telephone surveys &lt;br&gt; The questionnaire is mailed</td>
<td>Gives personal touch to the survey &lt;br&gt; Can complete mailed questionnaire in own time</td>
<td>Shares some of the limitations of mail surveys Relatively expensive</td>
</tr>
<tr>
<td>prior to a phone call by the interviewer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer assisted interviews &lt;br&gt; Interviewer records responses directly</td>
<td>Subsequent analysis is quicker since data inputting stage is not necessary Permits more complex interviews Permits use of e-mail and internet</td>
<td>Possible rejection of 'computer technology' E-mail/internet may preclude random sample unless wide coverage of PCs</td>
</tr>
<tr>
<td>to computer and/or respondent may respond to questions on computer screen</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

30 Pearce, D and Ozdemiroglu et al (2002) Op Cit. 5
**Box 4. Deliberative Monetary Valuation: Key parameter and principles**

- DMV is group based; usually comprising between 5 and 20 people
- Individuals are provided with information about the issues which they are asked to discuss and formally deliberate on in an open and fair environment.
- Group settings may take the form of an in-depth group discussion or may include more elaborate techniques, such as the use of *Citizens’ Jury* in which deliberation is based on exposure to information provided by ‘expert witnesses’
- Through group discussion and exposure to information, individuals learn about the issue. Preference construction is therefore part of the process.
- Through learning in a deliberative setting, individuals are encouraged to understand an issue in terms beyond their personal welfare, so that the resulting valuation, judgements and outcomes will reflect a more complete and socially equitable assessment.

**Individual willingness pay/accept through group deliberation**

3.6 As Spash’s (2008)\(^{32}\) review shows most DVM studies are attempting to increase the validity of individuals’ utility WTP/WTA measure by using a deliberative process to improve knowledge of the good, scientific uncertainties, the range of issues likely to impact on successful implementation of the proposal, before assessment.

3.7 Thus DMV at one level is about addressing instrumental concerns surrounding the use of survey based SP techniques. One of the major general challenges of applying an EsA in the context of survey based techniques is the potential for confusion and misunderstanding about the underpinning environmental complexities of issues. The language and terminologies of an ecosystems approach may not help here *(See main guide - Section 5)*.

3.8 Conventional survey methods such as the questionnaire work with the assumption that respondents have pre-existing preferences about the topic they are expressing values for. However, if people are unfamiliar with a topic,\(^{31}\)

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they are more likely to make their judgments in the context of the process itself, making up values as they ‘go along’ and to the best of their abilities. Self completion methods are generally not well placed to mitigate against this potential for uninformed preferences, since opportunities to clarify ideas and learn in the process will be generally limited. The capacity for input error may be high. Even in direct face to face forms of surveying clarification will be generally limited and constrained by time.

3.9 It is because deliberative techniques have a learning dimension to them that combining SP techniques with deliberative approaches may allow for a richer understanding of what is being asked of individuals and help overcome the difficulties that respondents experience when trying to understand the elements of the hypothetical market presented to them in a survey format. This seems particularly important in the context of integrated valuation of ecosystems services, since the scenario for the hypothetical market will become more scientifically complex than that for a single environmental good. Individual respondents will face greater challenges in trying to: (i) make sense of the problem; and (ii) produce a meaningful estimate of how much they would be willing-to-pay either to prevent or to promote changes envisaged. DMV may involve individuals expressing a value for what they – personally – would pay/accept following a group discussion. Alternatively the process may involve the group making a collective judgment for what they believe individuals should pay/accept.

Social willingness pay/accept through group deliberation

3.10 The remaining options for DMV take a different perspective, which are more closely in keeping with the arguments made in Section 3. In these cases the deliberative model involves individuals - chosen to represent the wider public - to arrive at an ‘aggregate social value of an environmental change’ (Spash 2008: 471). In other words, through facilitated deliberation, participants are able to debate the pros and cons of a suggested course of action, including its scientific, economic and policy justifications, to determine value for what they believe society should pay/accept. The distinction between the options lies in the way the social willingness pay/accept values are formally delivered: DMV is designed either to elicit individual views regarding the aggregate social value of a proposed course of action, or the group stating an aggregate social WTP/WTA. It is notable

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within the literature that rather fewer studies use DMV to specifically measure specifically social WTP/WTA values.

3.11 A final noteworthy distinction between approaches to DMV is with regard to the particular PDT used. In situations where the focus is on the group expressing social willingness pay/accept values practitioners of the DMV will be able to use a citizens’ jury technique (see Section 4) in addition to more standard workshop/group discussion formats. This is because the citizens’ jury is, by design, concerned with group judgments. This opportunity is therefore precluded for DMV where participants are expressing individual values for what they believe they or society should pay/accept.

3.12 Three short case studies are provided below to illustrate how DMV has been used in contexts relevant to the valuation of ecosystem services.

Summary

3.13 The purpose of this section has been to illustrate how analysts can approach monetary valuation processes using participatory and deliberative techniques. The move to a deliberative/group based process may strengthen standard approaches but also bring complementary forms of valuation based around eliciting collective benefit values. Deliberative monetary valuation that elicits collective values for change represents a novel area of valuation with environmental economics. Many of techniques have been employed in a research context and are currently an experimental stage. However, the general principle of linking valuation to a combination of collective and individual approach is in step with an EsA’s concern for pluralistic and holistic approaches to valuation,
Case Study 1 - Wild goose conservation in Scotland


The first example considers a valuation exercise in which individuals stated their **individual WTP and WTA values in a group context.** The topic is wild goose conservation in Scotland.

The study explains that over the last 30 years goose numbers have expanded rapidly which has brought conservation efforts into direct conflict with farmers. The wild geese graze on improved pastures and young cereal crops, and this causes considerable damage and financial losses to agriculture in areas close to reserves and other secure roosts. In order to alleviate this problem it has been proposed that farmers be compensated for goose damage in the most badly affected areas. In a sense, then, this management issue exposes some of the trade-offs between different types of ecosystem service. For example, the goose population is strongly related to cultural/natural heritage of the landscape and has strong amenity and recreation association. At the same time, their presence impacts on livelihoods because they jeopardize the production of food.

The study compared an approach based on DMV with a standard CV survey based on personal interviews. The interview-based questionnaire, conducted in person by a market research company, resulted in data for 251 respondents. A follow up debriefing exercise over the phone was undertaken within 1 week of completing the questionnaire. In contrast, the DMV approach involved two one-hour meetings held one week apart. In total 52 members of the general public, divided into eight groups of between four and eight people, attended the first event, with a small number not attending the second meeting. The first meeting was primarily concerned with the presentation of relevant information (about the proposed project) described in an ‘Information Folder’, and a detailed explanation of the contingent market and payment vehicle. Participants were given the opportunity to discuss any aspect of the project and to question the moderator. A ‘Question and Answer Sheet’ at the back of the folder was also provided to help clarify issues such as the use of taxation as an appropriate funding method. The group meeting concluded with a WTP question, which respondents answered confidentially in writing.
During the week-long interval between the two group meetings, participants were asked to complete a daily diary in which to record their thoughts and questions about (in this case) goose conservation and any relevant activities such as watching nature programmes or visiting bird reserves. At the second group meeting participants were given the opportunity to ask questions and to discuss any unresolved issues concerning the project. The WTP question was then re-administered to participants. A de-briefing exercise was carried out to establish the extent to which participants understood the approach as a means of establishing the values they placed on goose conservation.

The study revealed some interesting differences between results of the interview and deliberative approach:

- respondents who were interviewed were most certain about their WTP; a higher proportion of people were in the ‘definitely pay’ and ‘definitely not pay’ categories;
- in almost all payment categories, mean WTP was higher for the interviewees than for deliberative assessments; Overall, deliberative assessment were 3.5 times lower than the interview estimates;
- there were some significant difference in the WTP values elicited at the first and second deliberative event. For example WTP was significantly lower in second event in the ‘prepared to pay’ category.

The researchers argue that deliberative estimates of WTP may be closer to actual WTP than interview-based estimates. They point for instance to the way hypothetical CV WTP exceeds the actual WTP usually by a factor of between 2 and 10. The researchers also argue that the result reinforce the argument that people tend to revise their bids downwards when they are given additional time.

Overall, the research findings suggest that there is evidence that moving to a group-based survey mode could enhance CV in several ways. First, misunderstandings and gaps in understanding could be resolved. Second, discussion of an issue helped people learn what they want to know in order to make a rational decision. Participants also benefited from an informal setting where in-depth discussions with the moderator and other group members could take place. Finally, the week-long interval between the two meetings allowed participants to re-evaluate their WTP following further thought, information searching, and discussions with family members and/or friends.
Case Study 2 - Managing the Tillamook Bay Catchment


This example concerns a process of groups’ stating social willingness to pay values as part of Estuary management in the Tillamook Bay catchment, north-western Oregon. This is a valued landscape supporting diverse living resources, including shellfish, runs of salmon and trout, groundfish, and numerous bird species. It is integral to the local and regional economies that are largely based on natural resources, including forestry, agriculture, tourism/recreation, and commercial fishing.

The principal focus of the work was an evaluation of the consequences of three ecosystem management options in terms of their associated environmental and economic consequences: limiting livestock access to streams; protecting and restoring tidal wetlands; upgrading forest management roads. Each option was associated with a specific cost or benefit to society for additional land purchases.

The overall valuation process involved five small group sessions consisting of 89 local residents drawn randomly from utility ratepayers. Participants were asked to select the most desirable actions and asked if they would be ‘willing to have society pay’ additional money (US$ millions) in added taxes to implement the policy option. As a result the researchers were able to place a lower-bound (US$ 3000) and an upper bound (US$ 5000) on the social value for each additional acre of protected salmon habitat. The data were then used by Tillamook Bay National Estuary Project managers to decide whether or not it was worthwhile to purchase marginal farmland at US$ 3000–5000 per acre to attempt to restore the full range of ecological services. These results show strong support for adapting a structured group decision process to both clarify tradeoffs among different policy objectives and derive meaningful estimates of the social economic value of ecosystem goods and services.

The project team argued that this process of clarifying trade-offs among different stakeholder objectives is essential to the development of more effective, cost efficient, and broadly acceptable environmental policies. It was suggested that linking scientific input and local participation effectively will require a greater familiarity and comfort with analytical techniques such as eliciting objectives from community stakeholders, decomposing problems and actions into their component parts, and evaluating trade-offs across multiple dimensions of value. Moreover, the
project indicated that the process of engaging people in a process of refining and
distilling options was at least, if not more important that the DMV exercise itself. It
suggested however that these techniques will be well worth the added costs (in staff
training, for example) because it will result in more defensible project
recommendations and a closer alignment of project efforts with existing local and,
national priorities.
Case Study 3 - Mitigation of carbon dioxide emissions


A recent experiment of the influence of deliberation on individual WTP values for mitigation of carbon dioxide emissions was conducted by social psychologists in the USA. The mitigation measure focused upon was sequestering CO₂ by way of the planting of trees. It therefore focused on a regulating ecosystem service. Individuals were asked to state WTP values first through private (mailed) survey and after structured small-group discussion. Among the findings the process revealed that:

- *Deliberative-group respondents considered a greater number and broader range of issues* - from the nature of underpinning scientific evidence surrounding global warming, to the location of tree planting - in making their responses than standard survey respondents.

- *WTP values did not significantly change as result of participation in group discussions.* This finding contrast with Example 1 (and other studies such as Alvarez-Farizo and Hanley, 2006) which suggest that WTP estimates tend to be lower after a deliberative process.

Of particular interest, the data do not support a simple distinction between individual and social values. Rather, ‘the survey mode frames the WTP question in terms of a charitable contribution or a consumer purchase ... [whereas] group discussion frames the question as a public policy problem’ (Dietz *et al.*, 2009: 337). Individuals ask different questions of themselves and others, depending on the two ways of thinking about the task. In ‘survey mode’ they adopt an economic orientation – ‘how much do I support this cause?’ and ‘how much could I afford to contribute’? The authors report 66% of survey respondents thought about the positive attributes of the mitigation proposal whilst 50% also considered personal financial issues in their WTP. By contrast, in group-deliberation mode, ‘they thought and acted like policy-analysts’ (Dietz *et al.*, 2009: 343), asking different questions, including: is climate change a real problem? How will the proposed policies work? Would there be better ways to achieve the outcome? Respondents commented on implementation issues (94%), alternative solutions (54%) and scientific evidence (45%). Personal financial issues were only mentioned by roughly one third of the sample.

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One conclusion from the Dietz et al. (2009) study is worth quoting in full:

‘In terms of estimating societal WTP, the data show that even a simple simulation of societal discussion can change the way people think in considering their preferences for environmental improvements. Thus, societal WTP calculated from a CV survey early in the history of public debate on an environmental issue may yield different results from what would be found later on, because the societal debate may change the way people see the issue and the kinds of values they see as being at stake. The results also suggest that the same environmental improvement, presented in association with different policies for achieving it, may yield different estimates of societal WTP.... These possibilities deserve investigation in future experiments that manipulate both the mode of presentation (individual vs. group deliberation) and the policies offered for achieving the same environmental objective. (343).

The consumer-citizen distinction, first drawn by Sagoff (1988) to describe the two roles that individuals might adopt in responding to questions about environmental valuation, find expression in what were described in Section Three as ‘self-regarding’ or ‘other regarding’ perspectives. As Dietz et al. (2009: 344) conclude: ‘[E]ven minimal group discussion seems to prompt citizens to think in terms of public values – the appropriate kind of thinking for public policy decisions – rather than in terms of individual considerations, such as charitable contributions, that dominated when responding to a standard CVM survey’.

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Introduction

4.1 Appraising costs and benefits of proposals in non monetary terms can be approached in variety of ways: from desk-based and 'lighter-touch' qualitative approaches, such as interviews and focus groups, to more deliberative techniques, such as in-depth discussion groups and citizens juries. At their most advanced deliberative techniques can be used to support a process of multi-criteria analysis within Impact Assessment and policy appraisal. In this section we introduce these techniques and illustrate how they can be used.

Desk based approaches

4.2 While desk based approaches are formally outside of the scope of this guide it is worth emphasising from the outset that documentary analysis provides decision makers with one approach in which assessments of non-monetary values can be derived. Related government guidance on policy evaluation from a social research perspective – the Magenta Book\(^\text{36}\) - explains that:

“Documentary analysis uses public and private documents as data. Documents can be both written documents (for example, parliamentary papers, administrative historical records, public reports; private letter, diaries and notebooks) and non-text documents, such as photographs, maps and plans, videos and DVDs”

4.3 The guidance suggests that documentary analysis can be used to provide important background information to an intervention, (for example prevailing social/cultural attitudes to, and uses of a particular habitat) and can be useful in contextualising other forms of data collection in appraisal processes (such as data expressed in numbers and statistics). There is a need to think laterally about the types of sources available for conveying values for ecosystem services. There are a range of conventional sources available, such as distilling the findings of published social research on a related issue, but it may also involve working with less conventional sources, such as values for ecosystem services embodied in art and literature. Using a range of documentary sources can give the decision maker and analyst a ‘feel’ for what may be at stake in a proposal.

**Basic survey and deliberative approaches**

4.4 Survey based techniques tend to be used in the earlier stages in the policy cycle. For instance, they can be usefully deployed to inform an understanding of stakeholder priorities as options are being formulated. In the context of policy appraisal and impact assessment, survey based approaches have an exploratory element to them: policy makers and analyst are able to discern the likely costs and benefits of change, and how particular stakeholders stand to win and lose. There are three main techniques:

- **Structured questionnaires**
  The structured questionnaire is a way of collecting quantifiable information about peoples’ views and behaviour regarding a particular issue. Questionnaires employ a consistent approach to the content and phrasing of questions and link these to coded response scales (such as tendency to agree/disagree). This allows standardised, and therefore highly comparable, data to be produced.

- **Semi-structured interviewees**
  Semi-structured interviews are a way of collecting detailed qualitative data about a respondent’s view experience and insights on a particular subject. The approach generally uses open-ended questions to explore ideas. The content and phrasing of questions will often vary between interviews. There is scope for interviewees to develop ideas in unanticipated ways relevant to the particular subject.
• **Focus groups**
  A tightly-structured, intensive, face to face group interview technique designed to elicit perceptions and thoughts regarding a particular issue. Information is provided in a qualitative format. Unlike semi-structured interviews or structured questionnaires, the emphasis is on producing reasoned insights about a topic through interaction.

4.5 Deliberative techniques involve working constructively in a group setting by sharing experience about an issue, testing knowledge claims, learning from one another and acknowledging where consensus/divergence exists\(^\text{37}\). At early stages in the policy cycle they are appropriate to exploring issues where there are known controversies regarding desirable outcomes. Because they emphasise group learning and evolution they also fit well with aspirations for continuous assessment and reassessment of goals and actions across the policy cycle. Two key deliberative techniques are:

• **In-depth discussion groups**
  This technique is designed to elicit perceptions, and thoughts of a group regarding a particular issue in a qualitative format. Unlike focus groups, the discussion group is more open in structure, and generally sustained over a number of occasions. Participants shape the terms of the discussion, developing themes in ways relevant to their own needs and priorities.

• **Citizens’ Juries**
  This technique involves a small cross section of the general public (a ‘jury’), usually 15-20 people, coming to a considered judgment (or ‘verdict’) about a policy issue through detailed exposure to, and scrutiny of, the relevant evidence base. The evidence base is presented to the jury in the form of oral and written testimony at a formal ‘jury event’ (the ‘proceedings’).

4.6 Three short case studies are considered below to illustrate how survey and deliberative have been used in contexts relevant to the non monetary valuation of ecosystem services. See Main Guide for Section 4.

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Case Study 4 - Exploring the cultural ecosystem services of marine landscapes through questionnaire survey


This study illustrates the use of survey based approaches for understanding non monetary values associated with ecosystem services. The policy context for the research concerned proposals for offshore wind farming in the German North Sea. The study explains the controversial nature of wind farm development in terms of their impact on marine areas. Before the study took place impact assessments for these areas had been conducted at different spatial and temporal scales. The authors’ note how critiques of the wind farm proposals centred on concern over their impacts on the amenity and recreational value of the landscape. – “despoil[ing] the horizon and severely impact[ing] on tourism”. There had been some localised campaigns to resist these developments.

The authors of the study undertook an extensive postal questionnaire survey in area of potential future development to examine in greater detail how and to what extent the non monetary benefits derived from marine cultural ecosystem services shape arguments for and against offshore wind farming. The study analysed 387 questionnaires considering how members of the public understood seascapes in terms of issues such as sense of place, spiritual services, recreation and cultural heritage. Results showed that 56.1% of all respondents were opposed to potential developments and that economic considerations were ranked very lowly when rationalising the costs and benefits of change. Key considerations in arguments against these developments, for instance, were the negative impact on aesthetics (21.8% of all respondents) and concern over nature conservation (15.1%). In contrast, the basis of supportive arguments were on environmental grounds; a concern to produce clean energy (23.3%).

The authors argue that in the context of beginning to appraise policy proposals “surveys offer a useful tool for gaining insights into intangible values ascribed to ecosystems by groups of stakeholders. Results can enhance the visibility of intangibles and enable their ranking in order of relative importance”. 
Case Study 5 - Exploring perceptions of the Thames Estuary through focus groups


This study was focused on public understandings of the tidal Thames environment. The study took place at a time when a number of measures to foster integrated management of the estuarine resource had already taken place. Unlike case study 4, which was based on a hypothetical future intervention, the focus of this research was about informing a new cycle in policy development and in particular, whether relevant bodies could “expect and use public support for its policies of further enhancing the Tidal Thames environment and habitats”.

The study involved focus groups of approximately 8 participants and totalling 63 participants in total. The groups followed a discussion based format involving a list of key topics and questions. Photographic materials of foreshore encroachment were also used as a stimulus for debate. In addition a questionnaire was used in conjunction with the technique in which participants were asked to rank 14 selected issues as problems for the Thames environment. In doing so, the study revealed a range of non monetary factors that could, in principle, be taken forward in future rounds of policy appraisal from concern about large, potentially state changing activities, such as property development in the estuary, to lower level interventions, such as concern to enhance vegetation cover alongside the riverside.

While, the objective of the study was not to generate such criteria the principle holds that these techniques provided a snapshot of how people think and feel about priorities for a landscape under change. Interestingly, the study issues a note of caution in how public groups may lack understanding/awareness of some of ecological processes and therefore corresponding ecosystems services already being provided and enhanced in the estuarine landscape. Improvements in water quality, and an understanding of the value of estuary mudflats, for instance, were cited as cases in point. The authors warn that some of the Thames estuarine resources may be consequently undervalued in appraisal. This finding tends to reinforce the point that engagement techniques for valuing ecosystem services should ideally have a strong learning aspect to them if estimates of values are to be considered sound. Deliberative processes therefore provide an important mechanism/opportunity for this.
Case Study 6 - Shaping policy priorities using the Citizens’ Jury technique


A Citizens Jury was used to explore public views on air quality in order to inform the development of future policies and strategies to achieve specific policy outcomes. Twenty-two jurors from a 12 mile radius of Sutton Coldfield were randomly recruited by telephone. The jury process was based on addressing a series of questions, formulated by the jurors themselves:

- Is there a continuing problem with air pollution?
- If so what kind of problem is it?
- What actions would be preferable?
- At which level should decisions on actions be taken?
- At what level should actions be taken?

Witness presentations and questioning followed by a juror discussions resulted in a final list of recommendations for the sponsor. The jurors’ conclusion included a desire to minimise adverse health effects; support for ensuring a competitive UK economy that provides jobs; and belief in the fair treatment of less well-off members of UK society. They did not expect any organisation or individual to have the freedom to pollute in a way that would seriously affect the health of others.

However, the jurors did not expect controls over pollutants to be so tight that the competitiveness of UK industry was adversely affected. Government was expected to take a number of actions: regulate the emission of air pollutants; rewarding good behaviour as well as punish failure to comply with regulations; raising the understanding of the impact of individual behaviour on air quality; and supporting investment in cleaner technologies and promote their uptake.

The jurors said that any Government expenditure should be seen as an investment, rather than a cost, largely due to the beneficial impact of better air quality on health.
Analytic-deliberative approaches: multi-criteria analysis

4.7 In this final subsection we introduce multi-criteria analysis (MCA) as a further way of potentially approaching valuation.

4.8 In general terms, MCA encompasses a range of techniques for assessing decision problems characterised by a large number of diverse attributes. They are designed to address the difficulties that decision-makers have in handling complex information in a consistent way. The common feature of all MCA techniques is that they break a decision problem down into its component objectives and then develop and apply criteria to measure the performance of options/actions against those objectives.

4.9 Application of MCA across government is already the subject of formal guidance in the form of CLG’s (2009) *Multi-criteria analysis: a manual*[^38]. This section rehearses the main arguments of this work and exemplifies it in the context of ecosystem services.

**Key Characteristics of MCA**

4.10 The development of MCA approaches in environmental research is a growing area of innovation and one that has found validity in formal government advice in the context of non-monetary valuation. For example, while the Green Book does not dictate which approaches should be used to consider ‘unvalued’ impacts or how these should be applied, it does, identify multi-criteria analysis as one way of thinking about this issue.

4.11 According to Proctor and Drechsler (2006)[^39], the key four key technical steps of a MCA involve:

1. identifying the alternatives or options that are to be investigated in coming to a decision;
2. determining a set of criteria by which to rank these alternatives;
3. establishing preferences or weights for the various criteria; and,
4. undertaking an aggregation procedure by which the criteria-specific rank orders are aggregated into a single ‘compromise’ rank order.

An important part of this fourth step is to conduct sensitivity and robustness analysis to order to examine how different preferences affect the outcome of the aggregation and how robust the compromise rank order is with respect to these preferences.

to deviations in the preferences. The ultimate outcome of this process, which may take several iterations, is a preferred option, or set of options.

4.12 In technical terms what differentiates one MCA technique from another principally relates to how they combine data on the performance of options according to criteria. Variants of MCA are considered in detail in the CLG (2009) MCA manual.

4.13 MCA does not constitute a participatory process in and of itself, although when applied properly, it involves working with experts and stakeholders. In principle MCA can be used as a relatively light touch technique to select a short list of options, before moving on to full CBA.

4.14 A range of deliberative and participatory forms of multi-criteria analysis have been developed in recent years. The approach essentially varies in terms of who participates in the process and the degree to which they are involved in different stages of the process. So for instance key variants include:

- **Multi-criteria mapping** (MCM) is an interview based MCA technique focused on specialists and professional representatives. This approach is appropriate to the appraisal of policies, programmes or projects in the context of an ecosystem approach where interested and affected stakeholders have well established knowledge and viewpoints on the issue in question but where the performance of policy options is uncertain and underlying value judgments are contested.\(^{40}\)

- **Stakeholder decision analysis** (SDA) is a group based MCA, again focused on involving specialists and professional representatives. The standard SDA method involves 10-15 professional stakeholders coming together in repeat deliberative workshop processes to inform the MCA. The chief advantage of SDA over MCM is that it introduces a group learning/dynamic to MCA process.\(^{41}\)

- **Deliberative Mapping** (DM) is a group based MCA, but also opens the process up to members of the public as well. This approach is

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4.15 Despite these variants all of the approaches exhibit the basic structure of multi-criteria analysis. They integrate formal quantitative multi-criteria techniques with PDTs and provide qualitative evidence of the reasoning and judgments underlying valuations. In the context of participation SDA and DM can be regarded as analytic-deliberative processes\footnote{Further overviews of these approaches can be found in Stagl, S. (2007) SDRN Rapid Research and Evidence Review on Emerging Methods for Sustainability Valuation and Appraisal (Sustainable Development Research Network)}. 

4.16 A worked example of a MCA in practice, encompassing both monetary and non-monetary elements, is provided below (Case Study 7) to illustrate some of the reasoning behind the MCA process in the context of valuing ecosystem services.

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**Case Study 7 - Managing the Goulburn-Broken Catchment**

**Follow up:** Proctor W, Drechsler M, (2006), Deliberative multicriteria evaluation Environment and Planning C: Government and Policy, 24, 169 – 190

This case study centres on water management in the Goulburn-Broken Catchment of Victoria, Australia. The decision context is summarised in Box 5 and the overall MCA approach adopted in Figure 4.

The MCA follows the generic steps of the method and links this to participation via the use of a modified version of the Citizens’ Jury. Where the jury technique is usually focused on recruiting the public in to assessments of options, in this study the participants were the “natural resource managers - the decision makers in charge of strategies for recreation and tourism in the region” (Proctor and Drechsler, 2006:174). In other words the MCA centred on the professional stakeholders and is analogous to the generic approach of **Stakeholder decision analysis**. They therefore called the jury process a ‘stakeholder jury’, rather than a ‘citizens’ jury’

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The Goulburn-Broken Catchment of Victoria, Australia, covers an area of 2.4 million ha that stretches from just north of Melbourne in the south to the Murray River in the north. The catchment is characterised by substantial environmental problems including soil salinity, rising water tables, and poor water quality. About 200,000 people live in the catchment and land uses include irrigated dairying and horticulture in the lowland parts; dry land grazing and cropping in the middle regions; and hobby farming, tourism, and recreational uses in the southern highland areas. The case study report[s] on this last part of the catchment (known as the `upper catchment'). The upper catchment is renowned for providing the opportunity to the population of nearby Melbourne (3.4 million people) to enjoy the magnificent scenery and tourism activities that are offered there, including skiing, four-wheel driving, bushwalking, camping, horse riding, and sightseeing. The influx of tourists (around 2 million) each year has, however, caused serious environmental problems for the area which need to be addressed quickly. Many of these problems are related to water issues in the catchment, which have flow-on effects for users further downstream. Both the Goulburn and Broken Rivers flow into the Murray River, which has its mouth near the city of Adelaide in South Australia. Issues which affect water in the upper catchment therefore may also affect water as far away as Adelaide.

(Proctor and Drechsler, 2006: 169)
Defining Objectives and Identifying Options

The stakeholders identified an overall set of objectives for management, devising a series of options to deliver them, and a set of decision criteria by which these assess their importance. In this case, the agreed objectives for the MCA were to:

- protect and enhance the environment and natural attributes of the catchment that attract recreational users; and,
- balance recreational development and use of the catchment (particularly in riparian zones) with the social, environmental, and economic values of the community.

A characterisation of the options and the key criteria established to judge these is presented in Table 4. Included in the five options were a base line 'business as usual' option and a 'sustainable mix' option, which some stakeholders had been involved in developing as part of a strategy for sustainable tourism and management. The criteria were a mix of qualitative indicators (based on expressing opinion) and secondary data.

Establishing Impacts

In order to establish the impacts of each option, an impact matrix was constructed. The performance of each option was assessed by the research team, with the assistance of expert input, against each of the 13 criterion. These were translated into a standardised (cardinal) scale as the basis for aggregation (Table 5).

Establishing Weights and aggregating criteria

The process of eliciting weights for each of the criterion went through a number of iterations as participants were informed about the options by expert witnesses at a jury event and discussed underpinning reasoning. Ultimately the jury were asked to provide a weighting of the various assessment criteria to reflect each individual juror’s priorities (Figure 5A).

The research team calculated a `net flux' to determine the ranking of the option (the higher the net flux, the higher the rank) with the weighting of each decision maker contributing equally to the final results. This involved calculating the mean and standard deviation of the net flux. In this context the standard deviation indicates whether there is consensus on the rank order of options: the smaller the standard deviation compared with the differences between the average net fluxes of two options, the more conclusive the ranking, that is, the higher the consensus.
<table>
<thead>
<tr>
<th>Option</th>
<th>Descriptor</th>
<th>Ecosystem services criteria</th>
<th>MCA Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business as usual</td>
<td>This option represents the current scenario for the recreation and tourism industry in the region. Carrying on with the current practice raises a number of concerns. These concerns include the effects of growing numbers of tourists which will result from population increases; improved vehicles and better roads making access easier; and increased international demand for recreation in the area</td>
<td>Maintaining water quality</td>
<td>Quantity of phosphorus (P) present in the water, in milligrams per litre.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maintaining water quantity</td>
<td>Measured by means of a discharge indicator, in thousands of mega litres.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Preserving biodiversity/native biota</td>
<td>Qualitative indicator, where 10 signifies high biodiversity and 1, low.</td>
</tr>
<tr>
<td>Maximise ecosystem services outcomes</td>
<td>This option essentially means a policy of no access to any of the recreation and tourism sites that are under threat from environmental damage (including national parks and state forests in the region). The benefits to ecosystem services would be immense, but these would come at enormous cost to the local community from the lack of domestic tourists, and also costs to the state from a lack of international tourists. There would also be costs to all individuals in terms of the loss of aesthetic experience</td>
<td>Soil maintenance through sediment filtration/ retention</td>
<td>Qualitative indicator, where 10 signifies high sediment filtration and 1, low, is used.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Erosion control</td>
<td>Qualitative indicator, as above: from 10 (high) to 1 (Low)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nutrient management/ waste assimilation</td>
<td>As above: 10 (High ) to 1 (Low)</td>
</tr>
<tr>
<td>Maximise social outcomes</td>
<td>This option emphasises employment for local people and therefore targets issues such as job creation and job training in the recreation and tourism industries. This includes jobs and training in such activities as ecotourism, four-wheel drive tours, camping excursions, environment education tours, and expansion of the local hospitality and accommodation markets. There is little concern for the impact on ecosystem services which are not noticeable to tourists (for example, water quality), but the impacts of activities on visible ecosystem services (such as the aesthetic appeal of a site) would have to be taken into account as without these visible services there would be no tourism industry.</td>
<td>Provision of shade and shelter</td>
<td>As above: 10 (High provision) to 1 (Low)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stream health including in-stream and riparian zones</td>
<td>Used an ‘index of stream conditions’ encompassing factors such as aquatic life and hydrology</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Aesthetics/scenic views</td>
<td>Qualitative indicator, from 10 (High appeal) to 1 (Low)</td>
</tr>
<tr>
<td>Social/cultural criteria</td>
<td></td>
<td>Public access</td>
<td>Qualitative indicator of 10 (High public access) and 1 (Low)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jobs</td>
<td>Total number of people employed.</td>
</tr>
<tr>
<td>Maximise economic outcomes</td>
<td>This option represents the policy of access to all areas, and therefore achieves maximum short-term profits to the recreation and tourism industry. These measures would be undertaken regardless of environmental effects: for example, there would be no concern for remedial work or conservation-related infrastructure (boardwalks, etc).</td>
<td>Maintenance of cultural and heritage values</td>
<td>Qualitative binary indicator used: 1 = indicates that the cultural and heritage values are maintained; 0 = not maintained.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Education</td>
<td>Qualitative binary indicator used: 1 = option encompasses educational programme; 0 = does not include.</td>
</tr>
<tr>
<td>Sustainable tourism/ environ./ society</td>
<td>This option essentially incorporates the items found in the Goulburn Broken Catchment Management Authority Upper Goulburn Recreational Waterway Strategy. The plan represents a more balanced approach to the concerns related to environmental, economic, and social issues.</td>
<td>Economic criteria</td>
<td>MCA Measure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Direct/indirect mon. costs</td>
<td>AUS $, (using existing available data)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Direct/indirect monetary benefits</td>
<td>AUS $, (using existing available data)</td>
</tr>
</tbody>
</table>
Table 5. Impact Analysis

<table>
<thead>
<tr>
<th>Ecosystem services criteria</th>
<th>Indicator</th>
<th>Option [See key below]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Current</td>
<td>Max ES</td>
</tr>
<tr>
<td>Maintaining water quality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mg/l P</td>
<td>0.02</td>
<td>0.005</td>
</tr>
<tr>
<td>Maintaining water quantity</td>
<td>Discharge</td>
<td>150</td>
</tr>
<tr>
<td>103 ml</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Preserving biodiversity/native biota</td>
<td>Qualitative 10 = high; 1 = low</td>
<td>3</td>
</tr>
<tr>
<td>Soil maintenance</td>
<td>Qualitative= 10 = High, 1= low</td>
<td>7</td>
</tr>
<tr>
<td>Erosion control</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Nutrient management/ waste assimilation</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Provision of shade and shelter</td>
<td>35-41</td>
<td>42-50</td>
</tr>
<tr>
<td>Stream health including in-stream and riparian zones</td>
<td>Very Poor = 0–19, Poor = 20–25, Moderate = 26–34, Good = 35–41, Very Good = 42-50</td>
<td>35-41</td>
</tr>
<tr>
<td>Aesthetics/scenic views</td>
<td>Qualitative: 10 = high; 1 = low</td>
<td>5</td>
</tr>
<tr>
<td>Social/cultural criteria</td>
<td>Public access</td>
<td>Qualitative= 10 = High, 1= low</td>
</tr>
<tr>
<td>Jobs</td>
<td>Number (thousands).</td>
<td>15</td>
</tr>
<tr>
<td>Maintenance of cultural and heritage values</td>
<td>Qualitative: 1 = maintained; 0 = not maintained.</td>
<td>0</td>
</tr>
<tr>
<td>Education</td>
<td>Qualitative: 1 = includes; 2 = does not include.</td>
<td>0</td>
</tr>
<tr>
<td>Economic criteria</td>
<td>MCA Measure</td>
<td>Direct/indirect mon. costs</td>
</tr>
<tr>
<td></td>
<td>2.5-3.5</td>
<td>Direct/indirect monetary benefits</td>
</tr>
</tbody>
</table>

**Key:** Max ES = Maximise ecosystem service outcomes, max S = maximise social outcomes; max Ec = maximise economic outcomes, mix = sustainable tourism/environment/society
Figure 5. Stakeholder weights and final option ranking

A  Weighting for each stakeholder [each shape represents a stakeholder]

B  Final ranking of options [Black column = mean flux; Grey column = Standard Deviation]
The final results of the exercise are presented in Figure 5b. In this particular scenario the mixed option (the prevailing strategy) was endorsed through the scoring and weighting process.

There are an important number of subtleties to this example that are obscured here to demonstrate the basic reasoning behind MCA. The study notes how rankings and weightings in the MCA changed as stakeholders were exposed to more information about the options and pooled information. While the ‘maximizing ecosystem services’ option does not come out top its significance as an option markedly changed/improved over the process. However, the important underlying point is that when MCA procedures are linked to a deliberative process then non-monetary valuation of ecosystem services can begin to be incorporated.

Summary

4.17 MCA when linked to a deliberative process is designed to serve as an aid to thinking and decision making. While the goal of a particular MCA may be to provide an ordering of options, the process of undertaking it, and the focus given to it, can be as illuminating as the end result.

4.18 MCA offers a large degree of flexibility in terms of the values that can be considered within decision making. While at one level, MCA is most closely associated with the process of bringing non-monetary values formally into decision making, it is important to recognise that MCA criteria used to evaluate an option may be either non-monetary or monetary in expression or they may be both. As the CLG (2009)\(^{44}\) guidance notes, for instance, CBA itself is a form of multi-criteria analysis: it is examining multiple criteria (i.e. cost and benefits) but doing this in a monetary way.

4.19 Different levels of analysis in an IA may benefit from the use of MCA. The example described above suggests a complex analytical and deliberative process that takes time and skill even when small numbers of expert participants are involved. As they suggest:

“The jurors .... had two days of face-to-face discussion (the first day involved the identification of issues and from those the relevant options, objectives, and criteria; and the second day involved the deliberative process) but in between these face-to-face sessions the

jurors had involvement with the issues through a larger Ecosystem Services Project meetings as well as information exchange via e-mail. Such processes involving citizens would have to allow for a longer time frame for participants to understand the complex issues, as well as the practicalities of the procedure itself, and to engage in longer deliberations as required” (Proctor and Drechsler: 189).

4.20 However, in practical terms, the general principles of an MCA can be deployed to varying degrees of analytical and deliberative complexity. There is no inherent reason why these techniques cannot be deployed to engage stakeholders in basic discussions regarding the types of criteria that are more or less significant for appraising the costs and benefits of change.
Section 5  Conclusion

5.1 The purpose of this guide has been to demonstrate how participatory and deliberative techniques can be used to inform approaches to valuation in decision making.

5.2 By arguing for holistic valuation an Ecosystems Approach (EsA) suggests that the choice is not one of using either monetary or non-monetary valuation methods but, rather, of using a combination of both approaches. Since we can manage the relationship between ecosystem services and human well being in a variety of ways, it is important to take a holistic approach when assessing what matters and why. Individuals and communities hold different priorities about ecosystem services and procure benefits from nature in different ways. An EsA recognizes that the management of these services is a matter of societal choice, but the values we hold about nature are by no means uniform.

5.3 More generally, the particular choices we make can often conflict with wider longer term freedoms: it is often unclear whether the cumulative impact of our decisions will lead us to pass fundamental ‘limits’ and ‘thresholds’; that is, whether the underpinning function of ecosystems will be sustained by benefits we procure from them. These limits and thresholds are beset with uncertainties. Making decisions involves linking our values to the best available evidence.

5.4 While opportunities to use monetary and non monetary valuation will vary according to purpose, as well as practical constraints to working, the general argument of an EsA is that engaging with a plurality of values is integral to good decision making processes, and more likely to lead to robust and resilient decision outcomes.
Further reading

General theoretical arguments

A useful reference for following up general theoretical arguments made in this paper is:

Turner, R.K., (2010) *A pluralistic approach to the valuation of ecosystem services*  
*CSERGE Working Paper EDM 10-07*


Deliberative monetary valuation

Key suggested references for following up arguments made about deliberative monetary valuation:


Deliberative Multi-criteria Analysis

Useful insights on recent theoretical and applied work on DMCA in contexts relevant to ecosystem service valuation are now emerging. This includes:


Materials relating the general use of participatory and deliberative techniques in the context of EsA relevant process can be at the end of the Main Guide.
Glossary

**Analytic-deliberative techniques** - participatory techniques that integrate technical forms of analysis into a deliberative process.

**Citizens’ juries** - a deliberative technique in which a small group of the general public come to a considered judgment about a stated policy issue/problem through detailed exposure to, and scrutiny of, the relevant evidence base and expert witnesses.

**Cost benefit analysis** – An appraisal tool for comparing the ‘pros’ and ‘cons’ of options for decision makers.

**Deliberation** - the process of making a reasoned assessment - typically through a process of group debate and learning - about an ethical or practical uncertainty within decision making.

**Deliberative monetary valuation** - an analytic-deliberative technique that employs deliberative processes to express values for environmental change in monetary terms.

**Deliberative multi-criteria analysis** – a set of techniques that involve groups of stakeholders designing formal criteria against which to judge the non monetary and (sometimes) monetary costs and benefits of different management options as the basis for making a decision. Techniques vary according to the types of stakeholders involved.

**Engagement** - the general process of interacting with stakeholders in a decision process including dissemination activities, consultation processes and active collaboration.

**Expert** – any individual recognized as having authoritative understanding of an issue/topic.

**Ecosystem services** - those aspects of ecosystems which are utilised, actively or passively, to produce benefits to human well-being

**Ecosystems approach** - a set of principles for incorporating consideration of ecosystem services into decision making.

**Focus group** - a semi-structured face to face interview in a group format.

**In-depth discussion groups** – a deliberative technique for eliciting the insight of group regarding a particular issue. Unlike focus groups, the discussion group is more open in structure, and generally sustained over a number of occasions. Participants
shape the terms of the discussion, developing themes in ways relevant to their own needs and priorities.

**Stakeholder** - any organization, group or individual affected by, with an interest in, or influence over, a decision making issue.

**Stated preference techniques** - techniques to generate monetary values where conventional markets do not exist, or where conventional and proxy markets are considered an inadequate guide to values.

**Participation** – a way of engaging stakeholders in decision making based on the exchange, interaction and reciprocity of information and ideas.

**Participatory and deliberative techniques** – the practical tools for involving stakeholders in a decision making process either through the solicitation of views or collaboration.

**Specialists** - experts who are formally recognized as having knowledge and understanding of a precise area of research and practice either by way of accumulated professional experience and/or qualifications.

**Lay expert** - individuals who have non-professionalised expertise on an issue/topic.

**Representative** - stakeholders who formally or informally stand in for the views of others.

**Revealed preference techniques**: techniques for valuation based on deriving monetary values from real and proxy markets (such as the travel cost method).

**Semi-structured interview** - a survey technique using open-ended questions to collect qualitative data about stakeholder attitudes, knowledge and behaviour. Content and phrasing of questions, as well the emphasis given to topics, may vary over the sample.

**Structured questionnaire** - a survey technique for collecting quantifiable and standardized information about peoples’ views and behaviour regarding a particular topic.

**Survey** - a method for learning about the attitudes, knowledge and behaviour of stakeholders regarding a topic.

**Valuation** - the process of expressing and estimating the worth of something. Formal approaches to valuation in policy and decision making involve understanding the relationship between costs and benefits of a proposed change. This may have monetary and non-monetary dimensions.
<table>
<thead>
<tr>
<th>i</th>
<th>The decision to use a combination of monetary, non-monetary, quantitative and qualitative participatory and deliberative tools in the technical appraisal stage of the IA raises questions about how their quality should be appraised. It is important to ensure that every value-producing technique used as evidence in an ecosystem services policy-appraisal process is reliable and capable of results which are recognised to have validity.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ii</td>
<td>Ensuring the quality of knowledge about the multiple benefits of ecosystem services (provisioning, regulating, supporting and cultural) is difficult since it requires evaluation of evidence produced under different philosophical, theoretical and methodological assumptions. Standards used to judge qualitative evidence will not be applicable to quantitative data, and <em>vice versa</em>.</td>
</tr>
<tr>
<td>iii</td>
<td>Given the novelty, scientific complexities and uncertainties associated with ecosystems valuation, a strong case can be made for a continuous process of quality control review at each stage, especially if dealing with potentially sensitive issues.</td>
</tr>
<tr>
<td>iv</td>
<td>For the technical components of the appraisal, generic quality checks from an economics perspective are summarised in <em>Box 6</em>, which should be applied to an ecosystem valuation whether to help design and conduct new work to support the policy appraisal process, or as an evaluative framework for pre-existing work, especially if a benefits transfer approach is being adopted for the policy appraisal.</td>
</tr>
<tr>
<td>v</td>
<td>A summary of the quality checks that should be applied to qualitative research, a key feature of many of participatory and deliberative techniques, is provided in <em>Box 7</em>. Further and more detailed guidance on can be found in Spencer <em>et al</em> (2003)(^45)</td>
</tr>
</tbody>
</table>

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### Box 6. Generic quality checks for monetary ecosystem services valuation

1. **Overall study design.** Key questions to ask are whether the study aims are coherent, reasonable and measure what it intends to measure. For example:

   - Will (has) an appropriate valuation technique been used? For example, only Stated Preference methods can capture non-use value quantitatively.
   - Will (has) the correct welfare measure be used taking into account property rights and the nature of environmental change?
   - Will (has) the study be subject to external review?

2. **Data and statistical analysis.** A key constraint in ecosystem services valuation is the quality and appropriateness of the data being used and the analytical methods adopted. For example:

   - In general, primary data is preferred because it is generated for the specific study purpose.
   - Will (has) the appropriate biophysical data be collected for measuring the ecosystem service?
   - Are samples based on appropriately defined target populations, sampling frame and sampling methods?
   - Is best practice being followed in data collection?
   - Is the statistical analysis appropriate?

3. **Validity and reliability of estimates and aggregation issues.** Assessment of the validity (the study measures what it purports to measure) and reliability (the degree to which the results are reproducible) of a valuation study will determine how much confidence can be placed on the resulting welfare estimates. For example:

   - Expectations-based validity: Do the results conform with theoretical expectations and other empirical results?
   - Convergent validity: how do estimates compare with those derived from other techniques?
   - Reliability: does the estimated econometric model have satisfactory explanatory power? Do test-retest procedures indicate stability?
   - Has aggregation been appropriately conducted?

### Box 7. Generic quality checks for qualitative research

**Overall study design.** Key questions to ask include:

- Was there / is there a clear research question? What was the study design and was this appropriate to the research question? What justification was given for the selection of a qualitative approach? Was it suitable and was the right design chosen?
- What was the **context** of the study? Was it sufficiently well described that the findings can be related to other settings?
- Was the work worth doing? Has the study been subject to external review? Has it contributed usefully to knowledge?

**Data collection and analysis.** In qualitative research, ‘data’ comprise texts of different kinds (archival and/or contemporary) including written communications, verbal communications elicited through interviews and group discussions, visual communications; and unobtrusive observations of individual and group behaviour (as in participant-observation). Key questions to ask:

- **Sampling:** why were the cases chosen? Were sufficient cases/settings/observations so that conceptual rather than statistical generalisations could be made?
- **Data collection:** was the data collection process systematic, thorough and auditable? Were attempts made to identify and explore disconfirming examples?
- **Data analysis.** Were data analysed systematically and rigorously? Did the analysis take account of all observations? Were sufficient data resented? How were disconfirming observations dealt with?

**Results and conclusions.**

What were the main results of the study and in what ways are they interesting, surprising or suspect? Were there any unintended consequences arising from the research process and what were they?

Do the conclusions draw a clear link between data and a theoretical explanation? If not what were the limitations of the theoretical analysis?

**Two issues of special importance in appraising qualitative research.** Qualitative researchers/PDT process designers and facilitators are integral to the research process, deploying their interpersonal and intuitive skills, to gain access to informants, build trust and generate insights. Given this ‘positionality’, two questions are important:

- **Reflexivity.** Were the researchers / facilitators positions and roles clearly explained and the resulting biases considered? Were the researchers /facilitators preconceptions and ideology adequately set aside?
- **Ethics.** Are there any ethical reservations about the study?