Chapter 24:
Shared Values for the Contributions Ecosystem Services Make to Human Well-being

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Key Findings

Ecosystem assessment requires a consideration of shared values. 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. Whether individuals choose to regard themselves as isolated beings driven to satisfy their own needs and desires before taking account of others' needs, or whether they see themselves as wanting to moderate their rights to maximise their own satisfaction because they have shared responsibility for collective well-being, is a matter of context and philosophical perspective.

Shared values concern the values people hold for ecosystem services as 'citizens'; that is as 'social beings' capable of expressing preferences for ecosystem services not simply in terms of individual costs and benefits, but in terms of social rights and wrongs. An important dimension of shared values is, therefore, consideration of the ethical arrangements which guide society's concern for nature, place and landscape, and includes issues of altruism and existence value, as well as aesthetic considerations.

The reliability and legitimacy of decision-making processes that flow from ecosystem assessment depends on the explicit recognition of shared values. This is particularly the case when trade-offs have to be made between utilitarian, ethical and aesthetic dimensions of change. In order to ensure public trust and confidence when reaching difficult decisions, decision-makers need to be able to demonstrate knowledge and understanding of the shared values individuals and social groups attribute to their interactions with the natural world.

Consideration of shared values within ecosystem assessment and decision-making 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 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. The key techniques are 'deliberative monetary valuation' and 'participatory multi-criteria analysis'.

There is an overall need for theoretical and methodological plurality in how we assess the value of ecosystem services for human well-being. Just as there are quite different grounds on which judgments of value can be communicated and inferred for ecosystem services, so too are there many different ways in which values can be formally recorded and assigned significance. Both individual and collective values have validity in their own right to ecosystem assessment and corresponding processes of decision-making. Hybrid valuation techniques, such as deliberative monetary valuation and participatory multi-criteria analysis, hold much promise for systematic and integrated treatment of utilitarian, ethical and aesthetic considerations, although they remain at an experimental stage.

24.1 Introduction

The UK NEA Conceptual Framework (Chapter 2) emphasises the need for holistic valuation of ecosystem services. It is explained that within economic analysis the conventional focus is on assessing the monetary value of environmental goods to individuals. While this approach is fundamental to the analysis of the UK NEA, the Conceptual Framework recognises that this is not an exhaustive way of thinking about ecosystem services in the context of valuation. Holistic valuation implies the need for theoretical and methodological plurality in how we think about the importance of ecosystem services to human well-being. One important facet of this, which is the focus of this chapter, is the need to give due recognition to shared values for ecosystem services. In general terms, this dimension of the valuation debate concerns the way ecosystem services are assigned collective meaning and significance by citizens, that is, values for services that cannot be reduced to individual preferences and motivations alone. The purpose of this chapter is to consider the analytical and methodological dimensions of incorporating such shared values into ecosystem assessment alongside the conventional focus of inferring what individuals are prepared to pay for a given environmental good.

The chapter begins by revisiting some of the general arguments made in Chapter 2 regarding distinctions within economic analysis between individual and collective forms of valuation. It then goes on to consider how traditions of work within the humanities and social sciences may make sense of shared values in the context of valuation. A general distinction is drawn between interpretive methods based on analysing cultural texts, and those that involve directly interacting with people. Against this background, the chapter describes how novel methodological tools are now emerging from within ecological economics that may be used to derive monetary values for ecosystem services through collective (group-based) discussion and deliberation. These tools may be used to enhance the credibility of individual values for ecosystem services by overcoming weaknesses within conventional contingent valuation techniques; but more importantly, in the context of this chapter, they may also bring collective (social 'willingness to pay') values to bear directly upon valuation. The chapter then considers how complementary (non–monetary) values for ecosystem services can also be elicited by linking deliberative forums to multi-criteria approaches. This provides a further way of acknowledging shared values within ecosystem assessment and is important given wider philosophical problems that tend to arise when embedding ethical and aesthetic considerations into economic analysis. Finally, the chapter considers the status of shared values in the context of scenario-building, which is another important dimension of analysis within the UK NEA (Chapter 25).

24.2 Incorporating Shared Values: General Rationale

Ecosystem services valuation is an emerging area of policy appraisal where there is debate about the extent to which the full range of costs and benefits of marginal changes in provision can be quantified. Given the inherent complexity of nature, a number of different dimensions of nature-based value can be discerned and evaluated in various ways. These include: in monetary terms via economic analysis and the concept of Total Economic Value (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. Each of these dimensions of nature-based value has validity in its own domain.

Environmental philosophers have constructed a generic value typology with four categories: 'anthropocentric instrumental value' which maps closely onto the economic concepts of use and most of non-use values; 'anthropocentric intrinsic value', a culturally dependent 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. The other two value categories, 'non-anthropocentric instrumental value' and 'non- anthropocentric intrinsic value', are less directly relevant to ecosystem policy appraisal unless a radical ethical position is accepted as the societal norm, which is currently not the case (Hargrove 1992).

Within the TEV framework, the distinction is drawn between 'use' and 'non-use' values. Non-use value, such as existence value, derives from individuals who 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. The economic valuation literature has yet to reach a comprehensive consensus on whether use and non-use value can be formally distinguished using standard welfare economic measures. The use of survey-based methods, such as Contingent Valuation (CV) and Choice Modelling Experiments (CME), to elicit monetary expressions of existence values is still open to debate on the grounds of validity and reliability (Bateman *et al.* 2002; Sagoff 2011).

The conventional economic assumptions about human motivations and behaviour can be seen as quite restrictive. For example, findings from behavioural economics and psychology are extending the somewhat limited understanding within environmental economics of cognitive behaviour and the influence of networks of agents (individuals, groups, institutions and governments) on environmental values (Gowdy 2007; Welsch & Kuhling 2008; Rauch 2010). It seems that 'bequest' motivations

(i.e. the requirement to pass on, over generational time, an 'environment' which can yield at least a constant set of 'opportunities'), existence value motivations and altruistic motives may all be relevant and real in certain environmental loss contexts.

Analysts disagree over how to interpret this set of possibly overlapping motivations and behaviours. Some see the welfare effect as an individualised 'warm glow' effect connected to the act of giving, while others insist that 'pure altruism' is required for existence value and can be recognised. The debate is further complicated by consumer-citizen distinctions (Sagoff 1988): individuals may assume either a utility-maximising (consumer) or common good, 'other regarding' (citizen) role in responding to CV surveys. As citizens, individuals may hold social preference values and motivations which may be best elicited through participation in some kind of collective or public forum.

If one accepts the position (as in conventional Cost-Benefit Analysis [CBA]) that only individual preferences yield 'real' values to be taken into account in the policy process and that individual behaviour is dominated by self-interest and self-regarding motives, then only a restricted version of existence value (contaminated by the 'warm glow' effect) is possible. Thus, value estimates derived from CV surveys will not necessarily indicate 'true' economic value derived from public goals such as the ecosystem service gain/loss under test. If, on the other hand, one is persuaded that citizen-type motivations and behaviour can be recognised, then other motives and social preferences—'true altruism'—exist. In the latter case, it is necessary to consider the adoption of techniques which offer opportunities for wider public and stakeholder participation, using methods which encourage dialogue and debate to arrive either at consensus about which bequest and existence values can be elicited, or agreement to differ in which the reasons for divergence are clarified.

When focusing on anthropocentric instrumental and intrinsic value in nature, it is important to note that the former value concept is usually interpreted in economic analysis in terms of an individual person (or sometimes aggregated household) and their preferences and motivations. The latter value concept, however, can also be viewed in a collective way such that motivations and preferences can be assigned to social groups, and may be culturally transmitted and assimilated over time as social norms. These shared values may not be captured adequately through monetary valuation, but they are important. Shared values demonstrate that human well-being (a richer concept than that of human welfare) and quality of life is a function of satisfying individual 'wants', but also the fulfillment of a variety of social, health-related, and cultural collective needs.

It is also important to acknowledge that ecosystem services classifications and approaches may lead to the 'commodification' of ecosystems, with the danger of consequent policy and management failure. Such 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 overexploitation and system change or collapse. Where the value of whole environmental systems is concerned, conventional economic valuation (restricted to the flow of service benefits) may not be sufficient. It is important to assess and conserve the structural and process/functional value of 'healthy' evolving ecosystems despite the formidable uncertainties surrounding likely thresholds for system change. The fundamental life-support services provided by ecosystems are clearly valuable, and the focus on the flow of assigned ecosystem benefit values is not meant to deny this. Healthy ecosystems, anchored to a sufficient configuration of structure and process, have 'prior' value (labelled '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. So total system value is always greater than total economic value (Gren *et al.* 1994; Turner *et al.* 2003). **Figure 24.1** summarises the arguments presented so far.

The fundamental challenge, identified in Defra's (2007) 'Introductory Guide to Valuing Ecosystem Services', is how to ensure policy appraisals fully capture the benefit provided to society by ecosystem provisioning, regulating, supporting and cultural services, as well as the costs of the impacts of policies on those services. One element of this challenge is to ensure that every value-producing technique used as evidence in an ecosystem services policy appraisal process is reliable and capable of generating results which are recognised to have validity. Such assurance is dependent on a number of factors including the integrity and defensibility of data from the natural sciences relating to the primary value of the ecosystem. This is difficult given issues of spatial and temporal scale, uncertainty, non-linearity and thresholds. Furthermore, ensuring the quality of knowledge about the multiple benefits of ecosystem services (provisioning, regulating, supporting and cultural services) is difficult since it requires the 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 *vice versa*. This presents significant difficulties for economic valuation of ecosystem services if the argument above is accepted, i.e. collective benefit-values are not the same as individual benefit-values. Measurement of the latter does not ensure the former are adequately captured, which may lead to distortions in the appraisal process. Developing an impact assessment methodology able to integrate monetary and non-monetary valuation approaches may assist in resolving this issue.

In Defra's (2007) Introductory Guide to Valuing Ecosystem Services it is argued that "the choice is not a case of either economic or non-economic valuation but of using a combination of both, as required by the context of the decision". It may be the case that the context of the decision would call for engagement with a broad range of stakeholders in an ecosystem services valuation, but there may be time, financial and practical constraints which place limits on what might be possible. Full-scale participatory and deliberative processes require levels of resource that may only be available to central government.

In summary, if society is simply the sum of isolated individuals, their wants and needs are, if not infinite, many

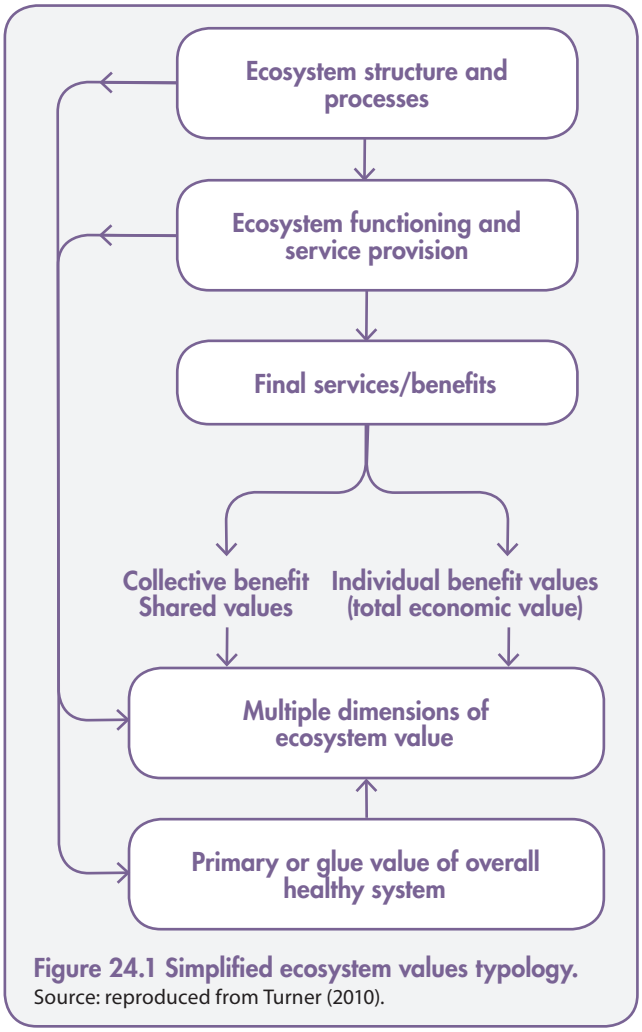

Figure 24.1 Simplified ecosystem values typology.
Source: reproduced from Turner (2010).

and diverse. If resources are scarce (relative or absolute), then CBA and its economic efficiency-based social welfare function is relevant to, and very useful for, public policy choice-making. Furthermore, given that all policy choices are made by humans, some conception of 'preferences' and their human motivation lie behind any environmental policy. Yet many would contend that collective society is more than the aggregation of individuals, other social welfare functions have validity and that techniques such as CBA tend to overlook issues of distribution, equity, fairness and justice (Sagoff 1988). They would dispute the economic (new welfare) explanation of how preferences are determined and would not agree that self-interest is the only 'rational' motivation. There are 'other regarding' preferences towards humans and other entities in nature.

24.3 Methodologies for Examining Shared Values

Shared values for the natural world are expressed through environmental discourses, practices and institutions. There is, in principle, considerable diversity in methodologies for examining these, though it would be misleading to suggest that there is a corpus of research explicitly registering its concerns as 'non-monetary assessments of the shared value of ecosystem services'. Work is placed within a variety of theoretical and disciplinary registers.

An important focus has been analysis of cultural texts: television, magazines, cinema, art and literature, official documentation and so forth (Burgess *et al.* 1991; Anderson 1997; Davies 2000; Fish 2007). As Turner (2010) explains, such texts are integral to an understanding of collective/cultural values about change. From the perspective of ecosystem services, interpretative analysis of cultural texts can help make explicit what would otherwise remain tacit assumptions regarding the aesthetic, ethical and utilitarian dimensions of ecosystem worth.

Shared values for the natural world have also been explored by surveying people. Surveys of individuals represent a basic approach with many variants: quantitative and qualitative; extensive and intensive; structured and semi-structured. For instance, a recent study of cultural ecosystem services in marine landscapes by Gee and Burkhard (2010) used an extensive postal questionnaire to explore, in part, the aesthetic controversies surrounding offshore windfarm development in the German North Sea. In contrast, Dougill *et al.* (2006) used an intensive round of face to face semi-structured interviews with key informants to build an understanding of priorities for a socially valued landscape: the Peak District in England. There is voluminous literature within academic and public policy discourse utilising such survey methodologies to explore how people value and benefit from environmental settings under threat or change.

Since shared values are, by definition, a product of social and cultural interaction, it has also been common to provide contexts in which these values can be negotiated and articulated in group settings. The practice of bringing small groups of people together to share their feelings, experiences and values for local nature and greenspace developed in the mid 1980s in the UK with the Greenwich Open-Space project (Harrison *et al.* 1987; Burgess *et al.* 1988a,b,c). The commonest metaphor used in people's talk about why urban parks and greenspace mattered was that outdoor settings were 'a gateway to a better world', valued for the multiple contributions they made to community well-being. Studies of 'talk' were combined in the 1990s and 2000s with more novel ways of observing what people actually did when out in the natural world and interacting with living nature (Burgess 1995; Hinchliffe *et al.* 2005; Wild Ennerdale Partnership 2006). Since the landmark Royal Commission for Environmental Pollution report (RCEP 1998), such studies have been complemented by the use of a range of participatory and deliberative techniques which aim to introduce environmental values into decision-making processes in ways that are not reductive, i.e. shared values have not been reduced/reconfigured into statistical, questionnaire answers.

The general term we can use to convey the idea of shared (group-based) valuation of ecosystem services is 'deliberative valuation'. By deliberation we follow Stern and Fineberg (1996) in referring to a process by which: 'people

confer, ponder, exchange views, consider evidence, reflect on matters of mutual interest, negotiate, and attempt to persuade each other. Deliberation includes both consensual communication processes and adversarial ones'.

In a methodological sense, deliberation is grounded in 'talk' and the process of in-depth discussion around a particular topic or theme, ideally sustained over an extended period of time. Deliberation provides for the qualitative expression of values for ecosystem services through the sharing of information, ideas and experiences between citizens. Like other methodologies that use qualitative approaches (such as a semi-structured interview), the focus is on gaining an understanding of why people think and feel the way they do. The formative output of a deliberative process is a well-reasoned group argument about the topic or theme under investigation. Since deliberation primarily expresses the values people hold about ecosystem services through 'words', there is a natural overlap between deliberative techniques and non-monetary forms of valuation.

As Turner *et al.* (2010) argue, through a group valuation 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'. Nonetheless, it would be an oversimplification to suggest that the valuation of ecosystem services is divided into two competing strands: either deliberative non-monetary values for 'other regarding' citizens or non-deliberative monetary values for 'self-regarding' individuals. In practice, these procedures can be coupled together in novel analytical-deliberative ways:

- Firstly, there is a body of novel work emerging that is combining Stated Preference (SP) methods with deliberative processes to elicit 'Willingness to Pay/Accept Values' (WTP/A)—so called 'Deliberative Monetary Valuation' (DMV). Not only can these techniques use shared values to inform individual motivations and preferences towards ecosystem services, but they are also giving rise to new value expressions based on an aggregate social value for change, or 'social willingness to pay';
- Secondly, there are methodologies emerging that allow non-monetary values to be expressed in quantitative terms and considered alongside monetary valuation as part of a deliberative process—so called 'Deliberative Multi-criteria Analysis' (DMCA). The process involves scoring and weighting a range of monetary and non-monetary criteria to provide an integrated and systematic assessment of priorities for decision-making.

The methodological pluralism needed for holistic valuation is, therefore, leading to more hybridised models of assessment. In Sections 24.4 and 24.5 we provide an overview of these DMV and DMCA techniques including some examples of recent work.

24.4 Deliberative Monetary Valuation of Ecosystem Services

In general terms, the development of DMV techniques reflect economists' concerns to strengthen the validity of monetary values elicited through standard SP methods. There are a number of general parameters and principles guiding DMV (Spash 2008; Turner *et al.* 2010):

- Individuals are provided with detailed information about the issues which they are asked to discuss and formally deliberate on.
- Group settings for DMV 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 reflects a more complete and socially equitable assessment.

There are four key types of DMV exercise which can be considered alongside the conventional contingent valuation survey (**Table 24.1**). A fundamental distinction within DMV

Table 24.1 Survey-based and deliberative monetary valuation: key variations. Source: reproduced from Fish *et al.* (2011).

Valuation Objective	**Individual benefit values:** Individual willingness to pay/accept			**Collective benefit values:** Social willingness to pay/accept	
Engagement Level	**Survey**	**Deliberative monetary valuation (Group-based)**			
Techniques	Questionnaire/ interview format—(Optional quality check via one-off focus group)	In-depth discussion/ workshop	Citizens' Jury, in-depth discussion group or workshop	In-depth discussion/ workshop	Citizens' Jury, in-depth discussion group or workshop
Value expression	**Individuals** express a value for what they **personally**—would pay/ accept	**Individuals** express a value for what they **personally**—would pay/accept	**Groups** express a value for what they believe **individuals** should pay/ accept	**Individuals** express a value for what they believe **society** should pay/accept	**Group** expresses a value for what they believe **society** should pay/accept

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. In a methodological sense, it is worth noting that, in situations where the focus is on a group expressing a WTP/A value, practitioners of the DMV will be able to use a citizens' jury technique in addition to more standard 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 values for what they (individually) believe they or society should pay/accept.

24.4.1 Individual Willingness to Pay/ Accept Through Group Deliberation

As a review by Spash (2008) shows, most DMV studies are attempting to increase the validity of individuals' utility WTP/A measure by using, before assessment, a deliberative process to improve: knowledge of the 'good'; scientific uncertainties; as well as the range of issues likely to impact on successful implementation of the proposal,. This approach to DMV has two dimensions. Either DMV involves individuals expressing a value for what they would personally pay/accept following a group discussion, or the group makes a collective judgment of what they believe individuals should pay/accept.

In both cases the deliberative element brings a social learning dimension to the process. Determining what individuals should pay/accept is based on some explicit or implicit negotiation of shared values. In instrumental terms, combining SP techniques with group interaction is understood to provide for a richer understanding of what is being asked of individuals and help overcome the difficulties that respondents can experience when trying to understand the elements of a hypothetical market presented to them in a survey format. Such practical benefits have been noted in a study of wild goose conservation in Scotland by Macmillan *et al.* (2002). The research involved individuals stating their individual WTP/A values in a group context. The authors suggest the process allowed misunderstandings and gaps in understanding to be resolved and, therefore, respondents could make more informed or rational decisions.

A further recent experiment of the influence of deliberation on individual WTP/A values examined the mitigation of carbon dioxide emissions and was conducted by social psychologists in the USA (Dietz *et al.* 2009). The mitigation measure focused upon was the sequestering of carbon dioxide through the planting of trees—a regulating ecosystem service. Individuals were asked to state WTP/A values, firstly through a private (mailed) survey and, secondly, after a structured, small-group discussion. Among the findings, the process revealed that, compared to mailed survey respondents, the deliberative group respondents considered a greater number, and a broader range, of issues in making their responses, ranging from the nature of underpinning scientific evidence surrounding global warming to the location of tree planting. 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' (*ibid.*). 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, while 50% also considered personal financial issues in their WTP. By contrast, in group deliberation mode, 'they thought and acted like policy-analysts' (*ibid.*), 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. One conclusion from the 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". (*ibid.*).

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, finds expression in what were described in Section 24.3 as 'self-regarding' or 'other regarding' perspectives. As Dietz *et al.* (2009) 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".

24.4.2 Social Willingness to Pay/Accept Through Group Deliberation

The two alternative options for DMV take a quite different perspective, which are more closely in keeping with the arguments made in Section 24.2. In these cases, the deliberative model involves individuals being asked to determine an 'aggregate social value of an environmental change' (Spash 2008). 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 to 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/A.

This approach to valuation remains only weakly exemplified in practice. A useful example is provided by Gregory and Wellman (2001) who developed 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 such as forestry, agriculture, tourism and 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; and 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 (US$ 3,000) and upper (US$ 5,000) boundary 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$ 3,000–5,000 per acre to attempt to restore the full range of ecological services. These results show strong support for adopting a structured group decision process to both clarify trade-offs among different policy objectives and derive meaningful social estimates of the economic value of ecosystem goods and services.

24.5 Non-monetary Expressions of Shared Values

Deliberative techniques are able to inform shared valuations of ecosystem services where monetisation is considered difficult or felt to be inappropriate. The potential for qualitative expressions of value through techniques such as interviews, focus groups and discussion forums have already been noted in above (24.3). A further additional technique is 'Multi-criteria Analysis' (MCA). Within decision-making this technique allows otherwise unvalued criteria to be considered alongside monetised costs and benefits through a more formal process of weighting and scoring. The use of participatory and deliberative techniques is considered central to the application of a MCA process.

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 and/or actions against those objectives.

Application of MCA across government is already the subject of formal guidance (CLG 2009) and, in environmental research more generally, is an area of recent innovation. According to Proctor and Drechsler (2006), the key four key technical steps of MCA involve:

i) Identifying the alternatives or options that are to be investigated in coming to a decision;
ii) Determining a set of criteria by which to rank these alternatives;
iii) Establishing preferences or weights for the various criteria;
iv) 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 analyses in order to examine how different preferences affect the outcome of the aggregation and how robust the compromise rank order is with respect to deviations in the preferences. The ultimate outcome of this process, which may take several iterations, is a preferred option, or set of options.

Multi-criteria Analysis does not constitute a participatory process in and of itself, although when applied properly, it involves working with experts and stakeholders. A range of deliberative and participatory forms of MCA 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 (Stirling & Mayer 2001).
- ***Stakeholder decision analysis*** (SDA) is a group-based MCA focused on involving specialists and professional representatives. The standard SDA method involves 10 to 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 and dynamic to the MCA process. (Burgess 2000).

- ***Deliberative Mapping*** (DM) is a group-based MCA which opens the process up to members of the public as well as specialists and professional representatives. The technique rests on integrating the approaches of SDA and MCM. This approach is best used in situations of greater risk and public controversy (Burgess *et al.* 2007).

Despite these variants, all of the approaches exhibit the basic structure of MCA. They integrate formal quantitative multi-criteria techniques with participatory and deliberative techniques, as well as providing qualitative evidence of the reasoning and judgments underlying valuations (Stagl 2007).

24.6 Shared Values and Scenario-building

An important further approach linked to group-based work, and which is especially pertinent for embedding social values for ecosystem services into policy and decision-making, is scenario-building. (Alcamo 2001; Börjeson *et al.* 2006; Bishop *et al.* 2007; O'Neill *et al.* 2008; Wilkinson & Eidinow 2008).

As Bradfield *et al.* (2005) observe, while scenarios have been used extensively, a number of methodological issues remain unresolved. They note that there are many conflicting definitions, principles and ideas about scenarios that exist in the literature, with terms such as 'planning', 'thinking', 'forecasting', 'analysis' and 'learning' all variously employed in describing what scenarios might be used for. The tension between the forecasting and learning perspectives is, it seems, particularly acute.

Although there are many differences of approach among those who use scenario tools, perhaps one common or unifying assumption is that they are not predictions about the future. Rather they are a set of conceptual tools that enable people to collectively deal with a particular type of problem that involves high uncertainty and complexity. According to Zurek and Henrichs (2007), in these circumstances, scenarios can help stakeholders by:

- structuring choices by revealing their possible long-term consequences;
- support strategic planning and decision-making by providing a platform for thinking through the implications of various options in the face of future uncertainties; and,
- facilitating participation in the strategic development process by allowing the voicing of conflicting opinions and different world views.

In terms of a practical approach, scenario construction can legitimately try to:

- 'look forward' and seek to identify what kind of future might unfold under different assumptions about the key drivers of change; or alternatively
- 'backcast' from some desired set of goals, thus allowing people to think through the conditions that might realise these objectives.

O'Neill *et al.* (2008) have recently set out some of the issues surrounding the development and use of scenarios that throw particular light on their relationship to processes of social valuation in deliberative settings. They argue that one important theme that has emerged from recent debates is the tension between two contrasting perspectives on the role of scenarios, namely scenarios as 'products' and scenarios as 'processes'. The notion of scenarios as products relates to more model-based approaches to capturing different futures. The emphasis is on the technical representation of social values for, and about, change. In contrast, the process perspective emphasises the relationship between scenario-building and social learning.

There are a number of corresponding ways in which we can evaluate the value of scenario-building as a tool for decision-making. This issue has been considered by Hulme and Dessai (2008) who looked at the 'predictive success' of scenarios alongside two other potential outcome measures, namely 'decision success' and 'learning success'. These commentators emphasise just how misleading it can be, in scientific terms, to regard scenarios as prophetic devices. Problems with such a perspective include the fact that, by looking to predictive success, we often try, inappropriately, to make a judgment about which scenario from a family of scenarios is 'better' or more 'accurate', when the actual outcomes are within the plausible or probability range of many of them. Thus, they emphasise that 'decision' and 'learning' success are perhaps more useful measures of the efficacy of the scenario approach, with the latter probably being the best.

For Hulme and Dessai (2008), 'decision success' is measured according to whether the decisions based on a scenario-building exercise were 'good ones'. A key test, they suggest, is whether the scenario exercise allowed the full range of uncertainties surrounding an issue to be considered by the decision-makers. However, while this perspective is perhaps more useful than one based on prediction, it is also problematic. These authors argue that measures based on 'decision success' only make sense if we move away from judging decisions by some kind of retrospective analysis of outcomes, and look at the robustness of the decision-making processes themselves; this seems to involve notions of learning and capacity-building.

Although difficult to measure, the extent to which scenario-building leads to effective social learning is, according to Hulme and Dessai (2008), the most appropriate test of the success of such studies. The measure is closer to the original intention of scenario studies, which was to introduce alternative and multiple views of possible futures into discussions about future strategies and plans. Learning success is, they suggest, also more lasting than 'product outcomes' which can rapidly become outdated as the relationship between the science, society and policy communities evolves. As Garb *et al.* (2008) argue, providing we recognise that scenarios shape and embed their social contexts, they can be used effectively as decision support tools.

Scenarios are an important dimension of the UK NEA (Chapter 25). The focus is on understanding and valuing the consequences of different plausible futures, with a corresponding assessment of implications for policy and decision-makers. While the UK NEA scenarios were not designed to be linked to a deliberative social valuation process, they are designed to serve a general social learning purpose. The wider methodological point, however, is that scenarios are a useful technique for participative process because they can provide a context in which people can begin to explore what kinds of values they hold about particular environmental features or characteristics, and what kinds of change might be considered socially acceptable.

While such approaches have integrity in their own right, the development of integrated platforms for ecosystem assessment and valuation is likely to be a design feature of decision support tools in the future. Hybrid tools that bring together quantitative and qualitative, monetary and non-monetary, and individual and shared values for future change remain a logical aspiration for decision-makers wishing to take an holistic approach to the management of ecosystem services. Future experimentation in the promising, but by no means fully developed, techniques of 'deliberative monetary valuation' and 'deliberative multi-criteria analysis' will be an important part of developing an holistic approach.

24.7 Conclusion

According to Turner *et al.* (2010), ensuring the "correct and appropriate application of economic valuation techniques, alongside other valuation methods" is a key element of reconciling—or least understanding—the types of trade-off that may occur between the different values we hold for ecosystem services. Capturing and acknowledging these values within ecosystem assessment and corresponding decision-making processes implies the need for methodological plurality: just as there are quite different grounds on which judgments of value can be communicated and inferred for ecosystem services, so too, there are many different ways in which values can be formally recorded and assigned significance.

This chapter has emphasised that consideration of shared values is one important component of moving towards more pluralistic approaches to valuation. Economic analyses that infer monetary values for ecosystems services based on individual—'self-regarding'—preferences are recognised to be philosophically and analytically restrictive. There is a need to consider 'other regarding' motivations towards humans and other entities in nature. As Wilson and Howarth (2002) have suggested, ecosystem services are: "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".

The practical process of incorporating shared values into ecosystem assessment and wider decision-making involves recognition of the validity of more qualitative and interpretative approaches to valuing ecosystem services. The emphasis on deliberation and participation is particularly important in the context of decision-making processes that flow from ecosystem assessment. The consideration of values for ecosystem services in a deliberative context provides a basis upon which both synergies and just trade-offs between practical courses of action can be identified and explored—for instance, between utilitarian, ethical and aesthetic concerns. In an important sense, exploring shared values in a deliberative setting can help expose the wider politics in which decisions about ecosystem services occur, and can lead to more informed, citizen-led outcomes.

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