INCREASING THE VALIDITY OF VALUING BIODIVERSITY: REDUCING PROTEST RESPONSES BY DELIBERATIVE MONETARY VALUATION

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ABSTRACT

This paper focuses on increasing the validity of biodiversity valuation. A group deliberation technique (Deliberative Monetary Valuation) is supplemented by a contingent valuation (CV) survey. An exceptionally large number of focus groups provided basis for applying a relatively unproven methodology and comparing the results with CV. We present evidence that our interpretation of DMV tackles some of the limitations of CV: prevalence of lexicographic preference orderings and lack of *a priori* or well-formed preferences. Both of these may result in protest responses decreasing the validity of results. Our interpretation of DMV significantly reduced the ratio of protest responses by more than half (from 29% to 13%). We also suggest a rethinking of the general practice of DMV applications. Elicited plural monetary values (fair price, social fair price) indicate a relatively high social value of biodiversity improvements in Central-Mezőföld, Hungary.

Keywords: valuation of biodiversity, Deliberative Monetary Valuation, agriculture, lexicographic preferences, unformed preferences, protest responses, fair price, social value

INTRODUCTION

There are multiple benefits of biodiversity. 'Biodiversity benefits people through more than just its contribution to material welfare and livelihoods. Biodiversity contributes to security, resiliency, social relations, health, and freedom of choices and actions. Changes in biodiversity due to human activities were more rapid in the past 50 years than at any time in human history' (Millennium Ecosystem Assessment, 2005, p.vi). Biodiversity underpins ecosystem services. 'Ecosystem services are the benefits that people obtain from ecosystems. Examples include food, freshwater, timber, climate regulation, protection from natural hazards, erosion control, pharmaceutical ingredients and recreation' (TEEB, 2008). An extensive research has recently been carried out in describing, distinguishing and categorizing biodiversity functions (Millennium Ecosystem Assessment, 2005; Balmford et al., 2008; Markandya et al., 2008). The Millennium Ecosystem Assessment states that 'improved valuation techniques and information on ecosystem services demonstrate that although many individuals benefit from biodiversity loss and ecosystem change, the costs borne by society of such changes are often higher' (Millennium Ecosystem Assessment, 2005, p.vi).

In this paper we focus on improving the validity of stated preference surveys. In the first part of the paper the problems of contingent valuation methods applied for valuing unfamiliar goods, such as biodiversity are discussed. Later we present our results of our research carried out in Central-Mezőföld on valuing the impacts of agricultural activities on biodiversity. The aim of the research is to offer economic tools that take proper account of the true value of biodiversity and ecosystem services. Central-Mezőföld, Hungary is one of the best-endowed areas in Europe in terms of plant cultivation, therefore ideal for assessing the impacts of agriculture on biodiversity.

THE DEFICIENCIES OF CONTINGENT VALUATION METHOD IN VALUING BIODIVERSITY

In the literature only limited number of studies can be found which deal with valuation of biodiversity in relation to agriculture. Most valuation studies in this field use the Contingent Valuation (CV) method. Nijkamp et al. (2008) notes that valuation of biodiversity allows for a direct comparison with economic values of alternative options, enabling a cost-benefit analysis to be carried out.

One of the main goals of this paper is to advance the methodology of valuing the impacts on biodiversity. In the followings some of the deficiencies of the most widely used method, CV, are pointed out and methods which increase the validity of valuation of a change in complex and unfamiliar goods such as biodiversity are proposed instead.

In theory the CV is capable of estimating the total economic value of non market goods including the non-use value components of natural resources (Marjainé Szerényi, 2000). We note however, that in the case of biodiversity the validity of the method is problematic. Urama (2003) accentuates that the numbers produced by CV surveys are controversial over their content and meaning. In the interest of CV Randall (2002) underscores the accumulating evidence that data generated by 'real money' experiments may also exhibit quirks similar in direction, although not always in degree. An indication of that may be the September 11 attack on the World Trade Center, where charitable contributions soon exceeded the amount required for 'reasonable' compensation of the families of victims.

In this paper we do not pursue a thorough critique of CV as it has an extensive literature (see e.g. Clark et. al., 2000; Gowdy and Erickson, 2005; Kahneman and Knetsch, 1992; Sagoff, 1998; Blamey and Common, 1999). Here, in the following sections, underscoring our research agenda, CV is assessed in relation to biodiversity only. In the following sections we cover the characteristics of biodiversity as a particular good, and in relation, we emphasize lexicographic preferences, lack of knowledge and information, protest responses. Finally we reach a conclusion on to what extent CV can be applied in valuations of the impacts on biodiversity.

Biodiversity is a complex public good, with an ever decreasing supply. As a consequence of the absence of market biodiversity has no price. It is no surprise that the research gap in the literature is wide. As Nijkamp et al. (2008, p.224) put it the valuation of biodiversity is 'perhaps the most challenging issue in the context of economic valuation'.

In the context of biodiversity non-use values, such as existence value is of crucial importance. Assessing non-use values has been proven to be difficult. Blamey and Common (1999) emphasize the following problems: protest responses, implausibly high wtp, low sensitivity of responses to price variation, embedding effect and large difference between wtp and wta. The authors divide the critics of CV into two groups. The first group is of the opinion that further refinement of CV survey practice can reduce the problems mentioned above. The second group questions the validity of CV and believes that elicited wtp based on non-economic motivations can not be used in cost-benefit analysis (cf. Cooper, Poe and Bateman, 2004). The latter group's view derives from, among other things, the influence of ethical attitudes on responses. Vatn and Bromley (1994) emphasize functional transparency, where the respondent is unaware of all the functions of the good under valuation. Marjainé Szerényi (2000, p.64) stresses five elements which constrain the applicability of CV in environmental policy decisions: lexicographic preferences, information effect, embedding, warm glow effect and uncertainty of elicited value. In the case of valuing biodiversity, as a particular good we are outlining in the following sections why we suggest that the lack of *a priori* preferences needs to be added to this list. In this paper we focus on those problematic elements only, to which our proposed methods may provide some solutions.

Biodiversity can often be characterised as a particular good as its dynamic is non-linear (exponential) and is burdened with irreversibility and uncertainty (Farber, Costanza and Wilson, 2002; Vatn and Bromley, 1994; Limburg et al., 2002), moreover, attitudes towards species are driven primarily by ethical considerations. Accordingly, it is not indifferent that at which end of the axis marginal change in biodiversity is assessed, as the disappearance of last specimen constitutes the same marginal change in absolute terms as that of any specimen in a stable population, however, it leads to different outcomes both from ecological and psychological point of view. Farber, Costanza and Wilson (2002) pointed out that it is not warranted that ecological critical thresholds necessarily equal to economic thresholds. It is not unlikely that the given situation can be treated economically as usual, while it is unacceptable in ecological terms as a tipping point has been crossed.

LEXICOGRAPHIC PREFERENCES

It is in the realm of cognitive psychology to cover non-compensatory and conflict-avoiding strategies for choice. Lexicographic preference orderings may result in non-compensatory choices. Blamey and Common (1999) defines lexicographic preferences where alternatives are compared on the most important dimension only. The second most important dimension is considered only if equal scores are obtained on the most important dimension, and that way a decision is reached. The notion that to prevent the extinction of species is always preferable in the eyes of some to additional income may serve as an example of ethical considerations resulting in lexicographic preferences. A consequence of lexicographic preferences is that indifference curves can not be drawn as the axiom of continuity condition is violated.

Stevens et al. (1991) found that around 25% of responses could be described as lexicographic. 23,2% of respondents surveyed by Spash and Hanley (1995) were characterised similarly. Common et al. (1997) conducted experiments to investigate the possibility of lexicographic preferences and found that approximately a quarter of respondents had such preferences (see Blamey and Common, 1999).

Lexicographic preference orderings may be a possible implication of ecocentric attitudes. The refusal to trade-off natural resources is logically consistent with the notion that nature has intrinsic value irrespective of its utility function to humanity.

It is not ethical commitments only which may be a source of lexicographic preferences. Blamey and Common (1999) points out that it is known in psychology that dealing with information-processing difficulties or with uncertainty as to the consequence of choice people may adopt a rule-of-thumb strategy consistent with lexicographic preference orderings. Common et al.'s (1997) survey mentioned above identified an additional quarter whose preferences were incomplete or intransitive. It is worthwhile to assess the extent to which lack of information and knowledge regarding biodiversity may be linked to lexicographic preference orderings. Spash and Hanley (1995, p.195.) argue that individuals with lack of information may rely on lexicographic preferences, or, more generally, facing ignorance they refuse trade-off increases/decreases in biodiversity against losses/gains in income. The authors, nevertheless, reject the hypothesis that any simple relationship exists between information provision and ethical commitments.

The existence of lexicographic preference orderings implies that utility functions can not be defined (Spash and Hanley, 1995; Blamey and Common, 1999). Spash and Hanley (1995) argue that cost-benefit analysis becomes meaningless under non-compensatory preferences.

Some authors argue that a minimum living standard may be a constraint on standard lexicographic preference orderings (Spash and Hanley, 1995; Gelso and Peterson, 2005). O'Neill and Spash (2000) define modified lexicographic preferences as a minimum living standard is required for lexicographic preference orderings to activate. We believe that if modified lexicographic preferences exist, they must be culturally determined.

INFORMATION PROVISION, KNOWLEDGE

Nunes, van den Bergh és Nijkamp (2003) accentuate that at economic valuation of biodiversity social values in general are based on individual values, irrespective of information provision and knowledge of the given individuals on biodiversity-related issues.

At valuing biodiversity surveys naturally cover topics which are unusual and hence exceed the boundaries of ordinary contexts. Respondents must face a position uncommon where they may not have well-formed preferences. Spash and Hanley (1995) stress two problems of economic valuation of biodiversity: firstly, individuals may be unwilling to trade off biodiversity against income; secondly, many individuals are unsure as to the meaning of biodiversity and the implications to themselves.

Biodiversity is a complex concept. Most instances a deficient knowledge characterises the subject. To many individuals the characteristics and properties of biodiversity as a good are unclear. Miller (2005) dwells on the subject of the extinction of experience. Szabó (2008a) found weak association level related to biodiversity of some inner city residents of Budapest. Spash and Hanley (1995) found that the most common responses to the question 'What does the word *biodiversity* suggest to you?' were "don't know", "haven't a clue" and "nothing". 71% of the respondents in the UK the definition of biodiversity were totally unfamiliar. Another survey (Defra, 2002) found similar results; 26% of respondents have already heard of the term 'biodiversity' (see Christie et al., 2006). Only 5% of respondents surveyed by Getzner (2005) were at least familiar with the concept. Christie et al. (2006, p.305.) argues 'if one is unaware of the characteristics of a good, then it is unlikely that one has well-developed preferences for it which can be uncovered in a stated preference survey'.

The findings during focus groups of Christie et al. (2006) that despite half of participants never heard of the concept biodiversity most of them appeared to be capable of quickly grasping a basic understanding of biodiversity concepts is encouraging for our proposed method, to be discussed later.

PROTEST RESPONSES

A general difficulty of CV surveys is the prevalence of protest responses. One of the manifestations of protesting in a hypothetical valuation survey is when an individual chooses a zero wtp to express its unwillingness to trade-off the right of species to exist against money. Spash (2006) presents reasons which could lead to protest responses as dislike of payment vehicle and institution and lack of information. Macmillan et al. (2002, p.51) argues that 'oversimplified information could generate protest or perhaps flippant responses'. Clark et. al. (2000) emphasise that some respondents, in order to terminate the interview quickly, may opt for a quick escape strategy such as 'yeah-saying' or protesting. Besides these, it may lead to protesting if the respondent already contributes financially or demands alternative approaches (Spash, 2006). Blamey and Common (1999) argues that responsibility consideration may lead to protest responses as CV questions may implicitly imply that the respondent has some responsibility protecting the environment, thereby justifying financial contributions. Individuals, however, may believe that financial contributions are the responsibility of those who caused the problems in the first place. Using a typology of consumer psychology Fischer and Hanley (2007) suggest that there may be a link between impulsive behaviour and protest responses. The authors found that most protest responses were cognitively controlled thus signalling a rejection of some aspects of the survey.

Spash and Hanley (1995) argues that those respondents with lexicographic preference orderings who regard themselves on a minimum living standard will reject any financial contribution to improvements in biodiversity (can not afford to), but will give an infinite value of any decrease in biodiversity. Contrary to this, some CV surveys indicate that ecocentric attitudes (species

inalienable right to exist), instead of protest responses, leads to higher wtp (see Spash, 2000; Kotchen and Reiling, 2002).
Findings on the prevalence of protest responses in CV surveys are somewhat similar. Spash and Hanley (1995) reported 32.3% of protest responses, while Kenyon and Hanley (2005) that of 29%. Stevens et al. (1991) found that 40% of zero wtp responses protested against the payment vehicle on the grounds that taxes should provide the financial needs, while 25% protested for ethical considerations, claiming that wildlife values can not be monetised. In Spash's (2006) survey we find real motivations behind responses difficult to decipher because of the high ratio of 'don't know' responses (11% protested, 5% declined the choice and 26% chose 'don't know'), so all we can see is that protest responses were between 11-42%. The choice experiment survey of Christie et al. (2006) showed 20.7% protested, of which 6.5% protested against the payment vehicle, while in the CV survey 38.4% protested. Meyerhoff (2005) excluded 56% of the sample from valuation on the grounds of being protest responses.
We stress the methodological importance of general exclusions of protest responses in stated preference surveys. Researchers exclude protest responses from the analysis on the grounds of being illegitimate choices (see Blamey and Common, 1999; Spash and Hanley, 1995; Spash, 2006; Gelso and Peterson, 2005). Spash (2006) argues that this practice results in a 'systematic exclusion of respondents' opinion' and 'censoring biases CV samples'. We are on the opinion that by excluding protest responses from the analysis of results, reality, modelled by stated preference surveys, is tailored and restricted to standard economic models.

THE APPLICABILITY OF CV SURVEYS IN VALUING BIODIVERSITY: UNFORMED PREFERENCES

As discussed above, according to Spash and Hanley (1995) the prevalence of lexicographic preference orderings has significant implications on the acceptability of CV surveys in the valuation of a change in biodiversity. Marjainé Szerényi (2000, p.71) also emphasises the difficulties caused by lexicographic preference orderings arguing that 'it renders CBA of projects impossible, if there are individuals who refuse any compensation for the degradation of the environment'.
Spash and Hanley (1995) accentuate that the high degree of ignorance concerning individual's understanding of biodiversity concepts also raises concerns over valuations by consulting the general public. We agree with the authors claiming that given the general public's lack of knowledge about this particular public good, the information provided to respondents will be stimulating the formation of preferences rather than informing existing preferences. Moreover, James and Blamey (2005) point out the limited time and information available for CV respondents to make their choices and the lack of possibilities to seek clarification of any issues of concern.
There are several indications of individuals having to form values (preferences) during the survey concerning the valuation of biodiversity rather than simply relying on and eliciting existing preferences (see Macmillan, Hanley and Lienhoop, 2006.). Kumar and Kumar (2007) from psychological perspective emphasize that the perceptions of ecosystem are quite different depending on if conceptualized by common persons or conventional economists. Spash (2007, p.693.) notes that 'assumptions that preferences are pre-existing, stable, and complete across all choice sets, and can therefore merely be called upon, no longer seem tenable'. Preferences seem 'labile and constructed with susceptibility to framing effects and variations in context and elicitation procedures' Spash (2006, p.603.). Bateman et al. (2008) tested the conception of individuals' preferences as *a-priori* well-formed and readily divined and revealed through a single dichotomous choice question. Their findings rejected the conception. The notion of the prevalence of unformed or not-well-formed preferences for non-marketed public goods seem to be well-established in the literature (see Vatn and Bromley, 1994; Spash and Hanley, 1995; Sagoff, 1998), nevertheless we believe it receives far too little attention.

We argue that the problems of valuing a change in biodiversity by contingent valuation method are mainly due to the following two reasons:

- prevalence of lexicographic preference orderings;
- lack of *a priori* well-formed preferences.

Lexicographic preference orderings are closely linked to ecocentric attitudes and intrinsic value of nature. Besides ethical considerations, dealing with information-processing difficulties or with uncertainty as to the consequence of choice may also lead to lexicographic preferences. The sources of unformed preferences can be traced back to lack of knowledge, understanding and information as well as complexity of the valuation scenario.

Any of the two factors may result in protest responses in a CV survey. Therefore we suggest that by reducing the ratio of protest responses, the validity and acceptability of valuation of the impacts on biodiversity is increased. Naturally, total elimination of protest responses would be a mistaken aim as some of them are the results of lexicographic preferences based on ethical considerations.

AIMS OF DELIBERATIVE MONETARY VALUATION

We have so far seen that a common notion of valuation by CV of unfamiliar goods such as biodiversity is the relatively high ratio of protest responses. The prevalence of protest bids reduces the validity of such surveys. Although in literature we found limited experiences with Deliberative Monetary Valuation (DMV), the methodology in theory may tackle the problem of lack of information and knowledge and allow preferences to be formed during the discussions. In the case of biodiversity valuation deliberative processes thus may lead to more valid outcomes. We hypothesise that group deliberation contributes on the one hand to tackling lack of understanding and information-processing difficulties and on the other hand to well-formed preferences, thus the ratio of protest responses may be reduced. Reviewing the literature on Deliberative Monetary Valuation, characteristics of the method appear to be divergent (Macmillan et al., 2002; Spash 2007, 2008; Álvarez-Farizo et al., 2007; Sagoff, 1998, Getzner et al., 2005). Spash, Stagl and Getzner (2005, 17.o.) mention the inadequacies in the economic model of human behaviour as a driving force behind DMV. DMV combines stated preference methods with deliberative techniques known from political sciences. DMV is a two session approach with the aim of discussing an issue in small-scale groups, deliberating and valuing. Most biodiversity and ecosystem benefits are public goods that have no price. DMV is a possible approach for tackling this problem.

Literature review reveals two major aims of DMV. Firstly, it may increase the validity of stated preference methods; secondly, it may create a new value theory. In this paper we primarily focus on increasing the validity of the survey (i.e. reduction of protest responses). The question, however, seems to be adequately raised as to the meaning of the value resulting from DMV. Spash (2006, 2007, 2008) puts forward detailed analyses of the meanings and realms of value expression in DMV. Spash interprets the meaning of value in two dimensions; on the one hand whether the terms in which wtp are specified is regarded to be social or individual (aggregated or disaggregated value); on the other hand, whether the value provider is a group or an individual in a group setting. He places particular emphasis on the aggregated value elicited in small group setting. Spash (2007, p.696) argues that 'social value under stated preference techniques is normally calculated by asking individually focussed valuation questions of respondents, who decided as individuals, and then conducting some aggregation procedure (with or without weighting, exclusion of protestors and outliers, and discounting)'. The author concludes that 'yet there is no reason to expect this to equate with an already aggregated response'. Spash's literature review (see Macmillan et al., 2002; Kenyon and Hanley, 2005; MacMillan, Hanley and

Lienhoop, 2006; Urama and Hodge 2006; Lienhoop and MacMillan, 2007a, 2007b; Alvarez-Farizo and Hanley, 2006) reaches a conclusion that although most studies used small-scale group deliberation processes, they arrived at disaggregated individual wtp rather than social value. Thus Spash (2008) regards the resulting wtp and wta values as charitable contribution.

Nevertheless, it is important to emphasise that the empirical studies reviewed by Spash (2008) conducted a monetary valuation questionnaire already in the first session of the deliberative process. We believe researchers thus missed out the opportunity for participants to acquire knowledge and information regarding the good. Participants relatively early in the process realised the aim of the study (having to make a choice, monetary valuation), thus the process could not serve entirely the introduction of the good (biodiversity) and the formation of preferences. Therefore, we believe the above studies missed out the opportunity to decrease the uncertainty of participants in the deliberative process regarding the good as the time period between the two sessions of DMV could have been used for preference formation.

In our understanding Deliberative Monetary Valuation is a two session approach, with the first one dedicated to discussing the issues, deliberating and the second to monetary valuation. Hence lays a crucial distinction between our approach and most studies in this field: in the first session participants are free to discuss the issue (biodiversity, ecosystem services), as quantitative (monetary) aspects enter in the second session only. In our reasoning, it is not only discussions during the first session, but the time period elapsing between the two sessions (one or several weeks) as well, which contributes to reducing the uncertainty as to the meaning of the good and leads to preference formation. This mental process is ensured by instructing participants to keep a diary between the two sessions to record their thoughts, questions etc.

Choices made in isolation and those made in a group setting may result in different values. Our aim was to pursue community preferences. We regard DMV as a participatory method with the aim of differentiating between individual and social values. We believe the advantages of DMV include among other things time for reflection, potential for information gathering and group deliberation. Therefore it is hypothesized that valuation would result in significantly different value if a social forum for discussion is provided as opposed to a contingent valuation survey only.

Spash (2008) accentuates the unclear meanings of values resulting from DMV. He regards the social value, which is based on asking for a small group to make a decision as to what an individual should pay for the good, as *fair price*. The theoretical foundations of this non-aggregated form of value are laid down by Sagoff (1998), who differentiates consumer and citizen preferences. Getzner (2005, p.31) sees the justification behind the dichotomy of consumer vs. citizen as citizens do not maximise their individual utility seeking personal advantages only but include broader societal arguments in their decisions as well. Households (respondents) act differently in the case of marketed goods and public goods. By using variables on social contexts Getzner doubled the explanatory power of his model (Adj. R^2 = 24% vs. 45%). Assessing the role of social context it is worth to mention Harsányi's (1995) dual structure, where he differentiates between ethical and subjective preferences. The former refers to the person's preference based on impersonal social considerations alone, while the latter to the person's own interest. This duality enables us to distinguish between what a person believes is good from the social viewpoint and what he believes is good from his own personal viewpoint (see Sen, 1982, p.99). Pearce and Turner (1990, p.237) notes that as public preferences do not involve desires or wants but opinions or beliefs, it has been argued that they belong to different logical categories than private preferences.

APPLIED METHODOLOGY

Valuing biodiversity is a complex issue, so methodological pluralism is considered crucial, hence a qualitative as well as a quantitative approach was applied. The qualitative approach involved the use of focus groups with residents, farmers and hunters. The results of the qualitative approach are presented in Szabó (2008b). In this paper, besides quantitative assessments, we rather focus on methodological issues.

An unusually large number of deliberative forums provided the basis for the application of a relatively unproven methodology. The large number of focus groups applied in this research aims to ensure comparability on a significant level. Overall 8 focus groups with a total of 85 participants were held amongst residents of Central-Mezőföld (one of the groups consisted farmers as well). Besides residents, two focus groups with conventional farmers (17 participants) were also held. The focus groups with farmers were held in order to identify and deliberate on ecosystem services. An additional focus group was dedicated to the testing of questionnaire. Focus groups varied between 5 and 13 participants in size and followed a semi-structured interview lasting one and a half hours. Discussions were facilitated by a professional moderator, who also ensured neutrality.

The purpose of 8 focus groups with residents is twofold. Besides being a qualitative assessment of direct ecosystem services (see Szabó, 2008b), it is a monetary valuation with the help of a CV questionnaire (DMV). 8 focus groups were thus iterated as a DMV. The second session began with the completion of the questionnaire, followed by consensus seeking deliberation.

Not all participants who participated in the first focus group were able to attend the second session (DMV). Many residents missing the second session were later contacted in order to administering the questionnaire. Participants of the focus groups with farmers were similarly contacted. Thus overall 90 persons filled out the questionnaire.

To test the influence of deliberation techniques, besides DMV, the survey was also administered to 152 respondents as a normal CV allowing for the comparison of results with and without deliberative session.

The CV builds on the survey used by Christie et al. (2006). For the questionnaires two scenarios were developed, both related to changes in agricultural technology. The first one implies a modest improvement in biodiversity, while the second one aims a healthy land use structure with up to doubling of the diversity. The two scenarios were described, with the help of cards and pictures, to respondents and they comprise different impacts on Central-Mezőföld's diversity of animals, plants and habitats. The *Switch from conventional to environment friendly crop production program* would result in a 10-20% increase in diversity of plant species. Healthier field strips would provide more food sources for birds. The *Agro-environmental program* would result in up to doubling the diversity of plant species. Extended and healthier field strips and loess-valleys would provide lot more food sources for birds and habitats for insects, butterflies and mammals. The parameters of the scenarios were outlined by literature review and primary field research (Szabó and Pál, 2007) and validated by experts.

In this research we carefully chose the methodology to avoid the problems of valuing biodiversity by CV, outlined in the first sections. A split sample allows for the testing of the impact of group deliberation. Instead of eliciting willingness to pay (wtp), we aimed at social price. Deliberative processes place individuals in the role of representing society not their own interests. One of our main assumptions was that aggregated wtp values do not equal social value. Instead of the standard wtp, we used '*fair price*' ('How much society is to pay?'). Our

interpretation of fair price is asking an individual in a group setting to make a decision as to what an individual should pay for the good ('Please indicate the maximum contribution of residents of Central-Mezőföld over a period of 5 years to the improvement of the diversity of species and habitats of Central-Mezőföld by the *switch from conventional to environment friendly crop production* / *Agro-Environmental Program*. What do you think is the maximum increase in the price of bread necessary to be accepted/tolerated/approved'.) The second session of focus groups, by seeking consensus, aimed to directly obtain an arbitrated social value. We define *social fair price* as a group consensus decision on fair price, which is then multiplied by the adult population.

The assumption seems logical that in the eyes of individuals the value of a good may increase, if more information on the good under valuation is given. In the literature, however, conflicting evidence as to the effect of additional information on wtp can be found (see Hanley and Munro, 1994, Spash and Hanley, 1995, Christie et al., 2006). We accept the reasoning of Spash and Hanley (1995, p.197) that individuals need to be provided as much information as they can assimilate.

Participants of the second session were also asked to make their CV choices collectively, that is on the basis of what would be best for the environment in the eyes of the whole community.

Participants of DMV may not arrive at a consensus, the process may "need to conclude with voting subject to some form of majority rule" (Wilson and Howarth, 2002, p. 437). To elicit the collective decision, which in theory may lead to social price, at the second session majority voting was used, subject no one wanting to veto the choice. We agree with Spash that "seeking to explain, explore and respect (not remove) "dissensus" might be just as valuable in some contexts as aiming for consensus can be in others" (Spash, 2007, p.692).

RESULTS

In the followings we present the main quantitative results of the research focusing on increasing the validity of surveys. For a more detailed report of qualitative assessment and ranking of direct and indirect ecosystem services see Szabó (2008b).

Before turning to quantitative assessments, we briefly describe the range of perceptions of focus groups participants. Facing the question whether participants perceive any changes in biodiversity in their neighbourhood area, the most common answer was a definite yes. In all focus groups participants had perceived the decline of certain species, the appearance of previously non-native species and habitat loss. Species such as partridge or swallow were frequently mentioned as being seen their numbers decline. Partridge was considered regionally extinct. On the other hand the proliferation of invasive species, such as ambrosia, and pests was mentioned as an example of the deterioration of the environment. Irreversibility, fragility of the environment, feeling of loss, etc. frequently appeared in the discussions.

ANALYSIS OF SURVEY RESULTS (DMV AND CV)

During the test focus group a complete distrust of the usual payment vehicles (i.e. tax, fund) was found, therefore an 'increase in the price of bread' as payment vehicle was invented. The test focus group also made it clear that the term biodiversity is not advisable to use because most participants are unfamiliar with it.

Out of the 242 responses 90 people participated in focus groups. It turned out to be difficult to recruit representative samples for the focus groups. According to Vicsek (2006) due to small

sample sizes and not random recruitment procedure, results of focus groups can not be generalised. However one of the main novelties of this research is that on the one hand we dedicated particular attention to have a non-biased recruitment procedure and on the other hand aimed for a relatively large sample size. Across the two samples, based on independent-samples t-test, no significant differences can be found in terms of gender ($p = 0.135$), size of household ($p = 0.593$), number of dependents ($p = 0.179$), education ($p = 0.303$) and income ($p = 0.840$). The only demographic indices where the independence of sample means is significantly rejected is age ($p = 0.000$). The average age of focus group participants is 47.96 as opposed to 40.46 of CV-only respondents. Age turned out not to be a significant factor in the case of whether society should pay for biodiversity improvements ($r = 0.068$, $p = 0.291$), although there is a significant correlation between age and the amount of fair price. Since age negatively correlate with amount of fair price at both programs ($r = -0.161$ and -0.191 respectively) and average age is higher amongst focus group participants, without this sample bias the difference in fair price bids as a result of deliberative forum participation would even be larger.

Besides demographics, two more possible biases could have occurred. The first one concerns farming. Respondents with income from farmers are overrepresented in focus groups ($t = -2{,}851$, $p = 0.005$). However we found no significant correlation between farming background and responses of whether society should pay for biodiversity improvements ($r = 0.110$, $p = 0.089$). In the case of fair price amount a t-test carried out at both programs rejects the independence of sample means ($p = 0.194$ and 0.256 respectively), in other words fair price results are not biased by the differences in farming background.

The second possible bias concerns environmental attitudes. The New Ecological Paradigm Scale (NEP), consisting of 15 likert scale items, is a widely used measure of proenvironmental orientation. It is designed to measure endorsement of an ecological worldview (Dunlap et al., 2000). Average NEP score of CV-only respondents was 53.55 and of focus group participants was 54.77. The means of those who participated in focus groups and those who did not do not differ significantly ($p = 0.219$), signalling that no bias were made at the recruitment of participants, i.e. environmental attitudes of the two groups are alike.

As discussed in the first sections of this paper, we consider the reduction in the prevalence of protest responses of primary importance. In this survey respondents may have protested against the payment vehicle (increase in the price of bread) or the overall concept of monetary valuation, which itself comprises the previous. As Table 1 shows, DMV significantly reduced the prevalence of protest bids; less than halved its ratio. Protest bids amounted to 29% of CV-only responses, while to only 13% of focus group participants. As we have seen in the literature review section, protest responses usually comprise about a third of the responses, so our CV-only result appear to conform to general practice. The 13% of protest bids among those who participated in focus group deliberations (DMV) is the lowest level to be found in the literature we are aware of.

It is in apparent contradiction though, that two-thirds of protest bids in DMV protested against the payment vehicle. Many of them, however, also indicated other motivations as secondary reasons for protesting. The payment vehicle (increase in the price of bread) is admittedly imperfect (although had a better reception than any other proposed payment vehicle), so future research focusing more on payment vehicle issues may provide additional ground for our results.

TABLE 1: PROTEST RESPONSES

Protest responses	CV-only (N = 152)	Focus Group (N = 90)
Protest payment vehicle	21	8
Protest bid (incl. payment vehicle)	44 (29%)	12 (13%)

Evidence is provided that the prevalence of protest responses may be reduced and this reduction may be a result of DMV tackling some of the limitations of CV surveys. With the favourable outcome of significantly reduced protest responses we believe the DMV methodology we used in this research improves the validity of monetary valuation of biodiversity. We therefore conclude that a crucial aspect of deliberative methodology is the contribution to reducing protest responses.

After excluding protest bids, 186 responses provided the basis for analysing the monetary results. Fair price was calculated using the stated amount regarding the increase in the price of bread used as a payment vehicle (price increase in relation to income). Since it is a calculated indirect value, we prefer to call it *implied fair price*. The mean of the implied fair price was calculated at 5053 HUF/year/person of the *Switch from conventional to environment friendly crop production program* and at 7859 HUF/year/person of the *Agro-environmental program*.

Participation in a deliberative forum had a significant impact on the fair price. Focus group respondents placed significantly higher bids in case of both programs (see Table 2). Among focus group participants the mean of the implied fair price of a modest improvement in biodiversity (*Switch from conventional to environment friendly crop production program*) was calculated at 6273 HUF/year/person. The other scenario, a healthy land use structure with up to doubling the diversity (*Agro-environmental program*) resulted in a mean implied fair price of 9848 HUF/year/person. These results are one and a half times more than the mean of implied fair price of respondents without participation in deliberations.

TABLE 2: INFLUENCE OF DELIBERATIVE FORUMS ON IMPLIED FAIR PRICE

Scenarios	Mean (per year, in HUF)	
	CV-only (N = 108)	Focus Group (N = 78)
Switch from conventional to environment friendly crop production program	4330	6273
Agro-environmental program	6682	9848

A curious result of the analysis is that only age and participation in focus groups correlate significantly with fair price amounts. Contrary to expectations neither gender, income, education, farming background nor pro NEP attitudes correlate significantly with implied fair price. The lack of correlation prevents the estimation of a linear regression model with a good fit.

Average stated yearly net disposable income per head was 679104 HUF. Comparing to this sum implied fair price represent a relatively high value. Analysis of results indicates that socially 0.74% of the average disposable income should be dedicated to modest improvements in biodiversity, an aim captured in the first program, and 1.16% to improve the overall health of the Central-Mezőföld agricultural region, captured in the second program. Participation in deliberative forums significantly increased the implied fair price at both programs (see Table 3).

TABLE 3: IMPLIED FAIR PRICE EXPRESSED IN PER CENT OF AVERAGE NET INCOME

Scenarios	CV-only	Focus Group
Switch from conventional to environment friendly crop production program	0.64%	0.92%
Agro-environmental program	0.98%	1.45%

Although to the best of our knowledge no other research in Hungary aimed at eliciting social price, general CV surveys in Hungary have so far resulted in similar or somewhat lower values (Marjainé Szerényi, 2005; Kerekes and Tardi, 1999).

CONSENSUS SEEKING

An important conclusion is that it was difficult to achieve consensus. In most focus groups opinions were so divergent that, although views tended to converge during the deliberation in the second session, the veto provision prevented consensus from emerging. A consensus was achieved in only those focus groups (out of 8), where all participants' initial position was similar. This may indicate that after a discussion session preferences were formed (solidified). The *arbitrated social fair price* (consensus decision on fair price multiplied by the adult population of Central-Mezőföld of 69 thousand [KSH, 2006]) varied between 257-643 million HUF/year for the 1st program and 386-1287 million HUF/year for the 2nd program. (During the research exchange rate fluctuated around 240 HUF/Euro.) It is important to note though, that the above result needs to be treated only indicative because of the small number of participants.

CONCLUSION AND DISCUSSION

Valuation of biodiversity faces many difficulties. In this paper we presented ways to solve some of its problems. Evidence is provided that deliberative techniques improve on the limitations of conventional CV surveys (Stated Preference Methods). We believe the DMV methodology applied in this research tackled to some degree the problem prevalent in CV surveys of lack of time and information available for respondents. Also may have contributed to well-formed preferences in the case of unfamiliar and complex environmental good (biodiversity). As a possible result of these, we were able to reduce the ratio of protest responses by more than half (from 29% to 13%). DMV thus possibly increased the validity of results. Our interpretation of DMV may have reduced the prevalence of protest responses close to the lowest possible level, considering that some protest bids are the result of legitimate lexicographic preferences based on ethical considerations.

Our interpretation of DMV possibly increased the validity of results as the elicited monetary values are considered to be based on a survey informing preferences rather than stimulating the formation of preferences. We provided evidence that participation in a deliberative forum has a significant impact on results. Participation in focus groups produced a significantly different fair price of biodiversity improvements. For the limitations of CV methods of valuation of complex and unfamiliar environmental goods such as biodiversity we consider the results of DMV as more valid than CV-only values.

Analysis of results indicates a relatively high social value of biodiversity. Due to small sample size, however, we emphasise that it will be difficult to generalise from our results and extrapolate the values to other regions. Among focus group participants the mean of the implied fair price of a modest improvement in biodiversity (*Switch from conventional to environment friendly crop production program*) was calculated at 26,1 Euro/year/person. As of a healthy land use structure with up to doubling the diversity (*Agro-environmental program*) a mean value of 41

Euro/year/person as a fair price emerged among those who participated in deliberations.

We found seeking consensus to be a rather difficult exercise. Our finding concerning the diverging opinions in focus groups may however be a result of preference solidification during deliberations in the first session and afterwards.

The favourable outcome concerning the reduction in the prevalence of protest responses calls for a rethinking of the general practice of DMV applications. As we have seen, most DMV studies ignore the theoretical opportunity to provide time and information for respondents to reduce uncertainty, improve understanding and form preferences. The studies cited earlier conducted a monetary valuation in the first session already, possibly depriving participants of further opportunities regarding information, knowledge, understanding and preference, which they otherwise could have had before the second session. The practice may likely lead to anchoring the choices of respondents, as by the second session's valuation participants already expressed their choice once (re-evaluation). We emphasise the role of time period between the sessions, particularly in the case of biodiversity, as opportunity to gather information, reduce uncertainty, improve understanding and form preferences. Therefore, in case of lack of *a priori* preferences, we regard the current DMV practice as suboptimal.

Brouwer et al., (1999) found in a CV survey that the understanding of the majority of participants of WTP question would have been improved if participants had been able to discuss the issues beforehand. Our results seem promising if protest responses are any indication of respondent's lack of understanding of the questionnaire. Macmillan et al. (2002) sought to assess uncertainty of wtp and found that respondents who participated in deliberation forum were less certain about their expressed value. This finding apparently contrasts to Brouwer's, however the authors seem to be relatively uncertain as to the consequence of their results.

Information-processing difficulties and uncertainty as to the consequence of choice may in theory be tackled by deliberation forums and therefore it may be a legitimate aim to reduce the frequency of lexicographic preference orderings based on psychological reasons. We believe further research is needed on psychological reasons leading to lexicographic preferences.

We agree with Spash (2008) that the resulting social values are not necessarily directly comparable with the numbers obtained in a cost-benefit analysis. We nevertheless believe that the requirement of plurality (see ethical considerations) may be expressed in various forms of value obtained in DMV. Fair price may be closely linked to the exchange value used in economic models but the social fair price expressed in small groups needs likely to be considered a new form of value. It is worth to note the role of social context (group deliberation) in both cases, as a prime difference between the two values may be conceived whether it was elicited by consensus decision.

Alvarez-Farizo et al. (2007) tested Sagoff's (1998) theory as whether a difference exists between individual and collective behaviour. Their focus was rather similar to our fair price value. In terms of individual and collective value the context of decision-making produced differences only when the analysis was restricted to 'non-selfish' respondents. Alvarez-Farizo et al. (2007) thus found little evidence to support significant difference between individuals acting in the self interest and the same individuals acting in the collective interest. We emphasise however that more research is needed as the sample size seems rather little for drawing far reaching conclusions (N=24) as well as the motivational variable appears inadequate (we consider membership in environmental NGOs as a rather weak explanatory variable for altruism and ecocentric attitudes).

In the case of pubic goods, where deontological ethics bear high relevance (i.e. biodiversity), we believe it is reasonable to diverge from the value categories of standard neoclassical economics. This is the rationale behind our aim to assess the plurality of social values, the use of

plural value categories. We give emphasis to Spash et al. (2006, p.9.) arguing that 'monetary valuation which aggregates and assumes commensurability without cross-checking motives will fail to represent public opinion'. Standard neoclassical economics excludes choices from analysis which do not conform to theory (see protest responses). This prevents certain value orientations (see deontological ethics, ecocentric attitudes) from influencing social optimum based on cost-benefit analysis. We believe the use of plural forms of value may contribute to the accommodation of divergent views. Acknowledgement of the need for more research as to the meaning of the new forms of value does not invalidate the necessity of the plurality of views. The use of *fair price* and *social fair price* or other forms of value (see Spash, 2008) may take us closer to social optimums (e.g. social optimum of agricultural production and technology use), which accommodates various ethical considerations (anthropocentric, ecocentric).

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