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Contents

Welcome

Richard Broadhurst (Senior Recreation Officer, Forestry Commission and Chairman, CRN)

Welcome to this Workshop organised by the Countryside Recreation Network. Let me first say something about CRN. CRN is a UK-wide Network—for individuals offering the opportunity for quick and easy access to the principal agencies involved in countryside recreation and related matters; for agencies CRN provides a very useful network to swap and spread ideas.

CRN has three aims:

- to identify and help meet the needs for advice, information and research; second;
- to promote co-operation between agencies in formulating and in executing research;
- to encourage the dissemination of the results of recreation research.

It is as part of the third aim that CRN runs a series of workshops-this is the first of a number during 1994. In summary the Network is devoted to exchanging and spreading information to develop best policy and practice in countryside recreation.

A workshop was held in this room about four years ago looking at some of the topics that we are revisiting today. A good deal of discussion and debate went on—pleasantly warm one might say. Interestingly, this stimulated CRN's forebear—CRRAG—to set up a conference on this theme. That conference was held in 1991 and as a result of that conference, an environmental economics subgroup was set up. The work of that group has led to this workshop in an attempt to see where we have got to today. There are three tasks for today's event. First, to hear some of the latest news in this area of environmental economics; second, to give everybody the chance to exchange ideas; third, to explore some of the basic assumptions that lie behind the methodologies.

I would first like to welcome Fiona Bryan who will deliver the first paper written by Ian Bateman and herself, both of UEA. Fiona has recently joined UEA from New Zealand.

Recent Advances in the Monetary Evaluation of Environmental Preferences

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Overview

The paper opens with a brief critique of the role of monetary evaluations of environmental preferences within decisionmaking. The focus of the paper then switches to consider the evaluation methods themselves. A critical analysis of relevant recent research findings is presented. This discussion highlights the need for care in applying such methods and in interpreting results, while still emphasising areas of practical use for such studies.

The Nature of Value

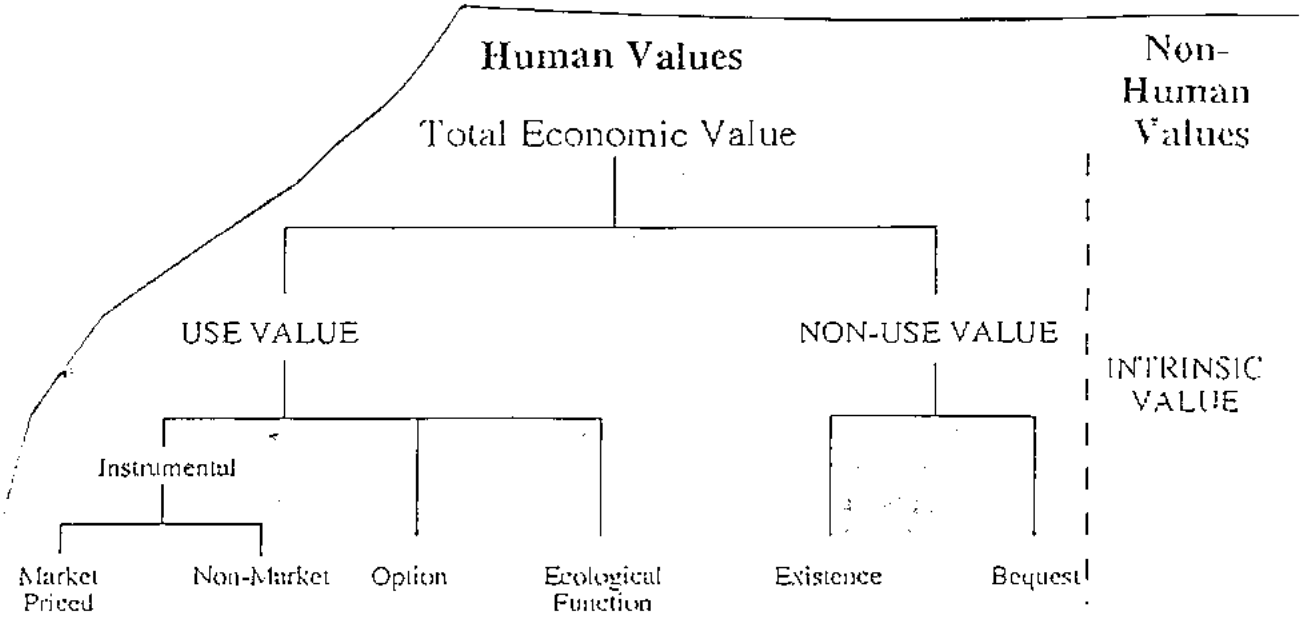
The need to incorporate the value of environmental goods and services into both public and private sector decisionmaking is a vital precondition for any move from a net-loss, resource-exploitative economy to one which is focused upon long-term sustainability. Yet in reality, even in the public sector where there is an explicit remit to consider *all* costs and benefits, incorporation of environmental values is at best haphazard. Often the services of the environment, whether it be as a provider of outdoor recreation, landscape amenity, or pollution assimilator, are treated as "free" goods. This arises from the common confusion of prices and values.

As consumers we are highly familiar with prices and easily slip into the misconception that the price of something and its value are equivalent. Even for market priced commodities this can be a dangerous oversimplification. Consider the case of water. Here price is given by a rates bill or metering charge. Such a price, while it may seem high at the time, is in some (often convoluted and approximate) way related to the supply and demand for water, rather than to its value which is extremely high.

This difference between price and value is even more extreme for many environmental goods which, because of a lack of private property rights, are often not bought and sold and consequently do not have market prices. However, as common sense shows goods such as open-access woodland recreation, while being unpriced are not without value. Economic research has slowly caught up with common sense and now recognises a variety of value-categories beyond those reflected in market prices. Figure 1 (p.4) summarises these categories which can be roughly divided into use values (those which are centred around the use of the resource by the "valuing individual"; including those services which are paid for and many which are not) and non-use values (those which are not personally used by the individual but are nonetheless valued). Together these make up the "total economic" or "sum human" value of a resource. However, Figure 1 also briefly raises the possibility of "non-human" or "intrinsic" values. The concept of an intrinsic value argues that "things" may be valuable irrespective of anthropocentric opinions. For example a whale may have an intrinsic value quite separate from the fact that humans value their continued existence[1].

[1] This is an example of the non-use existence value shown in Figure 1 which is of course quite different from the use-value for whales which other humans may have.

Figure 1: The Nature of Value



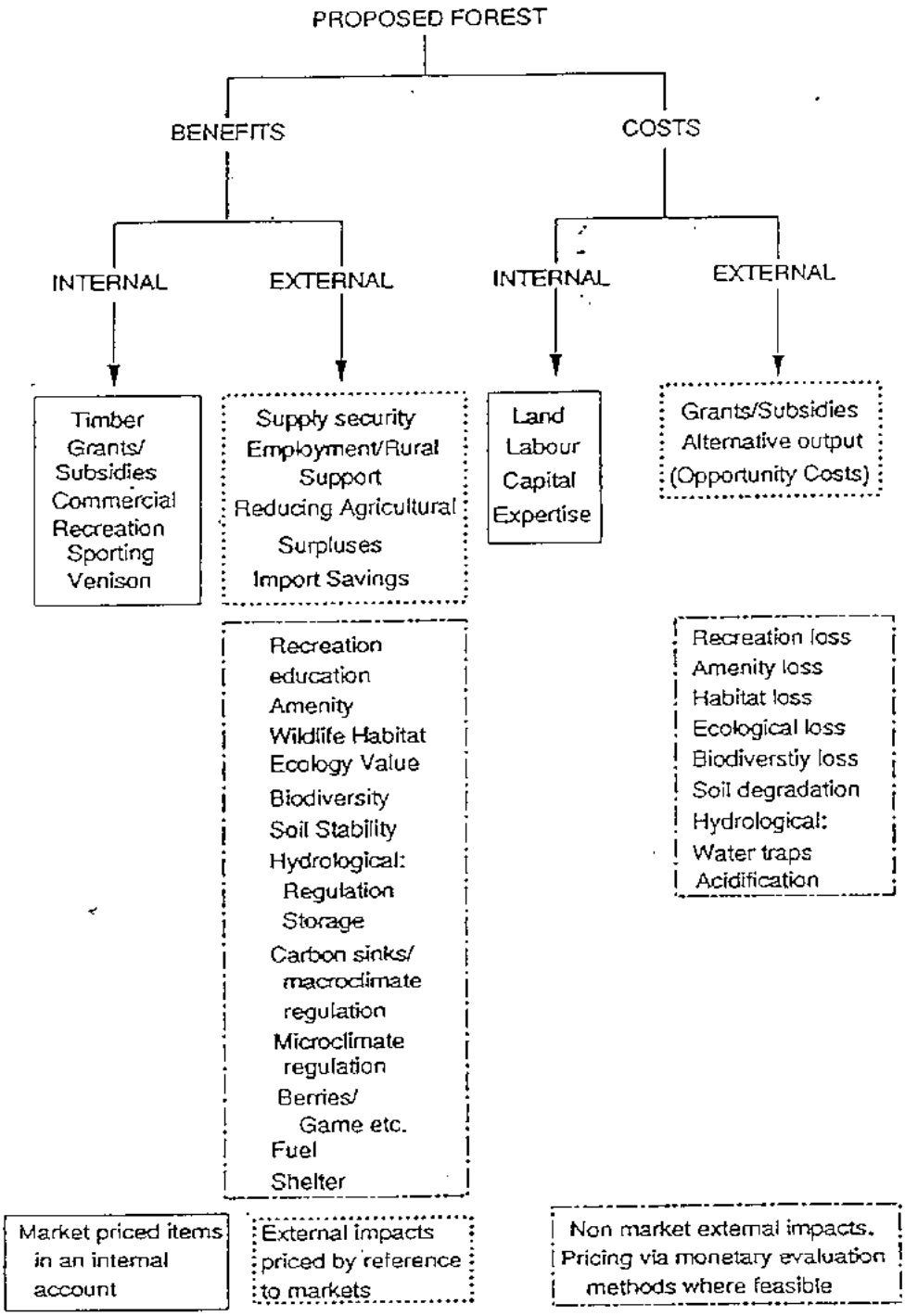
The very notion of values existing separately from humans is a point of long standing philosophical debate which we will not venture into. What is important to remember is that environmental economics, while emphasising the need to look at a wider definition of value than that provided by market prices, is restricted to the realm of human values and can say nothing about intrinsic values. This distinction between human and some wider definition of values needs to be born in mind when considering methods for the monetary evaluation of environmental goods and services. Such methods are not capable of "valuing the environment". Rather they are restricted to the evaluation of humans preferences for environmental goods, a much less ephemeral and consequently reasonable goal.

Cost Benefit Analysis

The fundamental rationale for wanting to evaluate in monetary terms any non-market, say environmental, resource is to permit its consideration within the economic analysis of some project. Economic, and more specifically, cost-benefit analysis (CBA), operates upon the numeraire of money. If benefits and costs are measured in terms of money, then reliance upon market prices will lead to the omission of unpriced (environmental) impacts and incorrect assessments of projects. Figure 2 illustrates this potential problem. Here the benefits and costs associated with a woodland project have been subdivided into those which are internal to the afforestation company (whether public or private sector) and those which are external, falling upon society. This permits easy identification of those items which have market prices (solid line boxes) those for which we may have some reference to related market prices (dotted line boxes) and those which are totally unrelated to any market price (dotted and dashed lined boxes). Clearly reliance upon market prices alone will lead to environmental costs and benefits being ignored, an error which is addressed (but not necessarily solved) by monetary assessment of environmental values.

The standard economic view of this problem is that CBA maximises the efficiency of resource allocation in a world where resources are finite. In other words in a Neo Classic economic world, CBA ensures that we make those decisions which give us the biggest overall return on our investment recognising that such a return is composed not just of market priced goods but also non-market resources.

Figure 2: Benefits and Costs of a Woodland Project



Source: Bateman (1992a)

There are many critics of CBA. The more subtle, point to weaknesses in the fundamental model of human behaviour which underpins Neo Classical economics. Others point out that efficiency (the size of the "cake") is not the same as equity (who gets the "slices") although CBA makes no pretensions to producing a morally defensible decision but merely reflects societies preferences[2] (which may be immoral). Of particular relevance to this paper are the concerns expressed regarding the accuracy of monetary evaluations of non-market environmental goods (Sagoff, 1988; Jacobs, 1991).

Several categories of response to the above criticisms can be identified to which various catchy labels can be assigned. The economic "optimists", "technocentrists" (O'Riordan and Turner, 1983) or "keepers of the true faith" reject fundamental criticisms of Neo Classical economics and analyses based upon its principles. Applied problems are seen as stemming from imperfect information or property rights and thus correlation of these issues is called for rather than a rejection of economic analysis. The antithesis to such a view is provided by the "economic pessimists", "deep greens" or "ecocentrics" (ibid) who reject the palpable efficiency, rather than equity, orientated reality of real world economic decisionmaking, ridiculing the demonstrable lack of the "trickle-down" effect by which efficiency for the rich is supposed to lead to equity for the poor.

This paper adopts an admittedly wet-liberal middleground position between these two extremes which we shall term as "pragmatic". This recognises the validity of ecocentric demands for equity to be given equal weight with concerns regarding efficiency. To this end any decision system should treat both rich and poor fairly (intragenerational equity) as well as ensuring sustainability of decisions by treating present and future generations in a fair manner (intergenerational equity)[3]. While the remainder of this paper concentrates upon more mundane decisionmaking matters, which in turn tend to be dominated by efficiency issues, we should like to stress that we accept the call for a shift of emphasis to place equity concerns on an equal footing with those regarding efficiency. Practical approaches for enhancing equity within CBA are discussed in Bateman et al. (1993a).

Nevertheless, the need for efficient use of a pressurised resource base is clear. However, this is only one of the reasons why we would argue for further research into CBA, rather than its abandonment. True to our pragmatic principles we would argue that one of the main reasons why such research should be undertaken, and why environmental NGO's and similar groups should take note of such work, is that CBA is now the basic appraisal technique of almost all government departments. H.M. Treasury, the Department of the Environment (DoE), the Department of Transport (DOT), and the Ministry of Agriculture, Fisheries and Food (MAFF) all now have consistent CBA project appraisal manuals[4]. Furthermore, many government agencies are adopting CBA as their guiding principle in decision analysis. For example the National Rivers Authority (NRA) already use a CBA manual which is consistent with those of government departments. H.M. Inspectorate of Pollution (HMIP) are currently moving towards the use of CBA. Waste disposal authorities, while not currently using CBA seem likely to be merged with NRA and HMIP into the proposed Environmental Agency (ENVAGE)[5] which will have "an economic duty" to deliver value for money ie. CBA efficiency analysis will be the guiding appraisal tool here.

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[2] To expand briefly: CBA only measures the total net benefit and does not differentiate as to whether costs or benefits are born by the rich or poor. However extended CBA analyses can and have been used (Pearce, 1986) which take account of "who receives and pays what". The authors feel that it is lamentable that such studies are the exception rather than the rule.

[3] The classic reference on equity is Rawls (1972). For more recent views see Pearce and Turner (1990: Ch. 15) and Bateman (1991).

[4] For example the Treasury "Green Book". [Economic Appraisal in Central Government: A Technical Guide for Government Departments, 1991]

[5] Most likely to occur in 1995.

In the face of such an overwhelming trend, major environmental groups who choose to purely ridicule or ignore CBA are inviting a dialogue of the deaf with government or agency decisionmakers. Such decisionmakers readily understand costs and benefits which can be expressed in monetary terms and have obvious difficulty in accurately assessing items expressed in a variety of diverse units, comprehensible only to experts in that field. This trend seems set only to grow in the foreseeable future. The "pragmatist" view then is to accept the current state of the world is likely to persist for some time and attempt to work within that paradigm rather than sit outside bemoaning that fact that the present situation is far from perfect. This does not mean that we accept current practice. Rather it means that we accept the current language within which decisionmakers operate, recognise that the British in particular have an inbuilt resistance to learning foreign languages and instead exhort those decisionmakers to "speak proper". In simple terms, if CBA is going to be the way that decisions are taken, then those concerned for the environment have a vested interest in ensuring that CBA is carried out fully, correctly and fairly. Carping on about abandoning CBA is looking increasingly futile.

Problems with Current CBA Practice

While not at all back-tracking on the above, it is important to emphasise that bad CBA is considerably worse than no CBA. Or to express it another way, bad CBA is worse than simple political decisionmaking which is often just what such CBA's are designed to obscure. As an example consider the DOT's approach to CBA known as COBA. Here all market priced (internal) costs (many e.g. construction) and benefits (few) are entered into the appraisal using their £ values. However, such a simple (financial) analysis would clearly produce a negative net-benefit and no road would ever be built. Accordingly the DOT move into CBA mode and begin to monetise the external impacts of roads starting with external benefits such as accident savings (usually some small positive value) and car-drivers time savings (almost always some massive positive value) as shown in Table 1. However, at this point, for some inexplicable reason, the DOT stop monetising externalities - just before they examine environmental costs such as noise, loss of amenity, etc (see Table 2)[6]. Adding monetised external benefits (to car drivers) onto the market priced items usually results in some large positive net benefit for the road scheme in question. Consequently, after ignoring a further stricture of CBA that such schemes should then be compared with non-road alternatives, the DOT conclude that the road in question is excellent value for money and the road is built.

Table 1: Items Which are Monetised in COBA

Item	Value
Construction costs	Market prices
Land costs	Market prices (debate as to appropriateness)
Demolition costs	Market prices (debate as to appropriateness)
Compensation costs	Market prices (debate as to appropriateness)
Maintenance costs	Market prices (debate as to appropriateness)
Vehicles operating costs	Priced from market prices of fuel, operating costs, etc
Time savings	Ongoing debate re value of time
Accident reductions	Ongoing debate re value of life, value of health

Source: Bateman et al. (1993a)

z

[6] Such environmental costs are assessed in COBA using non-monetary EIA techniques (Wathern, 1988). However there is considerable evidence (eg. Twyford Down) that such assessments are ignored in favour of monetised values in the final decision.

Table 2: Items Which are Not Monetised in COBA

Item	Present Analysis in COBA
Recreation/amenity loss	Quantified (area, land, quality)
Traffic noise	Quantified (distance or dBA bands)
Visual obstruction	Quantified (expert analysis)
Visual intrusion	Descriptive
Air pollution	Quantified (or unassessed)
Built environment/heritage	Descriptive
Severance	Descriptive/qualitative
Ecological sites	Descriptive/qualitative
Pedestrian/cyclists	Descriptive
Disruption during construction	Descriptive/qualitative

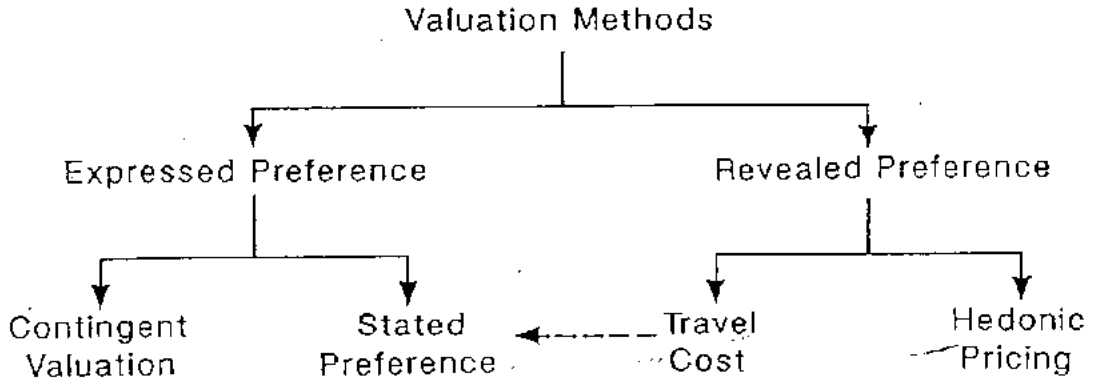
Source: Bateman et al. (1993a)

Consequently we can propose a simple "pragmatist" rule that while "good" full CBA is better than simple political decisionmaking, the latter is preferable (and much more honest) to "bad" or incomplete CBA. The task then is to ensure that CBA's deal with all costs and benefits in an evenhanded way.

Methods for Monetary Evaluation of Environmental Preferences

Economic theory shows that if we are interested in the value of an item rather than just its price we need to examine what people would have been willing to pay (WTP) for the item rather than what was actually paid (Turner et al., 1994). This WTP is described in the "demand curve" for the item. For market priced items the difference between WTP and what was actually paid is often trivial. However, for non-market, environmental assets which have, in effect, a zero market price, this difference is clearly major. Consequently environmental valuation techniques have been referred to as "demand curve approaches" to separate them from simple "pricing approaches" which look not at the value of environmental assets but at say the cost of their preservation (Bateman, 1992b). Figure 3 summarises the valuation methods discussed in this paper.

Figure 3: Methods for the Monetary Evaluation of Environmental Preferences



In Figure 3, expressed preference methods are those which rely upon respondents stated valuations of environmental assets as elicited in survey analyses. Revealed preference approaches examine individuals purchases of market priced goods essential to the enjoyment of environmental assets to determine the implicit value which is placed upon those assets.

Discussion of the theoretical underpinning and methodological requirements of these methods is continued at length elsewhere[7]. Here we shall concentrate on recent advances in research into these methods and comment upon the implications of such findings for the "pragmatist" argument for retaining and improving the CBA approach to decision making.

Recent Advances in Monetary Evaluation

In this paper we were asked to focus upon recent advances in monetary evaluation. We have therefore concentrated in part upon work being carried out at CSERGE, it being the most up to date research which we have access to[8].

The Contingent Valuation Method (CVM)

Work regarding the CVM has concentrated upon the impact of changes in questionnaire design upon response. One such analysis examined the effect of altering the way in which the WTP question was asked (the "elicitation" method)[9], the study was undertaken as part of a wider CBA looking at a flood alleviation scheme for the Norfolk Broads. A sample of over 3000 visitors to the Broads was taken using face-to-face interviewing techniques. Respondents were asked whether or not they were prepared to pay for a flood alleviation scheme[10] and, if so, how much.

Three elicitation methods were used as follows.

1. A first sample was simply asked "How much are you willing to pay?" This is referred to as an "open-ended" (OE) question as, in theory, any amount can be given in reply.

2. A second sample was asked "Are you willing to pay £X?", with the amount X being varied across the sample to see how individuals react to different levels. As respondents can only reply "yes" or "no" this is known as a dichotomous choice (DC) question.

3. The latter sample were then subjected to a "bidding game". That is, if they said "yes" to the initial DC question they were then asked if they were WTP twice that amount. Alternatively those which said "no" to the DC question were asked if they would pay half the initial amount. This procedure was then repeated after which a final open ended question was asked. It is the replies to this final question that we have termed the iterative bidding (IB) responses.

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[7] For a simple introduction to both "pricing" and "valuation" methods see Bateman (1992b). A deeper analysis of valuation techniques is given in Bateman (1994). Detailed analyses of individual methods are as follows: for contingent valuation see Mitchell and Carson (1989) or Bateman and Turner (1993); for stated preference see Adamoicz et al (forthcoming, a); for travel cost and hedonic pricing see Bateman (1993) while Price (1991) provides an interesting critique of hedonic pricing and Green et al (1990) provides a similar analysis of the travel cost method.

[8] A number of CVM analyses have now been carried out at CSERGE including experiments examining the impact of changing from WTP to willingness to accept compensation formats; different elicitation methods (outlined here); embedding and mental accounting effects.

[9] Full results given in Bateman et al (1993b).

[10] Nearly 90% of respondants were willing to pay something. Of those who declined most gave a reason related to their ability to pay while less than 1% of the total sample rejected the valuation principle (true "protest votes" as defined by Sagoff (1988)). For details see Bateman et al (1993b).

Figure 4 illustrates both a single DC and an IB response originating from some starting point (here the DC question "are you WTP £100?"). The figure also illustrates a further analysis which is achieved by examining all the responses from the initial "will you pay anything at all question" up to the third bound dichotomous question (but excluding the final IB response). Such an analysis is termed a hierarchical or multi-level and employs the statistical techniques developed by Goldstein (1987) in the context of educational research. Full results from this analysis are given in Langford, Bateman and Langford (1994) while results for the other elicitation methods are detailed in Bateman, Langford et al. (1993b).

Figure 4: The DC, IB and ML Responses

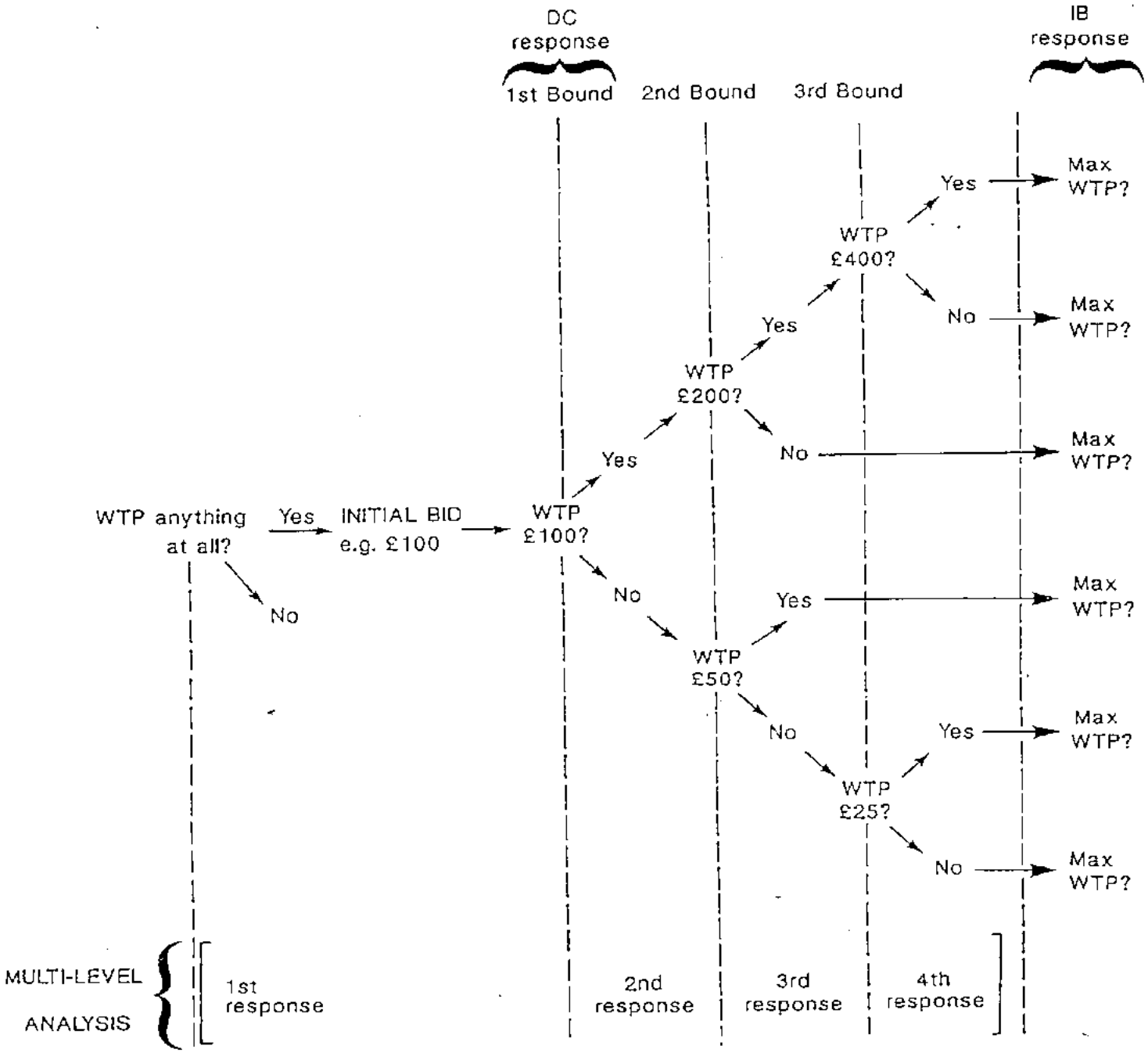

Table 3: Mean WTP Results From Four Elicitation Methods

Elicitation Method	Mean WTP (£)	95% Confidence Interval	
		Lower (£)	Upper (£)
DC	143.18	75.00	261.00
IB	74.91	69.27	80.55
3DC/MLM	81.65	44.32	118.97
OE	67.19	59.53	74.86

For further details see Langford et al. (1994) and Bateman et al. (1993)

Table 3 details mean WTP and associated lower and upper 95% confidence intervals for the four analyses carried out in this study. By far the highest mean was elicited by using a single DC question. This of itself is interesting in that the DC approach was favoured over the OE method in the recent "Blue Ribbon" panel report to the US National Oceanic and Atmospheric Administration regarding the use of CVM (Arrow et al., 1993). We identify four factors potentially influencing responses to DC questions all of which operate in an upward direction.

1. Anchoring: Following Kahneman, Slovic and Tversky (1982), it is likely that the bid level used in the DC analysis provides an "implied value due" from which individuals derive their response. Support for such an argument is given by the extreme strength of the DC bid level in explaining WTP when analysed in a bid function regression. Further support for the anchoring hypothesis is given in bid function analysis of the IB results which also showed that the initial bid level had a considerable influence upon final IB response although here the strength of this factor appears to have become slightly diluted through the bidding game.

2. Upward rounding: Suppose that a respondent has some significant WTP for protecting the Broads, say a true WTP of £75. Now suppose that respondent was asked the DC question "are you willing to pay £100?" We argue that respondents may well feel that a negative response may be taken as an undervaluing of their significant real WTP (actually the statistical analysis would not imply this but such a fact is unlikely to be appreciated). Particularly, if the respondent sees a no reply as being taken as a zero or low WTP then a positive answer is seen as a more accurate description of true WTP. Consequently there is a tendency to over state positively.

3. Good respondents/yea-saying: Following Orne (1962)[11] it may be that respondents attempt to be "good" by giving what they see as "correct" answers (not necessarily linked to true preferences). Such an impetus is again likely to raise the probability of positive responses to DC questions.

4. Strategic overbidding: A number of commentators (see review in Mitchell & Carson, 1989) have argued that certain respondents may perceive the nature of the CVM "game" and deliberately over-inflate their WTP in an effort to raise mean WTP and increase the probability of the good in question being provided.

Tendencies 2 and 3 above are difficult to check for although bid curve analysis did not reveal any obvious problems. The strategic overbidding issue was assessed both by a series of upper tail truncations and by comparing WTP with ability to pay. Such assessments suggest that there may be a small number of strategic overbidders. However, while their number is small their influence is disproportionately large and their omission reduced mean WTP by something in the order of 30% - a factor rarely analysed in most studies. In conclusion we would argue that simple, single-bounded, DC analyses are vulnerable to a variety of upward biases.

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[11] Thanks to Colin Green for this one!

Turning to consider the IB results, as noted these are also subject to some anchoring although not as severe as for the DC experiment. Consequently we are not surprised to see lower mean results here. Very similar results are derived from the triple bounded dichotomous (or multi-level model) analysis (3 DC/MLM) and this seems logical as both depend heavily upon the path through the "bidding game" chosen by respondents. In statistical terms because it uses almost all the information gathered, the MLM analysis is the most efficient giving the most accurate description both of mean WTP and its confidence interval. Notice that the CI is quite wide reflecting the variability of responses.

Comparison with the OE experiment is also interesting. Bid curve analysis showed that respondents experienced very considerable uncertainty in answering the OE question, "What are you willing to pay?" This is not surprising given unfamiliarity both with the idea of fixing prices and valuing non-market goods. Consequently we would expect risk-aversion and possibly free-riding to be factors here both of which lead us to expect a lower mean response, as is indeed observed.

In conclusion then, the way in which CVM WTP questions are asked does have a very significant impact upon answers. It is important therefore that this factor should be considered in future studies. If it is addressed then the researchers will be able to better assess the range of reasonable valuations. Our own preference is for joint MLM and OE studies to be conducted.

Does this "envelope of valuations" mean that CVM is of no use to project decisionmaking? The answer, unfortunately depends upon the case study in question. If project costs lie well below or well above[12] the range of benefit estimates then the decision will be aided by CVM. If costs lie within this valuation envelope then no clear decision is obvious although the information that cost benefit ratios may be near unity is of itself useful.

In this particular case-study the CVM analysis was of clear value. Table 4 shows that the marketed costs and benefits of the proposed flood alleviation scheme were roughly balanced with costs just exceeding benefits. However, inclusion of non-market benefits from the CVM study clearly indicate that flood prevention provides a large positive net benefit.

Table 4: Costs and Benefits of the Norfolk Broads Flood Alleviation Scheme (Yare Barrier)

Market Items	£ million[1]	Ratio
Benefits (damage avoided)	232.34	
Costs (construction etc)	237.65	
Benefit : Cost Ratio		**0.98**
Non-Market Items		
Net Benefits (preservation etc)	228.71	
Benefit : Cost Ratio		**1.94**

Note: [1] Undiscounted; considers Broadland area only
Source: National Rivers Authority (1992)

[12] We should emphasise that other values from Figure 1 may not be addressed ina particular study and must be considered in the wider CBA.

The Stated Preference Method

A recent trend in the evaluation literature has been the use of stated preference models. Here respondents are interviewed either on or off site and presented with a choice between hypothetical recreational sites. These sites are constructed from lists of attributes. These attributes are in turn varied across respondents such that a preference ranking for individual attributes is obtained. These are valued via the inclusion of variable cost items such as different lengths of travel or site entrance fees (the latter being similar to CVM while the former derives from the travel cost literature).

In the UK, pioneering work into SP has been undertaken by Ken Willis and Guy Garrod at the University of Newcastle upon Tyne under the sponsorship of British Waterways. However, the approach originates from North America. As an example we refer to the work of Adamowicz et al. (1994b) regarding the value of recreational fishing given various rates of flow in the Highwood and Little Bow rivers in southwestern Alberta. However, as the scenario cards reproduced as Figure 5 indicate, a variety of attributes other than simply river flow were assessed.

The full list of attributes together with regression coefficients for both standing and running water scenarios is given in Table 5. The coefficients need to be interpreted with respect to the statistical definition of attributes. However, generally a negative coefficient means that presence of the relevant attribute lowers the likelihood of a visit (vice versa for positive signs), while the absolute size of the coefficient indicates the impact of a unit change in the attribute. Therefore, for the running water case, if only one species of fish is present (Mountain Whitefish) the site is less preferred to one with two species which is in turn less preferred to a site with three species.

Figure 5: Example of a Stated Preference Question as Used in the Alberta SP Experiment

Suppose last August that you could have chosen only from the recreational opportunities described below.

	A. Standing	B. Running	C. Non-Water
Water Feature	Natural Lake	Stream	
Terrain	Mountain	Foothills	
Driving Distance	50km	50km	
Fishing:			Any other
Types of fish available	Pickerel, Pike & Perch	Rainbow Trout & Mtn Whitefish	non-water related
Fish size	Large	Large	recreational
Typical fishing success	1 fish every 35min.	1 fish every 4hrs	activity or
Camping Facilities	Designated Campsite	Designated Campsite	stay at
Water Quality	Good	Good	home.
Boating	None	None	
Swimming	Yes	No	
Beach	No	Yes	
Day Use or Entry Fee to Maintain Facilities	None	$6	

1. If these recreational opportunities had been available to you last August, would you have seriously considered visiting

   Opportunity _ Yes _ No
   Opportunity _ Yes _ No

2. Had the above opportunities been available last August, which one would you have most likely chosen? (Check one and only one box)

   $\overline{A}$ $\overline{B}$ $\overline{C}$

Source: Adamowicz (1994b).

Table 5: **Attributes and Relevant Coefficients of the Stated Preference Model**

Attribute	Description	Standing Water[a]	Running Water[a]
Terrain[b]	Flat Prairie (=-1) versus	-.367	-.415
	Rolling Prairie (=1)	-.071	-.100
		(.046)	(.042)
	Foothills (=1)	.257	.125
		(.045)	(.042)
	Mountain (=1)	.181	.390
		(.045)	(.042)
Fish Size	Large (=1) versus Small (=-1)	.058	.090
		(.026)	(.025)
Fish Catch	Fish per unit time	.062	.105
		(.028)	(.026)
Fish Species[b]	Mtn Whitefish (=1) versus	n/a	-.275
	Rainbow Trout and Mtn Whitefish (=1)	n/a	.064
			(.043)
	Rainbow Trout, Mtn Whitefish and Brown Trout (=1)	n/a	.107
			(.041)
	Cutthroat Trout, Mtn Whitefish and Bull Trout (=1)	n/a	.103
			(.042)
Water Quality	Good (=1) versus Bad (=-1)	.394	.321
		(.027)	(.025)
Facilities[b]	None (=-1) versus	-.353	-.277
	Day-Use Only (=1)	-.200	-.109
		(.046)	(.043)
	Limited Facility Campsite (=1)	.305	.162
		(.045)	(.042)
	Fully Service Campsite (=1)	.248	.225
		(.045)	(.042)
Swimming	Yes (=1) versus No (=-1)	.274	.158
		(.026)	(.025)
Beach	Kilometres	.198	.123
		(.026)	(.024)
Distance		-.007	-.007
		(.0004)	(.0004)

Notes: Standard errors given in parentheses.

[a] Water Feature specific (running versus standing water) coefficients are estimated for most attributes except distance. n/a indicates not applicable and n/s indicates not significant and not included in the model.

[b] Attributes with multiple levels are coded using effects codes. The base level is assigned -1 for all columns representing the remaining levels. Each column contains a 1 for the level represented by the column and a -1 for the base. The interpretation of these parameters is that base level takes the utility level of the negative of the sum of the estimated coefficients and each other level takes the utility associated with the coefficient.

Source: Adamowicz (1994b).

Adamowicz reports resultant welfare measures in terms of $/trip which he then subdivides into distance categories from the site (to allow comparison with a travel cost study). These group means range from $4.29 to $8.06 per trip with a grand mean (unweighted) of $5.94/trip.

SP models appear to offer three potential benefits over CVM approaches. Firstly they provide useful information regarding which attributes a respondent rates most highly in assessing a site (a factor which may aid in planning issues). Secondly, they appear to provide statistically stronger bid function models. And thirdly, they are highly compatible with revealed preference, travel cost models.

In summary then SP models do hold out considerable promise and are certainly worthy of further research. However, some caution is advised as we would expect some of the criticisms of CVM to apply to SP models. In short SP may help with monetary evaluation but decisionmakers should not expect a panacea. The fundamental problem is too complex for that.

Revealed Preference Methods

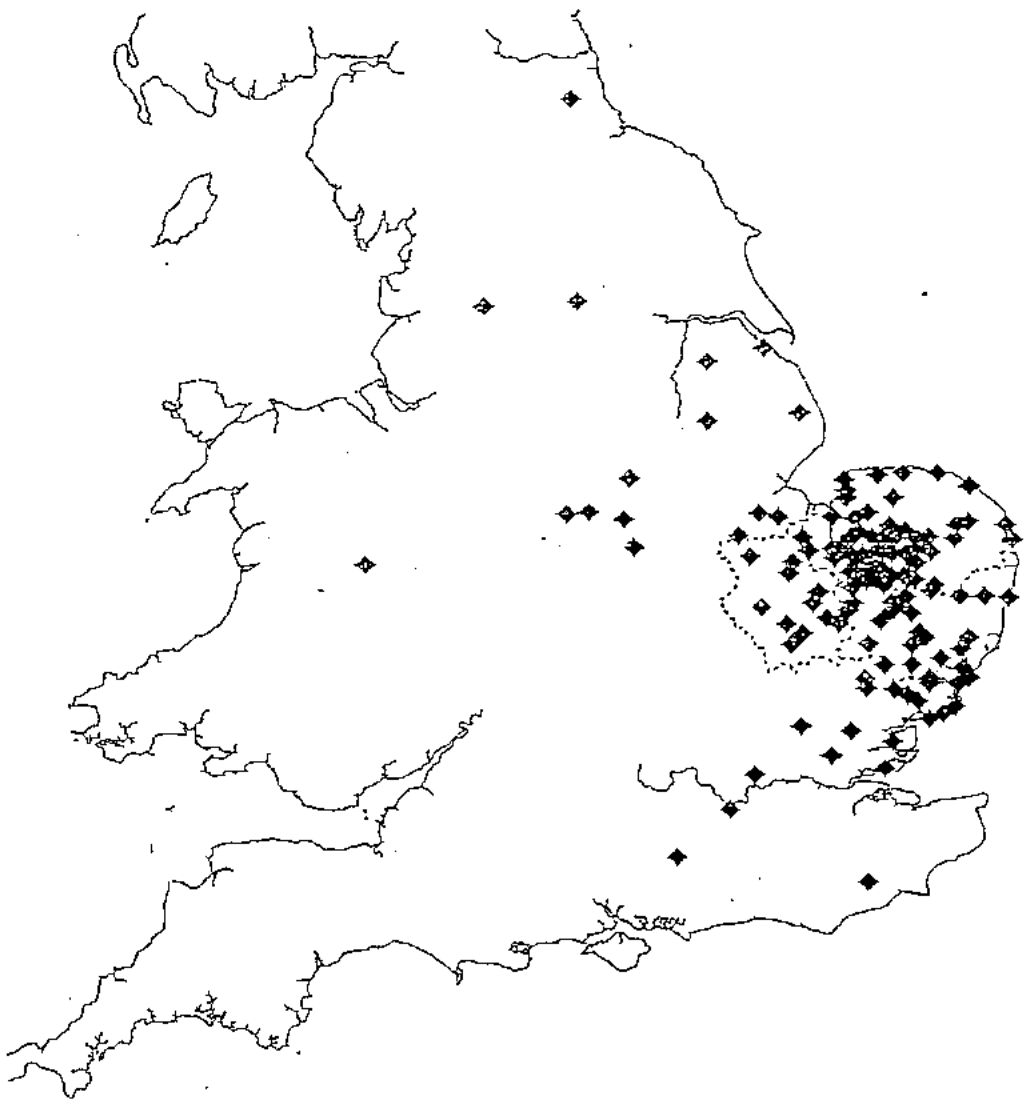
Recent work at CSERGE and collaborating institutions has focused upon the use of geographical information systems (GIS) as a method of holding and analysing the complex spatial variables often involved in revealed preference studies. For the uninitiated then, at its simplest, a GIS is a piece of software capable of handling and interrogating digital maps.

Travel Cost Method (TCM)

The following draws upon currently unpublished work by Ian Bateman, Andrew Lovett and Julii Brainard at UEA and Guy Garrod at the University of Newcastle upon Tyne.

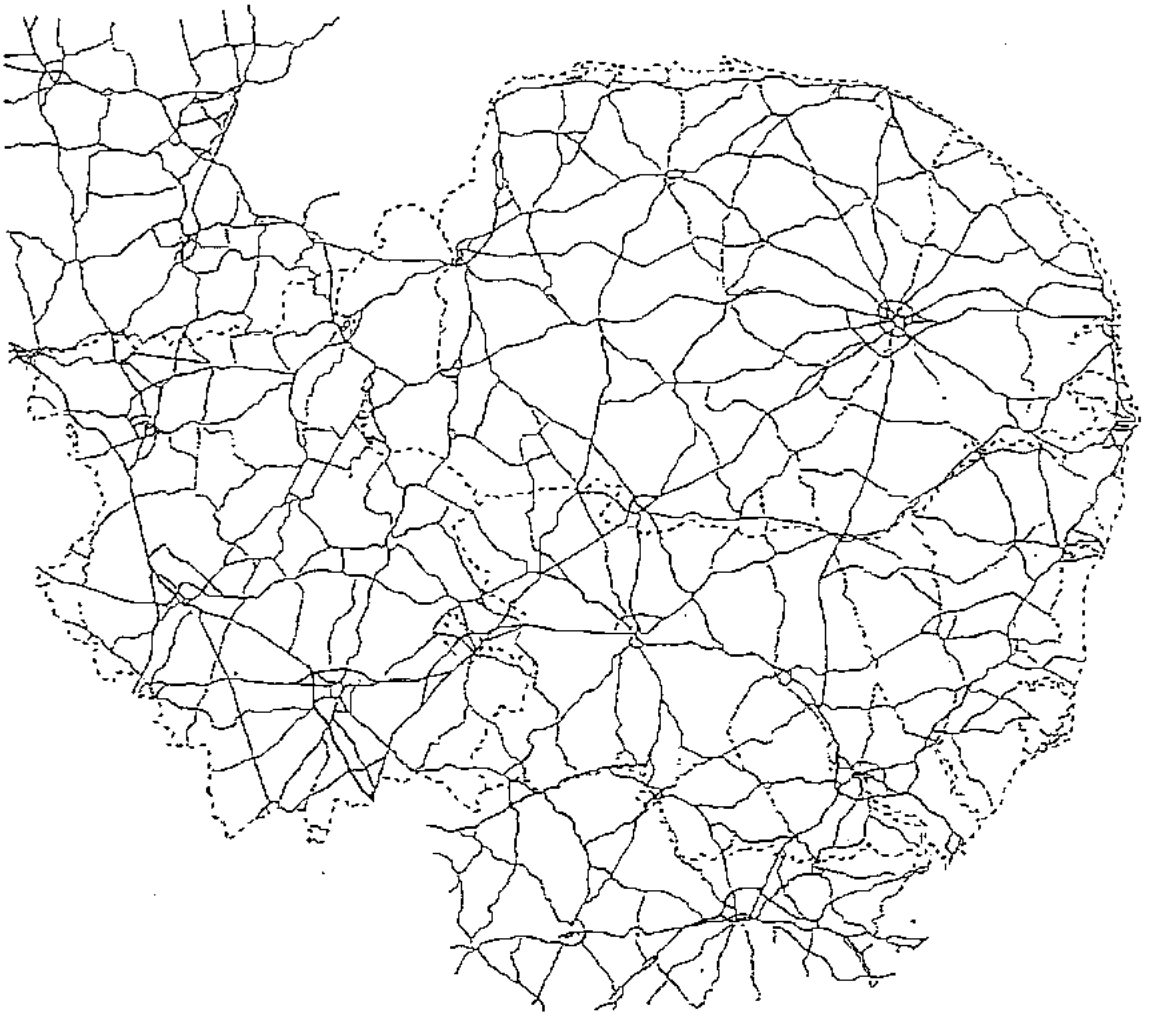
To test the usefulness of GIS in conducting TCM research a case study concerning day visitors to Thetford Forest, Norfolk was undertaken. A sample of 350 interviews was taken and trip origin addresses digitised onto the OS grid (see Figure 6).

Figure 6: Visitors to Thetford Forest: Trip Origins



Using the GIS a full road network was extracted as illustrated in Figure 7 (note that for reproduction we have omitted the smallest roads from this figure). This data layer specified not only travel distances but also road quality and relevant average travel speeds. Accordingly accurate travel times were calculated.

Figure 7: Road Network Used in the Thetford Forest Study



As part of the interview, respondents were asked questions regarding the purposefulness of their visit to Thetford. This allowed calculated travel costs to be adjusted to reflect the importance of the visit to Thetford with respect to the entire days trip (i.e. someone who had no intention of visiting the forest and just stopped to use the toilets would have a zero adjusted travel cost).

A trip generating function was estimated using maximum likelihood techniques, the best fitting model being as follows:

$$\ln(Q+1) = \underset{(0.5923)}{-0.4853} \underset{(0.0883)}{-0.2857\,TC} \underset{(0.1994)}{+0.2643\,HSIZE}$$
$$\underset{(0.5333)}{-1.4729\,HOLS} \underset{(0.4534)}{+1.7408\,WORK} \underset{(0.3946)}{+2.277\,LIVE}$$
$$\underset{(0.2417)}{+0.5050\,SCENE} \underset{(0.2370)}{-0.4629\,NT} \underset{(0.2465)}{+0.4416\,TAX}$$
$$\underset{(0.2583)}{+0.6066\,DOG}$$

Where

Q	=	Number of party visits p.a.
TC	=	Travel Cost evaluated at 8p/mile and time cost at 2.5% of wage rate
HSIZE	=	Household size
HOLS	=	On holiday when interviewed (0-1)
WORK	=	Works at forest (0-1)
LIVE	=	Lives at forest (0-1)
SCENE	=	Scenery rating (1-4)
NT	=	National Trust member (0-1)
TAX	=	Respondent is a taxpayer (0-1)
DOG	=	Respondents main reason for visiting is dog walking (0-1)

The GIS approach provides several advantages over conventional methods. In particular data regarding travel times and travel costs can be calculated to a far greater degree of precision than previously feasible. In Clawson-Knetsch (zonal) studies zones can now be calculated upon travel times rather than concentrically (problems associated with concentric ring studies are discussed in Bateman, 1993). Welfare measures derived from the optimal model are presented in Table 6.

Table 6: Thetford Forest Individual Travel Costs Method Study: Welfare Measures for the Best Fitting Model

Travel Cost (pence/mile)	8p
Travel Time (% of income)	2.5%
Travel Cost coefficient	-0.077656
Log likelihood	-454.59
CS/household per annum (£)	153.23
CS/household per visit (£)	3.95
CS/person per visit (£)	1.32

The first row of Table 6 shows the level of travel cost used in the best fitting model. At 8p/mile this indicates that visitors only consider marginal petrol costs (i.e. ignoring fixed running costs) when planning journeys. Row 2 shows that optimal time costs are very low indicating that leisure time is not seen as a loss of work/wage-earning time. Both these findings seem reasonable. Row 3 lists the coefficient on overall visit costs while row 4 gives the log likelihood value showing the model fit. The final three rows list the welfare measures as consumer surplus per household per annum; per household per visit; and finally per person per visit. This latter value allows comparison with other UK forest recreation studies which have expressed welfare in this way. Interestingly the value given in this cell is very similar to that which can be calculated from the work of Benson and Willis (1992) if lower bound assumptions are used (see Bateman, forthcoming).

These findings appear encouraging and certainly the use of GIS seems helpful. However, again we would issue a word of warning regarding the variability of results obtained from the TCM. In a further analysis of this data a variety of defensible assumptions regarding the definition of visit costs were tested. These included:

Travel cost = 8p/mile (marginal petrol cost only)
= 23p/mile (petrol + standing costs)
= perceived (as stated by respondents)

Time cost = 0% wage rate (travel time is not a cost)
= 43% wage rate (as used by DOT)
= 100% wage rate (full wage rate)
= X% wage rate (best statistical fit)

Table 7 reports results for the permutations of the above assumptions. Note that model fit (as expected) does not deviate by much across these models. However, the resulting coefficient and therefore welfare estimates do vary very considerably from a minimum of £1.21/person/visit up to £7.72/person/visit. Indeed the magnitude of variance is greater than in our CVM study.

As before then we are faced with an envelope of valuation although at least we have some statistical indicator of which result fits the data best. Such a finding reinforces our belief that monetary evaluation of environmental preferences is, by dint of the nature of goods involved, not an exact science but rather a matter of degree. As previously noted, the usefulness of such evaluations will vary between studies depending upon the other costs and benefits involved.

Table 7: Thetford Forest Individual Travel Cost Method Study: Truncated Maximum Likelihood Results

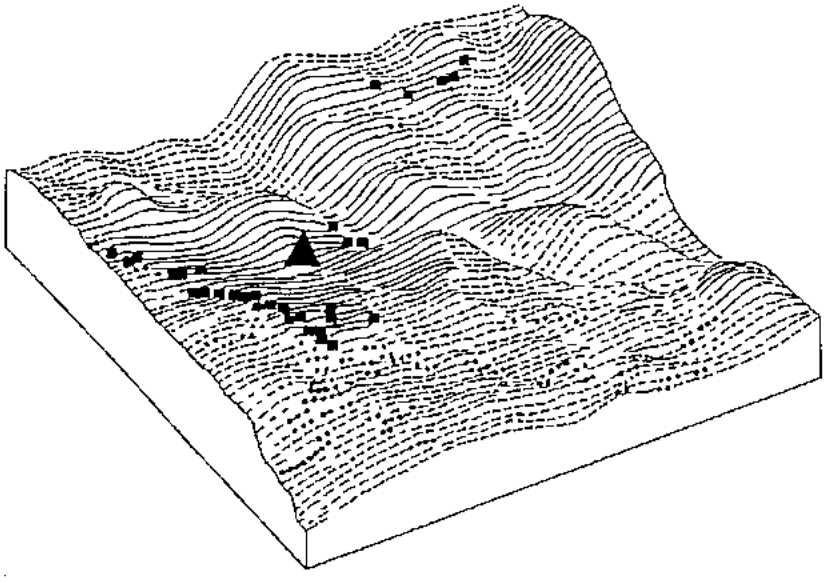
Travel Cost (pence/mile)	Travel Time (% of income)	Travel Cost coefficient	Log likelihood	CS/house-hold per annum (£)	CS/house-hold per visit (£)	CS/person per visit (£)
8p	0%	-0.084758	-455.46	140.39	3.62	1.21
8p	43%	-0.031808	-455.59	374.10	9.65	3.22
8p	100%	-0.016002	-456.28	743.61	19.18	6.39
8p	2.5%	-0.077656	-454.59*	153.23	3.95	1.32
23p	0%	-0.031207	-455.36	381.31	9.83	3.28
23p	43%	-0.020856	-455.72	570.56	14.71	4.90
23p	100%	-0.013251	-455.35	898.02	23.16	7.72
23p	6%	-0.029540	-455.34	402.83	10.39	3.46
Perceived	0%	-0.083677	-455.95	142.21	3.66	1.22
Perceived	43%	-0.034485	-456.60	345.06	8.90	2.97

Note: * = best fitting model.

The Hedonic Pricing Method (HPM)

The HPM has not been used extensively in the UK although there are some notable exceptions such as the work of Pennington et al. (1990) and Garrod and Willis (1992). Again we feel that GIS has a considerable amount to offer. Two capabilities are of particular relevance. Firstly the ability to computerise the accurate measurement of spatial and temporal distances from properties (if such is the first stage dependent variable) to facilities should allow for the enhanced incorporation of non-environmental explanatory variables into HPM regression models. Improved quantification of such variables will allow clearer identification of the influence of environmental factors upon house prices. Secondly those environmental variables can themselves be modelled with much greater accuracy using the contouring and "viewshed" capabilities of a GIS. To illustrate this latter point consider an ongoing case study being examined by the author and Andrew Lovett (UEA). Here the impact of an incinerator chimney upon local house prices is being considered. This particular incinerator is located in the floor of a valley. Traditional HPM models often use straight line distance as the quantifying variable in such studies. However, because of the valley floor location houses located less than 1km away in neighbouring valleys cannot see the stack whilst others located up to 10km away along the valley have an unimpeded view. Clearly traditional approaches may only pick up a weak effect of the chimney. But the GIS viewshed capability interrogates contour maps to produce either discrete or probabilistic variables describing whether the houses in the study area can actually see the stack or not. Figure 8 reproduces a simplified version of the viewshed created for this study.

Figure 8: GIS Generated Viewshed of an Incinerator Chimney



Conclusions

To end this paper we have a couple of "pragmatist" conclusions. Regarding the underlying mode of decisionmaking, research into non-CBA approaches appears likely to be restricted in its practical value, at least for the foreseeable future. Ecocentric refusals to consider money based appraisals seem likely to confine such commentators to the margins. However, this does not mean that we subscribe to the form of CBA currently practised in many official appraisals. An immediate need is for an extended efficiency analysis in which external, and particularly environmental, costs and benefits are assessed on an equal footing with market priced items. As a medium term goal we should also like to see a shift towards the incorporation of equity considerations (both intra and intergenerational) within decisionmaking.

Turning to consider the role of methods for the monetary evaluation of environmental preferences within CBA, we have tried in this paper to emphasise the nature of such valuations. It is ironic that market prices are often accorded such ready acceptance when even a cursory analysis reveals many of the relevant markets to be highly distorted implying that resultant prices are only poor indicators of underlying welfare (agricultural goods markets being a prime example). What is clear is that valuation estimates for non-market goods are, understandably, even more prone to variability. The techniques discussed in this paper do not give defensible point estimates of value. Rather they provide ball-park orders of magnitude. The vital test is whether or not such estimates aid the decision process. In reality decisionmakers may have very little ex-ante information regarding the value of assets such as those provided by the environment. In such situations then the broad band estimates of value given by these methods may, when compared to other project costs and benefits, provide sufficient information to clarify the correct decision as to whether that project should proceed or not.

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Questions and Comments

John Adams (UCL)
All of your examples relate to trying to ascertain willingness to pay. There is no great problem with this if you are talking about a flood prevention scheme for example, but if you are, for example, talking about the conversion of Thetford Forest to a superstore or shopping mall, it seems to me that the important principle here is "willingness to accept". Why does your study appear to ignore this?

Fiona Bryan
Most studies have only looked at the willingness to pay aspect and I am aware of the divergence between the two with willingness to accept being far greater (as much as three to five times). We nevertheless limited the study methodology to willingness to accept.

Tony Philpin (Pennine Way Co-ordinator)
Looking at the recreation activities side of the equation it seems, in terms of the willingness to pay arguments, that there is absolutely no distinction between the kind of recreation activity that people carry out in Thetford Forest and the rest of the country. I know that Thetford Forest is used for national orienteering championships which means that people might be travelling a lot further afield. Would that not confuse the overall picture substantially to the extent that your average user becomes almost an irrelevance?

Fiona Bryan
It could possibly, but the reason that they chose Thetford Forest was the fact that they keep very accurate records in terms of what people were actually doing there.

David Sayce (Surrey County Council)
Have you done any research into the discount factor that you would use to adjust the annual figures? This makes an awful lot of difference to the capital values that would be fed into the cost-benefit analysis.

Fiona Bryan
The government test discount rate was used.

Richard Broadhurst
We will return to the issue of discounting later on.

Wendy Emmett (Avon County Council)
I am interested to know how you deal with people's political inclinations and with the person who answers "well I pay already. I am willing to pay but I already do so through my taxes". Contingent valuation is used much more widely in the United States where people are used to paying for what are traditionally regarded as 'public goods' in the UK.

Fiona Bryan
Yes, the political inclinations of the respondents were recorded.

Richard Perkins (SNH)
Was your use of the iterative bid method more sophisticated than purely giving respondents one figure of £100?

Fiona Bryan:
Yes; the example of £100 that I used was for illustrative purposes. The actual study used eight separate bid points ranging from £1 to £500.

Tony Harrison (Inland Waterways Association):
Can you confirm that UK government departments have consistent CBA methods both within and between departments. I would also like to make the comment that the methods are applied to existing recreational resources and when you apply them to new recreational resources the assumptions used must be closely examined.

Richard Broadhurst
We will save discussion on that aspect until later.

Environmental Values and Public Policy

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Introduction

I am an economist, but I take a different view from many of my colleagues on the validity of economic approaches to valuing the environment. However I take their view seriously. I take it seriously for a reason that was illustrated in the paper by Ian Bateman and Fiona Bryant. They pointed out that the flood alleviation proposals in the Norfolk Broads would be marginal if you only included the normal 'economic' items in the CBA. That is, if you excluded the environmental value of the Broads, the costs and benefits of the scheme would come out roughly equal. However if you added in the environmental benefits, as estimated by environmental economists, the total benefits of flood alleviation would substantially outweigh the costs. Therefore if environmental decisions were made on the basis of the principles espoused by this approach, the environmental protection project would go ahead. I suspect most of us would be pleased about that.

The defence given by economists for this method is a strong one: that since public policy decisions are made on financial criteria, the environment must be valued in monetary terms like other costs and benefits. If we do this, they claim, we are *more* not less likely to protect the environment.

I think this argument is sometimes right but more often than not probably wrong. I want to try to demonstrate this by talking both about the *principles* involved in making public policy decisions, and about the *context* in which such decisions are made. I am therefore not going to dwell on the technical objections to, or theoretical difficulties with, the orthodox economists' technique of contingent valuation, though I shall mention two which have a direct bearing on the argument.

The crucial thing to remember about these issues is that they involve *public decisions* - that is, decisions made by public, not private, authorities. My argument is as follows. First, cost benefit analysis is not an appropriate way to frame public decisions, and contingent valuation is not an appropriate way of gauging the public's views about those decisions. Second, and partly because of this, these are not *helpful* techniques in the real world of public decision making about the environment. They don't make for easier or better processes.

Is Cost Benefit Analysis an Appropriate Framework for Public Decisions?

Let us start with the technique of cost benefit analysis (CBA), offered by orthodox economists as the appropriate way to frame (that is, to understand and to set out) public decisions. The criterion CBA uses is utilitarian. It says that what public authorities should be doing when they make public decisions is maximising the utility, or preference-satisfaction, of the individual members of the present generation. Such a view of how public decisions should be made has a long and honourable tradition, stretching back to Jeremy Bentham. But it is not a universally held view. Indeed it is not, I suspect, how most people want public authorities to make decisions on their behalf. We want those authorities to take other criteria into account.

For example, we might want the interests of *future generations* to be given some weight. The feeling that too many decisions have been made without taking the needs of future people into consideration is after all one of the wellsprings of the idea of 'sustainability', now officially accepted by government.

We might also want to give a place to what are perceived as the *rights* of certain groups of people. One of the strongest arguments made in defence of local areas of countryside and open space when threatened by (for example) road building is that local people's interests are ignored. This is 'our' environment, they say: land which makes an important contribution to quality of life, recreation, historical and cultural identity and spiritual nourishment. Local people make a claim to their environment which is simply not equivalent to the claim made by motorists from other parts of the country who desire shorter journey times. (In fact motorists' desires are not measured: the monetary benefit of time savings is calculated through a formula based on wage rates - the assumed desire to save time is not investigated.)

We might also be concerned about *distributional equity*. The interests of poorer people tend to lose out in cost benefit analysis because individual preferences (willingness to pay) inevitably reflect ability to pay. In markets for ordinary commodities we tend not to worry about this: it is accepted that the poorer you are the less your influence. But for important parts of our cultural heritage and life - museums, art galleries, television - we do accept the principle of equity. We don't charge people to visit the countryside because it belongs to all. So we might say that public decisions about that countryside should also be made on equity criteria.

Many people (I would argue, probably most) would say that public authorities should take these factors into account when making decisions on their behalf. They would not argue that the majority of people's preferences should be ignored; only that the utilitarian criterion should not be the sole determinant of public decisions. CBA therefore is not an appropriate framework.

The great attraction of utilitarianism and CBA, of course, is its simplicity. With only one criterion, public decisions (at least in theory) become much easier. If we are to operate with a range of criteria, we need to know how to balance them against each other, for they will often be in conflict. This is much more difficult. But that's what the real world is like: it does involve difficult judgements about which among several options is the better course of action. We cannot simply reduce all values or criteria to a single scale and add them up, as CBA demands. This is not how we make decisions in our personal life - choices, for example, about career and residence which conflict with commitments to family and friends. Different values can be incommensurable. Making decisions is then about *judgement*, not computation. I shall return to the subject of how public authorities should make judgements a little later.

For these reasons I do not believe CBA is an appropriate framework for making (or considering) public decisions. Nevertheless it can still have a role within a wider framework. Some of the factors which enter into the judgements public authorities need to make are amenable to economic analysis. There are real financial costs involved in public decisions, and real financial benefits, measured by actual markets. (For example, in the flood alleviation scheme, the prevention of flood damage to agriculture, other land and buildings represents a real financial benefit.) These need to be added up. Their sum is not the end of the matter, since a distributional analysis must also be done: who gets the benefits and who pays the costs? Is this fair? But it is one piece of information which the decision maker should be given, to contribute to the overall judgement.

Is Contingent Valuation an Appropriate Method for Discovering the Public's Views?

Orthodox economists make a powerful claim in defence of their techniques of monetary valuation. These techniques, they say, don't impose some expert's valuation of the environment. They measure the preferences of ordinary people. Using these preferences to make public decisions is democratic, it is said - unlike the methods preferred by certain environmentalists, who want to impose their own elitist values on society.

It can readily be agreed that public decisions should take into account the public's views. But two questions arise. First, do the orthodox economists' techniques elicit the full range of views about the environment which members of the public hold? Second, should the public's views be the ultimate determinant of public decisions? Or should public authorities take other views into account as well? In which case, how should this be decided?

The technique offered by orthodox environmental economists for eliciting the public's views is contingent valuation (CV). CV asks people in a survey to give a monetary figure representing their willingness to pay for environmental benefit or (more rarely) willingness to accept compensation for environmental loss. It is not quite true, in fact, to say that this technique seeks people's 'views'. Asking people about their `willingness to pay' is a rather narrow - even a rather strange - question. It assumes that people think about the environment in the general way that they think about ordinary purchasable commodities such as toothpaste or holidays. But many people would surely say that the environment is not like an ordinary purchasable commodity. It is somehow 'special'. Its specialness is a function (many of us would say) of the fact that it is not human-made (though it is human-influenced), that it has been there a long time, that human beings couldn't be human beings without it, that it would exist (in some form) without us, that other living things depend on it, that it is intimately bound up with the history and culture of the local places people call 'home', and so on.

For many people, therefore, the question `how much are you willing to pay?' to protect a piece of land, or species or whatever, comes across as rather odd. The environment isn't that sorts of thing. One result is that many people don't answer the question: they refuse to take part in the survey. Economists call responses of these kinds 'lexicographic preferences'.[1] Sometimes, particularly for beautiful, unique and emotionally valued assets, the number of people who refuse to answer because they don't think this an appropriate sort of question is very high - up to 40%. Yet such responses are excluded from CV figures as if they were 'don't knows'. They have to be excluded, because the only alternative interpretation (that what people is saying is: 'my willingness to pay is zero') would obviously influence the total value *downwards*, when the (non-monetary) valuation being given is actually very high.

The problem of lexicographic preferences is a very serious one for contingent valuation, because it undermines a basic assumption on which the technique is built: that what people are doing when they 'value the environment' is expressing a willingness to pay for it. But more importantly for this discussion, it exposes the fact that in public decision making we don't really want to know how much people would be willing to pay for a particular aspect of the environment, since they are not going to be asked, individually, to pay for it. What we want to know is *what they think the public authority should decide to do* about that aspect.

Now of course the reason orthodox economists want to ask about willingness to pay is because they regard the question: 'what should the public authority do?' as barely necessary. Cost benefit analysis has already provided the answer to that: the public authority should protect the environment if its net present value exceeds the net present value of protecting it. CV is therefore designed to get a figure for net present value to put in the CBA. But if (for reasons given above) we reject CBA as the overall framework for making decisions, then the reason for asking about willingness to pay disappears. Instead of asking an indirect question which must be manipulated within a further complex procedure, why don't we get the people's views on the actual question we want answered? This question - the question asked in public decisions - is very simple: `What should society do about this aspect of the environment?'

The orthodox economist can offer a defence of CV. It's no use asking people 'what should society do?', they will say, because this does not offer them the real choice. Environmental protection is expensive, and ultimately the public will have to pay for it - whether directly through public expenditure, or through higher prices, or income foregone, or whatever. CV forces people to put their money where their mouth is: to face the financial consequences of their valuations.

This is absolutely correct. But it does not save CV. In the first place, CV asks for people to pay personally, when public decisions may in fact be paid for by others. And rightly so - many people would argue (and the 'polluter pays principle' would support them) that environmental damage should be paid for by those who cause it, not those who suffer it. Even where payment is universal, its distribution may be progressive - for example, if payment is made through the taxation system, or if prices are raised for luxury but not essential goods.

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1 See C.L. Spash and N. Hanley, 'Preferences, Information and Biodiversity Preservation', 1994, mimeo, Environmental Economics Research Group, University of Stirling

More importantly, there is no reason why public opinion techniques which ask people 'what should society do?' have to ignore the question of payment. On the contrary, they can easily make it clear what the financial consequences of alternative decisions are for individual respondents. This can be done by opinion surveys (for example: 'Protecting this open space from development will mean an extra penny on your Council Tax and will prevent the creation of thirty jobs. Do you believe the local authority should protect it?'). It can also be done by more qualitative techniques.

Given the complexity of people's attitudes towards the environment, and the fact that what public authorities really need to know is what people want them to do, the willingness to pay question seems curiously narrow and wrongly focused. It makes the environment seem like an individually purchasable commodity, when it can't (and won't in fact) be individually purchased, and it isn't an ordinary commodity fulfilling ordinary preferences.

It seems to me that we need to develop much better ways of understanding the public's views. I would like to see considerable innovation by public bodies in this. For example we could try using qualitative techniques such as focus and `in-depth' discussion groups. In such contexts people can express far more deeply and with greater complexity what the environment means to them, and can work through in arguments and feelings the consequences of their actions for other people. Though not 'representative', this information will give public authorities a much richer sense of the 'costs' and 'benefits' of their potential decisions than CV or simple quantitative opinion surveys. Similarly, there are techniques such as the 'parish maps' promoted by Common Ground which give people in a locality the opportunity to define in their own words what it is that is valuable and distinctive about a place. And of course there are the 'old' consultation methods of public meetings, seeking people's views in community groups, correspondence in the local press, and so on. I shall return to these later.

Is Public Opinion All That Counts?

One reason for wanting more qualitative methods of discovering people's views about what public authorities should do is that decisions about the environment have very wide ramifications. One of the ways in which the environment is not like any other commodity is that it is not properly divisible into component parts (in the way that CV, incidentally, requires). Each habitat, each species, and so on, is part of a wider web of natural and nature-human relationships - ecosystems, biochemical cycles, and so on. These are not properly understood by scientists, so they are hardly likely to be understood by the lay public. In situations in which members of the public are ignorant about the wider ecological implications of decisions, simple 'willingness to pay' surveys would appear to be a peculiarly inappropriate way to inform public decisions.

This problem has been recognised by contingent valuation practitioners. CVs of biodiversity, in particular, show that valuations depend on the amount of information respondents have about the habitat or species they are asked to express a preference for.[2] Unsurprisingly, many respondents don't understand very much about the ecology of, for example, a wetland; quite openly, they acknowledge that they don't know how they should value it. If the amount of information given to respondents is varied, their valuations go up and down accordingly.

Like that of lexicographic preferences, this problem (so-called 'information bias') poses damaging difficulties for contingent valuation even in its own terms, since it means that no determinate figure can be given for people's preferences for a given environmental feature -only for a particular description of it. If the description changes, so does the valuation. But even more fundamentally it undermines the point of conducting CVs. Put crudely, should public decisions about rare species and fragile ecosystems be made on the basis of an ignorant public's willingness to pay for them?

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2 Spash and Hanley op cit.

The claim here is that biodiversity falls into the category of what economists would call a 'merit good'. Public authorities should protect it even though people aren't necessarily willing to pay for it, because though they might not realise it, they need it. The `value' of biodiversity which should be considered when making decisions about it should be provided by ecologists, not the public through willingness to pay.

But this argument need not only apply to the ecological value of biodiversity. Many other professional groups would claim to have an understanding of the importance of environmental change which might not be appreciated by public opinion. Other environmental scientists, for example, might comment on the pollution and energy effects of a particular development; landscape assessors could offer an aesthetic valuation of a place; cultural historians a view of its historic and cultural value. It is by no means clear that, even using qualitative techniques, ordinary members of the public would understand or give full weight to these things. Should they then be ignored?

Ultimately of course this is an issue for the democratic theory, rather than for environmental economics. How much importance should public authorities give to public opinion in making public decisions? Is public opinion one factor - in the environmental case, one source of valuation - which public authorities should consider? Or is it the overriding one, which contains and encapsulates all the others?

I don't claim to offer answers to these questions here; but as an economist I am not embarrassed by asking them. It seems self evident to me that the techniques used to make public decisions are a matter for political theory and the political institutions which articulate it. It is the peculiar conceit of orthodox economics that such decisions could somehow be removed to the realm of technical computations of monetary valuation and cost benefit analysis.

How Do Politicians Think?

This brings me to perhaps the most important question: leaving aside their appropriateness in principle, are the cost benefit analysis and contingent valuation techniques *helpful in practice* for making public decisions? To answer this it is useful to distinguish between two different types of public environmental decision, and therefore of decision-maker.

The first is the large-scale decision, usually involving substantial development or other changes in land use, which affects a number of significant interests. Such decisions are made by politicians, either at local or at national level. They are 'public' not only in the sense that they are made by public authorities but because they often involve considerable public debate. The extension of the M3 through Twyford Down would be a classic example of this type of overtly political decision.

The second type of decision is concerned with alternative ways of 'managing nature', rather than with major development. Such decisions are relatively small, with fewer implications and fewer interests affected. They concern things like whether to plant one species rather than another, whether to fell trees in X or Y year cycles, whether to go for more recreation, more restricted access land or more commercial forestry, and so on. Thousands of 'managerial' decisions of this kind are made every day by staff in local authorities, the Countryside Commission, Forestry Commission, English Nature, English Heritage, National Trust, RSPB and other 'environmental managers'. Such decisions are made by public authorities (or other bodies acting in what they perceive as the public interest), but they are not usually 'public' in the sense of being publicly debated, and they do not usually involve politicians.

Contrary to the claims of orthodox economists, I don't believe that, in the real world, CBA and CV are of much use to either of these two types of decision maker facing their respective types of decision.

In my experience neither local councillors nor national politicians have a CBA-type framework in mind when they consider public policy decisions of the kind we are referring to. That is, they don't think of the issue in terms of maximising net benefit over cost. This is one consideration - but equally or more important are others. These might include the symbolic effects of the decision in terms of the values they personally hold concerning the importance of economic growth, employment or the environment; the interests of their constituents; the interests of lobby groups (and the protests likely if they make one decision rather than another); their sense of fairness; their sense of being guardians of local or national culture and heritage; and so on.

Similarly, politicians don't think of environmental benefits in terms of aggregated willingness to pay. They will be interested, to be sure, in (say) the number of people who use an area of countryside for recreation - but the number itself will generally be enough; its multiplication by willingness to pay or travel cost will add little. They may be interested in the ecological value of a wetland, as expressed by ecologists; but its `value' in terms of willingness to pay from a CV is (in my experience) unlikely to impress. (They will simply ask what this figure *means* - and in my view will be right to do so.) If they want to know the strength of feeling (`preference') about a particular aspect of the environment, they will more likely measure their postbag and judge the mood of community meetings, correspondence in the local press, active protests and so on.

Now the orthodox economist may argue that current political practice is precisely the problem. These are not 'rational' ways of making decisions, and they should be replaced rather than applauded. CV, they will argue, provides an impartial set of procedures to calculate environmental benefit in a rigorous way; and CBA then adds up costs and benefits objectively and without bias. These techniques take the irrationality out of politics.

But this misunderstands public decision making. Politics isn't arithmetic, and we don't elect politicians to be calculators. If this were the object, it would be easier and much less costly to build some robots to govern us. The values and interests politicians take into account are *our* values and interests, and they are right to do so.

This is not at all to say that current decision making procedures are adequate. They are often appalling. But this is because they are not open and democratic enough, not because they are 'irrational' in terms of calculating costs and benefits. Indeed, CBA is part of the problem. By presenting information about costs and benefits in a 'black box', with many different kinds of considerations all wrapped up in a single figure for net present value, CBA obscures rather than clarifies the real consequences of the options faced.

What we need are new procedures and institutions which set out these consequences in terms of different values and different interests - an approach based on the idea of the `planning balance sheet'. These consequences will include economic ones which economists can measure: some of these may even be aggregated in a CBA. But this will be just one of the types of information presented, not the whole of it. As argued above, environmental values should be presented partly in terms of `expert' judgements, partly in terms of public views gauged by both qualitative and quantitative methods. And we might also try the use of public 'juries': randomly chosen groups of citizens presented with the evidence and asked to make a 'decision'. There is enormous scope for innovation in the institutions by which information is presented and public opinion articulated.

But then, ultimately, politicians will have to exercise their judgement. Taking into account all the information presented on all the consequences, they will have to judge which is the best option. (The choice of the options themselves must of course be openly debated too: this is perhaps the greatest failure of present arrangements.) This is what politicians are for, and informed judgement is what they are asked to exercise. If we don't like what they decide, we should kick them out and elect others. What we shouldn't do is ask them to act like automata, simply adding up private, monetary costs and benefits. Fortunately, if we do ask them to do this, they will ignore us.

Environmental Management and Professional Cultures

What of the smaller-scale managerial decisions about the environment? Here there is a more practical problem. Contingent valuation is far too expensive a technique to be used to guide environmental managers in their day-to-day work. The only way CV could be used would be if values were transferred from one context to another, thereby avoiding the need to conduct a new CV in each place. But this is a rather dubious practice - there is no reason to suppose that a forest in one place has the same willingness to pay value as a forest in another. In any case, CV is too crude to do what the environmental manager generally needs. CV researchers have found that (even in their own terms) they can only get values for major groups of habitats and species; they cannot measure willingness to pay for particular, geographically specific examples of them[3].

3 I. Bateman, 'Contingent Valuation Methods and their Role in Natural Resource Management' CSERGE, UEA, 1992

Similarly, CBA is much too crude a technique for use in everyday managerial decisions. CBA compares discrete options, of the sort involved in big political decisions. But what environmental managers are faced with is a multiplicity of options involving different balances of many different variables. In neoclassical theory, a demand curve could be constructed showing the value of all the different options. But in practice we never have enough information to construct demand curves: all CBA gives us is a few points on it. There just isn't the detail to make decisions in this way.

Environmental managers are faced with complex choices balancing many different variables. CBA and CV are not useful. So how should they make decisions? The answer is that they should use their professional judgement. This is how they have made such decisions in the past, after all - just as doctors have made clinical medical judgements not through CBA but through a cultural tradition built up over many years and transmitted through professional training.

But there is an immediate problem with this. It is precisely because the professional culture among environmental managers is under challenge from new environmental concerns amongst the public that the question arises. The 'traditional' ways of managing the environment by planners, countryside managers, the Forestry Commission and others are no longer acceptable: hence this debate. (Exactly the same is true in medicine.)

In my view we therefore need to create a new professional culture. Since these decisions are crucial public ones, this process should not be undertaken by professionals alone. It should be guided by democratically elected politicians, through arms-length bodies appointed for the purpose. Such bodies should include elected politicians and lay representatives as well as 'experts'. Their role would be to create a new framework for making small-scale management decisions.

They would do this by making 'sample' decisions: looking at a series of case studies typical of the sorts of decisions that environmental managers face and then deciding what to do in those cases. They would exercise informed judgement, on the basis of their own values, and their understanding of public values, using information presented in 'balance sheet' form. Their sample decisions would be used as benchmarks, models or guidance from which the environmental management professions could derive a 'new' cultural tradition. Its policy makers and managers would then be expected to apply analogous judgements in their everyday decisions.

Such a method would allow policy makers and managers to justify particular decisions in general terms ('this case was similar to that one which was decided by the arms-length body') but the detail would have to emerge out of the new cultural tradition. At some level detailed decisions would be inscrutable, the personal judgement of the manager - but all judgements are ultimately like this. This is the responsibility that the manager faces. But the results can of course be subjected to periodic review by the politicians or arms-length body, to ensure that the new culture and the decisions that it produces are in line with public values and political priorities.

I believe this process should be conducted at national, regional and local scales, with appropriate representatives or arms-length bodies at each. Such bodies could themselves conduct further qualitative and `jury' research with the general public. National bodies such as the Countryside Commission, English Nature and the Forestry Commission should obviously generate policy coherence within and between the different levels, so that decisions in one place relate to (for example, balance out) decisions made in another.

Even within the `new' tradition which this process would try to create, in which perhaps biodiversity and environmental concerns were given a higher priority than before, such a method would not make it any easier to make marginal decisions. The situation in which (say) 'for a bit more money we could have this much more biodiversity' will always arise, and then any choice will seem arbitrary. But then *it may be arbitrary*; that is, there may in fact be very little to choose between the two options; neither leads to a dramatically improved state of the world. As with many familiar decisions we make as individuals (not just as consumers; in other areas too, such as jobs and careers) choosing between practically equivalent options is often like tossing a coin. But it must be remembered that CBA and CV can't provide help with these marginal decisions either.

Why does this debate over willingness to pay generate so much heat? The reason, I believe, is that it concerns the way we think about the environment. Many people feel - and this is the source of the new environmentalism which has brought us here - that the environment is a public good which belongs to us all, and with which we should have a relationship of stewardship not exploitation. Others believe it is something which transcends narrow human interests altogether, the repository of intrinsic and spiritual value. Most people certainly feel that the environment is not just a commodity which can be treated as if it were to be bought and sold in a market.

And yet this is the way orthodox environmental economics asks us to look at it. Literally -contingent valuation asks people for their willingness to pay for this special, essential and ultimately unfathomable thing.

Two points follow. The first is that CBA and CV generate so much heat because it is feared that the more these techniques are used the more people may come to feel that the environment is indeed just like a commodity in a market. If this were to happen (and it has happened to other public goods over the past decade) many of us feel it would be a disaster: not only for the environment, which would be progressively devalued as it was traded off against other commodities; but for our very culture and psyche.

Second, if most people *don't* in fact think about the environment as a tradable commodity, then making public decisions in this way is bound to lead to political controversy and protest. Not just at the decisions that will result, but at the way in which they have been made - perhaps at the very legitimacy of the institutions making them. Indeed I suspect this is already happening: the extraordinary upsurge in public protest about road building suggests to me not just that many people don't want more roads but that they are alienated from the political institutions making these decisions. I don't think this is healthy. Contrary to the claims of their advocates, I believe that the extended use of cost benefit analysis and contingent valuation will therefore make public decisions more difficult, not easier.

Questions and Comments

Colin Price (University of Wales, Bangor)
In the abstract you refer to contingent valuation moving towards referendum techniques. Could you elaborate on this?

Michael Jacobs
Contingent valuation surveys ask what people are willing to pay for the environment out of their own private income. This is based on a philosophical model of the consumer buying something, for which he or she has a preference, in a market. The sort of survey I am suggesting is based on an alternative model, in which people are asked not about their private market choices but about *what society should do*. This question can still require respondents to say whether they are willing to pay for what society should do - there will of course be a personal financial implication. There is now some interesting work being done within the contingent valuation research field in which questions are put in this sort of `referendum' framework: some practitioners are clearly moving away from the neoclassical model. I welcome this, and would like to see further research of this kind. I certainly don't reject all the work of contingent valuation practitioners: I think that asking people how society should act and reflecting in that question something of what it would cost them is legitimate. I doubt that even `referendum' models of CV can ever provide the richness of information on public values which decision makers need, but they can almost certainly contribute.

Rob Guest (Forest Enterprise)
We are currently floating various options through a public consultation process in order to arrive at an investment decision, both through a controlled discussion and wider contact groups. We want to know how far this process will improve the quality of our decisions.

Michael Jacobs
I think it will. But I would go further. I would argue that you should be stimulating direct debate between representatives of various interest groups, so that they can encounter one another's positions and values face to face. Direct argument will not necessarily lead to agreement, but it may be possible to arrive at some consensual 'sample' decisions. I believe it is through this sort of process that we ought to be creating a new professional culture in a time of social conflict.

Alec Dauncey (Forest Enterprise)
We elicit views from a variety of local interest groups and elected representatives on our plans, but my problem with your argument is that the deliberations of the planning committee may not be very enlightening. Perhaps if we had principled and rational politicians they would be asking for a cost benefit analysis. They would be asking managers such as me 'What is the relative value of all these different woodland elements'?

Tony Philpin (Pennine Way Coordinator)
I have a similar problem with so-called `rational managers'. A lot of the decisions are made not for environmental gain but for personal status within the hierarchy or stealing a march on the opposition. We are simply not in a climate of rational decision making.

Michael Jacobs
This is the nature of our imperfect world. Are you expecting decisions to be made by real people operating in real institutions which we can try to improve, or do you feel that we can find some computational method which avoids such messy realities? The attraction of cost benefit analysis is simply illusionary.

I'm not proposing 'rationality': I don't think public decision making can be like that. There isn't a 'rational' - in the sense of objective and algorithmic - way of reconciling incommensurable values. To hope that CBA can provide one is to engage in wishful thinking. CBA simply imposes - usually in a hidden, `black box' way - a particular set of utilitarian and economistic values, and purports to substitute these for the political process.

Tony Philpin
But how would your arbitrary process improve the irrationality of the people we are faced with, given the role of self-aggrandisement, etc?

Michael Jacobs
Ultimately, public decisions have to be made by individuals and not automata. So you can never eliminate poorly thought out or self-interested or vested-interest-group-influenced decision making. What I am saying is that we can present information to decision makers better, and we can improve the institutions of debate, of public opinion gathering and of decision. For managerial decisions we can generate `sample' decisions to act as a guide.

Marc Carter (English Nature)
I think it would be a rare environmental economist who says that the CV value obtained at the end of a study is the final value. Most would say that this is the minimum value. From English Nature's point of view I see CV as the third stage in decision making. The first level is that SSSIs are sacrosanct (the critical natural capital idea). The second stage is an opportunity cost approach whereby the extra costs of relocating a road around a feature are considered.

I think CV's part is overplayed. American practitioners such as Richard Carson and Alan Randall have said they would be hard pressed to come up with a case where a development has not gone ahead because of a CV value. It is still only one part of the decision making process.

Michael Jacobs
The issue is not really whether CV is presented as giving a full or minimum value. It's the principle that people's views about the environment can be expressed in terms of willingness to pay. If CV only give a `minimum' value, what relation does this bear to the `full' value? What role should it play in the assessment of total costs and benefits? Does `minimum' imply that the `full' value can be expressed in monetary terms?

I acknowledge, incidentally, that nearly all economists, when pressed, admit that CBA is never sufficient *on its own* to determine a decision. But the same questions apply. How does net present value relate to the full range of criteria which should be used to make a decision? Is CBA a large part of the process or a small one? If it's a large part, my criticisms remain. If it's a small part, why try and encapsulate all the non-market values within it?

I agree strongly that the first priority in decision making should be to protect critical natural capital. Deciding what constitutes critical capital, of course, requires democratic political processes.

Adrian Whiteman
I was interested in your criticisms of CV. Do they apply more to non-use values than use values? Personally I feel that for some use values the CV technique is useful, but it is when you go further away from the familiarity of a market good that there is breakdown. If you propose to use techniques other than CBA, where do you draw the line? - because CBA isn't only used in the environmental field.

Michael Jacobs
I think that the question should be the other way round. CBA is not used for very many public spending decisions. In the case of defence spending, for example, people are not asked for their willingness to pay for a reduced threat to national security, and the budget fixed where marginal defence expenditure just equals the marginal benefit to security! Similarly, the education budget is not determined by calculation of the monetary value of education. The environment, like defence and education, is a public good. What neoclassical economics wants to do is to take it out of its traditional and correct place in the public policy making framework and pretend that it is not a public good at all. Difficult decision on how society should spend limited funds for public goods should be open to public debate and democratic decision.

I agree with you about the limitations of contingent valuation in measuring non-use values (that is, values people hold simply for environmental features to exist, rather than for any direct use they get out of them). But the special advantage of CV, according to its advocates, is that it can measure non-use values in a way that revealed preference methods can't. Where there are genuine markets for environmental goods, as for example with private views, then yes I am happy to allow for some use of CV. But CV is principally used in cases where there are no markets, where existence values are precisely the issue, and where therefore hedonic pricing and travel cost methods are unavailable. The problem is that `willingness to pay' is the wrong question to measure non-use values - people's feelings about these aspects of the environment are not measurable preferences of the market consumer kind.

Richard Broadhurst
I am sure that we will hear more of just how far we can move along the line from the market price, where everybody seems to agree that it is fairly easy to get information, to the use of bequest values and so on. Thank you to all the speakers and delegates for a stimulating morning and exchange of views.

Putting Environmental Economics to Work

John Corkindale
Environment Protection Economics Division, Dept. of the Environment

It is by no means clear what sustainable actually means and this accounts for the confusion over knowing how to measure progress and make the concept operational. Wilfed Beckerman, who is the Chairman of the Dept's panel on Environmental Economics, has drawn a distinction, which I think is a very useful one, between sustainability and optimality. He makes the point that sustainability is very important when you are talking about the management of renewable resources. With the management of fish stocks for example there is a concept of a sustainable harvest, but it is much less obvious what the expression means is relation to depletable resources. Once the resource is taken, it is taken for good and the concept of using it sustainably is one with which it is difficult to get to grips. Here the economist's traditional concept of optimality comes into its own. The optimality concept also leads one to different conclusions than the sustainability concept when applied to renewable resource. I would argue that the approach taken in "Policy Appraisal and the Environment", which essentially is the welfare economics/cost benefit analysis approach, is grounded in the concept of economic optimality.

Central to cost benefit analysis is the concept of externality, that is the cost which is imposed upon the rest of society by other agents, a classic case being that of the factory giving off noxious fumes to the atmosphere. Those fumes represent a cost imposed upon the rest of society, an 'environmental externality' in the jargon. The 'polluter pays' principle, developed by the OECD, aims to ensure that those externalities are, as far as possible, internalised. One of the strands of environmental policy which is being developed in the light of the Environment White Paper is the notion of using market-based instruments as a means of achieving certain environmental policy objectives. The classic case is the price differential between leaded and unleaded petrol. These market-based instruments take a lot of designing because very often you have to know at what level to strike the relevant tax or charge. The Forestry Commission have tried to grapple with this problem because they provide positive externalities in the form of recreational opportunities and biodiversity benefits, in addition to timber production. The question is: how much is it worth the taxpayer to finance the Forestry Commission to finance these kinds of benefits? Benefits estimates of, for example, forest recreation have been used in the pitching of the community forest supplement—the subsidy paid to farmers and landowners to plant trees in the vacinity of urban areas. It has also been used in the CBA of the National Forest.

There is another important issue in cost benefit analysis: that of distribution. It is said that CBA tends to ignore distributional considerations—this is not the case. The Pareto criterion states that a project will pass the cost-benefit test provided that nobody loses in consequence of a project going ahead and at least one person gains. This is a very limited criterion in that not many decisions made by Government result in nobody losing out but only gainers. If life was like that then politicians would have a very easy time indeed. It was in recognition of the limitations of the Pareto criterion that two other economists —-Hicks and Kaldor—developed the Hicks Kaldor criterion. This states that a project will only pass the cost-benefit test if the beneficiaries are able to compensate in full all those who lose out.

Up until recently economists have not fully addressed the compensation issue and only in certain policy areas, such as for the noise nuisance, has the principle been applied. The traditional approach of economists towards distributional issues is to rely upon the redistributive effects of the taxation system. There is a need, however, to develop mechanisms to enable the losers from a project or policy decision to be compensated by the gainers. In the case of Twyford Down it is clear that there are a lot of gainers as well as a lot of losers and to some extent these may be the same people, but I suspect to a very great extent that the gainers are different from the losers.

There is also the temporal or inter-generational aspect of the problem. In a book by Michan on CBA, there is a lengthy discussion on discounting. Mishan points out that the concept of social time preference breaks down when the time period considered overlaps generations. There has been recent debate about this over THORP where the costs of decommissioning, because of discounting, appear in the balance sheet as if they were very small indeed. With regard to the distributional point it seems to me that one likely consequence of this is that the gainers from nuclear power projects may be different people to the losers. How do the gainers compensate the losers—a difficult intergenerational problem. David Pearce in his book "Blueprint for Green Economy" makes the distinction between natural and man-made capital and comments that there is a limit to the substitutability of one for the other.

Questions and Comments

Irving Rappoport (Lea Valley Country Park)
I am responsible for 23 miles and 10,000 acres of land much of which is countryside. It is not our need, but the government demands, that we set a value on that and we have to do this by 31 March 1995. At the moment our estate department can only value it as recreational land; we are very unhappy with that because of the far wider range of aspects that we provide for example nature conservation. What would you recommend we do?

John Corkindale
Land values in this country are distorted by the planning system, CAP etc. When the government designates certain areas of land for certain kinds of use this will obviously have a significant impact upon land values. CBA attempts to introduce a sense of rationality into an irrational world. For public goods such as common land for which there is no market we need the sort of valuation techniques discussed by Ian Bateman and Fiona Bryan in their paper. The ESRC Countryside Change Project has examined a number of aspects of the valuation of land and the valuation of green belt land is one of them.

Putting Alchemy to Work ... for Open Space?

John Adams
Dept of Geography,
Uuniversity College London

My Title

First a word about the title of my contribution to this symposium -on the programme it is 'Putting environmental economics to work ... for open space?'. I am, you might have noticed, the only contributor sporting a question mark. Putting environmental economics to work, I protested to the organisers, is not one of my priorities. But since I got round to registering my protest only as the programme was about to go to press, and there wasn't time to consult the other participants, I settled for a question mark. It was intended to flag my contention that environmental economics in the form of cost-benefit analysis is part of the problem, not part of the solution. My revised title - putting alchemy to work ... - is intended to focus attention on the amazing claim of cost-benefit analysts to be able to transform base metals - and time, and noise, and grizzly bears, and trees, and life and limb, and all sorts of other things too numerous to list - into gold.

Cost-Benefit Analysis and Open Space

Cost-benefit analysis has an impressive history of working *against* open space. Measured by the amount of public spending that it has been used to justify, the most important application of cost-benefit analysis in Britain over the past two decades has been that of the Department of Transport. It has played a central role in the spending of billions of pounds on new roads involving the destruction of thousands of acres of open space - the currently proposed widening of seven and a half miles of the M25 will alone take about 500 acres. COBA, as the DoT calls its form of cost-benefit analysis, is confined to a very short list of costs and benefits falling within a severely limited geographical area. The benefits are dominated by time savings to motorists (usually about 85% of the benefits claimed are in this form) and the costs are essentially those of the land required and construction.

Land in the DoT's cost-benefit analysis is valued at its *opportunity cost* which the Department defines as `the value of the land when put to its best alternative use' (COBA9 2.7.2). When it comes to open space the Department says

> **'Open space does not generally command a high market price because of restrictions as to its current and future planning use. The Department's cost-benefit analysis can only reflect monetary values'** (DoT 1989).

Because most open space, whether public or private, is subject to planning restrictions, its value for purposes of cost-benefit analysis is severely reduced by the limited number of alternative commercial uses to which it can be put. The best protected land (Areas of Outstanding Natural Beauty and the like) will be subjected to the greatest number of restrictions on alternative use and will, therefore, have the lowest monetary value in the DoT's cost-benefit analysis. The effect of valuing land in this way is to build into the cost-benefit analysis an incentive to route new roads through the `best protected' parts of the country.

I shall assume that there are no defenders of this practice attending this conference (although I am not aware that economists have been clamorous in denouncing it). But what should be done about it? Does the practice reveal something fundamentally wrong with cost-benefit analysis, or is it merely symptomatic of an inappropriate use of the method?

Twyford Down

Barde and Pearce (1991) argue that it is symptomatic of a mis-use of cost-benefit analysis. They use the case of the DoT's road through Twyford Down to argue that the DoT should *expand* its cost-benefit analysis of road schemes to embrace environmental costs. They say:

> **'The only option which would minimize the environmental damage [to Twyford Down] was to put the road through a tunnel [that would cost £92 million more than the other options].'**

They criticise the DoT for its failure to take into account properly the environmental damage caused by its scheme:

> **'The UK government made no attempt to seek the monetary value of the environmental damage done. Had they or anyone else done so one wonders if the conservation of an area of outstanding natural beauty would have been found to be worth more or less than £92 million. ... by accepting the non-tunnel option the government had effectively said the view was *not* worth £92 million.'**

And they conclude:

> • **'*Any* decision *implies* a monetary valuation.'**
> • **'The implicit valuation was not made explicit.'**
> • **'The valuation, implicit or otherwise was made *without* consulting people about their valuations. Had they been asked they might have said that their valuations exceeded £92 million.'**

Almost certainly had the DoT played the cost-benefit game by Pareto's rules - which require asking people what sum of money would compensate them for the destruction of Twyford Down - the total would have exceeded £92 million. The reason that the DoT did not undertake such a survey is that it would have established a precedent that would have brought their road building programme to an end.

Playing the game by Pareto's rules requires that the benefits of a project be valued according to what the potential beneficiaries would be prepared to pay for them, and the costs according to what the potential losers would accept as fair compensation. These rules ensure fairness in theory, but render the method useless in practice. They give every potential loser a veto. There is no affordable test of whether someone who says `no amount of money would compensate me' (infinity) is genuine.

Pearce and Moran (*New Scientist* 9 Oct. 93) impute anti-democratic motives to the critics of cost-benefit analysis: 'One of the problems for this approach [CBA] is opposition from those who do not want preferences to count, because the majority sometimes does not want what they want.' But it is the proponents of CBA who misrepresent preferences. Let us return to the Twyford Down example.

Contingent Valuer Meets Donga

Barde and Pearce argue that, had `people' been asked, their aggregated valuations of Twyford Down might have exceeded £92 million. What people? The concept of *existence value* would appear to give everyone who has ever heard of Twyford Down a stake in its continued existence -including poor people and Dongas (a group prominent amongst the Twyford Down protesters). Such people are not able, and therefore not willing, to pay very much to ensure the preservation of Twyford Down. But despite their inability to pay for its defence, its destruction might for them still be a loss. How should their loss be valued? They must be asked. The economist cannot answer for them; it is *their* preferences that count. The Dongas, who ostentatiously flaunt their rejection of the values of the consumer society, and many others - poor and rich - who resist the idea of converting their feelings about nature into cash, present the cost-benefit analyst with an insoluble problem.

Pearce and Moran argue:

> **'Cost-benefit analysis does indeed "reduce all concerns to cash" but Adams does not understand why. Money is simply the measuring rod for human preferences expressed in or out of the market place. Economists would be perfectly happy to use any other unit of measurement, so long as human wants are measured.'**

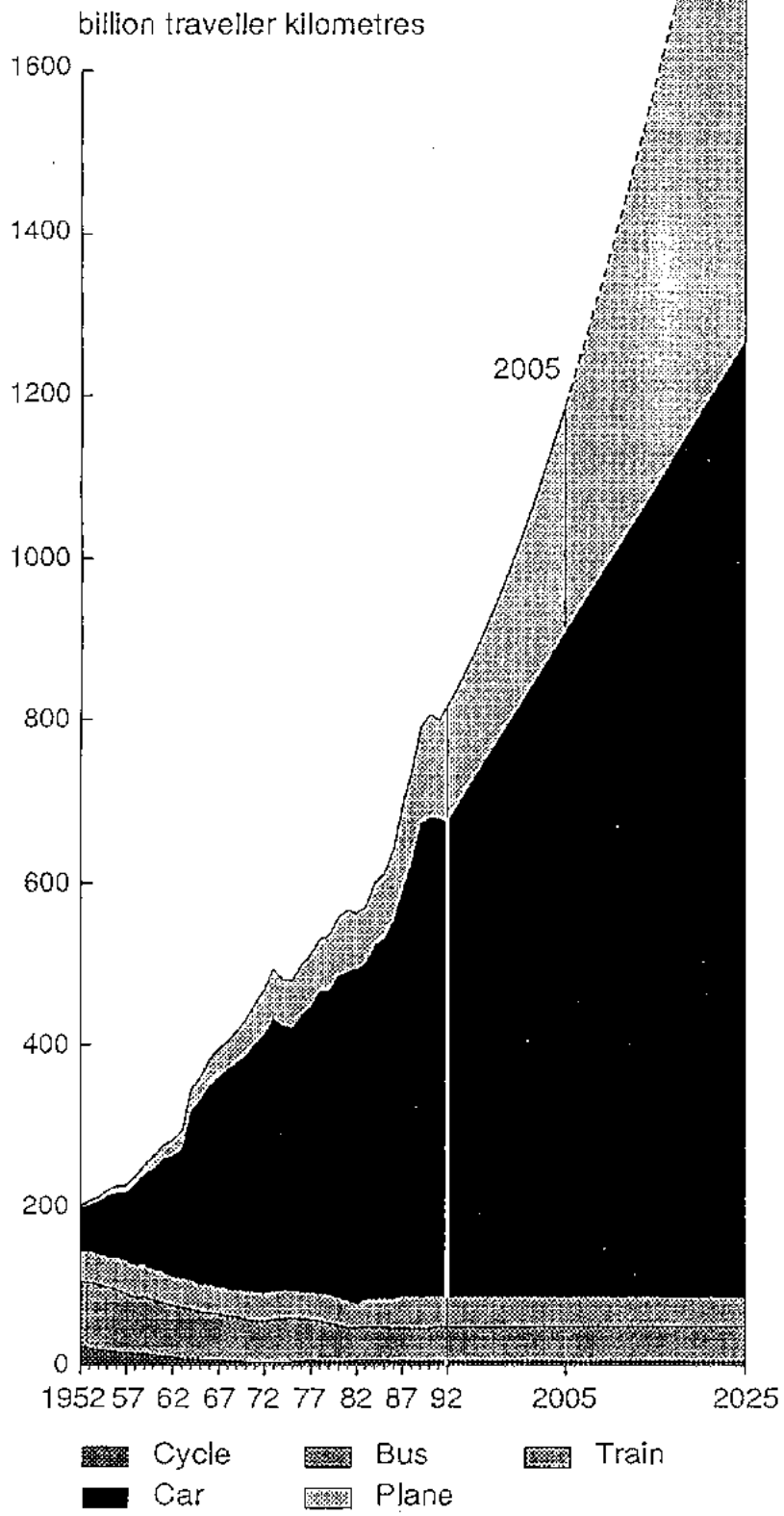
Economists become terribly unhappy when they encounter evidence that significant human wants cannot be measured with a single finite measuring rod; without the assumption of a such a measuring rod most of their sophisticated theorising becomes unusable. They cope with this problem by bending Pareto's rules beyond the breaking point. Because asking people what sum of money they would be *willing to accept* as compensation for environmental losses yields answers that they cannot use, they ask them what sum of money they would be *willing to pay* to prevent environmental loss. This limits the answers to sums that will not wreck their analyses. But *it is the wrong question*; it does not produce a measure of the losers' losses. To say that it merely undervalues their losses is to understate the economist's problem. The Government's unwillingness to pay £92 million for a tunnel through Twyford Down is not a valuation, implicit or explicit, of these losses. If someone insists that his loss is not expressible in the form of money the economist must either invent a £number for him, or exclude him from the cost-benefit analysis (see Knetsch 1993 for a good discussion of this issue).

Problems with Measuring Benefits

There are also problems with reducing the benefits of road schemes to cash. Figure 1(p.39) shows the decline over the past 40 years in the use of democratic and environmentally benign modes of transport in Britain -cycle, bus and train - and the rapid increase in the use of modes that are environmentally destructive and accessible to only a small fraction of the world's population - car and plane. Since 1952 the number of miles travelled per person per day in Britain has increased from about six to twenty-five. Travel by car has increased more than ten-fold and travel by plane more than thirty-fold. It also shows the further increases anticipated by the DoT in the environmentally damaging modes.

One of the main causes of the increase in car travel is also the main benefit of road building recorded in COBA - time savings to motorists. There has been no significant change in the number of hours per day that people spend travelling since 1952; the increase in distance travelled is accounted for by a four-fold increase in the average speed of travel. All the time saved has been spent on more travel; as the time-cost of travel is decreased more travel benefits (passenger miles) have been purchased from the same time-budget. The other main cause of the increase in motoring has been economic growth. Relative to income, motoring has become much cheaper.

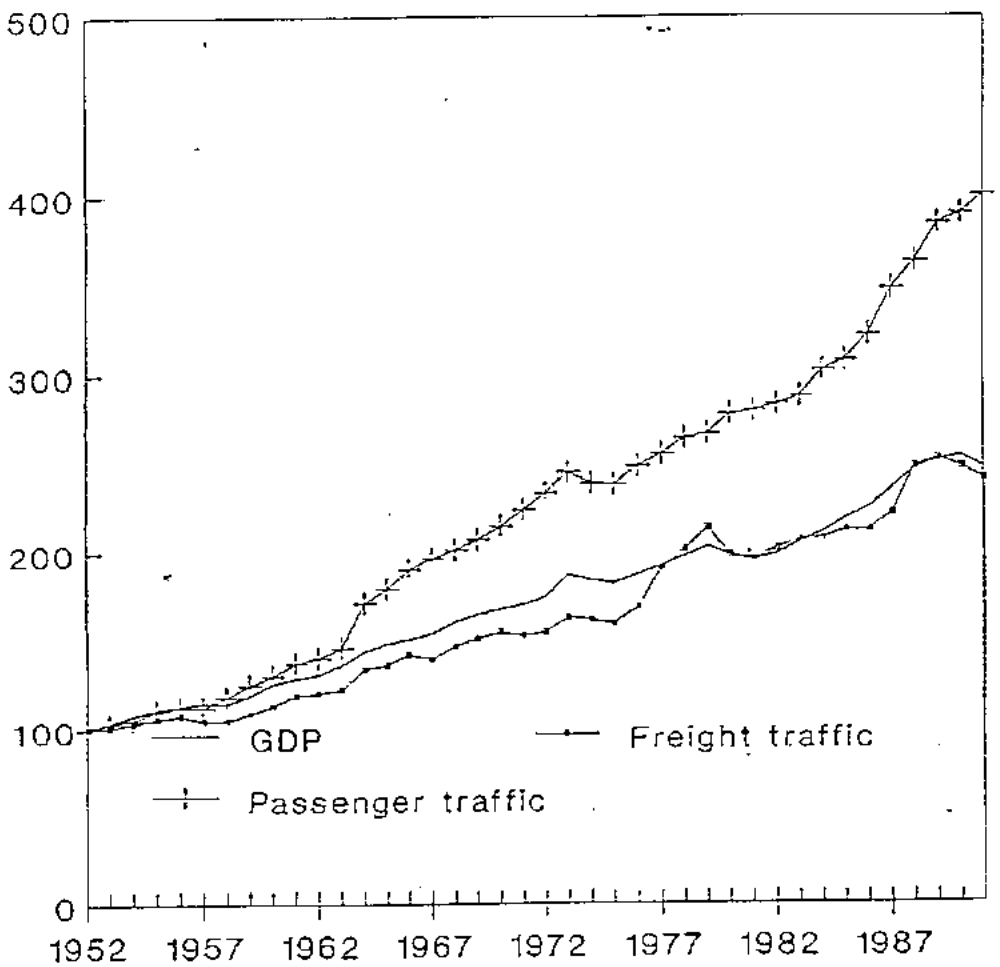
Figure 1: Travel by Britons by cycle, bus, train, car and plane (the Department of Transport's forecasts).



Walking is not included in Figure 1 because it is not considered by the DoT to be a sufficiently important form of transport to justify the collection of statistics comparable to those for the other modes recorded since 1952. It has almost certainly declined greatly over the past four decades. The DoT's forecasts of air travel extend only to 2005; beyond 2005 the air travel forecast is my extrapolation. The DoT's projection of a constant level of bus travel is disingenuous, because it knows that the primary cause of the past decrease in bus travel is the increase in car travel, which if forecasts to increase. The DoT produces no forecasts of cycle or train travel; they are shown in Figure 1 as holding constant, but will almost certainly decrease if the car and air forecasts materialise.

Figure 2 describes the close correlation between growth in the movement of people and goods and growth of GDP. The traffic forecasts in Figure 1 are the DoT's 'high growth' or `optimistic' forecasts. They are based on the assumption that the historic correlation between GDP and the movement of people and goods will continue, and that GDP will grow at 3% per year (rather than 2% assumed in the low-growth/pessimistic forecast). All the growth processes in Figures 1 and 2 depict increasing prosperity. They represent the growth of *benefits* produced by the Department of Transport and the collective industry of the nation. It is the aspiration of all the main political parties in Britain to preside over a perpetuation of these growth processes. It is the optimistic belief of some environmental economists (Pearce and Warford 1993) that 'economic growth can be separated from its effect on the environment.' Pearce and Warford insist that `the issue is how, not whether to grow' and the title of their book *World Without End: Economics, Environment and Sustainable Development*, suggests a confidence that this separation can be sustained indefinitely.

Figure 2: Growth Indices (GDP, tonne-kms of freight, and passenger-kms, 1952 = 100)



Sources: Transport Statistics GB 1991; Economic Trends, Annual Supplement, 1991

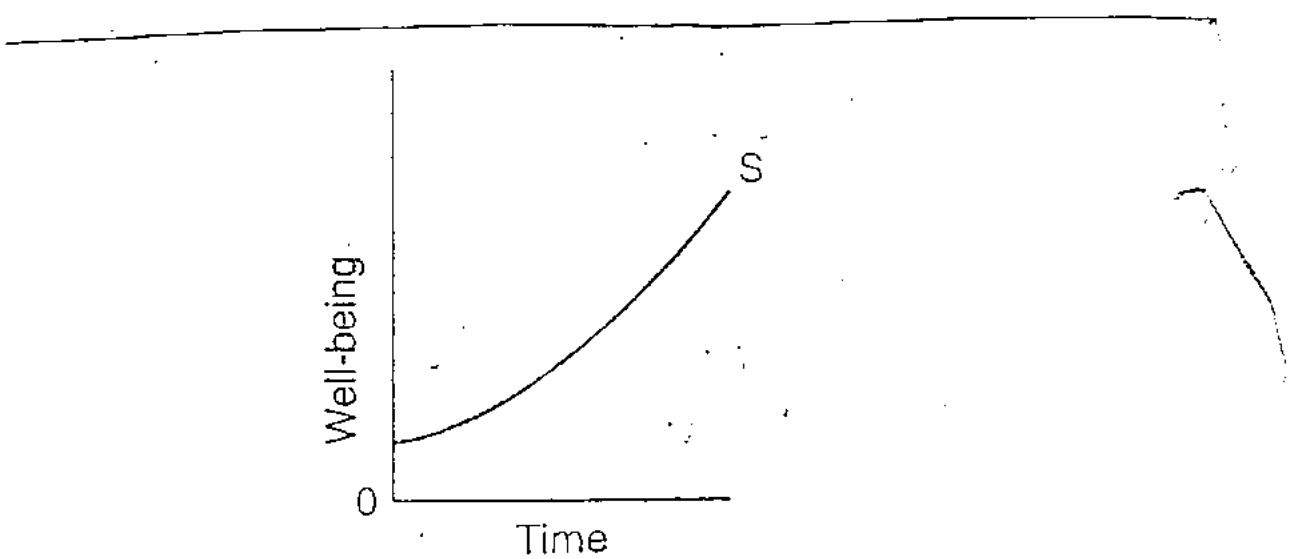
It is important, Pearce and Warford warn, that those calculating the rate at which we grow should take care to deduct the costs of growth from its benefits. But, they conclude, with the right incentives, conservation, and the help of advancing technology, the benefits can be increased and the costs reduced. Without end?

3% is a growth rate much bandied about. The DoT's traffic forecasts made in the 1970s used to assume a GDP growth rate of 3% per year `in perpetuity'. There appears to be a consensus amongst economists that such a rate is necessary to prevent unemployment getting worse. The *Guardian* (to take a recent example typical of the treatment of economic growth by the popular media) in an editorial entitled `The world is looking up' (20 April 1994) is greatly cheered by the prospect, announced by the IMF, that the world economy is expected to grow by 3% this year and 4% next year.

But graphs such as that in Figure 1 tax the imaginations of many non-economists. 3% growth sustained for another 100 years - a blink in the eye of time in a world without end - would make the world about 20 times richer. Does the mind begin to boggle? Another 700 years would make the world one billion times richer. In the realm of transport such growth rates quickly enter the realm of science fiction - travelling a billion times further, i.e. 25 billion miles a day, would not be possible without exceeding the speed of light.

The concept of limits to growth appears to have gone out of fashion amongst environmental economists. Pearce and Turner (Pearce et al 1993, chapter 1) when illustrating the concept of sustainable development graphically (Figure 3) use an upward curving graph of `well-being' from which limits are conspicuous by their absence. Although the fact that curve starts to straighten out as it rises hints at a lack of confidence that an exponential increase can be sustained indefinitely.

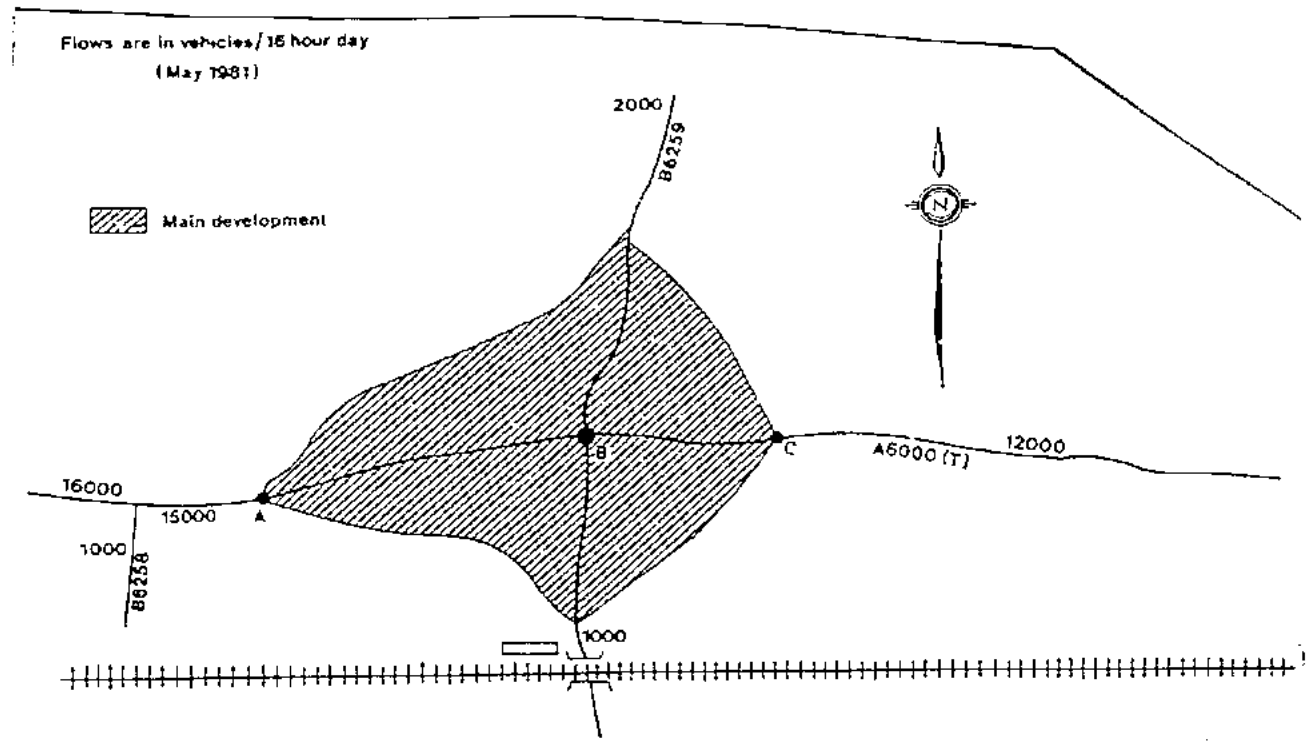
Figure 3: 'S' stands for 'sustainable development'



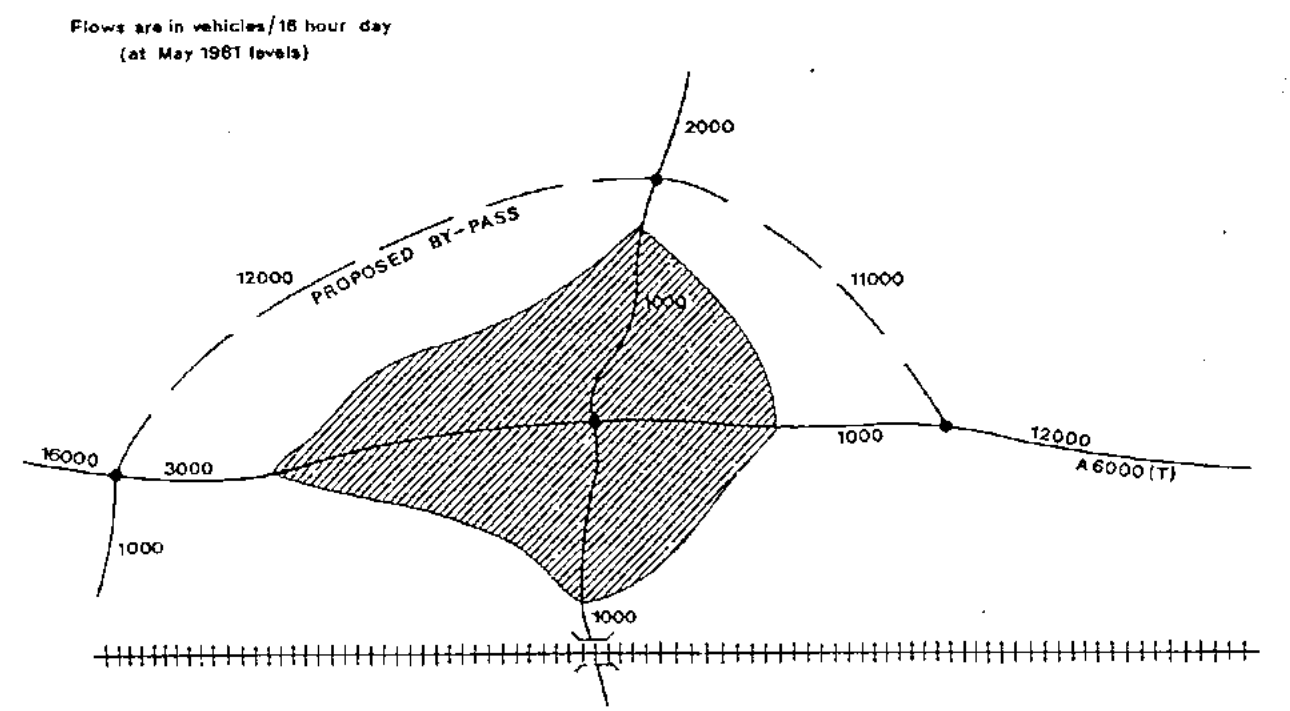
Source: Pearce et al (1993)

The belief that the benefits of economic growth can be decoupled from its environmental consequences encounters, later if not sooner, the question of how we are going to spend our ever increasing wealth, and raises for the cost-benefit analyst the question of when is a 'benefit' a benefit. Even if all cars and planes were powered by pollution-free perpetual-motion engines, would we be twice as happy, and feel twice as rich, if we were to be travelling 50 miles a day instead of 25? 100 miles a day? 200?

Figure 4 :Getting the Best Roads for Our Money: the COBA Method of Appraisal



MUNDARING – THE EXISTING SITUATION



PROPOSAL FOR A MUNDARING BY-PASS
THE CHANGE IN THE FLOW PATTERN

Source: Department of Transport (undated)

As the black wedge in Figure 1 has grown wider, more of the country has been paved over, the shops in local high streets have been driven out of business by out-of-town super stores, street life has retreated as the danger of traffic has increased, children have lost the freedom to roam their neighbourhoods, and crime has flourished in a society grown increasingly anonymous. For the cost-benefit analyst, all of these consequences of the growth of traffic are seen as costs to be deducted from the benefit of greater mobility. But for many others these consequences of increased motorised mobility are seen as so direct and so disproportionate to the benefits that the graph of rising mobility is itself interpreted as a graph of rising costs. The high-growth forecast that the DoT calls `optimistic', they call 'pessimistic' - with low growth, they argue, things will get worse more slowly. The black wedge was characterised by one person at a public meeting I addressed recently as a graph of the spread of 'tarmac cancer'.

Objections to the DoT's Twyford Down scheme were not confined to those wanting to contribute to the £92 million fund needed for a tunnel. Some opposed *any* addition to the nation's road capacity on the grounds that it would simply foster the growth of more traffic; saving motorists time they argued would generate more traffic (or liberate suppressed demand). Thus one person's benefit can be another person's cost. The reverse can also be true; things that are usually treated as environmental costs are perceived by some as benefits. Some people *like* the look of motorways, although they are commonly treated as undesirable 'visual intrusion.' Noisy parties produce numerous examples of this phenomenon. One person's music can be another person's noise. Even assuming that individuals could attach cash values to their enjoyment, or detestation, of a particular tune played at a particular sound level, summing these benefits (+) and costs (-) would be unlikely to resolve an argument about whether the volume should be turned down.

Environmentalists with the Midas Touch

There is now a vast literature on methods for translating environmental costs and benefits into money (the growth of is literature provides a good example of unsustainable exponential growth). There are essentially two views about it. The view of the practitioners contributing to a recent book entitled *Sustainable Environmental Economics and Management* (Turner (ed) 1993) is that their valuation methods are now 'much more sophisticated', that they 'provide reasonable estimates of the value of specific environmental assets', and that 'they require the training of more economists in developing countries capable of undertaking such analysis.' The alternative view is that the exercise is a pernicious nonsense[1].

The pernicious-nonsense school is a venerable one. Its founding father is King Midas - after he learned his lesson. Reducing *everything* to gold - or dollars, or pounds, or yen, or 'capital' - he discovered renders everything valueless; one ends up with lots of different sized piles of the same thing. The Taj Mahal, the blue whale, Oxleas Wood, a baby's first smile, a rare butterfly, a beautiful sunset, your grandmother, a video camera, and a Ford Escort are all reduced to larger or smaller piles of gold; and if they are the same size, any pile of gold can be substituted for any other. 'Development' is the name given to the growth process by which the total size of all the piles of gold is increased. And 'sustainable development' is the label applied to the process if it can be kept going for awhile.

[1] An hilarious exposition of this view can be found in 'Wildlife Valuation' by James Fenton, *Ecos* 13(4) 1992

The cash-reductionists have different ways of aggregating their piles of gold. One method is set out in an equation:

total economic value = use value + option value + existence value

It is assumed by the reductionists that each of the terms in this equation can be converted into gold. Another method distinguishes 'natural capital' (sunsets and butterflies) from 'man-made capital' (video cameras and Ford Escorts); again it is assumed that these different types of capital can be reduced to a common denominator. But each of these types of capital or value poses a challenge to the reductionist economist. How does one measure them? Contingent valuation (currently the most popular method) involves asking people what cash value they attach to various environmental commodities and assets. This has the merit of being democratic, but the disadvantage of frequently encountering people who cannot, or will not, answer the question. This is Turner's description of such people: 'respondents who refuse to state a WTP [willingness to pay] or WTA [willingness to accept compensation] for an asset (or state extreme amounts) are commonly termed "protest voters".' This description raises some interesting questions. How does an economist contemplating the results of his contingent valuation survey distinguish a sensible amount from an 'extreme' amount? All extreme responses must be discarded as `irrational' or they will wreck the whole analysis. And just what are those who refuse to state a price at all protesting about?

A helpful economist, instead of just rejecting the protesters as extreme or irrational, and excluding them from his analysis, would offer them some assistance. It would be a great help to those of us who are incapable of assigning cash values to the loss of ancient woodlands and rare species if Turner and the other cash-reductionist contributors to his book - Adger, Barbier, Bateman, Benson, Hanley, Pearce, and Willis -would provide us with some specific *personal* examples, and explain how they arrived at them. What amount of money, for example, would compensate Turner or Pearce for the sense of loss that they feel over the destruction of Twyford Down, or Willis and Benson for the loss of their favourite Site of Special Scientific Interest? If society's experts on the price of things cannot tell us the amounts, and how they calculate them, how are the rest of us to cope?

Turner himself ends on an ambivalent note. We still need, he says, 'better valuation of natural capital', but how, he asks in the concluding paragraph of a book dominated by the ambition to reduce all concerns to cash, can we 'alter the overly materialistic values that exist in much of contemporary society?' We need, he asserts in his final sentence, 'to be able to elicit from citizens social preference information in order to feed this into the decision-making process, which will determine relative social values.' He appears to be saying that to achieve sustainability society must become less materialistic, and that this transformation of social values can be assisted by decisions informed by contingent valuation surveys. But the validity of these surveys depends on those surveyed possessing one of the defining characteristics of Material Man (more commonly known as *homo economicus*) - the ability to measure everything by the measuring rod of money. Turner's own concern about excessive materialism is presented in an economistic jargon that is barely capable of expressing it:

> **'an ethical shift away from or modification of traditional individualistic moral reasoning is required unless depletion of the moral capital stock is not to take place.'**

Exasperation

The debate about the role of cost-benefit analysis has made little progress over the last two decades. Each side displays symptoms of frustration at its inability to communicate its message to the other. Pearce and Warford blame 'misconceptions about the purpose and nature of economic valuation' for the impasse - but the 'misconceptions', if such they be, persist. Pearce and Moran, in a letter to *New Scientist* (9 Oct 1993), conclude in exasperation: 'Adams can learn economics by leaving his office and walking the few hundred yards to his college's own economics department where we will be happy to enlighten him.' A subsequent contributor to the correspondence (23 Oct) noted that Adams and Pearce have been having the same argument for over 20 years and suggested someone should bang their heads together.

This led me to return to our first encounter in the letters section of the *Ecologist* in 1973, where Pearce sets out the core of what remains my unresolved difficulty with environmental economics.

> **'Economics, more than any other discipline, proceeds on the basis of setting what we would call an "objective function" -- i.e. saying what it is that we aim to maximise or achieve. ... And while we are at it, what do geographers maximise?'**

Geography, so far as I am aware, does not have an objective function. Its subject matter - the world and the people in it - is too varied and contradictory to be measurable on a single scale, or to permit its purpose to be reduced to a single equation. But Pearce (1992) is still dealing with a world populated by maximisers; he brushes aside concerns such as Turner's about excessive materialism insisting that 'economists assume that people are fundamentally greedy', and that `if the environment is to be improved it will require policies that use selfishness rather than opposing it.'

The central question is unresolved: is greedy, selfish, maximising, materialist *homo economicus* to be appeased or opposed? Is he part of the solution or part of the problem? Until economists can agree on the answer, the rest of us would be well advised to take their advice with a pinch of salt, or perhaps gold dust. Give or take a grain or two its all the same.

What Should be Done?

Cost-benefit analysis still has a seductive appeal for many pragmatic environmentalists who argue that if only a few environmental costs could be added to COBA, the positive Net Present Value of many DoT road schemes would be rendered negative, and the schemes would therefore be prevented from going ahead. But this is a game they are unlikely to win.

Cost-benefit analysis has a long history of being used as *post hoc* justification of decisions taken long before. It has served the DoT's road-building purposes well. It has not been used to justify the whole of the roads programme, merely bits and pieces of it as they came to their public inquiry stage. COBA contains a set of variables that have consistently for many years yielded `the right answer' - *build the road.*

Those wishing to load more environmental variables into COBA to make it yield different answers are unlikely to be given a clear run. If COBA is to be expanded, those who still believe in building more roads to accommodate more traffic will insist on loading some of their variables in to redress the balance. A report on *The Balance Sheet of Motoring* by the Automobile Association (AA 1992) provides an indication of the way the game would be likely to develop. Adding up all the taxes and all the government spending relating to motoring they conclude that there was a surplus of taxation over spending of more than £8 billion in 1990/91. In answer to the environmentalists who claim that this calculation omits important environmental costs they produce a list of `the unquantifiable benefits and burdens' of motoring. It looks like this.

BENEFITS	BURDENS
Tourism	Congestion
Freedom	Environment
Employment	Pollution
Leisure	Health
Lifestyle	Accidents

The scope for creating more work for contingent valuers by enlarging the scope of COBA is clearly enormous. But given the difficulties that the DoT already has with the variables that it considers quantifiable, the likelihood of successfully expanding cash-valuation to embrace some of the items on the AA's 'unquantifiable' list does not seem high. And, as we shall see, to the extent that they do succeed in enlarging the scope of COBA it is likely to work against, rather than for, the preservation of open space.

The Last Ditch

Pearce and Moran (*New Scientist* 9 Oct 1993) complain about the 'the total lack of any constructive alternative to making social decisions.' The last ditch defence of the cost-benefit analysts is to argue that, whatever the defects of their method, at least they have a method.

A method for what? Figure 4 (over) is an illustration of a typical COBA application - a proposed village bypass. The benefits are 1) time savings to motorists, 2) vehicle operating savings to motorists, and 3) accident savings. The costs are mainly 1) land acquisition and 2) construction. Omitted from COBA is any assessment of the environmental benefits gained by the village in the form of relief from the noise, fumes and severing effects of traffic, and the environmental costs incurred by paving over open space and shifting traffic into a previously tranquil area. The DoT maintains that these unquantified environmental benefits of its bypass schemes far outweigh the costs because far more people enjoy relief from traffic as a result of their schemes than suffer from its imposition. Thus any attempt sanctioned by the DoT to assign cash values to these costs and benefits is likely to increase the Net Present Value of their road schemes, thereby strengthening the case for building them. *COBA, whether in its existing or expanded form, is a method for choosing which scheme to build next.*

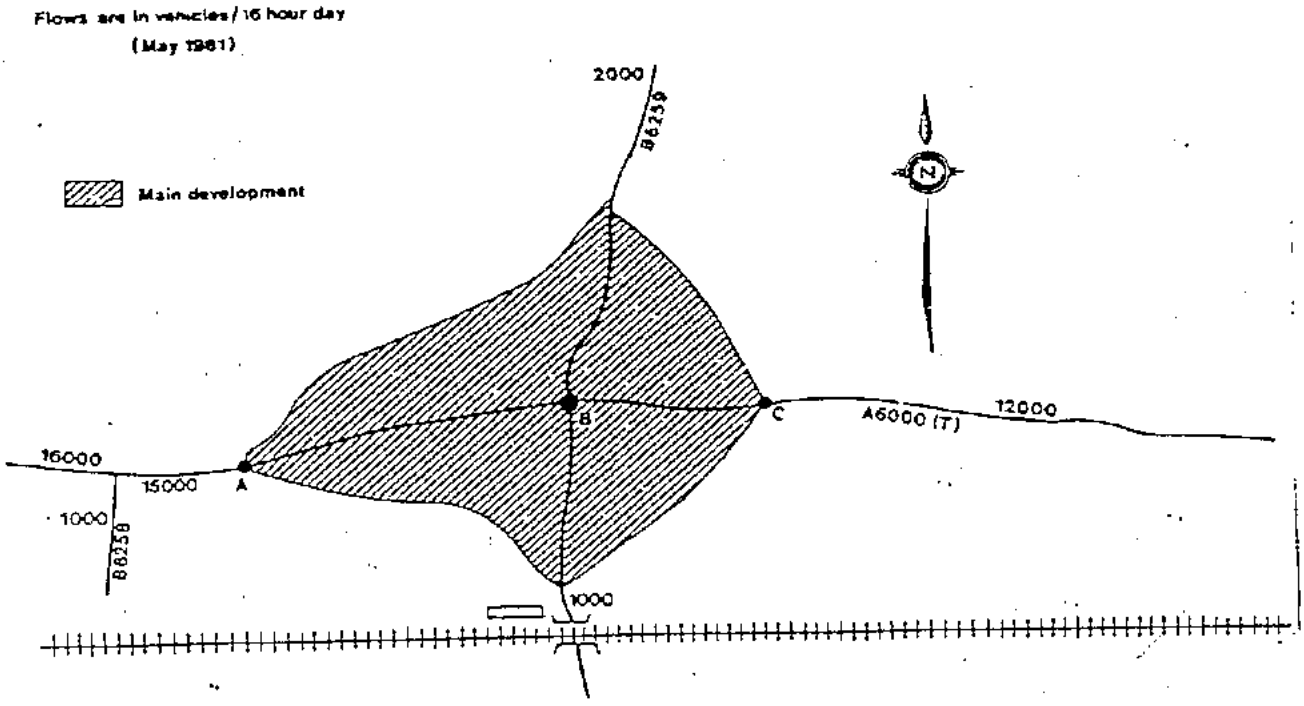
Building more road capacity encourages the growth of traffic, and traffic is the multiplier of the 'benefits' of road building. The greater the volume of traffic predicted, the larger the road COBA will justify building. The greater the number of bottlenecks removed (bypasses built) the greater becomes the need for more bypasses upstream and downstream of the last one built. So long as traffic is seen as an index of prosperity, and time-savings for motorists are treated as benefits, cost-benefit analysis will work *against* open space, not for it.

What is the alternative? Embarrassingly simple. A discussion in plain English of the mainifold unquantifiable consequences of projects that increase the nation's dependence on the car, and beyond that, one hopes, a discussion about *how* to reduce this dependence. This discussion must, of course be assisted by quantified evidence - about noise, pollution, danger, tonnes of gravel, acres of tarmac etc. - but what all these numbers mean for the way we live cannot be reduced to a single *Net Present Value* - a single number with a pound sign in front of it. At every major road inquiry for the past twenty years the alternative plain-English case has been put, and ignored. Objectors have been told that it is Government policy to rely on COBA to make its decisions about building roads, and that Government policy may not be challenged at a public inquiry. Cost-benefit analysis has served as a smoke screen for obscuring the plain-English case.

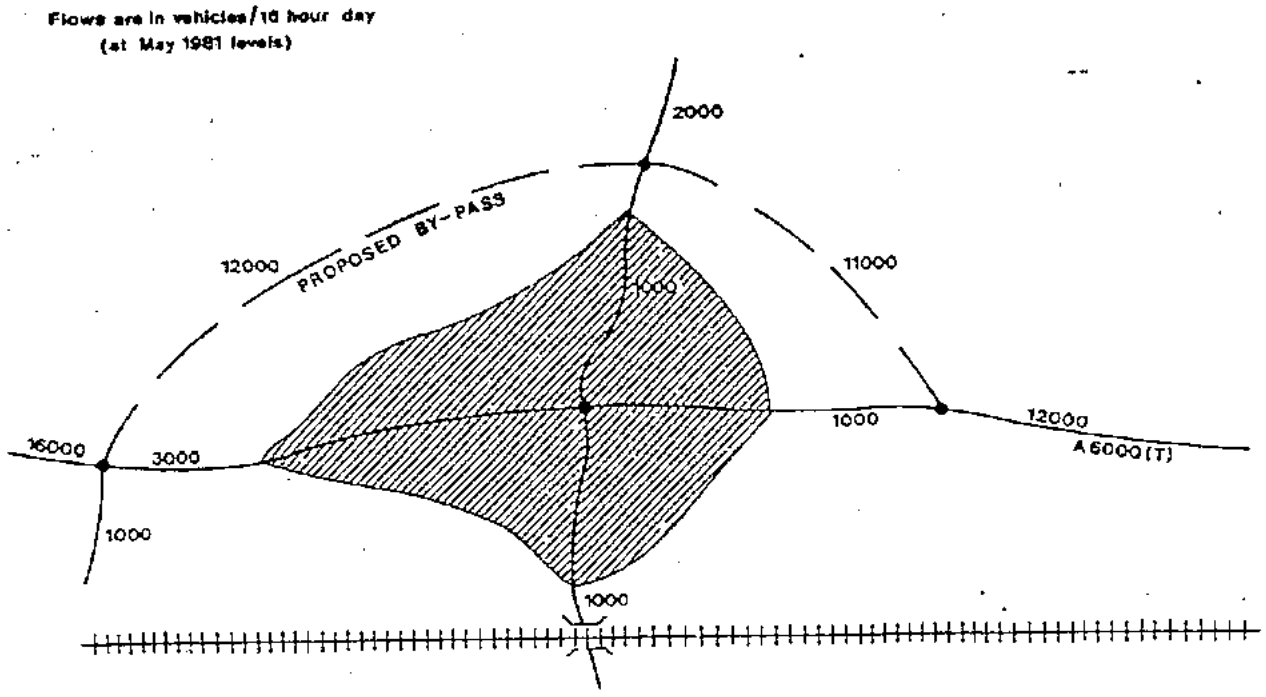
But no method of quantifying environmental problems can resolve disputes about the environment so long as the participants are arguing from different premises. Pearce et al (1989) rest their case for cost-benefit analysis on the premise that 'preserving and improving the environment is never a free option; it costs money and uses up real resources.' But more often than not preserving and improving the environment is not only free, it saves money. The global scale of the environmental degradation that we are now witnessing is the result of careless and excessive consumption. The economist's conviction that preservation and improvement are never a free option blinds him to what is often the most obvious solution -reduced consumption. There are expensive ways to lose weight - health farms, exercise machines, liposuction - but walking or cycling to work and eating less are likely to be more effective and actually save money. Before deciding to lose weight you do not need to calculate the cash value of being slimmer and then work out whether or not you can afford it.

First we need a debate about policy; we cannot hope for agreement about whether to build a road across (or under) Twyford Down before we have agreement about the objectives of transport policy. Oscar Wilde's definition of a cynic - 'someone who knows the price of everything and the value of nothing' - pre-dates the invention of cost-benefit analysis. But for those who have contemplated the method's use by the Department of Transport over many years to bulldoze roads through Areas of Outstanding Natural Beauty, Ancient Monuments and Sites of Special Scientific Interest, it is a definition difficult to improve upon. To restrict participation in debates about environmental policy to people who know the price of everything would exclude those who have most to contribute to a debate about values. It would be cynical.

Figure 4 :Getting the Best Roads for Our Money: the COBA Method of Appraisal



MUNDARING – THE EXISTING SITUATION



PROPOSAL FOR A MUNDARING BY-PASS
THE CHANGE IN THE FLOW PATTERN

Source: Department of Transport (undated)

Postscript

At the symposium none of the defenders of cost-benefit analysis addressed the method's central confidence trick - the use of *willingness-to-pay* values to measure the losses resulting from environmentally damaging projects. So long as this practice endures *all* cost-benefit analyses of projects or processes that damage the environment will continue to be frauds; they *cannot* fairly represent the costs. The symposium was presented with a *last* last ditch defence of cost-benefit analysis: however fundamentally and incurably flawed the method might be, we must strive to use it because the Government insists upon it. Critics were offered a choice: we can humour the Government and pretend that their chosen method can be made to work, or we can consign ourselves to the margins of important environmental debates.

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Questions and Comments

John Corkindale
I think that it is unrealistic to portray all consumption as necessarily being damaging. I think that one has to accept the fact that people are going to feel deprived and rightly so. It is not just a question of weaning people off drugs for example because people consume for a lot of reasons rather than addiction. It is not immediately obvious that travel itself is not a benefit; people don't travel unless they want to travel and presumably they feel that they will derive benefit from it at the time that they make the decision. The question you pose about the extent to which the costs are taken account of in these calculations in COBA is a perfectly fair one. David Pearce has recently done calculations as to exactly how much motoring costs in environmental terms, an estimate in the order of £24bn. It doesn't seem that there is a great deal of difference between you on this particular issue.

John Adams
I accept that but I think that the consumption of motor travel for example is an addiction of sorts. There are, to simplify somewhat, three different possibilities to the traffic growth. One is that it can carry on growing like it is and that way lies environmental disaster. Second is to stop where we are but this runs into Tony Crosland's objection that the middle classes shouldn't pull the drawbridge up behind them. But we are only half way to the DoT's saturation level of car ownership. Third, do we attempt to get back down to a level that is environmentally and morally sustainable? So long as growth in car ownership is viewed as a benefit by those undertaking CBA in the DoT for example, and there are those who disagree and see it as a cost, then any method for arriving at an objective answer will settle nothing.

Putting Environmental Economics to Work for Rivers and Coasts

Colin Green
Flood Hazard Research Centre, Middlesex University

Water can claim to be the starting point of environmental economics in this country (Figure 1, opposite) and it is more widely claimed that water is the area in which CBA started out. In the early 1970s, a mass of work was going on particularly associated with the Trent Study (Kavanagh 1968; Smith and Kavanagh 1969; Water Resources Board 1973), which looked at whether it was worth cleaning up the River Trent. Similarly, Mansfield (1971) used the Travel Cost method to look at the recreational benefits of a proposed reservoir/barrage at Morecambe Bay; and Stabler and others (Harrison and Stabler 1981; Stabler and Ash 1978) at Reading examined the amenity benefits of canals, particularly the angling benefits, using both the Contingent Valuation and Travel Cost methods. With the exception of a gap in the late 1970s and early 1980s, this continued with a stream of work, such as that associated with Hengistbury Head (Parker and Thompson 1988) and Aldeborough (Turner, Bateman and Brooke 1991), which using CBA included an assessment of environmental benefits for the first time in relation to coastal protection schemes. A great deal of work is currently going on associated with the recreational use of rivers and coasts and the use of economic and environmental assessment by the NRA in relation to proposed new projects is routine (Bateman, Willis and Garrod 1993; Foundation for Water Research 1994; House et al 1994; Penning-Rowsell et al 1992; Willis and Garrod 1990).

To start with, some conclusions:

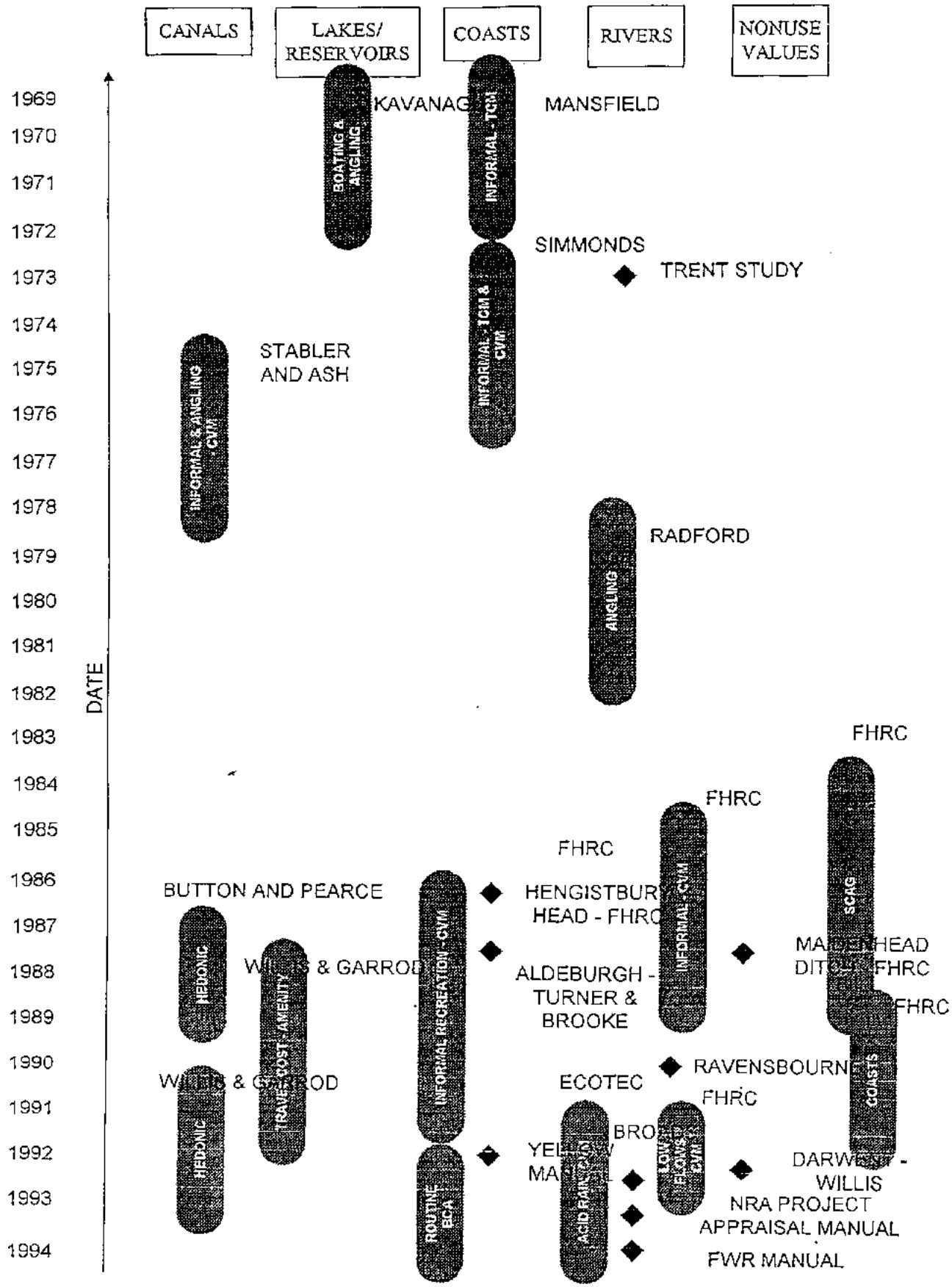
- PURPOSE OF ECONOMIC ANALYSIS IS TO CLARIFY CHOICE—NOT TO GET NUMBERS.
- USE VALUE—EASY.
- FOR NON-PRICED GOODS, ONLY VIABLE OPTION IS CVM.
- FOR RECREATION, MAJOR PROBLEM IS THE ESTIMATION OF VISITOR NUMBERS.
- EVALUATION OF NON-USE VALUE OR TOTAL VALUE OF SPECIFIC SITES IS NOT PRESENTLY POSSIBLE.
- LOSS OF ENVIRONMENTAL SITES IS CONSTRAINED BY PRINCIPLES OF 'CRITICAL NATURAL CAPITAL' AND 'CONSTANT NATURAL CAPITAL'.
- NEO-CLASSICAL ECONOMICS AS AN ETHICAL SYSTEM IS OFTEN INAPPROPRIATE AND AS AN ANALYTICAL FRAMEWORK LACKS RIGOUR.

1. water is the area where environmental economics started and has perhaps made the most progress in application in the UK.

2. why do we use economic analysis in that there are other and cheaper ways such as 'the political process'? An important reason is the increasing number of decisions that we have to take. As we get more involved with sustainable development issues, these decisions become more complicated. Accountability is increasingly important where the judgement of 'experts' is increasingly being examined.

3. a number of criteria are useful in choosing an appraisal method, particularly that we all should understand more about the choices after the analysis than before it was undertaken. There are a number of appraisal methods, such as multiattribute utility analysis, where I am sure that nobody is left any clearer about the choice. The important thing is to not necessarily get the numbers but to understand what the choice is about. An appraisal method, I would argue, is in fact an 'ethical calculus of choice' (Green and Newsome 1992). Implicit in this is that all choices are fundamentally moral or ethical and they have four components:

Figure 1: Water and Environmental Economics Analysis



- there have to be some alternatives;
- some objectivess against which one is going to compare these alternatives;
- a series of ethical axioms or assumptions which enable the comparison of completely incommensurate consequences because things will differ in terms of whose affected, when they are affected and the nature of the effect. If we are going to choose then we are going to make a comparison; and
- a rigorous framework of analysis.

A driving force behind the development of economic analysis is the western belief in rationality and the use of reason.

4. the Travel Cost Method is of relatively limited use although you are always guaranteed an answer and you are able to pick the answer which best suits your purposes within a factor of about 10 (Cheshire and Stabler 1976; Common 1973).

5. the Hedonic Price Method has to date been of only limited use in the water research area all economists believe it ought to work; the problem is that the housing market is the least promising area in which to apply it. The housing market does not approximate to a perfect market, being more like a game of musical chairs, and it has been shown that preferences for housing involve non-compensatory utility functions. Attention has shifted to whether professional valuers can make reliable judgements about the affect of environmental conditions on house prices (Button and Pearce 1989).

6. there is very poor data on visitor numbers to water recreational sites hence creating problems of calculating use values (Green et al 1992).

The emphasis now with regard to Contingent Valuation for use and recreational value is less to do with developing the instrument, because we are fairly happy that we can get good contingent values for a recreational visit; the problem is finding out to how many people this value applies, particularly when you are usually looking at a change which will either increase the number of visitors or divert them to another location.

Through a CV study one can sometimes discover that some visitors at a site would have got more enjoyment at an alternative location for a lower cost. These are labelled as "irrationals" in economists' terms because they should not be there! There are two groups accounting for this phenomenon--first, those who went to the location by mistake and probably won't return and second, the locals who don't have a choice where to go. The latter are one reason why the Travel Cost Method doesn't really work in the UK that the largest group of visitors to rivers and coasts come on foot. More generally people's recreational behaviour doesn't follow the assumptions made in the Travel-Cost Method (Green et al 1990).

Contingent valuation has a strength in that it is an experimental technique. The basic model says that willingness to pay is a function of preferences, and constraints (ie. ability to pay) plus experimental artefacts. The basic requirement of a CVM study is then to find out what people want and why they want it. A CVM study also has to be based on the understanding that people are unlikely to know before you start asking them what they are willing to pay for or how much. Both the survey and the willingness to pay format should be designed around these requirements (Green et al 1993). Indeed, a CVM study should seen primarily as a study to find out what people want and why they want it, rather than as a data grabbing exercise. However, there has been little work, for example, into why starting point bias occurs in CVM studies; if you don't know what is happening then you can't control for it. We believe that starting point bias is probably simply a learning effect.

Non-use value or total values of specific sites are much more problematic at present and should be avoided (Green and Tunstall 1993). Why? Underlying the economic approach to non-use values are a whole battery of assumptions about motivational and cognitive psychology: what people want and why they want it. This is a naive psychology. Economists also start with the assumption of perfect information which is also unrealistic. A study on the valuing of river water quality improvement raised these concerns. For example do we seriously propose that every person could put a value on each of the 35,000kms of river in the UK (Green and Tunstall 1991)? Conversely, if we don't know that a species is about to become extinct, is there really a loss? Neoclassical theory is ambigous on this point; commonsense is not. The principle must be that we know that we do not have perfect information, contrary to the usual economists' starting point. It did not seem reasonable that people could put a specific value on each km of river in the UK or that if they did not know about the river, they wouldn't actually suffer a loss if nothing was done about its quality. It is starting to look as if people value a principle, such as the conservation or reducing the pollution of rivers, and apply that principle to individual instances rather than the other way round.

The good news is that the loss of environmental sites is constrained by the principles of critical natural capital, being embodied in such designations as SPAs and Special Areas of Conservation under the EU Birds and Habitats Directives.

The view is building that we need a general theory of choice in which private goods - like cups of coffee - are the trivial case (**Figure 2, p.52**) rather than the conventional neoclassical model (**Figure 3, p.53**) which assumes that blue whales are the equivalent of cups of coffee. Work coming out of CV studies shows that people do make choices essentially as a member of a society rather than solely considering narrow self-interest. They do not treat decisions about blue whales as if these were decisions about cups of coffee.

Why do non-use values occur? They may be bound up with issues such as morality, such as a duty to future generations, other people and wildlife. We have found (Green and Tunstall 1991) three dimensions of Environmental Value Orientations which seem to partly to explain willingness to pay for environmental goods. As can be seen from the first of these dimensions, the general environmental dimension (**Figure 4**), several of the statements loading on this dimension refer explicitly to 'duties'.

Figure 4: General Environmentalism

Statement	Mean Score
• We owe duty to our children and grandchildren to preserve the environment	4.6
• The Earth and Nature are fragile and we can easily cause irreversible damage	4.5
• I like to be in the open air	4.5
• I want my children and grandchildren to see and enjoy those things I enjoyed as a child	4.5
• I love the peace and quiet of the countryside	4.4
• We owe a duty to animals and nature, they don't exist just for our enjoyment	4.4
• We should live in harmony with Nature even if it means some sacrifices on our part	4.3
• We have a duty to other people as well as to our families	4.3
• The countryside is important for recreation	4.2
• We have no choice: we have to protect the environment or we will destroy the human race	4.2
• It is important to understand the past	4.2
• A fair society is better than a rich society	4.2
• The most important problems to-day are the threats to the environment	3.7
Standardised Alpha = 0.81	56.2

Scale: 1 - strongly disagree
5 - strongly agree

Figure 2: A General Model of Choice

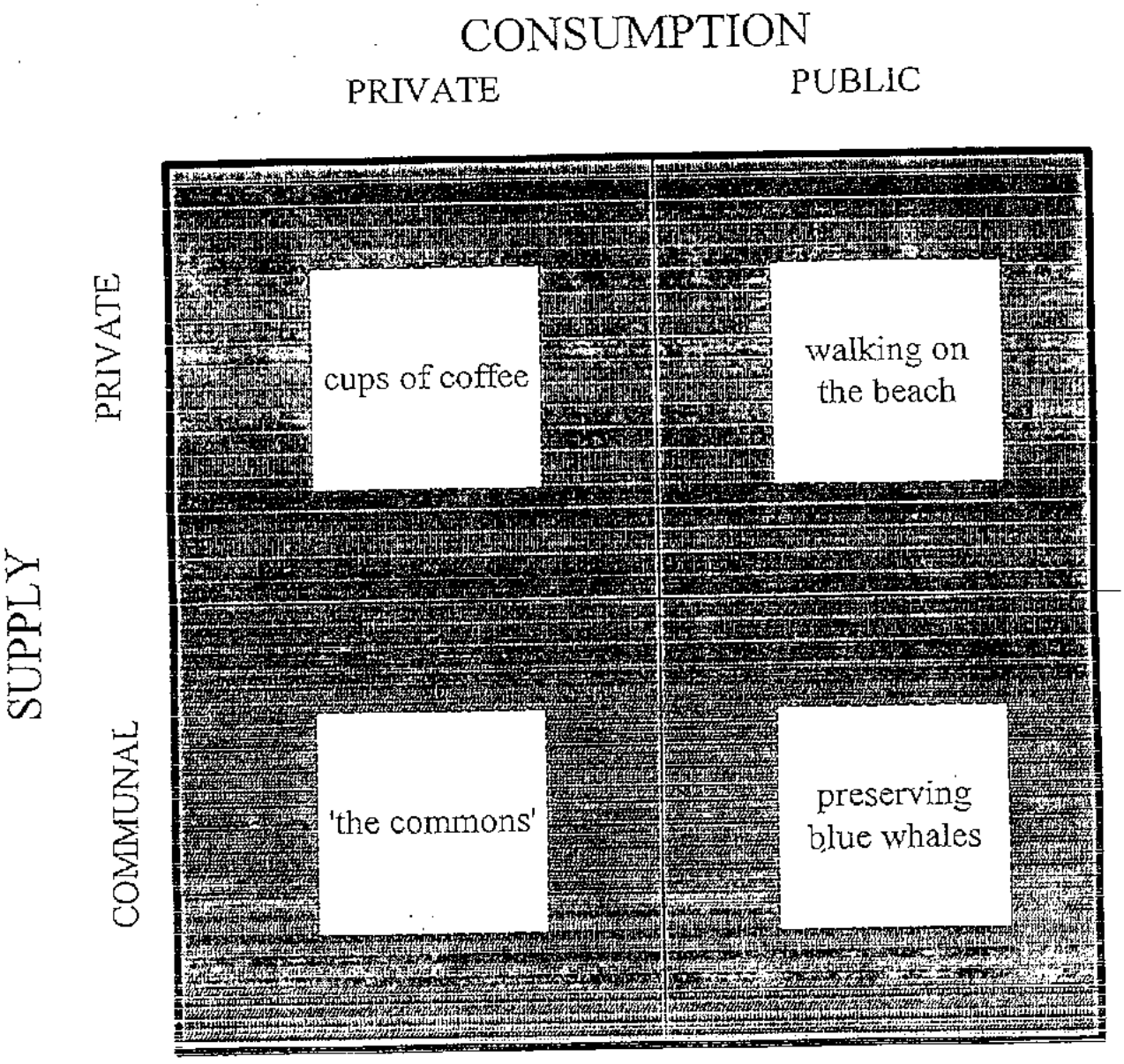
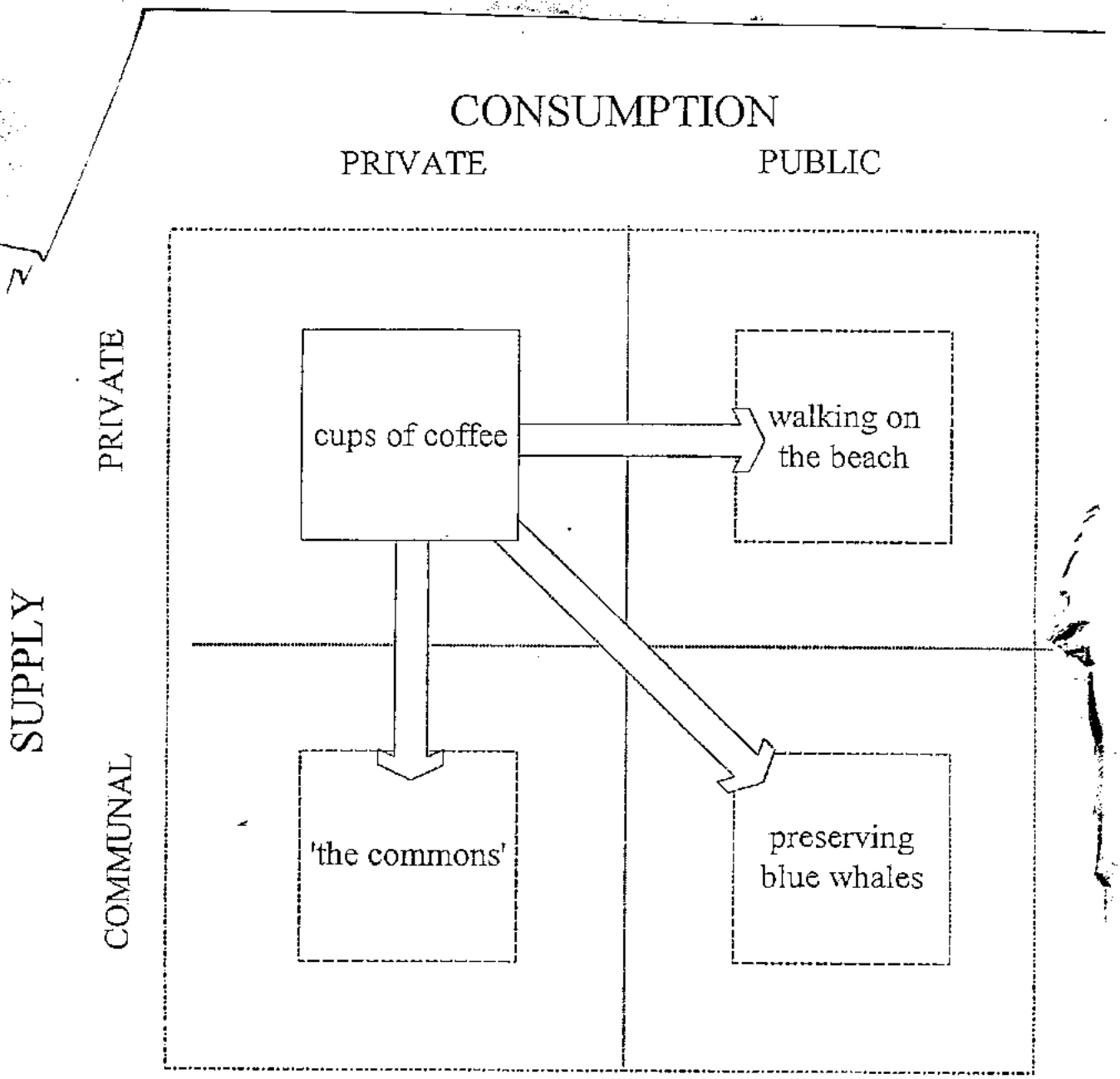


Figure 3: The Neo-classical Model of Choice



Across a whole range of CVM studies these and the other two components of environmental valuation actually explain a great deal not only about willingness to pay but also recreational behaviour.

For environmental goods, people seem to decide whether and how they are prepared to pay along the following lines (Green et al 1993):

Ought they to pay*(value to self, value to other people)* ability to pay.

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Questions and Comments

Anon
Does CV mean that the more people who you find that value a particular resource the more that it is worth and if it does mean that then how am I to deal with that with the resource that I manage improves the less that people use it.

Colin Green
there are two sides to this. As far as CV is concerned it is the number of people. If it is a matter of limiting numbers then the question is: what is the population who value it? This is the other problem with non-use values in that your site is part if a network of those sites concerned with preservation of natural resources. The difficulty is taking the willingness to pay principle and applying it to one site. This is the gap at the moment where it is not possible to apply the general principle to particular sites. We know that people value the principle but we lack the proper technology to get a proper value for an individual site. Thus people don't necessarily value each and every SSSI but they value the principle of nature conservation.

Tony Philpin
But surely social and psychological carrying capacity doesn't end up in the money value anyway.

Colin Green
The first question in any project appraisal is what is the choice all about? It is only then that the correct method can be selected; there are cases where you have to decide how much we are prepared to pay in order to prevent, for example, this archaeological feature disappearing into the sea. In many cases it will come down to how far we consider certain natural features such as dolphins as critical natural capital.

Colin Price
It is not so much as case of whether we consider dolphins as critical natural capital as they fact that they no doubt do!

Putting Environmental Economics to Work... for Landscape

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Abstract

Incipient political interest in environmental economics has revived the fortunes of a number of methods for valuing landscape in cash terms. Some methods attempt to value a particular landscape attribute or policy change in a single step. However, there are advantages in a staged evaluation, which separately relates expert judgement to public judgement, landscape change to existing landscape quality, aesthetic value to monetary value, and value to present and to future generations. The process is open and accountable, but will not necessarily be welcomed by politicians for this reason.

Introduction

There is nothing particularly new about putting environmental economics to work for landscape: over the past 25 years environmental economists have actively devised, applied and refined many potentially workable methods (Price, 1978, 1991). What is new is that politicians and environmentalists are beginning to show an interest. What is new is that the question "But how can you put a money value on beautiful landscape?" is not always asked rhetorically - people even sometimes wait for an answer! And there are at least eight separate replies.

1. Measure the increased productivity of those who work in aesthetically pleasing environment.

2. Find the financial costs saved by a better environment (Ulrich (1984) reports faster recovery from surgery, when patients have a good view from their hospital window). Alternatively, financial costs may be imposed by a poor aesthetic environment.

3. Investigate entrance fees for proprietary landscapes such as waterfalls or landscaped gardens (Price, 1994).

4. Record voluntary subscriptions to causes and campaigns with a landscape conservation objective.

5. Ask people directly what they would be willing to pay to preserve landscape quality (Randall et al., 1974). Nowadays this approach, under the contingent valuation label, has achieved dominant popularity.

6. Consult expert consensus on what compensation should be given for loss of amenity, for example when trees are destroyed by development (Helliwell, 1994).

7. Consider what costs have been undertaken in the past to create or maintain amenity, for example by making management agreements with farmers to avoid ploughing of heather moorland (Bilsborough, 1994). The assumption is then made - not always explicitly - that the decision to undertake costs was rationally made, so that the benefits must at least equal the costs.

8. Measure the expenditure incurred in gaining access to amenity by house purchase (Garrod, 1994) or travel to the countryside.

These methods have their technical problems, as their practitioners recognize better than anyone else. Political objections are also raised: that economic valuation usurps political functions; or that mathematically or philosophically abstruse methods place valuation beyond the scope of public participation or appropriate political judgement (Minter, 1994). It is thus useful to dismantle the process of economic valuation; examine the judgements; and perhaps to reconstitute a process which admits judgements, incorporates the expertise of appropriate professionals, and refers to public preferences, while exposing judgements and processes to public scrutiny and comment.

Preference and Relative Aesthetic Value

The widespread employment of landscape designers and considerable expenditure on landscape assessment (Countryside Commission, 1993) are tacit admissions that landscape preferences are not a random variable, but relate to values which are stable and meaningful, at the least for a given society. Applications of Fines's (1968) holistic scale of landscape value do demonstrate impressive consistency between individuals and over time. Furthermore, individuals can calibrate themselves to represent the judgement of a group (figure 1, p.58). These holistic valuations seem to be, broadly, explicable in terms of major landscape attributes such as topography and land use composition (figure 2, p.58).

However, we should be wary of jumping from this to an assumption that statistical analysis, for example of house prices, will render a reliable and stable cash value to these and to subtler landscape attributes. There are enormous problems: in identifying the most relevant attributes; in quantifying the attributes; in determining the form of the relationship between each attribute and aesthetic quality; in separating the effects of attributes which in fact act synergically. For example, the finding that mature Sitka spruce has a negative effect on house price while young Sitka spruce does not (Willis and Garrod, 1992) may have more to do with the improvement of forest landscape design practice over 50 years than with the age of the trees as such.

Even attempts to relate house price to holistically assessed view quality are likely to be confused by relationships between quality and the income of those who can afford good views - and who may interpret a "good view premium" as an assurance that the neighbourhood is an exclusive one.

Nor does the new popularity of contingent valuation guarantee its usefulness. The method has been used in relation to changes which affect countryside visitors in a major and obvious way: for example, to support public purchase of environmental assets (Cobbing and Slee, 1993), and to evaluate alternative policy packages for land use in the uplands (Willis and Garrod, 1993). But this superficially simple expedient—asking visitors what they would be willing to pay for conservation or improvement of landscape—raises serious problems when the expected changes of landscape are subtle and variable. For example, an electricity transmission line may, along a length of tens of kilometres, have aesthetic effects which range from negligible to catastrophic. To give a convincing representation of an adequate sample of such changes, to a sufficiently large cross-section of visitors, may exceed budgets of time, money and interviewer patience. The part-whole, mental account and information biases of the method (Bateman, 1994) are a further, more general cause for caution. In particular, previous investigation of the part-whole problem suggests that willingness to pay to prevent the entire transmission line being built might not greatly exceed willingness to pay to exclude it from a single scene.

The difficulties of these "single-step" approaches to valuation turn us back to the "dismantled" approach. The ordinal values discussed so far seem to be reliable and replicable, but they have limitations: for example, they cannot generate a legitimate arithmetic mean. They may, however, be translated onto a scale of relative landscape value. The process entails presenting choices, either to experts or to a sample of the population, in which only landscape values are arguments. For example, if the package of views on the lefthand side of figure 3 (p.59) is considered better than the package on the right, is greater than the difference between views graded I and VI. By adjusting the packages, it is possible to develop a cardinal scale of landscape, to which conventional arithmetic may be applied. (The warning needs to be given, that ratios of value between given view grades are not the same in "visited" and "inhabited" landscapes (Cobham Resource Consultants and Price, 1991).

The significance of developments and land use changes can also be judged on this relative landscape scale. Major changes are readily quantified by regrading the changed landscape. More subtle intrusions may require further choice experiments like that shown in figure 4 (p.59): would I prefer to be certain of seeing this landscape with wooden pylons intruding, or to accept a 90% chance of being able to see it without the pylons plus a 10% chance of not being able to see it at all? Although such choices may seem bizarre, with familiarity the judgements become increasingly easy to make - as is the case in almost every area of consumer choice.

Figure 1: Individual and group subjective scores

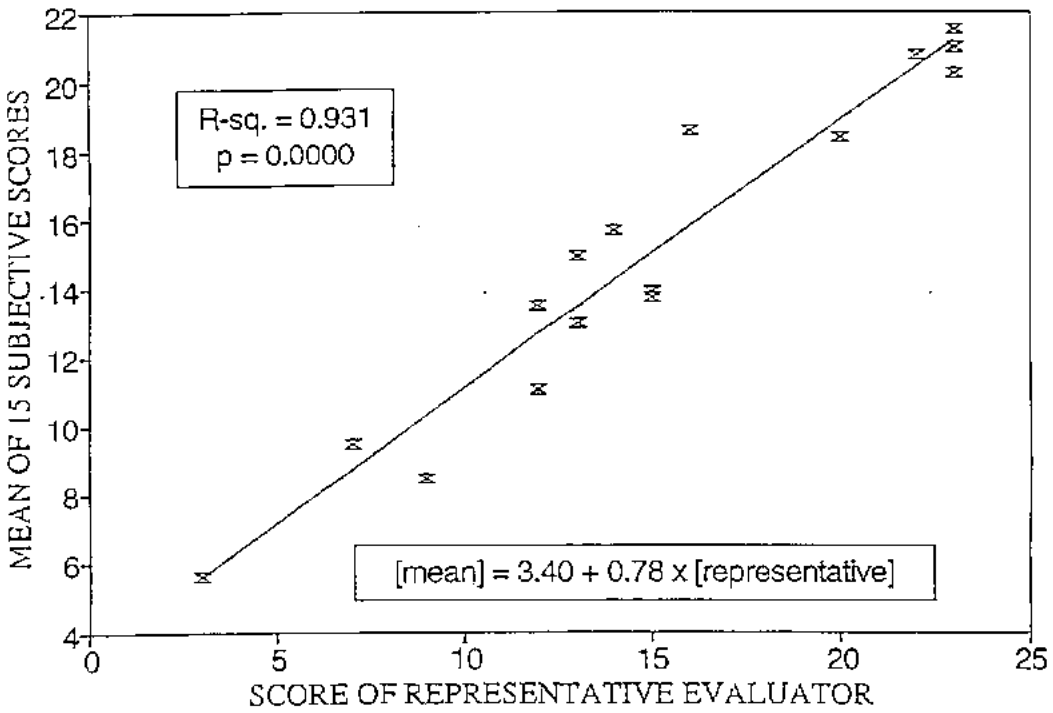


Figure 2: Subjective and objective evaluations

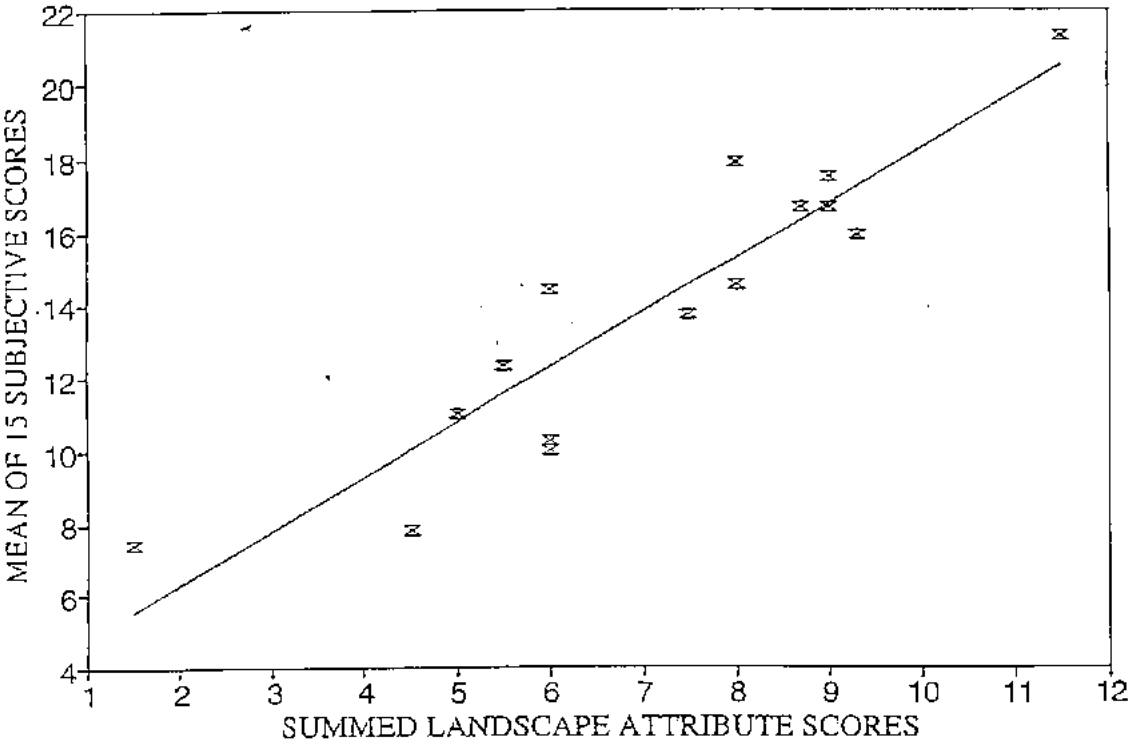


Figure 3: Cardinalizing the value scale by choices

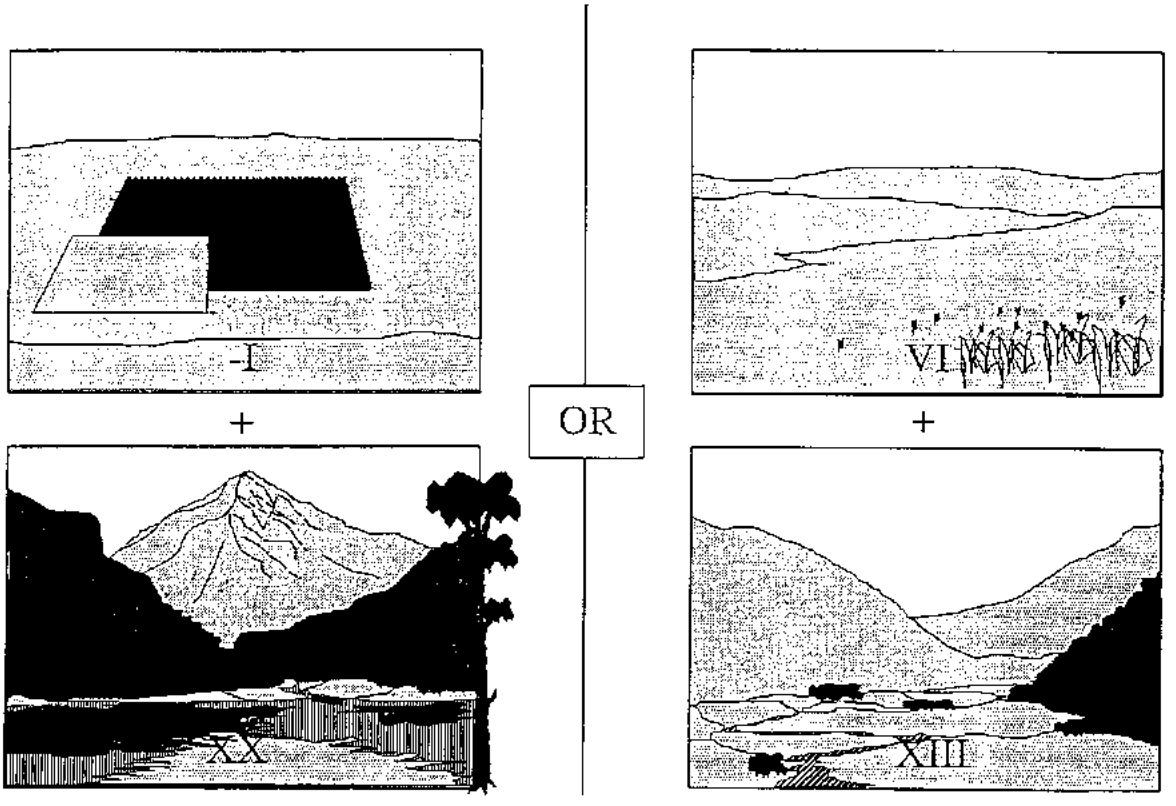
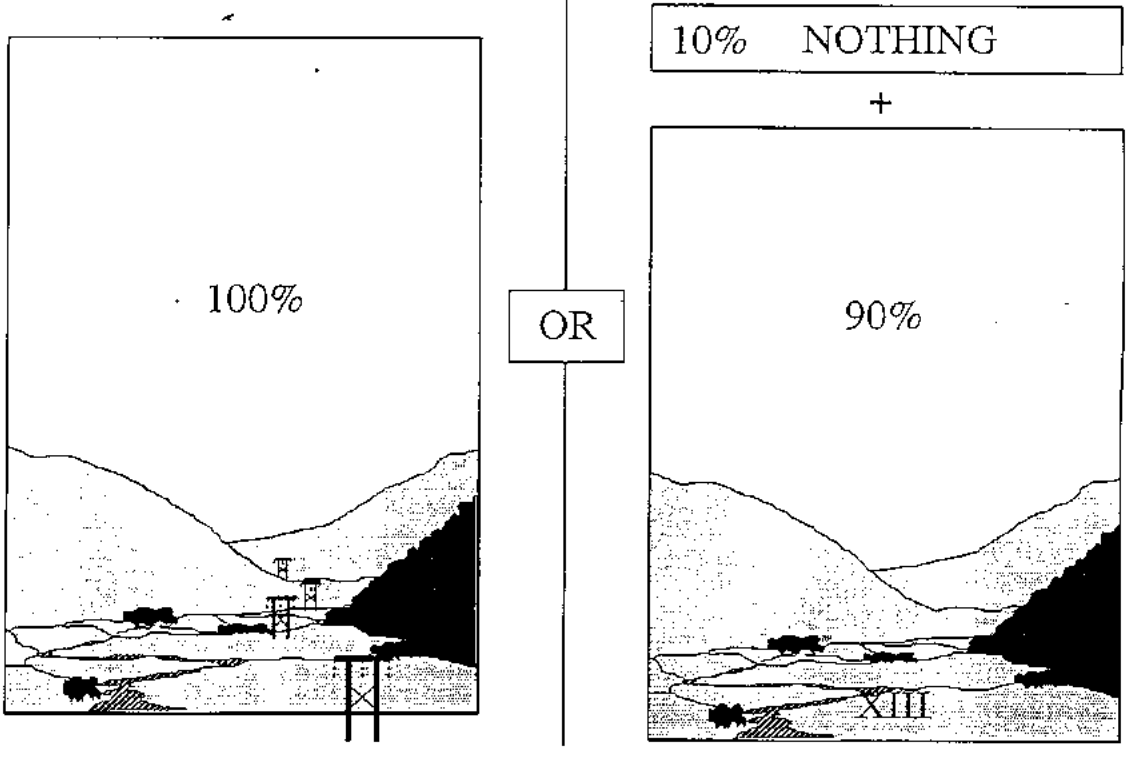


Figure 4: Evaluating the proportional effect of change

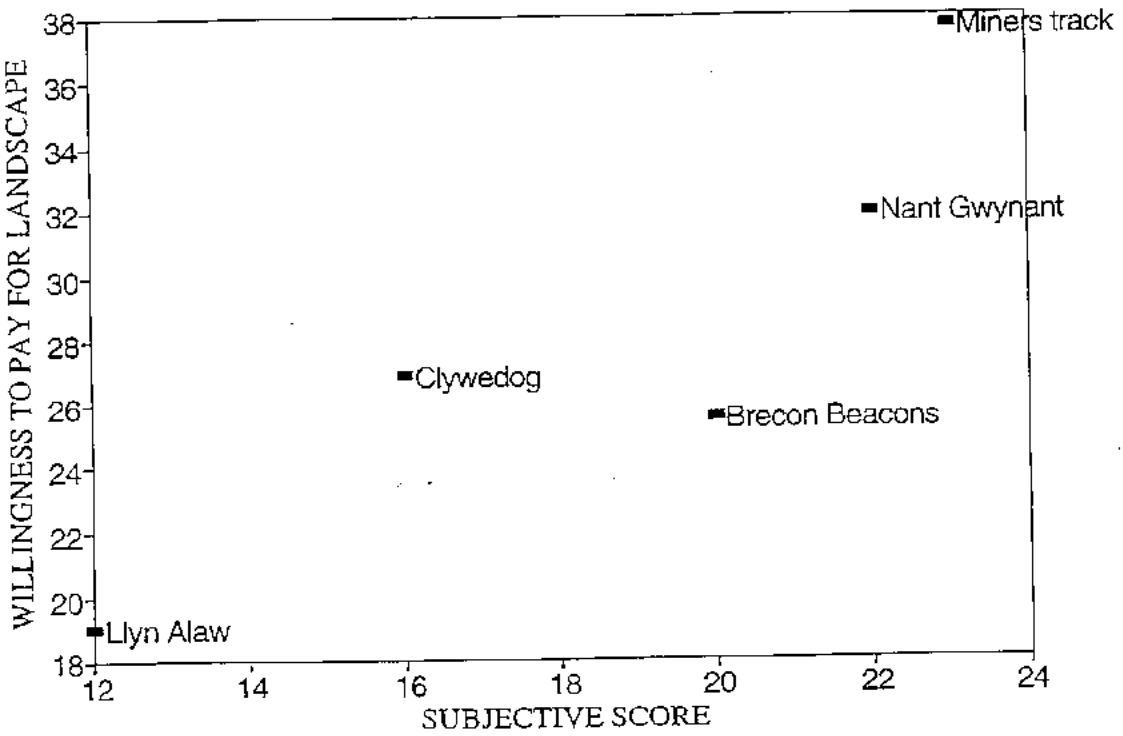


The Aesthetic/Monetary Trade-off

Combining landscape quality measures with proportional landscape degradation, and with numbers of visitor-days affected, gives a measure of impact of an intrusion, on a pure landscape scale. Many political scientists would no doubt wish to leave it like that, a political trade-off then being made between landscape impact and financial considerations. But it has been argued that economists have their own means of trade-off between aesthetic and cash scales: for example, better landscape should attract visitors to travel from a greater distance. In a pilot survey, Bergin and Price (1994) found a consistent positive relationship between landscape quality and a variety of measures of access cost (figure 5): with and without travel time and accommodation costs; using conventional consumers' surplus or gross expenditure; taking the whole value of visits, or apportioning it among landscape, recreation, wildlife interest, etc. For the most realistic assumptions, there was an implied willingness to pay about an extra £1 per visitor-group per day per quality point on the landscape scale.

Combining valuations of landscape quality, impact of change, numbers of visitor-days, and the revealed willingness to pay of countryside visitors, allows calculation of the annual cash equivalent of any specified state, or of any specified change in that state.

Figure 5: Relating aesthetic and monetary scales



Does the Future Matter?

Sometimes, for example when there is an annual cost in maintaining fine landscape, the annual benefit from high quality landscape is all that needs to be assessed. Often, however, benefit is affected over a long time period, or even indefinitely, while landscape preservation incurs immediate investment costs (adopting a more aesthetically sympathetic route for a road) or loss of potential short-term revenue (from quarrying, say). In such cases comparisons can only be made if annual landscape benefits are converted to long-term equivalents, a process which brings us to the heart of the topic of sustainable management.

The driving ideas of sustainability require an explicit account of why and how landscape values to future generations might vary from those presently experienced. It is not the case that utilitarian philosophy ignores such future values: on the contrary, one of the greatest utilitarian philosophers (Sidgwick, 1874) was quite explicit that "the interests of posterity must concern a Utilitarian". However, in practice the process of discounting, which is commended to both government departments (Treasury, 1991) and land managers (Forestry Commission 1987), systematically reduces the weight given to future values - to negligible significance over a time-scale greater than a century. It is by no means clear how this can be justified (Price, 1993a): it certainly infringes the sustainability constraint, which prohibits "compromising the ability of future generations to meet their own needs". There may be reasons to expect reduced landscape impact, for example, if new agricultural buildings mellow, or people become accustomed to a new land use pattern. However, there are other processes, for example, growing tourist numbers, which may increase the significance of landscape impact over time. There are no grounds to suppose that the net effect will be a declining overall significance of landscape change.

Passive Use Values

It may be objected that the account of valuation given above makes no reference to the fashionable topic of non-use or passive use values. Those who derive pleasure from the existence of a landscape, without actually visiting it, reveal no willingness to pay for access.

Passive use values seem to have become something of a trump card for people who are annoyed by the apparent success of economists in quantifying the previously-deemed-imponderable direct use values. "But how can you put a money value on the idea of beautiful landscape?" is the new-style rhetorical question. For this strategic purpose, passive use values may be deemed either "unmeasurable" or just "very large". And indeed there are suggestions from contingent valuation studies that "very large" is an apt quantification (Hanley and Craig, 1991).

One could, however, advance a mildly provocative counter-suggestion. Using the contingent valuation method for passive use values is a matter of drumming up spurious support for landscape conservation, by going into the community and

(a) upsetting people who didn't know that the landscape in question was threatened;
(b) applying the value of "knowing that a landscape exists" to the unsampled 99.99% of a population, who don 't know that it exists;
(c) attaching a limited quantum of environmental concern to a sequence of environmental causes, as each moves into the political limelight, and multiple-counting that quantum through successive reappearances.

These contentions are substantiated and elaborated elsewhere (Price, unpubl.).

Paradoxically, passive use values are most important to people who are also direct users. The rest of so-called passive use value is probably best dealt with by proper valuation of future benefits.

Appraising Evaluation

The complete process outlined above has been applied to practical cases (Cobham Resource Consultants and Price, 1991; Price, 1993b). It has fitted comfortably into the hurried time scale of planning decisions. The values attributed to landscape were both high enough to have a dominating effect on decision making, and robust enough to withstand major variation in assumptions.

By comparison with "one-stop shopping" evaluation methods ("how much would you be willing to pay to divert this electricity transmission line to a less conspicuous alignment?"), the above approach is untidy rather than elegant. It may, however, reduce the common objections, that environmental economics involves too dramatic a comparison of dissimilar entities, or removes the underlying assumptions of valuation too far out of the public arena. It is democratic in allowing public preferences to set broad relative values, without requiring individuals to make unfamiliar hypothetical trade-offs between money and aesthetic enjoyment. It gives a framework within which landscape professionals can deliver quantitative judgements on subtle and complex changes. Unlike house price and contingent valuation approaches, which normally render values for all future time in a single lump sum, it looks at future values from the future's point of view. And it allows decision makers to check the way the landscape value is compiled, and to insert their own values in cases where they can identify disagreement with expert and consumer opinion.

My suspicion is that politicians and environmentalists will dislike this approach, not because it fails to make economic processes accountable, but for an obverse reason: by giving scope for other actors in the decision process to insert their own judgements, it forces an explicitness on them which they may find rather uncomfortable. Vague generalities about imponderable or incommensurable values are politically safer than a competing quantification. In particular it may well appear that, despite the rhetoric of sustainable development, politicians have an even shorter time horizon than the utilitarian economists whom they revile, or the impatient public whom they represent.

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Questions and Comments

Tony Philpin
Do you really need put a money value on on this particular example, namely the main road to the Isles vs Kinloch Hourn which attracts only a few hundred climbers? It is pretty obvious that the hundreds of thousands who use that main route are not going to want pylons running down its length.

Colin Price
I actually downgraded the impact on the Kinloch Hourn route because some have argued that the countryside should really be saved for those who really appreciate it, in this case the climbers and not the 'riffraff' from the city who drive along at 80 mph and who have no opinion on the landscape around them. I agree that your viewpoint is the more defensible one but when construction costs are taken into consideration then one can't make an intuitive decision.

Summary & Glance into the Future

Adrian Whiteman
Senior Economist, Forestry Commission

From this workshop it is clear that there is a long way to go before economists and non-economists see eye-to-eye. It is quite pleasing however that there has been such an inquiry into some of the methodologies underpinning the theories. It is a great step forward that non-economists are coming into these discussions and stirring things up a bit. I will attempt to summarise the debate from three perspectives: where have we got to, where are we going, and, from the perspective of a government department, how the debate might help in the future management of the countryside.

Ian Bateman and Fiona Bryan's paper gave a very succinct description of the methodologies currently employed to value non-market benefits. It seems that of all the techniques the Travel Cost Methodology has progressed the least since we last met. Although the application of GIS is helpful, there remains the problem of the answers very much depending upon the assumptions that one starts out with. The Hedonic Price technique was not discussed to a great extent, but econometric and statistical problems with this model are such that we are unlikely to see great advances in this area either in the near future. It seems therefore, that everyone is concentrating on contingent valuation.

Economists are improving their statistical techniques and methods by looking at such things as elicitation effects, the effects of embedding on answers and the effects of information, but ultimately although they can look at these things and see what effect they have on the answers this doesn't give us any help about the right way to ask the questions. There is no 'right amount' of information that you should present to people in a Contingent Valuation (CV) question. The Stated Preference technique seems to improve use value estimates but I do wonder whether it will improve non-use value estimates. In the case of non-use values the respondant is faced with a good that is by definition very difficult to value (because it is not used by people) so it seems to counter-productive to me to ask questions in a complicated way which will if anything make questions more difficult to answer rather than make things easier.

Non-economists have pointed out several problems with CV, some of which are:

- the question of whether the answers to questions framed as individual choices should be used in public decision making;
- whether preferences can be put into monetary values at all;
- whether preferences actually count at all in the management of resources for some non-use outputs; and
- how distributional issues should be accounted for in decision-making.

It seems that non-economists are very strong on criticism but weak on alternatives at the moment. Everybody seems to agree that difficult choices have to be made and there needs to be some framework within which to work. What we need to do in the future is attempt to work out how we can improve the system that we have got or, if we are going to throw it out, consider what will replace it. I would argue that CV is a strong technique for use values but not so strong for non-use values . The concepts of critical natural capital and safe minimum standards sort out some of the problems faced in appraisals but they then have to be defined in some way, so that even if you get rid of the CBA decision making framework, a way of defining critical natural capital has still to be found. The uncertainty in CBA has increased in recent years due to the sorts of problems that have been raised. The idea of having standard values to drop into CBA which would make everybody's life a lot simpler seems less likely.

Where do we go from here? We need to know where preferences come from. Economists work on the basis of neo classical economics and are very good at computing values but don't very often question where the preferences come from. In terms of non-use values by their very nature if you don't use something then preferences for it can't have been derived from your own personal experience, ie. you must have learnt them from somewhere. This calls into question some of the fundamental principles of economic evaluation. If people are learning these preferences then you might as well go straight to the

people who are educating them and cut out the middle man. The next thing is to account for the people that won't play the game, people who act irrationally, people who give protest bids in CV studies. At the moment economists put them to one side saying that they don't fit into our framework so we are going to ignore them. We need to follow-up why they have been given such answers. Another useful step would be to pay closer attention to post-project evaluation. CV not only often talks about hypothetical markets for products but also hypothetical products. There is not a great deal of work done on going back to projects after they have been carried out and carrying out post-project CV studies. Finally, we need also to find out more about what the public want us to do. The public might actually be quite happy to have difficult decisions left to experts rather than have a difficult and complex consultation or CBA carried out. The measurement of numbers (not necessarily values) has to be improved; economists have concentrated very much on values but the total value of something is the value to the individual multiplied by the number of people that are affected. Unfortunately there does not seem to be a great deal of work done in the UK on measuring aggregate numbers of people that are affected by things.

I have been asked to comment on the reaction of the Treasury to all of this. This is hard to predict, but I would say that in my experience they are generally happy to take into account non-market benefits as long as it means reallocating money within existing budgets. I have yet to see the Treasury agree to the Forestry Commission getting additional money on the strength of non-market benefits. From a wider point of view within government, I would remind everybody here that CBA is only one method used in the decision making process which has a long history and has become prominent because it turns everything into cash values. It is no, however, the only process used within government to arrive at a decsion. A poor CBA is probably worse than no CBA at all. However I think it is unlikely that CBA will be replaced in government decision-making. In fact if issues such as compensation and litigation start to become more important then this will probably entrench the position of CBA and valuation studies.

For practical management of the countryside we need to have methods which are fairly simple and easy to use. A full blown CBA or similar study is not appropriate for many day-to-day decisions. Given that standard values and appraisal systems are a long way off I wonder whether the systems that we already have in place, such as public enquiries and planning committees etc. are going to be sufficient. A useful task for CRN would be to explore the possibilities os using simpler techniques for practical decision making. The Forestry Commission, for example, run courses on environmental decision making involving the use of very simple and straightforward techniques.

Closing Remarks

Richard Broadhurst

I feel some sympathy with Roger Clarke who when summing up the CRN Conference on Environmental Economics a few years back said: "I feel that we are steering through some very dense fog". What he didn't add was "in rough seas, strong tidal currents, strong winds and on a lee shore". There is an enormous amount of complication in the whole field of environmental economics and we are only just beginning to add a little more understanding to the other side of the coin from that of the traditional economists perspective. Tom Huxley said in a recent article in CRN News that the hunt is on for Value for Money. That has certainly been the case for some while. He also wrote that "would VFM stand for 'Very Forward Thinking Mentality'". I hope that the arguments that you have heard today have contributed to the development of 'very forward thinking mentality'. Finally I would like to thank those who have arranged today including: Jenny Heap and Marc Carter of English Nature, to all the speakers who contributed to the event and to everyone for coming.

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