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Nonuse Values and the Environment: Economic and Ethical Motivations

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ABSTRACT: Nonuse values are a potentially very important, but controversial, aspect of the economic valuation of the environment. Since no use is envisaged by the individual, a degree of altruism appears to be the driving force behind nonuse values. Whilst much of the controversy has focused upon measurement issues associated with the contingent valuation method, this paper concentrates on the underlying motivations, whether ethical or economic, that form the basis for such values. Some fundamental aspects of defining and quantifying economic nonuse values are considered, and possible motives for attributing value to the environment are analysed, making a clear distinction between 'selfish' altruism and 'selfless' altruism. The difference has crucial implications for economic valuation and for assessing individuals' willingness to pay for environmental quality. The concept of Safe Minimum Standards is introduced as a means of supplementing purely economic methodology to incorporate ethical concerns into decision making.

KEYWORDS: nonuse values, self interest, altruism, safe minimum standards

INTRODUCTION

Unlike use values, economic nonuse values are independent of any current or expected future contact with an object or with the tangible services that it provides. An individual need never make use of a feature of the environment and, yet, may still derive satisfaction from simply knowing that it exists, either for its own sake or for the benefit of others. Empirical studies have suggested that these values can be significant in comparison with the more traditional 'use' values such as recreation and food production (for instance Lant and Roberts, 1990; Randall, 1991; McFadden, 1994; Garrod and Willis, 1995). By incorporating nonuse values into valuation procedures, opportunity costs associated with

economic development which impinges on the quality of the natural environment can more accurately reflect the *full* worth that society attributes to this environment. Thus, the case for conservation may be better represented than would otherwise be the case, with policies being recommended that take greater account of environmental concerns.

There is considerable debate about whether current economic procedures can accurately measure nonuse values and, more fundamentally, whether there exist values associated with non-use whose underlying motivations make them incompatible with economic assessment and monetary valuation. It is the latter question that is the focus of this paper, rather than the issue of measurement and particularly the contingent valuation method. An outline of what economic 'nonuse value' actually refers to is presented, illustrating the problems that such a definition involves, and why it presents particular difficulties for measurement. Nonuse value appears to be associated with altruism towards others, which can be modelled within an economic framework on the assumption that the ultimate motivation is self interest. Altruistic motives that are truly selfless are not compatible with a standard economic analysis, and the possibility and nature of such motives are explored. Possible approaches to addressing these apparently incompatible categories of motivation – the underlying self-interest of economic theory and the selfless giving of the true altruist – are analysed, and a promising avenue for progress identified. This is the Safe Minimum Standards approach to decision-making, which maintains a strictly economic cost-benefit criterion based on individual self interest and welfare maximisation, that is constrained by broader social imperatives.

THE THEORY OF ECONOMIC NONUSE VALUES

The terms nonuse value and existence value are frequently used interchangeably on the basis that all nonuse value is associated with continued *existence* rather than use of an environmental attribute, regardless of the underlying motive. The concept originates from work by Krutilla (1967) who suggested that people may place a value on the 'mere existence' of natural phenomena. This is in addition to any value that may be associated with the 'use' of environmental resources. Nonuse value cannot be reflected in market transactions due to the 'public good' nature of the benefits with which it is associated: they are non-rival – one person's gain does not limit the potential gain to others – and non-exclusive – it is not possible to exclude others from deriving such benefit. As Bowker and Stoll (1988) note, 'nonuse clearly fits the traditional description of a public good', or even that of a 'very pure public good' (McConnell, 1983; Kopp, 1992a).

While nonuse values have traditionally been associated with 'action which will have an irreversible adverse consequence for rare [or unique] phenomena of

NONUSE VALUES AND THE ENVIRONMENT

nature' (Krutilla, 1967, p. 778), there is no reason to assume that they will not be apparent for more common features. In the extreme, Rosenthal and Nelson (1992, p. 117) are concerned that 'the range of possible existence values may well be limitless'. Indeed, there is no reason why nonuse values should *not* be held even for non-environmental phenomena, such as others' opportunity for employment and safety at work (Portney, 1994) or for 'historic and cultural features' (Krutilla, 1967). However, economic theory suggests that value at the margin will tend to zero when supply is unlimited, so that loss of small amounts of resources which are abundant, or for which many substitutes are available, is unlikely to be associated with significant loss of value (Randall, 1991). Natural features of the environment, with often unique, irreplaceable and long-lived character, might well carry relatively large nonuse values (Madariaga and McConnell, 1987). On the other hand, Kopp (1991) suggests that nonuse values for non-environmental features are already implicitly considered in public policies such as those that subsidise the livelihoods of farmers and local neighbourhoods.

Krutilla's original definition of existence value, based on the mere *knowledge* that a feature is preserved or continues to exist, implies that a necessary condition for attributing existence value is that some information has previously been obtained. This suggests a requirement for some past alteration in behaviour which would influence purchases of other resources. McConnell (1983, p. 256) notes that this 'violates the essence of the definition of an existence good', but states that for 'most practical applications' it may be reasonable to assume that individuals obtain information about such goods as a 'public input' (which is not obtained in any measurable market transaction).

This need for information leads Bishop and Welsh (1992, p. 407) to note that, 'some might argue that existence values for the obscure and unknown should be ruled out *a priori*'. They argue, however, that a lack of knowledge does not mean that the existence of resources cannot satisfy preferences, but may simply indicate that there have not been past opportunities or motivations for gathering the relevant information. So, even if, as Randall (1986, p. 85) suggests, 'individuals place no value on resources of whose existence or usefulness they are entirely unaware', this does not deny that such individuals could suffer a loss of well-being on learning of their loss, or that the value they attribute to any such loss should be incorporated into public decision making. Furthermore, Kopp (1992b) proposes that if the appropriate format for valuing a loss in the current level of environmental quality is in fact the willingness to accept compensation, then individuals *ought* to be informed of any such loss. Clearly, then, whilst there are difficulties in defining precisely what constitutes economic nonuse value, these difficulties are not insurmountable and do not negate the potential importance of such values.

Categorising Nonuse Values

The commonly perceived equivalence between existence value and nonuse values in general is perfectly valid in terms of deriving total economic benefits attributable to the environment. However, defining a clear taxonomy of possible benefits, with nonuse values distinguished according to underlying motivations, would have a number of potential advantages. It could help to ensure that all components of economic value are included in an analysis (Smith, 1987), it would facilitate the comparison of findings across studies, and improve any attempts to transfer benefit estimates between them. It is recommended, therefore, that existence value be treated as one of a number of distinct categories of nonuse value, all of which are derived from preservation of a feature of the environment independently of any current or expected future use by the individual to whom the nonuse benefits are attributed. Based on this definition, the motivation underlying nonuse value may be for the sake of the object itself or so that the *opportunity* is maintained for others of the current or of future generations to derive benefit from it. There is no assumption that others will benefit simply from *use* of the resource, nor that this is the intention of the individual who attributes such nonuse value. For instance, bequest value can be regarded as 'a potential future use value or non-use value' (Turner, Pearce and Bateman, 1994, p. 113) or, 'the bequest of existence values as well as use values' (Diamond and Hausman, 1993, p. 57).

Defining nonuse as relating solely to the individual and not, as is often the case, relating to whether the preserved asset is likely to be 'used' by others, is consistent with defining utility functions based on personal preferences. However, explicitly excluding intended future use *by the individual* as a component of nonuse value suggests that option value, which is derived from the knowledge that a resource is available for personal use in the future, does not fall within the bounds of nonuse value. Nor, then, does quasi-option value, similarly a function of anticipated future use, contingent upon the availability of improved information.

A list of just some of the terms that have been associated with economic nonuse values in the literature is presented in Table 1. A useful categorisation of the wide array of possible motives that have been suggested for nonuse value consists of existence, bequest and philanthropic provision (Randall, 1986). These three motives are all independent of any use made of a resource by the individual, yet still represent a potential source of utility. Existence value relates to the benefit derived simply from knowing that some feature continues to exist, irrespective of any potential use, and can be linked to 'Q-altruism' (Randall and Stoll, 1983), based on the knowledge that Q itself is benefiting from being undisturbed. Bequest value is derived from a feature remaining available for future generations to enjoy, and may be based partly on a sense of stewardship towards the natural environment (Aylward, 1992). Philanthropic value is asso-

NONUSE VALUES AND THE ENVIRONMENT

ciated with the resource being available for the enjoyment of contemporaries in the current generation, whether these are 'significant others' (relatives and close friends) or 'diffuse others' (the general public) (Mitchell and Carson, 1989). Distinguishing such intra-generational altruistic concerns could result in absurd results (Collard, 1978) based on a 'benevolence loop' between altruists. This is where each altruist derives satisfaction simply from the others' satisfaction, with the potential for ever increasing levels of satisfaction for all those involved (Cowen, 1993). However, ignoring possible philanthropic motives and considering only bequest and existence (which is a common approach) risks omitting valid concerns for the effects that environmental change may have on the well-being of others within the current generation.

Terminology	Example references
preservation values	Sutherland and Walsh (1985)
intrinsic values	Fisher and Raucher (1984)
existence values	Edwards (1986)
passive use values	Arrow et al. (1993)
intangibles	Carson and Navarro (1988)
off site use values	Randall (1993)
non-user values	Green and Tunstall (1991)
<i>made up of:</i>	
existence	Krutilla (1967)
bequest	Krutilla (1967)
intrinsic	Whitehead and Thompson (1993)
inherent	Brookshire et al. (1986)
vicarious use	Mitchell and Carson (1989)
philanthropic	Randall (1986)
benevolence	Carson and Martin (1991)
stewardship	Bishop and Heberlein (1986)
religious/cultural	Aylward (1992)
sympathy	Bishop, Boyle and Welsh (1987)
aesthetic	Aldred (1994)

TABLE 1. Terminology and nonuse values: a sample of terms that have been used to refer to economic nonuse value and its components

There is a problem of how to represent nonuse values, and existence values in particular, in relation to the quantity of a resource, given that they are not easily reconciled with marginal changes in resource quantity or quality (Carson and Navarro, 1988). Since, by definition, it is not possible to observe through changes in behaviour the attributes of a natural feature of the environment upon which nonuse values depend, it is generally assumed that attributes important for use will also be important for nonuse (Kopp, 1992b). Existence value is often modelled by including the *stock* of the resource as an argument in utility functions (Johansson, 1991), with marginal existence value being assumed to be positive and declining as stock increases. However, Brookshire, Eubanks and Sorg (1986) argue that a stock argument in the utility function cannot adequately reflect existence value which they associate instead with a *discrete* (binary) perception of threat to existence. Existence value might therefore be unaffected by the size of population above a certain threshold, and remain constant for each member of the population below this threshold. Brookshire et al. also suggest that the manner in which a species, for instance, is made extinct can influence the effect on utility, thus emphasising the importance of context and information in deriving values. These ideas clearly have implications for how nonuse values are to be measured and how they are to be allocated within groups of similar environmental assets.

Measuring Nonuse Values

Standard economic valuation of a non-market environmental resource via revealed preference techniques is based on the assumption of weak complementarity between the resource and some marketed or 'private' good. This relies upon the demand for the environmental resource being zero when the demand for the related marketed good is zero, and the marketed good being non-essential so that some 'choke price' exists where its demand *will* fall to zero. On the basis of these conditions, it is possible to derive values attributed to environmental resources which are implicit in expenditure on marketed goods and, as Bockstael and Kling (1988, p. 661) acknowledge, 'weak complementarity forms the foundation of [economic] theory of welfare measurement of environmental quality changes.' However, as these authors note, the presence of an existence value will cause evaluations based on this assumption to 'miss something'. Nonuse value is not compatible with weak complementarity as a structural characteristic of preferences, since this would require that the demand for an environmental attribute be associated with changes in behaviour in terms of the purchase of a marketed good. Therefore, where use values, attributed for instance to recreation, may be determined via the 'trail' of expenditures such as those on travel-related goods, there is no such trail associated with values attributed simply to the existence of a resource. The definition of nonuse value rules out the possibility of it being linked to any observable changes in behaviour.

NONUSE VALUES AND THE ENVIRONMENT

Nonuse motivations have generally been associated, instead, with preferences characterised by *separability* in the utility function. When an individual's utility function is separable between the environmental feature associated with nonuse benefits and all other (marketed) goods, then changes to this feature will not influence the marginal substitutability, or the consumer's choice, between any marketed goods. This rules out the possibility of deriving nonuse values through observable market behaviour, and leads to the generally accepted view, summed up by Freeman (1993, p. 288), that 'contingent valuation methods appear to be the only feasible approach to estimating nonuse values for policy purposes'.

Stated-preference contingent valuation techniques are, however, the subject of continuing debate and criticism. Some of the criticism relates to problems with the actual methods employed, although it should be possible to account for these by improving the way that contingent markets are created and presented, and their results interpreted and assessed (see, for instance, Hutchinson, Chilton and Davis, 1995). Other criticism relates more directly to the motives and choices that form the basis of an individual's value assessment. This reflects a more fundamental judgement on whether the contingent valuation method, and economics in general, can assess the full worth that society attributes to non-marketed features of the environment. This is linked to how nonuse values are defined, the motives upon which they are based, and whether such values are commensurate with measurement in monetary terms. This is a matter of considerable importance in assessing management options for environmental (and possibly other) resources since, if nonuse values *are* apparent, they need to be considered and measured as precisely as possible in order that public decision making be as fully informed as possible. It is proposed by Kopp & Smith (1993, p. 19) that 'few critics of the treatment of nonuse values deny their existence', a view which is echoed in Cummings and Harrison's (1995) 'Critical Review' of nonuse values. The implications for simply ignoring nonuse values, as Randall (1993) points out, are reduced social welfare and a misallocation of resources, with underinvestment in environmental goods and systematic relocation of those activities with the greatest potential to damage the environment to the most pristine areas of the world.

It is not intended to consider here all the problems that have been associated with contingent valuation methods of measuring nonuse values. Comprehensive coverage of these techniques, their drawbacks, and possible solutions are considered, for example, in Cummings, Brookshire and Schulze (1986); Mitchell and Carson (1989); Arrow et al. (1993); Hausman (1993); Bjornstad and Kahn (1996); and Bateman and Willis (forthcoming). Instead, the theory underlying the economic assessment of nonuse values is assessed: an analysis of so-called 'fundamental' failures rather than the 'technical' failures of contingent valuation (McFadden, 1994). This relates to the normative assumptions that neoclassical economics tends to make about motives and preferences that form the basis of individuals' choices and values.

NONUSE VALUES AND ALTRUISM

Since nonuse benefits are independent of any personal current use, future expected use or avoidance of risk related to future use, it appears that nonuse value must be derived from some form of altruism towards others. Such altruism, so far as it is associated with economic benefits and utility maximising behaviour, must ultimately be based on the satisfaction of personal preferences. However, it is also possible that an individual may value a resource not for any personal benefit (whether tangible or intangible) but solely for the benefit of others on moral or ethical grounds, based perhaps on a notion of what is right or wrong (Sen, 1977; Edwards, 1986). There is a fundamental distinction, therefore, between altruism which is rooted in self interest – so that the donor derives satisfaction or utility from knowing that others will benefit – and altruism that is truly divorced from self interest, from which the donor gains no satisfaction.

The former category has been termed ‘selfish altruism’ (Page, 1977) since the decision is based essentially upon the utility gained by the donor. This describes a situation of interdependent utility functions where one individual can derive utility purely from satisfying another’s wants or needs. It is not to be confused with common explanations for what is apparently altruistic behaviour, such as ‘reciprocal altruism’ (Hardin, 1977), ‘quasi-altruism’ (Kennet, 1980) or ‘enlightened self interest’ (Collard, 1978). These describe motives based not on altruism towards others and their welfare, but on the assumption that the donor will benefit in the long run by way of some ‘return on the investment’ of giving.

In contrast, truly selfless altruism describes giving which is entirely independent of expected personal gain, favouring others at the expense of individual self interest and well-being. Such ‘genuine’ altruism (Edwards, 1992; Aldred, 1994) is contrary to standard assumptions of neoclassical economic theory based on rational individuals seeking maximum personal utility. In the oft-cited terminology of Sen (1977), these two fundamental categories of altruism are referred to as ‘sympathy’ – where concern for others can maximise the altruist’s welfare – and ‘commitment’ – where acts of altruism are chosen even though they are expected to result in lower levels of personal welfare than alternative actions. The extent to which these alternative interpretations can or cannot be incorporated into an economic calculus is crucial to assessing the adequacy of economic nonuse values for addressing the full range of possible altruistic motivations.

Self-Interested Altruism

Self-interested, or ‘selfish’, altruism has generally been modelled within an economic framework in one of two ways. Concern for others is treated either as ‘commodity related’ (‘paternalistic altruism’) or as ‘utility related’ (‘individualistic altruism’) (Collard, 1978; Madariaga and McConnell, 1987). Individual-

NONUSE VALUES AND THE ENVIRONMENT

istic altruism refers to satisfaction derived by the donor, *i*, from an increase in the overall level of utility of a recipient, *j*, regardless of the source of this utility. It can be represented by the following utility functions for individuals *i* and *j*, with utility *U*, and bundle of goods *x*:

$$U_i = f(x_i, U_j)$$

$$U_j = g(x_j)$$

Individual *i* can be regarded as an altruist, based on individualistic concern for *j*'s well-being, so long as $\partial U_i / \partial U_j > 0$, or the utility of neither declines as the other's increases.

Paternalistic (or commodity related) altruism is concerned more specifically with the source of others' well-being, and can focus on particular resources (such as environmental public goods). It can be represented as follows:

$$U_i = f(x_i, x_j)$$

$$U_j = g(x_j)$$

Individual *i* is an altruist in this sense so long as $\partial U_i / \partial x_j > 0$, which may be restricted to a particular resource such as *R* that enters *j*'s bundle of goods, limiting *i*'s altruism to where $\partial U_i / \partial R > 0$.

In either of these cases, the altruist derives utility from changes that positively effect the level of the recipient's utility, making it comparatively simple to incorporate these motives into an economic analysis based on utility maximisation. Therefore, whilst there may be practical complications involved in eliciting individual nonuse values, so long as the motivation is based on underlying self-interest these values will generally be compatible with standard economic theory. Individuals behave so as to maximise their personal utility, trading off benefits from one outcome with benefits from another so as to achieve the greatest possible welfare with limited resources. Whether utility is gained from personal consumption or from anticipated consumption by others of the current or of future generations remains a matter of personal preference which can be incorporated into utility functions. Since the environmental attributes from which nonuse benefits derive resemble public goods, they are likely to be underpriced by a market mechanism and, based on purely private incentives, supplied at less than the optimum quantity that will maximise social welfare. Public decision making based on full evaluation of nonuse values that may be associated with environmental change should therefore be able to improve society's overall welfare. Assumptions regarding the structure of utility functions may have to be altered to accommodate such nonuse values, as discussed earlier, but there is no fundamental reason why such self-interested motivations cannot be included within an economic framework. In contrast, altruistic

motivations that are independent of any self interest are not so easily incorporated into economic procedures for evaluating environmental change. Actions resulting from these motivations could *reduce* an individual's welfare, making choices 'counter-preferential' and being regarded as irrational in an economic sense.

Social Interest and Commitment

A number of motivations have been identified which may explain behaviour that appears to be to the absolute disadvantage of the individual. These are usually linked to moral and ethical issues which tend to be ignored in conventional economic analysis of individuals' preferences and behaviour. There are a number of theories similar to Sen's (1977) division of motivations into 'sympathy' and 'commitment'. For instance, Margolis (1982) suggests that individuals may have two distinct utility functions, one for self interest and another for 'group interest', which derives from a sense of community and social responsibility. Sagoff (1988) argues that individuals can act as either consumers or citizens, where citizen preferences are related to public interest and the good of the community. Other such distinctions include those between 'empathy' and 'personal norms' associated with social responsibility, equity and reciprocity (Rushton, 1980); between 'personal tastes' and 'social values' (Opalauch and Segerson, 1989); 'individual (economic) rationality' and 'social rationality' (Coughlin, 1991); and 'concern' and 'respect' (Schmidtz, 1993). The common theme running through these approaches is the possibility that individuals may act according to social interest or moral principles in addition to self-interest. The implication is that utility maximisation might not explain all forms of behaviour (Sugden, 1982). If this is the case then it challenges the normative relevance of neoclassical economics, founded as it is on the 'well behaved' preferences of the rational consumer.

The terminology relating to different forms of altruism is far from distinct with, for example, the term 'pure' altruism being used to describe forms of selfish altruism (Palfrey and Rosenthal, 1988; Jones-Lee, 1992) as well as entirely selfless behaviour (Simon, 1993). The variety of altruistic motivations that have been associated with selfish altruism (as, for instance, those outlined above) would suggest that some other terminology be adopted to describe purely selfless behaviour. The terms 'commitment' and 'social interest', derived from the previous list, are adopted here.

ASSESSING SOCIAL INTEREST

Altruistic motives underlying nonuse values which stem ultimately from self interest can be addressed directly within an economic framework. Since

NONUSE VALUES AND THE ENVIRONMENT

motivations based on commitment or social interest present a direct challenge to such economic analysis the question arises as to whether individuals do in fact ever act in a purely selfless manner, disregarding their own well-being. For instance, Darley (1991) argues that self interest is the only 'real' motivation, whilst 'pure altruism' is regarded by Hardin (1993, p. 229) as a 'fictional construct that makes analysis of real situations easier'. In an empirical setting, Lant and Roberts (1990, p. 1385) in a study of riparian wetlands, found that 'most of the respondents clearly rejected this statement [relating to rights of species and moral or ethical duties to protect those rights regardless of sacrifice] in favour of the values of public health, bequest, and existence value – values that accrue directly to people'. There are also many and varied explanations as to why seemingly self-sacrificing behaviour may in fact be self-serving, such as in helping to regulate moods of the donor, coping with stress, dealing with the discomfort at knowing of another's need, or expressing what are regarded as 'appropriate' values (in Clark, 1991).

On the other hand, there is a strong argument which holds that self satisfaction alone cannot explain all human behaviour. Having accounted for seemingly altruistic motives derived from underlying self interest, there may still remain a 'residue of purely altruistic behaviour' (Collard, 1978). Choices based on moral values may suggest that one alternative is *better* than another, rather than simply being *preferred* to another (Wilson, 1991). This contradicts traditional welfare economics theory, driving a wedge between personal choice and welfare, so that individuals may make counter-preferential choices that will not maximise personal welfare according to the preference schedule of the individual. Sagoff (1988) suggests that such behaviour can be explained in terms of individuals acting as 'citizens' rather than 'consumers'. He argues that it is citizen preferences which are relevant when assessing the allocation of public goods such as the environment, and not consumer preferences (which form the basis of environmental economics and contingent valuation methodology).

On the grounds, therefore, of social interest and commitment associated with ethical and moral imperatives, individuals may not wish to make nor accept the validity of making trade-offs between standard consumer goods (or money) and public or 'citizen' goods such as the environment. And it is argued that issues concerning the environment 'are dominated by a moral dimension' (Vatn and Bromley, 1994, p. 135). Such attitudes could be associated with social 'norms', which regulate the way in which individuals act within society. Norms may originate from institutional procedures or voluntary social contracts, or could evolve over time as a result of recurrent behaviour influencing individual preferences (Opp, 1982). Thus, norms can be culturally determined and maintained, with altruism being 'socialised' as individuals acquire the standards and values of society (Grusec, 1991). In this manner, 'prosocial' behaviour (which benefits society at the possible expense of individual gain) can be instilled in society as a gradual change and selection of culture traits over time.

It is possible that social norms could act to co-ordinate social actions in a manner that is directly beneficial to the individual. However, they could also be detrimental, not only to the individual's well-being but also to society itself (Elster, 1989). They might not, therefore, necessarily be explained simply by collective rationality being imposed upon individual self interest. Norms which guide attitudes towards the environment may be socially inefficient, as outlined by Mohr (1994), who concludes that there is only a minor, bounded role for such norms to play in influencing society's relationship with its environment. Furthermore, it would appear that altruistic behaviour, possibly deriving from social norms and codes, is frequently not sufficient to ensure the provision of public goods (Roberts, 1984) or controlled use of common property resources (Hardin, 1977).

Studies which use laboratory experiments have shown that individuals often *are* concerned with contributing to goods that are public in nature (Pommerehne, Feld and Hart, 1994). However, whilst empirical evidence suggests that contributions towards public provision tend to be greater than zero, decreasing as group size rises, there does appear to be a general temptation to 'profit from the activity of others' (Stroebe and Frey, 1982), so that contributions are invariably less than an optimal solution would require. Thus, the free-rider problem and 'tragedy of the commons' are unlikely to be fully constrained by social norms or moral codes, and it will often be in the best interests of society to intervene in areas such as open access or public goods provision. This is the rationale behind intervention in imperfectly functioning markets and the internalising of negative environmental externalities.

PREFERENCES, CHOICES AND ECONOMIC VALUATION

Whether or not social interest and commitment are sufficient to constrain pure self interest, such motivations *could* influence attitudes towards public goods such as the environment, and the way in which individuals formulate decisions in this respect. If an individual is unable or unwilling to make precise trade-offs based on personal utility, regardless of social commitments, then decisions are likely to contravene rational welfare maximisation, with the potential for counter-preferential choices being made. One approach that might lead to seemingly irrational individual choices is through the lexicographic ordering of alternative outcomes.

A lexicographic ordering may occur when an individual feels so strongly about one commodity that they make choices based purely on the quantity of that commodity, regardless of the trade off that is involved with other resources (unless the level of that commodity remains constant between alternatives, when other resources will be considered). So, for instance, the environment or specific wildlife species might represent such a commodity, limiting the possibility of

NONUSE VALUES AND THE ENVIRONMENT

trading off environmental damage against gains in other areas. Lexicographic preferences are not compatible with the individual ascribing monetary values and could, therefore, bring into question the concept of determining willingness to pay for particular environmental attributes. One example might be biodiversity, for which Spash and Hanley (1995) found evidence of lexicographic preferences, where some survey respondents were unwilling to give any amount as a trade-off and stated that the resources should be protected regardless of cost. They also found that respondents' knowledge of biodiversity issues was very limited, and suggested that such a lack of information might induce lexicographic preferences. Similarly, when information processing requirements are beyond the capability of individuals, for which environmental amenities must be prime candidates due to a lack of experience in any buying or selling of such goods (Milgrom, 1993), preferences may be structured lexicographically in order to concentrate on just one important aspect of choice (Opalauch and Segerson, 1989). Thus, information provision and interpretation may be important in eliciting values for environmental goods, and could explain some apparently irrational behaviour.

Intrinsic Value

Direct comparison and trade-offs between natural features of the environment and other resources could also be ruled out on the basis of assigning intrinsic, or inherent, value. This suggests that animals have rights, and value, of their own, regardless of the value attributed them by humans. Once again, the typology of these values is complex, with economic nonuse values also having been labelled as intrinsic value (for instance Fisher and Raucher, 1984; Green and Tunstall, 1991) and as inherent value (Brookshire, Eubanks and Sorg, 1986; Cicchetti and Wilde, 1992; Spash and Simpson, 1993). Since intrinsic value is frequently associated with ethical concepts (see, for example, Norton (1992) and O'Neill (1992) in *The Monist* special edition, 75(2), on intrinsic values in nature), the use of this term is best reserved for this arena, with 'existence value' representing the *economic* value attributed by humans to nature for its own sake. In the extreme, an ethical intrinsic value approach can be interpreted as suggesting not only that value exists independently of human assessment, but that humans do not even have a choice as to whether or not particular species or ecosystems should be protected, being subject instead to an 'obligation' to preserve (Mazzotta and Kline, 1995, p. 245).

On the basis of intrinsic values associated with the environment, Spash and Simpson (1993) suggest that important ecological sites designated as Sites of Special Scientific Interest (SSSI's) could be made immune to 'economic exploitation'. If society recognised a commitment to preserving these areas according to their intrinsic worth, this could not be compared with any alternatives, thereby making protection absolute. This is in contrast to the scenario

where preservation is based on benefits exceeding costs, when alternative circumstances in the future could tip the balance to the side of costs, suggesting a net social benefit from revoking that protection. Whilst endorsing the inclusion of such ethical arguments into the planning process, Owens (1994) regards it more as a need to 'resort' to intrinsic value theory, since such a theory is still unable to indicate how such values are to be recognised or incorporated into planning decisions. Furthermore, even if it *is* acknowledged that such intrinsic values exist, this does not necessarily imply any obligation on the part of humans (O'Neill, 1992). The preoccupation with a search for intrinsic value is regarded by Norton (1992) as having diverted efforts from other 'more important and creative work' concerning the natural world, particularly the need for philosophical discussion to address 'real environmental problems'.

ADDRESSING SOCIAL INTEREST

The crux of the debate concerning motivation and welfare maximisation as the primary goal of the individual, is how supposedly 'irrational' motives (in the economic sense), such as moral commitment or an environmental ethic, can be incorporated into the political decision making process. The existence of such motivations is often viewed as a fundamental flaw in applying economic cost-benefit analysis to inform policy making with regard to the environment. Choices that are motivated not simply by maximisation of personal welfare but by concepts that could conflict with this, such as the desire to do what is 'right' rather than what gives most personal reward, would suggest that welfare maximisation may not be the pre-eminent objective of individuals and of society.

If this is the case, then, how are alternative outcomes to be assessed in a consistent, transparent, neutral and democratic manner? Rejecting development simply because it impinges upon the environment is likely to result in excessive opportunity costs to society and may well be to the further detriment of those already disadvantaged. As Pearce (1994) emphasises, trade-offs *have* to be made. It is argued by Viscusi (1994, p. 15), in the context of comparing human fatalities with the preservation of animal species, that although a comparison between such competing values may appear unfair, 'these are in fact the tradeoffs that society is making' and that 'it is more sensible to confront these tradeoffs directly rather than to assume that they do not exist by ignoring them altogether'. Whilst Vatn and Bromley (1994) see no reason why the environment should be 'commoditised' as part of the process of determining its value or 'price', but regard each part of the system as being as valuable as the whole, parts of the environmental whole *are* being lost. Unless these can be assessed within a metric that can be compared with the returns to be made from their demise, then the practical arguments for conserving environmental systems will be so much the weaker. A fundamental cause of the 'tyranny of the status quo' to which they

NONUSE VALUES AND THE ENVIRONMENT

refer is the very fact that the loss of value to society resulting from environmental decline has *not* been made explicit. To this extent, a full cost-benefit analysis that addresses the economic value to society of non-marketed environmental attributes has an important role to play. The question, then, is how are those concerns that may not be incorporated within even such a comprehensive economic analysis to be addressed?

The behaviour of humans will necessarily affect the environment, since the economy is ultimately dependent upon the environment and the resources derived from nature. It is simply not practical to say that in all areas where an individual feels a moral or ethical commitment to preserving some component of the environment, that the environment *must* be preserved. If an environmental ethic suggests that the loss of one resource is incomparable with any other, or that compensation for loss is not possible for 'something in nature held to be morally considerable by someone' (Booth, 1994, p. 247), then who shall decide which resources are to remain and on what basis? How shall political decisions that choose between competing claims be informed? The formulation of policy decisions according to, for instance, social norms (Vatn and Bromley, 1994), moral orderings (Booth, 1994) or explicit collective judgements (Owens, 1994), does not provide a framework for assessing that which will be forgone in order to uphold these ethical and moral principles. Nor is it clear that it is morally justifiable to deny other members of society opportunities for increased welfare. It seems a more productive approach to identify ways in which alternative methodologies can be incorporated into current environmental evaluation procedures.

Combining Economics and Ethics

As Kopp (1991) concedes, welfare economics is not yet able to incorporate moral or ethical concerns that may not conform to welfare maximisation. Economic nonuse values are *not* able to address the full range of possible motivations that might be associated with altruism towards others; notably truly selfless altruism that derives from social interest or commitment. It may be possible to identify whether such motivations influence responses when willingness to pay estimates are elicited for nonuse benefits (Brookshire, Eubanks and Sorg, 1986), as illustrated by Stevens et al. (1991; 1994). However, such a procedure is unlikely to indicate what an accurate valuation figure might be, especially when protests bids are registered.

It is not clear how such motivations may be quantified, but one approach could be to create contingent valuation surveys which 'explicitly recognize different environmental philosophies so that respondents are able to express their value in ways that are acceptable to them' (Mazzotta and Kline, 1995, p. 248). Whilst results which successfully derive willingness to pay estimates would appear to indicate that individuals have resolved any internal inconsis-

encies with regard to assigning monetary values, these estimates may not represent accurate valuations due, for instance, to the inability of individuals to compare all possible outcomes or trade-offs (Stevens, More and Glass, 1993). Uncertainty deriving from the complexity of trade-offs may lead to 'ambivalence' towards alternative outcomes that the individual cannot easily reconcile (Ready, Whitehead and Blomquist, 1995). Similarly, individuals who are faced with a complex decision and conflicting feelings towards the outcome may resort to conflict resolution rather than addressing costs and benefits (Opalauch and Segerson, 1989).

It may be possible to identify multiple and more complex preference structures as a means towards incorporating ethical motivations into procedures that will inform public decision making (Edwards, 1992). For instance, on the basis that all outcomes necessarily maximise utility, Aldred (1994) suggests that the concepts of utility and welfare should be 'decoupled'. Existence value – defined such that *no* use of the resource is anticipated, whether by the individual or others of the current generation or future generations – is then defined as 'utility in the absence of welfare'. Counter-preferential choices are thus identified as utility maximising but *not* welfare maximising. If a choice improves an individual's well-being then this represents a 'use' value (including vicarious and bequest 'uses') whilst counter-preferential choices represent existence value (entirely divorced from any possible use). This implies two independent preference orderings, one of which relates to 'commitment' and is not compatible with economic evaluation. This is consistent with Sagoff's (1988) view of the individual acting as either citizen or consumer, extending the definition to suggest that when valuing the environment, individuals can act as both citizen *and* consumer.

Alternatively, Kopp (1992b) outlines an approach to modelling nonuse values based on well-being as a single, separable function of ethical (or social) concern and self-interested utility. Thus individual actions are regarded as welfare (or well-being) maximising but not necessarily utility maximising, where well-being is broadly defined to include satisfaction gained from observing (potentially counter-preferential) ethical codes. Again, there is a decoupling between the concepts of utility and welfare which, in contrast to Aldred's model, suggests the possibility of welfare in the absence of utility. Social interest or commitment are incorporated into the economic calculus with the degree of utility forgone in order to maintain ethical consistency representing the willingness to pay to maintain an ethical commitment. Such an approach is relieved of the problem of identifying suitable units where ethical concern is involved; it need not be associated only with unique resources or irreversible changes; and it does not rely upon prior information of the resource but rather knowledge of the injury imposed. It does assume that some finite willingness to pay always exists above which ethical views will be overruled. However, Kopp suggests that the alternative imposition of a 'hard', inviolable ethical constraint, which does

NONUSE VALUES AND THE ENVIRONMENT

not appear to reflect common real-world decisions, might very possibly result in no feasible solutions, thereby providing little constructive guidance for policy making.

There is the possibility, however, that economic solutions could be made subject to constraints that reflect social or ethical values but which are *not* inviolable. Approaches, such as those outlined above, which amalgamate economic and ethical concerns into a single model appear likely to be highly complex and so to face hostility both from advocates of these, often competing, concerns and from practitioners of policy appraisal. In terms of real-world decision making, an approach that maintains economic cost-benefit analysis supplemented by constraints which adhere to clear operational guidelines, may be of greater practical relevance. One such approach is that of Safe Minimum Standards (Bishop, 1978 and 1993; Crowards, 1996a).

Safe Minimum Standards

The Safe Minimum Standards (SMS) approach represents a supplement to cost-benefit analysis that can accommodate moral and ethical standpoints regarding environmental damage or conservation, and may also provide a mechanism by which some of the possible problems of the economic treatment of nonuse values can be addressed. SMS seeks to minimise maximum possible future losses by ensuring (as far as possible) the continued existence of environmental resources, with the caveat that the social costs of forgone development should not be 'unacceptable' (Bishop, 1978). It implies precaution and a presumption in favour of protecting the environment, given the uncertainties surrounding irreversible impacts and degradation beyond potential threshold levels. But it is not a strict, inviolable constraint. Determining the 'social costs' that preserving minimum standards might involve, requires a full evaluation of the costs and benefits of proposed projects. Rather than obviating the need to measure nonuse values (as proposed, for instance, by Castle and Berrens, 1993), the SMS approach can provide a mechanism for imposing ecological and moral imperatives upon an underlying economic framework of cost-benefit analysis.

Achieving a safe minimum standard of conservation entails preserving a minimum stock of a resource above some threshold level or 'critical zone' (Ciriacy-Wantrup, 1952). This approach, then, may be partially consistent with a lexicographic preference for ensuring the continued existence of a resource. With the minimum standard identified *a priori*, valuation can be applied within the framework of preservation above this standard being the preferred option. While this would not allow incorporation of lexicographic preferences as such (since no value can be attributed to preservation as opposed to loss) it will reflect the underlying premise that priority is given to observing the standard. Applying SMS would also allow existence value to be treated as a discrete variable, remaining constant for changes below the minimum standard of conservation.

Thus, nonuse values are not restricted to being a uniformly increasing function of the stock of an environmental resource.

Safe Minimum Standards provides a mechanism for incorporating moral and ethical concerns for the inheritance of future generations explicitly into decision making that affects the environment. Applying SMS as a constraint to otherwise market-based cost-benefit analysis is consistent with Page's (1991) two-tiered approach to achieving wider social goals such as sustainable development. In this sense, invoking SMS forms part of the first tier, based on society's 'generalized interests, not particular preferences of particular individuals' (Page, 1991, p. 68). This first tier then sets limits on the behaviour of individuals in the second tier and the extent to which their personal preferences, as reflected in a cost-benefit exercise, can be satisfied at the expense of other social priorities. This approach endorses economic valuation of resources to determine their relative worth to society in terms of self-interested motivations (including nonuse benefits deriving from 'selfish altruism'). However, it involves an additional socio-political process to determine whether or not the economic benefits of a development can reasonably be forgone for the sake of maintaining environmental integrity. This could involve local community participation in the decision making process, input by various stakeholder groups, central government edict, international collaboration, or some combination of measures. Such a political process will still need to consider the economic ramifications of a policy choice, but would be beyond the realm of purely economic concerns. Employing SMS would allow the second tier to determine efficient allocation and trade-offs between resources, but within bounds determined by social imperatives enshrined within the first tier, such as sustainability and equity. Furthermore, formulation of the minimum standard itself may reflect social attitudes towards risk and the extent to which society is prepared to accept the possibility of irreversible environmental damage. Thus the Precautionary Principle (O'Riordan and Jordan, 1995) may be invoked, a popular interpretation of which recommends avoidance of damage even in the absence of proof of harm, combining societal attitudes towards potential environmental damage with scientific assessment of the risks involved in maintaining a given standard, as a means of determining how 'safe' such a standard should be (Crowards, 1996b).

The introduction of SMS can acknowledge the possibility that individuals may exhibit both citizen and consumer preferences; consumer preferences influencing the allocation of resources according to market forces in the second tier, constrained by a first tier that respects citizen or community preferences regarding broader social issues. Setting in motion a political process to determine whether the benefits to society of development outweigh the wholly uncertain but potentially enormous costs to society of irreversible environmental damage, represents a constructive approach to imposing these social preferences on otherwise individual, consumer-oriented choices. In this manner, SMS could conceivably be regarded as, or could become, a type of *norm* through which

NONUSE VALUES AND THE ENVIRONMENT

society can attempt to maintain opportunities available to the future (Vatn and Bromley, 1994).

Applying SMS, therefore, has the potential to address moral and ethical concerns for the environment that individuals may harbour in their role as citizens, whilst not denying the important role of self-interested, consumer-oriented motivations in achieving an efficient allocation of resources. Citizen or community-oriented preferences that might relate to concerns for intergenerational equity and the sustainability of current activities can be actualised as bounds to the extent that markets and consumption can drive ongoing development. In order for this development to be efficient and represent an optimal allocation of resources (subject to limits set by the 'first tier'), analysis should be based on quantifying the full economic value, including economic nonuse values, that consumers derive from alternative outcomes.

Not only may SMS provide a means of supplementing cost-benefit analysis to improve the economic assessment of nonuse values and to acknowledge possible social or citizen values, but nonuse values are in turn a necessary component of assessing SMS. Estimating the *net* costs to society of forgone development (i.e. the returns to development less *all* the quantifiable benefits attributable to threatened environmental assets) will allow a more accurate evaluation of the costs to society of maintaining minimum environmental standards. Comparison of development and conservation alternatives can then aid selection of those projects expected to provide the greatest benefit to society, within the bounds set by the SMS framework to minimise future potential losses resulting from irreversible environmental degradation

CONCLUSION

A Safe Minimum Standards approach which maintains economic cost-benefit analysis intact will not satisfy all the requirements of those who reject economic assessment of the environment on moral or ethical grounds. It does, however, provide a framework for incorporating such arguments within a practical approach to policy formulation. Regardless of the debate surrounding selfish or selfless motivations, increasing demands on limited environmental resources will force policy makers to make decisions concerning development and conservation, and opportunities for current versus future well-being.

Some motives for environmental protection may be truly selfless, but this does not obviate the need to evaluate economic nonuse values which are associated with underlying self interest. Such values would appear to be an integral and significant part of the worth that society attributes to many aspects of the environment, and have been identified as a major source of benefits to be derived from the continued existence of such natural phenomena as endangered species (Bowker and Stoll, 1988) and wetlands (Lant, 1994). It appears that

threatened species as well as complex ecosystems are the subject of considerable concern, even from those who may never expect to make use of them but who nevertheless would gain satisfaction from their preservation. As a consequence, economic nonuse values are increasingly recognised as a valid component of total economic value, and are set to become an important aspect of the decision making process determining outcomes that affect the environment.

Accepting that economic nonuse values are an important facet of environmental valuation does not, however, deny the possibility of there being moral or ethical motivations that are truly selfless. Economists and ethicists have traditionally represented two opposing camps in this regard. If progress is to be made towards informing decision making to accurately reflect society's legitimate concerns, it is important that these two camps firstly understand each others' standpoint, and secondly seek ways to address the full range of issues that are raised. This paper has suggested one possible approach that might promote this process.

NOTE

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