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Contrasting Values in the Sustainability Debate: Limitations of Economic Valuations and their Role in Decision-making

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Abstract

This paper explores some of the more controversial conceptual issues surrounding ecosystem valuations in monetary terms along with their role in the greater decision-making process. I argue that there is an urgent need to be explicit about the underlying ideologies and social goals being pursued by any given policy/action. The degree in which a given policy makes trade-offs between achieving each goal should also be transparent. In the context of the sustainability debate, economic valuations of ecosystems can provide missing information necessary for achieving the goal of consumptive efficiency, but they must be accompanied by a similar "conversion" of how much economic activity contributes to the goal of ecological sustainability.

Keywords: values; sustainability debate; economic valuation; utilitarianism; decision-making; ecosystem services; monetary valuation; ideologies; social goals; consumptive efficiency; ecological sustainability; just distribution.

Biographical Notes: Andrew Fanning is currently a PhD Candidate at the University of Cádiz in Spain conducting research on sustainability metrics for Integrated Coastal Management and alternatives to growth-based economic policy. He holds a Master's in Development Economics from Dalhousie University (Canada) where he became interested in the relevance and limitations of monetary valuation methodologies through his thesis research estimating the historical impacts of climate change on the ecosystem services of a coastal lagoon in Uruguay.

1.0 Introduction

The past few decades have witnessed a growing body of literature concerned with analysing different notions of value and proposing methodologies for valuation relevant to decision-making on the uses of ecosystem services (Farber et al., 2002; de Groot et al., 2010; Spangenberg and Settele, 2010.) Ecosystem services are defined here as the benefits humans obtain from ecosystems (MA, 2005.) When it comes to the monetary valuation of ecosystems, the issue is often controversial because of formidable challenges related to valuing and then aggregating many ecosystem components – both marketed and non-marketed – to arrive at a single price that convincingly reflects (economic) value (Rothman et al., 2003). Monetary valuations of non-market ecosystem services are usually undertaken using the argument that a common metric allowing for their comparison with economic services and manufactured capital is needed in order to inform policy decisions (Costanza et al., 1997a). Meanwhile, critics of monetary valuations abound on both conceptual and methodological grounds. Among others, a major argument against ecosystem valuations is that there is a non-trivial loss of information through the process of reducing multifaceted ecosystem characteristics to a single, monetary, metric (Vatn and Bromley, 1994).

The purpose of this paper is to explore reasons for the lack of consensus on how best to account for the ecosystem services that nature provides to society (often for free.) Why is it so hard to agree on what is, or is not, sustainable? In order to get a handle on the fundamental concerns at stake, I explore some of the more controversial conceptual issues surrounding ecosystem valuations in monetary terms and their role in decision-making. Essentially, the main argument of the paper is that monetary valuations of ecosystem services can provide information relevant to the goal of efficiently allocating scarce resources according to a utility-maximizing criterion, but the results need to be viewed in a multi-criteria framework that recognizes other social goals, values, ideologies and decision criteria. The reason for the importance given here to multi-criteria decision-making is because it analyses situations common to many real-world problems, including environmental management, by explicitly considering several non-commensurable and competing criteria for which there may be no solution for satisfying all criteria simultaneously (Opricovic and Tzeng, 2004). As such, not only must the conflicting criteria be analysed explicitly, but the preferences of the decision-maker for making trade-offs among criteria become paramount and thus also need to be clearly defined.

The remainder of the paper is structured as follows. Section 2 discusses notions of value and the utilitarian underpinnings of neoclassical economics. Section 3 explores some of the conceptual limitations identified with respect to economic valuations of ecosystems. Section 4 describes a three-tiered decision structure adapted from Norton et al. (1998) useful for framing the role of ideologies in the greater decision-making process and stresses the need for multiple criteria in evaluating policies. Section 5 concludes.

2.0 Notions of Value, Utilitarianism and Neoclassical Economics

Beginning with Plato and Aristotle, the history of western philosophy has been filled with attempts to establish the role of values in questions surrounding ethics and moral judgements, such as what is morally right or wrong, good or bad, responsible or just. The value of something is classically distinguished by whether that thing is considered to have intrinsic value or extrinsic value (Zimmerman, 2010.) Intrinsic value refers to the non-derivative value ascribed to some characteristic (e.g. pleasure, sentience, or being alive, for example) for its own sake whereas extrinsic value – often termed instrumental value – is the derivative value that something holds not for its own sake but for the sake of some other

criterion to which it is related somehow (ibid.) A central debate among philosophers lies between monists who hold that all intrinsic value can be ascribed to one single criterion versus pluralists who maintain that intrinsic values can be ascribed to multiple criteria that are neither commensurate with one another nor reducible to some "higher" criterion (Schroeder, 2012.) For example, hedonism is a monistic philosophy that recognizes pleasure as the only criterion for intrinsic goodness whereas a pluralist would argue that we often face complex, conflicting choices in our moral experience whereby pleasure is but one of numerous criteria holding intrinsic value (Mason, 2011.) For the purposes of this paper, it is sufficient to recognize the importance of intrinsic value and take a stance positing that there are plural bearers of value, thus leaving aside the millennia-old question of whether or not important criteria can ultimately be reduced to one single criterion (ibid.)

Instrumental value[1] will be defined here using the widely cited definition from Costanza (2000) as "the contribution of an item to meeting a specific goal or objective". The specific goals or objectives that give rise to an item's value – whether that item is a football player, a coastal lagoon or a night's stay in a 5-star hotel – ultimately originate in societal norms and institutions – or value systems – that guide human judgements and action (Farber et al., 2002). Valuation can therefore be seen as the practice of expressing a value for a given action or thing, thus allowing for observation, measurement and some degree of comparison with other valued actions or things (ibid).

There are two important points to note from the above: i) something only has instrumental value if it is contributing to a specific social goal understood to have intrinsic value; and ii) in the presence of multiple social goals, the same item can have more or less value depending on which goal is being pursued. When expressing economic value using conventional monetary valuation methods, it is important first to be clear about the underlying goal of neoclassical economics[2] in comparison to other social goals that (logically) each have their own values.

2.1 Utilitarianism and Neoclassical Economics

Mainstream economic theory is grounded in the philosophy of utilitarianism arguing that the morally right action is the action that produces the most good for the greatest number of people (Goulder and Kennedy, 1997)[3]. Utility is understood to be a measure of relative satisfaction or pleasure leading many utilitarians to call for society to be organized so that total individual utilities are maximized (Driver, 2009). Using the definition of 'value' from the previous paragraph: *a good or service's economic value can be seen as its contribution to the goal of individual utility maximization* (Costanza, 2000). As noted above, things are only economically valuable under this definition as means towards the ultimate satisfaction of the *intrinsic* good of human well-being or utility (Goulder and Kennedy, 1997).

A long-standing challenge with the utilitarian line of reasoning as a practical means to organize society is that relative utility cannot be meaningfully measured and compared directly across people (Marshall, 1920). For example, there is no way to quantify the satisfaction I experience from spending a sunny day at the beach that permits a direct comparison with the satisfaction you experience from that same sunny day. The neoclassical economists' solution has been to measure utility indirectly using a specific set of assumptions regarding the preferences revealed when individuals are observed making choices for one good or service over another at market prices, in the presence of constraints (Farber et al.,

[1] Hereafter, "value" with no preceding adjective refers to "instrumental value" as defined by Costanza (2000).

[2] The terms "neoclassical", "conventional" and "mainstream" are used interchangeably throughout the text.

[3] Note that utilitarianism as a theory of normative ethics generally extends moral status to all sentient beings capable of experiencing pleasure and pain, whereas its application in economics is confined to humans.

2002). Using the example of my sunny day at the beach, economists assume that my utility *is* higher than yours if I, given my limited time and money, am willing to pay more than you both directly (e.g. transport and user fees) and/or indirectly through the opportunity cost of time spent at the beach not spent doing something else (e.g. working).

Neoclassical economic theory seeks to determine the optimal price of a given good in a market through the equilibrium quantity of demand and supply governed by the circular flow of exchange between households (consumers, labour) and firms (producers, employers) (Weintraub, 2007). It is based upon three central assumptions: i) people have rational preferences among outcomes; ii) individuals maximize utility and firms maximize profits; and iii) people act in their own self-interest on the basis of complete information (ibid).

Contemporary branches of mainstream economic thought concerning consumers, producers, welfare, labour, the environment, etc. are built upon these three central assumptions. When it comes to reasons why an individual with limited resources chooses good *x* over good *y* in a market, mainstream economists have had a fair degree of success. However, when it comes to society-level decisions that compromise the sustainability of ecosystem services, conventional economic models have been heavily criticized due to the simplistic behaviour of neoclassical *Homo economicus* (Persky, 1995).

3.0 Conceptual Limitations of Economic Valuations

Critiques of the assumptions of economics are not new. Indeed, Persky (1995) provides a historical account of critiques of *Homo economicus* dating back to the early 19th century. This section identifies four broad limitations related to the economic valuation of ecosystems: i) intrinsic values; ii) different forms of utilitarianism; iii) equity issues; and iv) sustainability issues.

3.1 Intrinsic Values

Some people, notably those subscribing to the "deep ecology" philosophy, feel that protecting the environment and/or other species from harm has an intrinsic value beyond the "shallow," instrumental contribution to utility it gives to the person or society doing the protecting (Fox, 1984.) Rather, it is argued that ecosystems and/or non-human species/individuals have moral standing deserving of a healthy and prosperous condition that ought to be protected independent of whether or not humans derive satisfaction from it. Of course, such recognition of intrinsic values in non-humans opens up numerous questions, not least of which would be how to rank their moral significance with respect to each other and humans. However, as Goodpaster (1978) argues persuasively, moral consideration and moral significance are two different things. One can acknowledge moral considerability for the intrinsic value of all living things with or without decreeing greater or lesser moral significance among those same living things (ibid.) An ant may be deserving of moral consideration for its own sake without making comparative statements of whether it is more or less significant than a chimpanzee, for example. At the same time, comparisons of moral significance become even more complicated between individuals and groups of species or ecosystems (Warren, 1997:16)

By acknowledging intrinsic value of non-human beings, a different social goal could be sought whereby the value in protecting an ecosystem would be measured by the contribution of that protection towards the goal of *ecological sustainability*, not utility maximization. Ecological sustainability is defined here following Callicott and Mumford (1997) as "meeting human needs without compromising ecosystem health." Most importantly, the two goals discussed so far – ecological sustainability and utility

maximization – generate different, and possibly conflicting, concepts of what policy or action would be considered "valuable" even when dealing with the same ecosystem. In fact, the argument for recognizing moral "rights" of ecosystems on par with, for example, human rights moves beyond adding up ecosystem "values" altogether and would instead base the decision-making process on whether or not such rights would be violated by various policy alternatives (Goulder and Kennedy, 1997). In this sense, similar to decisions concerning human rights violations, conventional economic analysis would have little to offer decision-makers. However, even without attributing "rights" to non-human individuals, species and/or ecosystems, being morally considerate of their intrinsic value implies that ecosystem valuations based on utilitarianism may provide relevant information on instrumental value, but it will be insufficient for ethical decision-making.

3.2 Strong and Weak Forms of Utilitarianism

Leaving aside questions of non-human intrinsic value, many ecologists and economists can agree on a utilitarian notion of value if one defines the concept of utility broadly enough to allow ecosystem services to contribute to individual satisfaction through three broad uses: i) directly (e.g. consumption, recreation); ii) indirectly (e.g. flood protection, erosion control); and iii) non-uses (simply knowing something exists) (de Groot et al., 2010). Goulder and Kennedy (1997) refer to this as a "weak" form of utilitarianism. The authors distinguish between "weak" and "strong" forms of utilitarianism in order to help explain the uneasiness many ecologists feel with respect to monetary valuation of ecosystems in cost/benefit analyses (CBA).

Essentially, the strong form of utilitarianism makes the additional assertion that the value of an ecosystem service to *society* can be obtained by adding up *individual* utility values. This strong form of utilitarianism is inherent in CBA and convenient as a means to rank aggregate net benefits to society across alternative policy options. However, it makes many people nervous when it comes to the use of poorly understood ecosystem services because it accords equal weight to all individual preferences in society when aggregating those net benefits (Goulder and Kennedy, 1997). In other words, there is an argument to be made for counting some people's preferences more than others (e.g. expert opinion, indigenous knowledge, etc.) when deciding upon human uses of highly non-linear ecosystems. Preferences are particularly likely to be ill-formed when accounting for the uncertainty of critical ecological thresholds – or tipping points – whose crossing would cause irreversible and potentially catastrophic consequences (Farber et al., 2002).

Taking the above into account, this paper supports the position that the strong utilitarianism stance implicit in CBA is not sufficient to determine a policy option that would impact a given ecosystem. Rather, as will be discussed further in section 3.4, CBA can be useful for providing information towards weighing various efficiency-related alternatives only after ecological and social criteria have been debated and established.[4]

3.3 Equity Issues

There is a long-standing debate in welfare economics surrounding the supposed trade-offs between equity and efficiency (Dinwiddy and Teal, 1996). Essentially, conventional microeconomic analysis begins with a *given* endowment among individuals and/or allocation of productive assets among firms that can potentially be re-allocated more efficiently according to some decision-making rule, usually the Pareto Criterion (ibid). A Pareto

[4] See Vatn and Bromley (1994) for a more extreme position claiming that monetary valuations of ecosystems are neither sufficient *nor* necessary for decision-making about the environment

efficient allocation is one where it is impossible to re-allocate commodities or factors of production that would make one person better off without making somebody else worse off (Varian, 2005). A less stringent criterion that forms the basis of most cost-benefit analyses is the Kaldor-Hicks "Compensation Criterion" that would re-allocate endowments/allocations as long as those who gain could *theoretically* compensate those who lose (Feldman, 1998). In either case, by accepting existing endowments/allocations as the starting point of analysis, conventional economic models are criticized for ignoring normative questions surrounding distributional justice between: i) rich and poor (equality); and ii) present and future generations (intergenerational equity) (Costanza, 1997b).

Much research has gone into the appropriate selection of social discount rate(s) for a stream of future costs and/or benefits through the expression of societal time preferences, though the issue remains highly contentious, especially for long time horizons (Gollier and Weitzman, 2010). Essentially, how social welfare ought to be weighted both within and across generations is a hotly contested ethical question that does not have a definitive answer.

At one extreme of the debate are those who advocate real discount rates equal to the private return on investment – up to 15% in developing countries – based on the logic that the net present value of a public project in a cost/benefit analysis ought to be compared to the opportunity cost of expected returns from investing in private markets (Harrison, 2010; Posner and Weisbach, 2010). At the other extreme, Weitzman (2009) argues that *negative* social discount rates of up to 100% can be justified as catastrophe insurance in his "dismal theorem" concerning low-probability, civilization-ending catastrophic events characterized by structural uncertainty (e.g. extreme climate change).

Clearly, perceptions of risk and uncertainty about the future are driving factors in the debate surrounding appropriate discount rates. The position taken here is that Weitzman (2009) provides a valuable contribution by explicitly exploring the uncertainty surrounding a future that could be considerably worse off than the present. At the very least, for the majority of CBA studies that discount all future costs and benefits at the same rate, their results are highly sensitive to that choice, so the practice of performing sensitivity analyses by employing a range of discount rates ought to be considered a minimum standard.

Moving beyond minimum standards, there is a case to be made for further research in utilizing different discount rates in a single CBA, even within a single generation, depending on: i) socio-economic status; and ii) how the project will impact the status quo. First, a single discount rate assumes that everybody in society values a future gain or loss of income equally despite evidence suggesting that marginal utility declines as income increases (Layard et al., 2008). Proponents of a single discount rate argue that it keeps the CBA objectively focused on the "efficient" criterion concerned with adding up and comparing the *total* costs and benefits to society as a whole, regardless of who gains or loses (Harrison, 2010).

A conventional alternative to the purely efficient approach to CBA is to place distributional weights on particular (usually poor) groups' benefits before discounting, though this practice is also controversial (Harberger, 1978). A different alternative, suggested by Fleurbaey and Zuber (2013), is to evaluate policies using different discount rates depending on which socio-economic groups are affected. Additionally, evidence documented by behavioural economists and reviewed by Frederick et al. (2002) suggests that the context for how a project is expected to impact the status quo will affect the discount rates of those affected in a number of "irrational" ways. Notably, gains are consistently discounted more than losses while large outcomes are discounted less than small ones – both results have clear applicability for monetary valuations of ecosystem services in CBA studies that often assume the same discount rate for costs (losses) and improvements (gains), regardless of the

magnitude of the change (Hardisty and Weber, 2009). All in all, there is considerable scope for further research addressing equity concerns within and across generations in CBA, especially by refining the use of a single discount rate.

3.4 Contrasting Views of Sustainability

Conventional economic models often imply some degree of substitution between stocks of manufacturing capital, human capital and natural capital so that the mainstream – or "weak" – criterion for sustainability rests on maintaining total *net* capital stocks, usually expressed in monetary units (Gowdy, 2000). In contrast, the "strong" sustainability perspective holds that natural capital stocks are complementary, not substitutable, and should be accounted for apart from other forms of capital (Rees, 2003). This difference in perspectives on the substitutability of natural capital is fuelled by two fundamentally distinct ways of envisioning the human economy (Daly and Farley, 2011).

The weak sustainability paradigm views the economy through the lens of the neoclassical circular flow model between households and firms whereby the exchange economy is seen as an isolated "whole." Even in more sophisticated models of the circular flow of exchange that incorporate fiscal, trade and financial flows, nothing enters or leaves the economy from the outside because, in effect, there is no outside to the model (Daly and Farley, 2011). In this view, natural capital is logically seen to be substitutable because it is grouped alongside other factors of production available to firms for producing goods.

To adherents of the strong sustainability paradigm, the economy is viewed as a "part" embedded within, and sustained by, a larger whole – namely, the planet Earth and its biosphere. Here, the economy is not isolated but rather an open system taking in and giving out both matter and energy from the larger, non-growing "Earth-system". In turn, the planet itself is not isolated either. The Earth resembles a closed system because materials do not significantly flow through it but it does take in high-quality energy from the Sun and emits low-quality energy as heat (ibid). From this viewpoint, natural capital (including ecosystem services) from the finite and sustaining Earth-system is a complement to manufacturing and human capital because the economy requires a source of materials and especially energy, as well as a sink for wastes and heat.

Both paradigms are internally consistent, yet fundamentally irreconcilable. Empirical measures of strong sustainability such as the Ecological Footprint typically report the consumption patterns of wealthy countries as the most unsustainable (Rees, 2003). At the same time, measures that correspond to the notion of weak sustainability usually report these same countries as sustainable (Arrow et al., 2004; UNU-IHDP and UNEP, 2012)[5].

The implications to be drawn from the above for monetary valuations of ecosystem services are profound. If the weak sustainability proponents are correct, then a monetary value – when taken to its logical extreme – will have to be placed on everything down to the last atom on Earth (and beyond) if we ever hope to truly "get the prices right." Meanwhile, under the strong sustainability paradigm, there is a lurking inconsistency in trying to measure parts of the biosphere that lie outside the economy using tools from a model that does not envision anything lying beyond the economy.

The position supported here shares the strong sustainability view that monetary valuations of ecosystem services are methodologically incapable of providing guidance for keeping the economy's scale within the carrying capacity of the biosphere. As Daly and Farley (2011) argue, the set of prices corresponding to a Pareto optimal allocation depends on

[5] See Wilson et al. (2007) for an interesting analysis of the conflicting results given by various global sustainable development indicators

a given endowment of resources at a given distribution. As a result, if the quantity or distribution of resources changes – by implementing resource caps or redistribution policies, for example – then the Pareto optimal set of prices will also change. Therefore, existing prices cannot be used to determine ecologically sustainable scale or distributive policies. Each goal deserves its own decision rule.

4.0 The Role of Economic Valuations in Decision-Making

From the conceptual limitations identified in the previous section, three largely independent social goals arise: i) ecological sustainability; ii) just distribution; and iii) efficient consumption (Daly, 1992). On top of these, the gargantuan costs borne by the taxpayer as a result of the recent global financial crisis have demonstrated that financial stability is clearly another major social goal. As such, it's important to be clear about the role of economic valuations of ecosystems in the greater decision-making process that must also confront ecological and social realities in our increasingly 'full' world (Costanza et al., 1997b).

Mainstream economic models of production assuming perfect substitution between capital stocks and striving for Pareto efficiency from a given endowment have little or nothing to say with respect to goals of ecological sustainability, financial stability and just distribution. In neoclassical economics, substitutability between factors of production leads to the conclusion from a Nobel Prize-winning economist that "the world can, in effect, get along without natural resources" (Solow, 1974). Of course, all models commit simplifying assumptions but it is evident that the model leading to the above conclusion is not informed by an ecological understanding of the world.

On the other hand, even if we accept perfect substitutability between factor inputs, it is difficult to imagine how the results of ecosystem valuations in the real (as opposed to financial) economy could be usefully incorporated into models relevant to decision-makers concerned with the macroeconomic goal of financial stability. From a distributional perspective, cost/benefit analyses using monetary valuations of ecosystems implicitly assume a strong utilitarian stance that is very sensitive to the normative values imputed for inequality (distributional weights) and future generations (discount rates). Thus, if monetary valuations of ecosystems are to have any role at all in decision-making, they appear best-suited to help inform decisions concerning the allocation of resources towards the goal of consuming more efficiently. While this is no small area of influence, its importance relative to other social goals will depend upon, inter alia, ideological orientations and politics governing the decision-making process (Söderbaum, 1999).

4.1 Ideological orientations and decision-making

Söderbaum (1999; 2007) discusses the need to be explicit about values and ideologies in decision-making, especially when the transformative changes required for ecologically sustainable development are being considered. In particular, he proposes that *Homo Economicus* be replaced with a more realistic individual, dubbed 'Political Economic Person', who is guided by his/her ideological orientation rather than maximizing utility. Similarly, he argues that the neoclassical profit-maximizing firm would be better conceptualized as a 'Political Economic Organization' that is guided by a number of factors other than profits, including mission statements and corporate social/environmental responsibilities. Furthermore, by focusing on Political Economic Organizations, resource allocation by other kinds of organizations besides firms (e.g. cooperatives, charities, non-profits) can be conceptualized.

Following Söderbaum (1999), ideological orientation is defined here in its broadest sense simply as 'ideas about means and ends', thus encompassing more than the established political ideologies ending in '-ism' (e.g. anarchism, environmentalism, liberalism, etc.). Political Economic Person (PEP) is an actor embedded in a network of social relationships whose roles are many and diverse including consumer, citizen, worker, parent and friend. In terms of decision-making, PEP strives to balance the multi-dimensional impacts of alternative courses of action with his/her similarly multi-faceted ideals (ibid). The following section presents a framework for conceptualizing this matching process between the recognition of problems and choice of action through the prism of each decision-maker's ideological orientation.

4.2 A three-tiered decision structure

Norton et al. (1998) describe a two-tiered approach to decision-making, consisting of interacting periods of reflection and action, that is useful for envisioning the role of cost/benefit analyses and ecosystem valuations in the greater process of human-ecological organization. In their model, the authors envision the first "reflective" tier as a step for characterizing and categorizing environmental problems by building models of ecological-economic interactions in combination with analyses of resulting impacts on social values. The output of the authors' Reflective tier is thus "a determination of the type of environmental problem that is faced, an analysis of the social values at risk, a set of goals in dealing with that problem, and a proposal that one or more of the available "action criteria" be applied" (Norton et al., 1998:195.) The second step in the Norton et al. (1998) decision-making model is the "action tier" whereby the action criteria proposed in the Reflective tier are applied to specific management situations. Importantly, the authors assume policy-making to be an iterative process, so lessons learned from the Action tier can be fed back into the Reflective tier for further deliberation and analysis. In my view, the two-tiered decision structure envisioned by Norton et al. (1998) is useful but it is argued here that there is a need to expand the model in order to better understand how complex social goals may be agreed upon (or not) in their Reflective tier. More specifically, it is proposed to divide Norton et al.'s Reflective tier into two steps in order to explicitly model the role of ideological orientations in decision-making.

Figure 1 is thus a three-tiered adaptation of the iterative Norton et al. (1998) decision model whereby the process is still assumed to cycle through the tiers many times during the search for improved well-being. In one tier, the "recognition" tier, the need for specific social goals is internalized based on past experience, current events and uncertainty regarding the future. Extreme events are important catalysts in the Recognition tier, be they environmental, social, financial or some combination thereof. The output of this tier is the conceptual identification of "problems". In another tier, the "ideological" tier, stakeholders and decision-makers (e.g. political economic people and organizations) rank alternative courses of action according to their ideological orientations or value systems. The output of this tier is an analysis and plan or proposal recommending the application of one (or more) action criteria towards solving the "problem" as perceived by the ideological orientation of each stakeholder. In a democratic system, this ideological deliberation is explicitly recognized as "value formation through public discussion" (Sen, 1995), however it bears noting that the decisions in our private lives and organizations follow the same matching process between ideals and different courses of action (Söderbaum, 1999). The final "action" tier guides decision-making and policy formulation by following specific action criteria that embody

ideological attitudes including, inter alia, cost/benefit analyses (CBA) incorporating monetary valuations of ecosystems.

The main difference between the decision model proposed here and the two-tiered Norton et al. model is that the ideological orientations of decision-makers are explicitly recognized to be important determinants of action criteria chosen. This is most relevant for the example of an iteration given by Norton et al. (1998) stating "when actions guided by a chosen action criterion lead to unwelcome consequences in a particular situation, it is possible to return to the Reflective tier and re-examine the choice of an action criterion on the basis of new evidence." This implies that the primary reason for re-examining the action criteria chosen in the Norton et al. (1998) model is when they lead to "unwelcome consequences." On top of that, however, I would argue that it is entirely possible for action criteria to be re-examined based on a change in the ideological orientation of the decision-maker (for example, a newly elected government) – even when there have not been any unwelcome, or perhaps "unforeseen" would be better, consequences. Thus, changing decision-makers with different ideological orientations – a regular feature of democracy – are not easily envisioned in the Norton model because, I would argue, their Reflective tier is too general. For this reason, the three-tiered model proposed here would agree with Söderbaum (1999) that it is better to explicitly recognize the role of ideological orientations in environmental decision-making.

4.3 Discussion

Essentially, the Recognition tier is building social consensus around the argument that unsustainable development poses a threat to other social goals – for example, the Millennium Development Goals – leading to calls for action based on ideas (Tier 2) about how to reduce environmental risks through context-specific management policies. Cost/benefit analyses that include monetary valuations of non-market impacts (Tier 3) are argued to provide decision-making criteria for choosing the "best" option among various policy alternatives based on a utilitarian weak sustainability ideology. Simultaneously, strong sustainability adherents (Tier 2) are arguing that appropriate action criteria ought to be, for example, to keep the Ecological Footprint within the carrying capacity of the biosphere (Tier 3). Most importantly, the arrows moving in both directions in Figure 1 are meant to show that it is possible to address issues of cognitive dissonance between, for example, the ideological choice of cost/benefit (or any other) decision-making criteria in the action tier based on: i) new evidence from decisions made; and/or ii) changes to the ideological orientation of decision-makers themselves.

The sustainability debate is creating some pressure in the Ideological tier to move beyond the mainstream monetary cost/benefit decision rule towards an integrated multi-criteria decision whereby monetary valuations play a role alongside ecological and social indicators. For example, the United Nations Secretary-General's High-Level Panel on Global Sustainability (2012) has clearly recommended the development of a standard set of economic, ecological and social indicators by 2014 in order to aid decision-making by explicitly measuring the multiple criteria of sustainable development uniformly across countries.

However, there are clearly a number of missing points in the dialogue leading to the very open question of whether the current sustainability debate can lead to the type of timely and large-scale action needed to avoid irreversible ecological degradation (with accompanying social, economic and financial turmoil). In this sense, the take-home message of this paper is that there is an urgent need to be explicit about the underlying social goals being pursued by any given policy/action. Most importantly, many policies are designed to

accomplish multiple social goals (e.g. 'win-win' policies) but it is imperative to recall that social goals are interpreted differently by different ideological orientations that each have distinct definitions of how any particular action is considered more or less 'valuable' (e.g. how much it contributes to the goal in question). Thus, not only must social goals be made explicit but the degree in which a given policy makes trade-offs between achieving each goal should also be transparent.

Two recent real-world examples of attempts to explicitly grapple with the trade-offs between social goals are illustrative. First, a proposal from Ecuador outlining a 3-5% levy on oil exported to developed countries was presented to members of the the Oil Producing Exporting Countries (OPEC) cartel in 2012. The "Daly-Correa tax" explicitly proposes for OPEC to combine their traditional goal of maximizing profits from monopolizing resource rents with an additional role as global fiduciary charged with the goal of efficiently collecting and ethically distributing rents due to emitting carbon dioxide from rich to poor countries (Daly, 2007). Second, also in the Andean region, both Bolivia and Ecuador have adopted national legislation related to the concept of "Buen Vivir" that adopts a rights-based approach intended to value nature and society more equally by including the intrinsic right of nature to exist and flourish (Gudynas, 2011). Clearly, there are many other instances, especially at sub-national levels, but the above examples demonstrate that there is also willingness at national levels to re-think the trade-offs between economic, environmental and social goals.

In the context of the sustainability debate, economic valuations of ecosystems can provide missing information necessary for achieving the goal of consuming efficiently (as understood by neoclassical ideology.) However, monetary valuations cannot be used to determine an ecologically sustainable scale or a just distribution, since these are exogenous variables in neoclassical analysis. In this sense, the order of policy-making makes a difference and each goal needs to be valued according to its own criteria. The position supported here agrees with Daly and Farley (2011) that policies limiting physical throughput ought to come first, followed by choices on distribution of those resources deemed usable and then, finally, market trading via the price mechanism may be used (for rival and excludable goods) to allocate resources efficiently based on the given distribution of given resources. Note that the above ordering is based on practical policy-making considerations on a finite planet as required to undertake neoclassical economic analysis and not a philosophical stance positing that ecological sustainability is somehow more valuable intrinsically than, for example, the value ascribed to utility gains from efficient allocation.

Throughput-limiting policies, such as caps on resource use or waste emission, should come first to better reflect biophysical scarcities on an increasingly full planet by adjusting the current default quantity of super-abundant resource provision and waste absorption as the exogenous "endowment" from ecosystems in neoclassical economic analyses. Next, policies governing ownership need to be implemented in order to provide the initial distribution for the newly scarce ecosystem services. Efficient allocation can then be sought via markets and the price mechanism for those newly scarce quantities of ecosystem services deemed usable by the resource/pollution cap that can be privately owned, but only after their initial endowments and distribution have been defined (ibid.) Finally, there is a need for an iterative "conversion" of how much efficiency contributes to other social goals. Examples of some of the most promising work in this regard for ecological sustainability are related to energy and emergy analyses of the economy that, unlike market-based analyses, uphold the Laws of Thermodynamics (Ayres et al., 1996; Odum, 1996; Cleveland et al. 2000, Brown et al. 2009).

5.0 Conclusion

Values play an important, often implicit, role in everyday life. In this paper, I argue that discussions surrounding monetary valuations need to be explicit about the overall goal of mainstream economic models (e.g. utility maximization). Issues surrounding intrinsic values of ecosystems, aggregation, equity, and differing sustainability paradigms were identified as limitations of economic valuations. In order to promote ecologically sustainable economic policy, information obtained via economic valuations needs to be viewed within a multi-criteria valuation process that respects ideological orientations and encompasses a variety of social goals (e.g. ecological sustainability, consumptive efficiency and just distribution, to name a few). Failure to do so not only compromises the relevance of the monetary valuation undertaken but also provides potentially misleading information to decision-makers that can have dire consequences for the environment and future generations.

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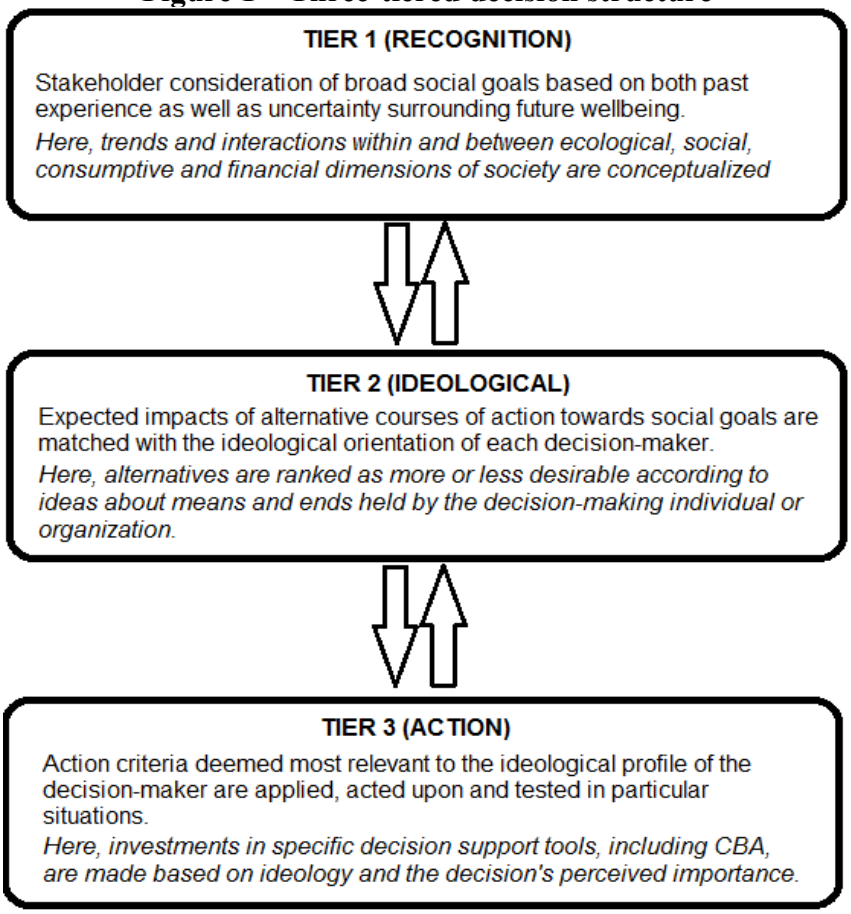
7.0 Figures

Figure 1 – Three-tiered decision structure



Source: Adapted from Norton et al. (1998)

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