Sustainability and the Fair-Sharing Principle[*]

Richard B. Howarth
Environmental Studies Program
Dartmouth College, Hanover, New Hampshire 03755
RBHowarth@Dartmouth.edu

Abstract

The term "sustainability" may be interpreted as a principle of intergenerational fairness in which the life opportunities available to a typical member of society should be maintained or enhanced over time. This essay explores the foundations of this principle and its implications for environmental policy analysis. Building on a long-standing tradition in American political thought, the essay argues that future generations are morally entitled to share in the benefits provided by environmental systems. This implies that either: (a) resource stocks should be protected and conserved; or (b) concrete steps should be taken to compensate future generations for the costs imposed by resource depletion and environmental degradation.

Introduction

In its seminal book *Our Common Future*, the World Commission on Environment and Development (WCED, 1987, p. 43) defined "sustainable development" as development that "meets present needs without compromising the ability of future generations to meet their own needs." From the outset this formulation proved controversial (Redclift, 1987). Beckerman (1994, p. 191), for example, argues that the very concept of sustainable development is "either morally repugnant or logically redundant." In Beckerman's view, good public policies should strive to maximize social welfare as gauged using the tools of cost-benefit analysis. Taken at face value, Beckerman's approach leaves no room for "sustainability" as an independent policy objective.

It is often argued that the concept of sustainability is broad and potentially vague in terms of its foundations and implications (Lele, 1991). Phrases such as "sustainable business," "sustainable buildings," and "sustainable transportation" point to practices and technologies that are believed to provide some mixture of social and environmental benefits. In such usages, however, the word "sustainable" is meaningful only to the extent that it stands in for some set of underlying principles or objectives. While this point is well-taken, Norton (2005) argues that the concept of sustainability reminds decision-makers to consider the rights and interests of future generations and the sometimes hard-to-characterize values that people hold towards the natural environment. In Norton's view, the concept can be rendered reasonably precise in many contexts through moral deliberation that strives to balance the values and perspectives of different stakeholders.

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In this essay, I shall explore how the concept of sustainability is linked to a long-standing discourse that is deeply engrained in U.S. natural resource and environmental policy. As a starting point, it is useful to consider the resource management philosophy advanced by Gifford Pinchot, the founder of the Yale School of Forestry and the first chief of the U.S. Forest Service. In his book *The Fight for Conservation*, Pinchot (1910, p. 80) argued that natural resources should be managed in a manner that

> recognizes fully the right of the present generation to use what it needs and all it needs of the natural resources now available, but [also] recognizes equally our obligation so to use what we need that our descendents shall not be deprived of what they need.

It is striking to observe how closely this text presages the definition of sustainable development adopted by the WCED a full 77 years later. Both Pinchot and the WCED emphasize the crucial role that natural resources play in satisfying human *needs* such as the pursuit of livelihoods and well-being. In addition, both statements emphasize the view that present society holds a moral duty to conserve and protect the environment. Accordingly, the use and depletion of natural resources should occur only when steps are taken to safeguard the interests of future generations.

A closely similar perspective is expressed in the writings of Thomas Jefferson, who asserted the principle that "the earth belongs in usufruct to the living" in a 1789 letter to James Madison (see Ball, 2000). The immediate focus of Jefferson's letter was the regulation of the public debt – Jefferson believed that it was morally unjust for present society to incur fiscal liabilities that would be passed on to future generations. In framing his argument, however, Jefferson appealed to an ancient principle of Roman and Anglo-Saxon law in which certain forms of environmental resources are viewed as the joint property of present and future society. The term "usufruct" entails "the right of temporary possession, use, or enjoyment of the advantages of property belonging to another, so far as may be had without causing damage or prejudice to this" (Oxford English Dictionary, 2d edition, 1989). Anticipating Pinchot and the WCED, Jefferson's aphorism implies that future generations have a moral right to share in the benefits provided by environmental resources.

Pinchot's version of the sustainability criterion is institutionalized in the multiple use and sustained yield doctrines that have guided the management of federally owned forests, rangelands, and fisheries since the turn of the 20th century. Differences of opinion exist regarding which aspects of natural systems should be conserved and on the effectiveness of federal agencies in achieving this end. The core principle, however, is embodied in a wide range of statutes, regulations, and case law decisions. The National Environmental Policy Act of 1969, for example, explicitly notes the government's duty to "fulfill the responsibilities of each generation as trustee of the environment for succeeding generations."

In the succeeding sections of this essay, I shall examine the ethical foundations of this approach and its implications for policy analysis. In line with Beckerman (1994), professional policy analysts often emphasize the use of cost-benefit techniques – a predilection that has been engrained in the policy evaluation guidelines set forth by the Office of Management and Budget since President Reagan signed Executive Order 12291 on February 17, 1981 (Smith, 1984).

Nonetheless, there are good reasons to believe that the concept of sustainability is both morally sound and, in operational terms, irreducible to the procedures of cost-benefit analysis.

Sustainability and Equal Opportunity

The definition of sustainability set forth by the WCED (1987) emphasizes the presumed *rights* of future generations. It is this feature that underlies Beckerman's (1994) critique that the pursuit of sustainability may be "morally repugnant" unless it is shown to be consistent with welfare maximization. By logical extension, Beckerman would be forced to conclude that the institutions of private property and competitive markets are legitimate because – and only because – they happen to maximize welfare. This line of reasoning leaves no room for the idea that human beings have fundamental rights such as the right to life, liberty, and the pursuit of happiness. Yet rights-based principles lie at the heart of the philosophical arguments that support both democratic governance and market economies (Locke, 1690; Buchanan, 1977).

One value that is widely accepted in democratic societies is the principle that each member of society should enjoy an equal opportunity to define and pursue her own conception of the good life. This point of view is developed most forcefully in the writings of John Rawls (1971), who envisions a society that is organized to maximize individual freedom. Freedom, however, is defined relative to entitlements, and Rawls argues that providing citizens with equal access to so-called "primary goods" (such as education and economic opportunities) is a core responsibility of government. This reasoning is conceptually tied to familiar notion that "all men are created equal" and to the Equal Protection Clause of the U.S. Constitution, which holds that "no state shall … deny to any person within its jurisdiction the equal protection of the laws."

It should be said that a commitment to equality of opportunity does *not* entail a focus on leveling the outcomes that are achieved by different members of society. From Solow (1974) to the present, economists have sometimes misinterpreted Rawls as calling for the maximization of the so-called "maximin" social welfare function, which focuses on maximizing the well-being of the worst-off member of society. Rawls' focus, however, was on opportunities as determined by access to primary goods in the context of a market-oriented, democratic society. Rawls was concerned with the definition and legitimation of rights and entitlements, not with the concept of "social welfare" as understood by economists (Rawls, 1982).

The concept of equality of opportunity leads naturally and directly to the following conception of intergenerational fairness:

> ***The Opportunity Principle*** *– The members of future generations have a moral right to inherit a set of life opportunities that is undiminished relative to those enjoyed today.*

Versions of this principle are set forth and defended by authors such as Page (1983), Howarth (1997), and Norton and Toman (1997). The key idea is that the adults and children who are alive at any point in time are contemporaries who are entitled to equal rights and entitlements. While adults have capabilities and competencies that they could exploit to maximize their own welfare at the cost of young people, exercising such power would be inconsistent with their collective moral duties. This is not to say that – based on motives such as love or altruism – today's adults

might not voluntarily sacrifice their own interests so that future generations could enjoy a better way of life. But undertaking actions that narrowed and reduced the opportunities available to future generations could not be justified on such grounds.

Gauging Opportunities

The foregoing discussion suggests that present society has a moral duty to ensure that life opportunities are sustained or enhanced from each generation to the next. In effect, this restates the WCED's (1987, p. 43) claim that "sustainability" may be defined in terms of meeting present needs "without compromising the ability of future generations to meet their own needs." This approach turns out to be a straightforward extension of the principle of equal opportunity between contemporaries. Arriving at an operational sustainability criterion, however, requires a means of measuring or characterizing life opportunities.

Authors such as Pezzey (1989) and Solow (1993) persuasively argue that an economy would be sustainable if it maintained or improved the *utility* or *welfare* of a typical member of society over intergenerational timescales. The well-being achieved by an individual of course depends substantially on the opportunities she was afforded. In this sense, experienced well-being might plausibly be used as a measure of the opportunities provided to members of future generations.

This insight is linked to an interesting and voluminous literature on the links between economic growth and environmental quality (see Neumayer, 1999). In practical applications, authors such Stern (2007) have explored how climate change mitigation strategies might affect the welfare of both present and future generations. One implication of such studies is that environmental degradation might impose large uncompensated costs on posterity (Gerlagh and Keyzer, 2001). Findings of this type of course depend on both model specification and the factual assumptions embedded in the analysis. Pessimists warn that environmental degradation poses an urgent threat to the welfare of future generations (Meadows et al., 1992). Optimists, in contrast, are confident that economic growth and technological change will lead to welfare improvements even in the face of major reductions in environmental quality (Nordhaus, 1992).

One difficulty of using utility to measure the attainment (or non-attainment) of sustainability involves the uncertainty and, perhaps, unpredictability of long-term technological, economic, and environmental trends (Funtowicz and Ravetz, 1990). A given model may confidently depict a set of plausible assumptions that reflects the considered judgment of the modeler. But models that explore the long-term links between economic and environmental systems differ dramatically in their assumptions and predictions (IPCC, 2000). The ozone hole that was discovered over Antarctica in the 1980s provides an example of an environmental impact that was dramatically inconsistent with the much smaller effects that scientists had projected to be possible using then state-of-the-art predictive models (Farman, 2001). Gauging trends in future utility is infeasible in cases where the impacts of environmental degradation cannot be predicted or the preferences of future generations are unknown. Authors such as Pearce et al. (1989) and Perrings (1991) have long argued that problems involving high degrees of uncertainty and potentially catastrophic risks therefore cannot be addressed through unidimensional sustainability indicators that focus on aggregate wealth or welfare. In such cases the information required to operationalize the stipulated indicators is simply not available.

A further problem is related to the emerging literature on the relationship between human well-being and economic growth (Easterlin, 1974; Layard, 2005). At low income levels, increases in the level of gross domestic product (GDP) per capita translate into large increases in longevity and other indicators of human flourishing. In industrialized societies, however, the substantial growth in material prosperity that has occurred since World War II has been accompanied by only slight increases in life satisfaction as measured in social surveys (Oswald, 1997). This point is relevant to the present discussion because per capita GDP is often taken as a measure of social welfare, or a starting point for the construction of adjusted indicators that account for the value of nonmarket goods and services such as environmental quality and household production (Daly and Cobb, 1989; Nordhaus and Kokkelenberg, 1999).

As Pezzey (1992) suggests, industrialized societies may be caught up in a "hedonic treadmill" in which increasing levels of affluence are required to sustain a near-constant level of well-being. Or to put this differently, a growing body of empirical evidence casts doubt on the hypothesis that human beings have stable preferences that are fixed and independent of prevailing social and economic conditions (Kahneman et al., 1999; Brekke and Howarth, 2002). Clearly affluence contributes to well-being, though this emerging literature suggests that simply adjusting standard measures of income and/or consumption to account for the value of nonmarket goods may be insufficient to measure changes in welfare over time. This paradox has led some theorists and practitioners to commence a search for alternative methodologies.

Development as Freedom

Amartya Sen's (1999) concept of "development as freedom" provides an alternative way to characterize human life opportunities that does not require analysts to measure the utility or well-being that individuals achieve. Following Rawls (1971), Sen argues that issues of distributive justice and (by extension) social and economic progress should be framed in terms of the capabilities or effective freedoms that people can attain. More concretely, a person's opportunities are defined by a multiple set of factors that include:

- Political freedoms
- Economic facilities
- Social opportunities
- Transparency guarantees
- Protective security.

These areas are set forth as complementary yet mutually distinct categories that should each be maintained or enhanced over time. If the conditions required to support substantive freedom were sustained, it follows logically that human welfare would improve over time if individuals and societies made well-informed, rational decisions. This does not, however, imply that maximizing welfare is the underlying objective of Sen's analytical approach. In fact, Sen's writings criticize the moral foundations of what he terms "welfarism" (Sen, 1979, 1987).

Sen's categories are on their face largely silent regarding the conservation of environmental resources. Of course, control over resources can be understood as a reflection of "political freedom," while natural resources undeniably contribute to "economic facilities" by supporting both the production and consumption of material goods. This last point is perhaps especially relevant in developing countries, where people's lives and livelihoods depend

disproportionately on the direct services provided by ecosystems (Millennium Ecosystem Assessment, 2005). More broadly, Sen (1999, p. ix) characterizes "worsening threats to our environment and to the sustainability of our economic and social lives" as "deprivations" that adversely affect people's welfare.

Howarth (in press; see also Sneddon et al., 2006) argues that Sen's framework can and should be extended to include environmental resources as a separate contributor to life opportunities that should be incorporated in a workable definition of "sustainability." In particular, Howarth proposes the following principle as an operational guideline for environmental policy analysis:

> ***The Fair-Sharing Principle*** *– Each member of present and future society is entitled to share fairly in the benefits derived from environmental resources. Specific stocks of environmental resources should not be depleted without rendering just compensation to members of future generations.*

The language of this principle builds on the concepts of intergenerational fairness advanced by the WCED (1987), Gifford Pinchot (1910), and Thomas Jefferson (see Ball, 2000) as discussed at the outset of this essay. The core idea is that the environment should be viewed as the shared property of present and future generations. This implies that present decision-makers should refrain from using natural resources in a manner that would impose uncompensated costs on members of future generations. Similar frameworks are described by authors such as Page (1983), Bromley (1989), Daly (1994), Norton and Toman (1997), and Brown (1998).

The Fair-Sharing Principle may be viewed as a version of the "strong sustainability" criterion that has been much-discussed in the literature (see Neumayer, 1999). This is because the principle stipulates that future generations hold a presumptive right to inherit particular environmental resources in an undiminished state. Although presumptive rights can in some cases be overridden, there are well-defined circumstances in which the only way to protect this right is to conserve and protect environmental quality.

Suppose, for example, that scientists were: (a) confident that *business-as-usual* policies would lead to climate changes in which mean global temperature would increase by 5°C in the long-term future; but (b) unable to predict the impacts of this temperature change on ecosystem functioning and human well-being due to structural gaps in scientific knowledge. Under these conditions there would be no feasible method for calculating the compensation that future generations should receive for the projected harms inflicted by climate change. The Fair-Sharing Principle would then imply that mean global temperature should be stabilized at a level that would avert the risk of imposing incompensable harms. This limit would be established based on the quality and confidence attached to scientific assessments and to decision-makers' ability to design compensation schemes (possibly involving climatic adaptation) that would function reliably over intergenerational timescales. An approach of this type is incorporated in the Framework Convention on Climate Change, which calls for limiting greenhouse gas emissions to "prevent dangerous anthropogenic interference with the climate system."

The Fair-Sharing Principle, however, is flexible enough to address the concerns raised by authors such as Solow (1993), who worries that overly stringent environmental policies might

lock up the resources needed to support both short-run economic welfare and the improvement of living standards over time. To see this, consider a strategy in which present society: (a) depleted stocks of a nonrenewable resource (crude oil) to obtain short-run economic benefits; and (b) invested in substitute technologies such as windmills, photovoltaic cells, and energy-efficient devices that would provide equivalent energy services to future generations. In this example, natural resources would be depleted, yet the overall policy regime would confer shared benefits on members of both present and future generations. In technical language this would constitute a *Pareto improvement* that might be detected using the methods of cost-benefit analysis.

The caveat is that the Fair-Sharing Principle implies a need to actually compensate future generations for the depletion of natural resources. The fact the discounted net benefits of oil depletion were positive would *not* justify the exhaustion of this resource in the absence of actions to provide suitable long-term substitutes. In this sense, the Fair-Sharing Principle is related to Buchanan's (1977) notion of "Pareto safety," which rejects the claim that policies that generate positive net benefits are socially justified even if they impose uncompensated costs on people holding prior entitlements. In addition, the Fair-Sharing Principle is linked to the Polluter-Pays Principle as described in the 1992 Rio Declaration: "the polluter should, in principle, bear the cost of pollution, with due regard to the public interest."

Conclusion

This essay has argued that the members of future generations are morally entitled to enjoy life opportunities that are undiminished relative to those available today. This claim rests on the principle of equality of opportunity that is broadly recognized in democratic societies. Following the work of Sen (1999), I have argued that sustaining opportunities requires broad attention to an array of social, political, and economic factors – especially the integrity of basic institutions and the structures necessary to provide young people with the resources and human capital necessary to lead rich, meaningful, and vibrant lives.

In contrast with Sen, this essay emphasizes the importance of conserving natural resources and environmental quality. In particular, I have defended what I term the "Fair-Sharing Principle," which holds that future generations are entitled to inherit either: (a) undiminished stocks of environmental resources; or (b) full compensation for the depletion of what is sometimes called "natural capital." The Fair-Sharing Principle can be viewed as a concept of "sustainability" that is linked to a long-standing perspective in American political thought.

In operational terms, the Fair-Sharing Principle has direct and intuitive implications for the conduct of policy analysis. It suggests a need to specifically characterize the differential impacts that natural resource depletion and environmental degradation would have on members of present and future generations. This is related to the methods of "generational accounting" that are employed in macroeconomics (see Auerbach et al., 1994). Moreover, the Fair-Sharing Principle suggests that sound environmental policies should employ mechanisms that achieve an equitable distribution of burdens and benefits over intergenerational timescales, accounting for risks and uncertainties and the deep-seated challenges involved in drawing inferences about the potential long-term impacts of present decisions.

References

Auerbach, A.J., J. Gokhale, and L.J. Kotlikoff. 1994. "Generational Accounting: A Meaningful Way to Evaluate Fiscal Policy." *Journal of Economic Perspectives* 8: 73-94.

Ball, T. 2000. "The Earth Belongs to the Living: Thomas Jefferson and the Problem of Intergenerational Relations." *Environmental Politics* 9: 61-77.

Beckerman, W. 1994. "Sustainable Development: Is It a Useful Concept?" *Environmental Values* 3: 191-209.

Brekke, K.A. and R.B. Howarth. 2002. *Status, Growth, and the Environment: Goods as Symbols in Applied Welfare Economics*. Cheltenham: Edward Elgar.

Bromley, D.W. 1989. "Entitlements, Missing Markets, and Environmental Uncertainty." *Journal of Environmental Economics and Management* 17: 181-194.

Brown, P.G. 1998. "Toward an Economics of Stewardship: The Case of Climate." *Ecological Economics* 26: 11-21.

Buchanan J. 1977. *Freedom in Constitutional Contract*. College Station: Texas A & M University Press.

Daly, H.E. 1994. "Operationalizing Sustainable Development by Investing in Natural Capital." In A.M. Jansson, M. Hammer, C. Folke, and R. Costanza, eds., *Investing in Natural Capital: The Ecological Economics Approach to Sustainability.* Washington, D.C.: Island Press.

Daly, H.E. and J.B. Cobb. 1989. *For the Common Good: Redirecting the Economy Toward Community, the Environment, and a Sustainable Future*. Boston: Beacon Press.

Easterlin, R. 1974. "Does Economic Growth Improve the Human Lot?" In P. David and M. Reder, eds., *Nations and Households in Economic Growth*. New York: Academic Press.

Farman, J. 2001. "Halocarbons, the Ozone Layer and the Precautionary Principle." In P. Harremoës et al., eds., *Late Lessons from Early Warnings: The Precautionary Principle 1896-2000.* Copenhagen: European Environmental Agency.

Funtowicz, S.O. and J.R. Ravetz. 1990. *Uncertainty and Quality in Science for Policy*. Dordrecht: Kluwer.

Gerlagh, R. and M.A. Keyzer. 2001. "Sustainability and the Intergenerational Distribution of Natural Resource Entitlements." *Journal of Public Economics* 79: 315-341.

Howarth, R.B. 1997. "Sustainability as Opportunity." *Land Economics* 73: 569-579.

Howarth, R.B. In press. "Towards an Operational Sustainability Criterion." *Ecological Economics* (forthcoming).

Intergovernmental Panel on Climate Change (IPCC). 2000. *Special Report on Emissions Scenarios*. New York: Cambridge University Press.

Kahneman, D., E. Diener, and N. Schwarz, eds. 1999. *Well-Being: The Foundations of Hedonic Psychology*. New York: Russell Sage Foundation.

Layard, R. 2005. *Happiness: Lessons from a New Science*. London: Penguin.

Lele, S.M. 1991. “Sustainable Development: A Critical Review.” *World Development* 19: 607-621.

Locke, J. 1690. *Two Treatises of Government*. London: Awnsham Churchill.

Meadows, D.H., D.L. Meadows, and J. Randers. 1992. *Beyond the Limits: Envisioning a Sustainable Future*. Post Mills, Vermont: Chelsea Green Publishing.

Millennium Ecosystem Assessment. 2005. *Ecosystems and Human Well-Being: Synthesis.* Washington, D.C.: Island Press.

Neumayer, E. 1999. *Weak Versus Strong Sustainability: Exploring the Limits of Two Opposing Paradigms.* Cheltenham: Edward Elgar.

Nordhaus, W.D. 1992. “Lethal Model 2: The Limits to Growth Revisited.” *Brookings Papers on Economic Activity* 1992(2): 1-43.

Nordhaus, W.D. and E. Kokkelenberg, eds. 1999. *Nature’s Numbers: Expanding the National Accounts to Include the Environment*. Washington, D.C.: National Academy Press.

Norton, B.G. 2005. *Sustainability: A Philosophy of Adaptive Ecosystem Management*. Chicago: University of Chicago Press.

Norton, B.G. and M.A. Toman. 1997. “Sustainability: Ecological and Economic Perspectives.” *Land Economics* 73: 553-568.

Oswald, A.J. 1997. “Happiness and Economic Performance.” *Economic Journal* 107: 1815-1831.

Page, T. 1983. “Intergenerational Justice as Opportunity.” In D. MacLean and P.G. Brown, eds., *Energy and the Future*. Totowa, New Jersey: Rowman and Littlefield.

Pearce, D.W., A. Markandya, and E.B. Barbier. 1989. *Blueprint for a Green Economy*. London: Earthscan.

Perrings, C. 1991. “Reserved Rationality and the Precautionary Principle: Technological Change, Time and Uncertainty in Environmental Decision Making.” In R. Costanza, ed., *Ecological Economics: The Science and Management of Sustainability*. New York: Columbia University Press.

Pezzey, J. 1989. *Economics Analysis of Sustainable Growth and Sustainable Development*. Washington, D.C.: The World Bank.

Pezzey, J. 1992. “Sustainability: An Interdisciplinary Guide.” *Environmental Values* 1: 321-62.

Pinchot, G. 1910. *The Fight for Conservation*. New York: Doubleday, Page and Company.

Rawls, J. 1971. *A Theory of Justice*. Cambridge, Massachusetts: Belknap Press.

Rawls, J. 1982. “Social Unity and Primary Goods.” In A. Sen and B. Williams, eds., *Utilitarianism and Beyond.* Cambridge: Cambridge University Press.

Redclift, M. 1987. *Sustainable Development: Exploring the Contradictions*. London: Routledge.

Sen, A.K. 1979. “Utilitarianism and Welfarism.” *Journal of Philosophy* 9: 463-489.

Sen, A.K. 1987. *On Ethics and Economics*. Oxford: Blackwell.

Sen, A.K. 1999. *Development as Freedom*. New York: Knopf.

Smith, V.K., ed. 1984. *Environmental Policy under Reagan's Executive Order: The Role of Benefit-Cost Analysis*. Chapel Hill: University of North Carolina Press.

Sneddon, C., R.B. Howarth, and R.B. Norgaard. 2006. "Sustainable Development in a Post-Brundtland World." *Ecological Economics* 57: 253-268.

Solow, R.M. 1974. "Intergenerational Equity and Exhaustible Resources." *Review of Economic Studies* (symposium issue): 29-45.

Solow, 1993. "Sustainability: An Economist's Perspective." In R. Dorfman and N.S. Dorfman, eds., *Economics of the Environment.* New York: Norton.

Stern, N. 2007. *The Economics of Climate Change*. Cambridge: Cambridge University Press.

World Commission on Environment and Development (WCED). 1987. *Our Common Future*. New York: Oxford University Press.