

Editorial

Sustainability and collapse: What can economics bring to the debate?

1. Past societies as a laboratory for studying global environmental change

The past decade has seen a virtual explosion of research in the study of the long-run sustainability of entire cultures. Tainter's (1988) book *The Collapse of Complex Societies* spurred interest in the complex relationship among environmental degradation, technology, and cultural behavioral patterns. Popular books by Bahn and Flenley (1992), Kirch (2000), Ponting (1991) and others introduced a wide audience to the relevance of the evolution of past societies to the understanding of the vulnerability of the current world socio-economic system. The most thorough contribution to date is the recent book by Diamond (2005), *Collapse: How Societies Choose to Fail or Succeed*. Diamond gives a wealth of information about societies that failed to achieve a sustainable relationship between human needs and ecosystem functions (The Anasazi, Easter Islanders, the Classic Maya, and the Greenland Norse). These cases have been well-documented before by Diamond and others. But his latest work also provides details of lesser known societies that managed to strike a balance between the exploitation of nature and the resiliency of the ecosystems that support human activity (The New Guinea Highlands, Tikopia, and Tokugawa Japan). The growing body of archaeological data about societies that succeeded in achieving sustainability offers the opportunity to develop testable hypotheses about factors contributing to the success or failure of entire cultures. We now have evidence from a variety of cultures that inhabited local environments with varying degrees of resilience to human induced change. These cultures faced the same basic environmental and social challenges that we currently face, but now the scale is global, not local.

Diamond's thesis is that five factors largely determine the direction of human civilizations: (1) human-induced environmental damage, (2) climate change, (3) hostile neighbors, (4) friendly trade partners, and (5) the society's response to its environmental problems. These factors are interrelated, sometimes in obvious ways and sometimes very subtly. For social scientists the most

important of these factors for policy and research on global environmental change is the last one. Regarding societal response to environmental change, a key question is left unanswered by Diamond's opus: What are the social selection pressures leading to sustainable or unsustainable behavior? Case studies of the successes and failures of a variety of cultures provide a rich source of information leading to more specific sub-questions. Why did the behavior of Easter Islanders lead to a population explosion from a few dozen people to perhaps 15,000 in a few hundred years, and then to a sudden collapse? How were the Tikopians able to establish a sustainable society of about 1000 people that lasted 3000 yr? A deeper understanding of our own prospects for sustainability requires not only identifying critical factors, but also an understanding of the interplay between social institutions, dominant cultural myths, and responses to environmental stress.

2. Generalized Darwinism as a method for studying the human dimensions of global change

A framework for analyzing the questions raised by Diamond is provided in another recent book, Richerson and Boyd's (2005) *Not by Genes Alone: How Culture Transformed Human Evolution*. Two relevant insights of Richerson and Boyd are: (1) culture is an ultimate cause of human behavior, and (2) culture is best understood using the approach of "generalized Darwinism". Generalized Darwinism has been championed in economics by Hodgson and Knudsen (2004). They argue that in studying the evolution of socio-economic systems there is no alternative to the core Darwinian principles of variation, selection, and inheritance. Other proposed analytical frameworks such as self-organization or Lamarckian evolution must logically fall under the umbrella of generalized Darwinism. It is also true that this framework is incomplete. Also needed is an understanding of the specific details of how the Darwinian mechanism works to select particular patterns of human behavior. This approach offers a framework to examine

the role of individual behavior and individual incentives promoting or hindering sustainability.

Studies of cultural evolution have been bedeviled by the conflict between methodological individualism and methodological collectivism. In economics this has led to “either/or” approaches that try to explain macroeconomic phenomena solely by applying tools developed for individual and firms, or by building macroeconomic models that ignore the heterogeneous nature of aggregate concepts like capital, labor, and natural resources. Contemporary Darwinism was designed to integrate levels of analysis—genes, individuals, and populations—and is wholly appropriate to analyze the relationships between individual behavior, cultural norms, and environmental sustainability. The evolution of cultural traits, like the evolution of biological organisms, is explained by the process of variation, selection, and inheritance of those traits.

In human cultures, with elaborate systems of rewards and punishments, almost *any* kind of behavior can be selected (Boyd and Richerson, 1992). In the case of Easter Island, intense competition between competing groups led to an intensification of behavior that resulted in the complete deforestation of the island and social collapse. Tikopians, on the other hand, adopted a pattern of behavior that led to zero population growth and environmentally sound management of their island’s natural resources. How were these disparate patterns of individual behavior selected by these two cultures? Generalized Darwinism can provide a basic framework for identifying mechanisms of selection and retention of (un)sustainable patterns of individual behavior. Rewards and punishments are used in all human cultures to pass on traits that are culturally desirable in the short run but may be disastrous in the end. What are the mechanisms for the transmission of patterns of behavior toward the use of environment and how can these patterns be modified in our own culture to insure sustainability?

3. Individual behavior and sustainability: a research agenda

A key contribution of economics to social analysis is the observation that individual incentives are a key to understanding behavior. Unfortunately, contemporary economic policy is dominated by a model of human response to incentives embodied in “rational economic man.” In this view, all humans are self-regarding, narrowly rational calculators who respond in predictable ways to monetary incentives. Although cultural differences influence “tastes”, the *way* people choose (embodied in the axioms of consumer choice) is the same for all individuals so that cultural context can be ignored. Not surprisingly, a growing body of evidence

shows this view of human nature to be simplistic and inadequate as a predictor of individual behavior (Camerer et al., 2004; Henrich et al., 2001). Individual behavior, including how people respond to various incentives, is culturally conditioned and highly variable. Furthermore, in terms of social welfare, there is nothing “optimal”, economic or otherwise, about the outcome of uncoordinated individual actions. Humans respond to incentives rooted in economic conditions, social mores, and individual life experiences. These incentives may or may not promote sustainable behavior.

Economics became the “Queen of the Social Sciences” by focusing on individual incentives as the driving force in economic processes. In recent decades a restrictive interpretation of this insight has narrowed the policy focus of most economists on monetary incentives and on increasing GDP as the only means of promoting social welfare. But there is much to be gained by returning to the basic principles established by classical economists from Adam Smith onward, that is, people respond to incentives, generally act in their own best interests, and that the objective of public policy should be promoting the greatest good for the greatest number (Gowdy, 2004, 2005; Gowdy and Erickson, 2005). What does all this mean for sustainability research? The sustainability of human societies ultimately depends upon the behavior of individuals. Individual behavior depends in turn on values selected according to the general Darwinian principles of variation, selection, and inheritance. Regarding variation, we know that human behavior is remarkably variable, and that almost any kind of behavior can be selected by systems of rewards and punishment (Boyd and Richerson, 1992). With the growing body of information about the social, economic, and ecological evolution of past societies, we cannot only identify sustainable and unsustainable behavioral patterns, but also the mechanisms through which these patterns are selected and propagated.

A basic problem for sustainability research is to identify the mechanisms by which environmentally relevant behavior is selected by rewards and punishments. We can then explore the policy options available to make individual behavior more sustainable. Traditional economic policies rely almost exclusively on monetary incentives: pay people for doing good, and make people pay for doing bad. A growing body of research shows that, in fact, monetary incentives may have the effect of crowding out civic virtues. For example, when the Red Cross tried to increase blood donations by paying donors, the number of donations fell sharply (Titmuss, 1971). Frey and Oberholzer-Gee (1997) found that willingness to accept a low-level radioactive waste site in a Swiss community was actually lower if monetary compensation was offered. If no compensation was offered, about 50% of the residents were willing to accept the site. When compensation was

offered the acceptance rate dropped to 25%. Frey and Jegen (2001) argue that monetary incentives “crowd out” public virtue and intrinsic motivation. When formulating policies to protect or increase public goods, such as environmental sustainability, appealing to altruistic motives and social responsibility may be a much more effective and socially acceptable strategy than relying on market mechanisms (Frey, 1997).

This is not to say that economic incentives are unimportant or that “perverse” incentives falling under the rubric of information, intervention, and other market failures should not be corrected (Lambin, 2005). Much of the current devastation of the world’s forests and fisheries is driven by government subsidies. But correcting market prices for “externalities” is not enough. Economists have known for a long time that it may be economically “rational” to destroy an environmental resource (Clark et al., 1979). Beyond that, contemporary behavioral economics indicates that reliance on market instruments alone is a poor guide for sustainability policies (Bowles and Gintis, 2002; Gowdy, 2005).

Global sustainability research now has a large cross-cultural data base to work with in terms of past cultures (Diamond, 2005; Kirch, 2000), diverse contemporary societies (Henrich et al.) and behavioral patterns relating to well-being (Frey and Stutzer, 2002). We also have a general method to approach the problem in generalized Darwinism, and basic concepts from economics to examine individual behavior in a social context. Sustainability research can now be based on a realistic view of human psychology, a return to the roots of welfare economics (“the greatest good for the greatest number”), and a concern with genuine human well-being rather than an ideological glorification of market consumption.

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