

Book Review for *Ecological Indicators*

The Road to Sustainability, GDP and future generations

By Pulselli, F.M., Bastianoni, S., Marchettini, N. Tiezzi, E.

This book presents the authors' perspective on the complex and important topic of sustainability. Sustainability is the central issue confronting the world in the 21st century. The difficult problem at the core of this issue is summarized in the question, "How can we maintain prosperous and vital human societies throughout the world both now and in the future in the face of finite resources and environmental limits?" The authors' present historical and scientific perspectives on this issue primarily drawing on ideas from ecological economics. The book includes two practical examples of sustainability analyses applied to the Italian Provinces of Modena and Rimini. Indeed, the impetus for these studies was derived from the forward looking managers of these provinces, who were seeking new perspectives to guide regional development in the future.

The book includes an insightful preface written by Herman Daly, who succinctly outlines a case for changing the way society views environmental resources, human knowledge, and financial institutions to open the way toward a sustainable future. Daly identifies the underlying reason for the current exigency in addressing issues of sustainability, i.e., "The economy is a subsystem of the finite biosphere that supports it." Furthermore, when economic activities become so great that the finite support capacities of the environment are diminished more than the economic gains realized, economic growth becomes "uneconomic". To account for such changes, he proposes that the standard measure of economic activity, Gross Domestic Product (GDP), be modified to account for "uneconomic" human activities through calculating another index, the Index of Sustainable Economic Welfare (ISEW). This index is the primary tool used to evaluate regional sustainability in the two case studies presented in the book.

The book includes 12 chapters organized into three parts: I Foundations, II Methods, and III Applications. The authors' use history, philosophy, and science to set the stage for the book's central premise which is that GDP is not the measure to guide sustainable economic development. The authors' stories are entertaining and the language sometimes borders on the poetic, but everyone may not agree with some of the conclusions drawn from their observations. Nevertheless, they convincingly demonstrate that the GDP measure leaves out many things that are important for sustainability. Chapter 2, "Economic and Environmental Sensibility," reviews the rise of environmental consciousness over the last 50 years focusing on humanity's rising awareness and understanding of the consequences of excess CO₂ produced by industrial societies and the climate change that is occurring as a result. The evidence for economic effects on the environment is presented in this chapter and some commentaries are examined. The development of ecological economic thought is briefly traced and Herman Day's role as a central thinker in this discipline is emphasized. The foundations of sustainability are considered in Chapter 3. The current conflicting definitions and views of sustainability prevalent in society are mentioned and three pillars for understanding sustainability are presented. They identify the foundations of sustainability as being biophysical and propose that time, biophysical limits, and relationships are the three pillars that support sustainability. This chapter puts forward a thermodynamic perspective on sustainability and quotes extensively from the work of Enzo Tiezzi. His original and insightful thoughts are worthy of much consideration in helping us to understand the nature

of what is sustainable. The following quote captures the attitude needed to solve the difficult question posed above.

“I am an incurable optimist but my optimism does not come from the type of ignorance which induces people to say that nature is great and strong and can withstand man’s onslaught. Nor is it based on a shallow hope of some technological miracle. It is based on the conviction that man has the capacity to make the right decisions to get himself out of this dilemma.”

“The End of Time,” E. Tiezzi, WIT Press, Southampton, 2003,

Tiezzi’s philosophy on how to meet the difficult problems of our age is one that we should all emulate.

Chapter 4 examines the role of the commons, knowledge, and nature in the sustainable management of resources. This chapter points out that sustainability can not be adequately addressed by simply attributing economic value to environmental resources. The authors state that the values attributed do not reflect the real value of a resource, because markets ignore the noneconomic functions of the resources within ecosystems. Herman Daly’s perspectives on human knowledge and nature and how these resources can be best managed are presented in this section. On the one hand, Daly proposes that knowledge, an inherently non-rival good, be made non-excludible, i.e., patent law, copyrights, etc., would be harder to get and limited in number and compensation to authors and inventors would be provided another way. On the other hand, the products and services of nature may be rival or non-rival depending on the circumstances, but at present they are often non-excludible giving rise to “the tragedy of the commons” or overuse and unsustainability. He suggests that it makes sense for the rival goods from nature to be excludible or enclosed within the domain of markets to avoid over exploitation. His logic for making knowledge a non-excludible resource is that if it is excludible this non-rival resource gives rise to “a self-inflicted scarcity.” The chapter concludes by considering some market instruments that may be helpful in managing the commons, particularly cap-and-trade systems.

Chapter 5 examines the thermodynamic basis for economic systems through the device of two extreme systems, autarky and globalization. The thermodynamic similarity between ecological and human systems is examined. The present trend toward globalization is seen as untenable from a thermodynamic point of view, due to the increasing energy and material demands made upon finite sources, as well as, the accumulation of waste gases that decrease the rate of loss of energy from the earth. Globalization is also examined from an ecological perspective (colonization versus climax system designs) and from a socio-political perspective, where it is found to lead to inequalities in the exchange and distribution of wealth, poverty, and the absence of democracy.

Chapters 6 and 7 complete Part I of the book. Chapter 6 uses a device modeled on the movie “Cube” to explore and illustrate the condition of economics in the changing world system today. Economic systems are characterized as the combination of a contrived rational system of laws, regulations, and principles with a vital dynamic human component characterized by free will, personality, emotions, and customs. This combination of the sometimes irrational with the rational into a single system has led to the condition where the instruments of economic thought are inadequate to deal with the rapidly changing complex socio-economic context in which we live. This thesis is explored through a thought exercise using the “Cube.” Chapter 7 explores the development of the transdisciplinary field of ecological economics.

The second part of the book includes two chapters that examine methods for measuring sustainability. Chapter 8 briefly considers several methods that have been applied to assess sustainability or to organize research on sustainability. In Chapter 8 the authors give a list of criteria for indices that are useful in assessing sustainability. The Drivers, Pressures, State, Impact, Response Model used by the OECD is described as a framework for organizing environmental information in a form useful to managers. The authors rightly point out that essentially no modern human system is sustainable as it exists today. Therefore, they propose that what we are really trying to do is to measure the degree of our unsustainability, i.e., how far are we from the ideal and how can we improve our present performance. Another important point discussed in this chapter is that sustainability is an extensive problem, and thus it can not be solved by increasing the efficiency of resource use, but only by decreasing the quantities of the finite energy and materials used. In the remainder of the chapter several methods used to examine sustainability of systems are presented and discussed, including ecological footprint, energy evaluation, and the inventory of greenhouse gases provided by the International Panel on Climate Change (IPCC). Chapter 9 gives an in depth discussion of the ISEW, which is the primary tool used to assess sustainability in the case studies of Modena and Rimini Provinces. The ISEW corrects certain aspects of the GDP measure of economic activity by accounting for social cost due to pollution of the water and air, long-term environmental damage, defensive private expenditures on health care and education, and deterioration of renewable and depletion of nonrenewable natural resources. In addition, it adds in the value of unpaid domestic work as a component of welfare.

The third and final section of the book presents two case studies of the sustainability of the Provinces of Modena and Rimini. The calculation of the ISEW is explained for each component in the expression for both Provinces. In both cases the ISEW followed the general trend of the Gross Regional Product (GRP) with the ISEW of Modena falling below the GRP in the mid-1970s, whereas in Rimini this point did not occur until the late 1980s. For Modena the interaction between the growing regional economy and the environment has resulted in declining environmental health, which is not measured by the economic indices. For this reason the Province administrators decided to use other methods such as energy analysis, ecological footprint and green house gas inventory, along with the ISEW to better assess the overall condition of the Province and to plan for the future. Chapter 12 concludes the book with a comparison of ISEW with ecological footprint analysis in an attempt to identify thresholds of sustainability. This chapter also includes a brief discussion of energy analysis and a comparison of energy evaluations of the Province of Modena at two separate times with results obtained from the ISEW. This comparative analysis showed that the intensity of resource use in the province increased from 1997 to 2003 more rapidly than the benefits of economic growth. True welfare as measured by the ISEW is costing more and more in terms of the energy of material and energy resources.

The conclusion is a fanciful peek into a possible future, ostensibly one where the principles espoused in this book have been applied. In the end it is the application of democratic principles and the forward thinking and hopeful attitude described by Tiezzi earlier in the book that has brought humanity through the storms of unsustainability to a stable and prosperous future. This book is an interesting and thoughtful look at a complex problem. It is well-written and deserves to be read by all those interested in this important subject.

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