

Emergy Accounting, Environmental Debt, and Sustainability

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Perhaps the greatest challenge confronting global civilization in the 21st century is to develop methods to assign fair value to the work that ecosystems do to support the socioeconomic activities of humanity. The well-being and indeed the survival of every person on Earth may depend on the ability of today's thinkers to find viable solutions to this problem. The concept of "ecosystem services" has been proposed to value the contributions of ecosystems to society. In this talk, an alternative perspective is presented; a solution is proposed and demonstrated with a practical example. Environmental accounting using emergy provides a unified, self-consistent method to value the products and services of the environment, economy, and society in terms of the available energy used in the past to create them. Emergy accounting provides the mechanism for unified bookkeeping so that the revenues and expenses, as well as the assets and liabilities of the environment, economy, and society can be recorded on the same income statement and balance sheet. The determination of value using an accounting method gives rise to the concept of environmental debt, which frames the problem of sustainability. Human activities and impacts on the environment are seen and evaluated as debts that accrue interest and must be paid back for the system to remain viable. The bottom line of the unified emergy-monetary balance sheet is a direct measure of the sustainability of any human enterprise.

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