

Penn Academics – Definition of Sustainability in Academics

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Penn's scholarship in environmental sustainability is equal to any university in the nation, yet all too often there is confusion about what it means to teach "sustainability." To help define what is being discussed, explored, and taught on in our classrooms, labs, and research seminars, the Academics Subcommittee of Penn's *Environmental Sustainability Advisory Committee (ESAC)* drafted the following working definition.

Comments are welcome to sustainability@upenn.edu.

Context and Purpose of this Document

This document is intended to create a working definition of sustainability in academics at Penn, to help define and support ongoing research, scholarship, and teaching, and to encourage more activity among students and faculty.

Our species' impact on the planet extends through more than 200,000 years of human habitation, blurring (or erasing) distinctions between natural and man-made environments. Even places considered today to be pristine show evidence of this impact – an impact that is accelerating with exponential population growth and corresponding resource consumption. These effects characterize the Anthropocene, in which geologically significant processes are acutely altered by human activities in ways not seen in prior ages.

Faculty in each of Penn's twelve schools are actively engaged in the emerging issues of the Anthropocene. The approach to sustainability scholarship at Penn extends far beyond simply reducing the man's negative impacts on the natural environment: it also embraces economic efficiency and social equity. These three pillars – often referred to as the triple bottom line – incorporate concepts essential to understanding 21st century environmental and societal challenges. Each of the aspects of sustainability outlined below can be examined at scales ranging from individual actions to policies undertaken at corporate, institutional, governmental and international levels.

Reduce Negative Environment Impacts. Sustainability's environmental component refers to human actions and their impact on the natural environment, how environmental systems are altered by human actions, and how humans predict and adapt to these changes. The study of natural systems, independent of human impacts, is essential to understanding sustainability, and is encompassed by the related and distinct academic fields of the natural and earth sciences, including chemistry, physics, biology, geology, climatology, hydrology, ecology, etc.

Sustainability in this context requires:

- an understanding of how the earth and life have changed over previous epochs, and an appreciation of earth time scales;
- systems thinking, and the ability to apply concepts such as ecosystem intricacy, complexity, limits, feedback, scale, amplification, resiliency, evolution, behavior, and predictive modeling;
- the ability to make and evaluate qualitative judgements; and
- proficiency with quantitative data to measure system change.

Increase Economic Efficiency. Sustainability in business, commerce, and economics includes two aspects: energy and resource efficiency, and viable, supportable consumption. A sustainable economic system is one that:

- extracts natural resources at rates that do not surpass our capacity to discover replacement or substitute resources, or the capacity of natural systems to renew them;
- re-uses, conserves, and optimizes those resources as much as possible; and
- recycles waste products of human activity or disposes of them at rates and in ways that do not exceed the capacity of natural systems to assimilate and neutralize those wastes.

Promote Social Justice. We understand our place in the world through the prisms of our religious beliefs, moral values, cultural practices, and our traditions, languages, arts, design, and media. Principles of sustainability are bound inextricably to traditions of thought and habit, how we inhabit our inherited landscapes, our ability to work together and with members of other cultures, and the stories we tell about our past, present, and futures. A world

where different sets of societies experience dramatic variation of standards of living and security, political stability, and access to resources, health care, and education cannot be said to be sustainable.

Because societies are increasingly complex and pluralistic, sustainability depends on the ability to understand and reconcile multiple perspectives. Sustainable social systems provide for an equitable and durable distribution of a society's benefits among all of its members.

Applied sustainability thinking is both value- and outcome-oriented, and encompasses history, anthropology, literature, design, engineering, fabrication, and planning. In this context, sustainability predicates a favorable future that is predictable and a result of actions taken or not taken, with a desire and intent to:

- maintain and preserve a productive and fulfilling human/natural relationship;
- restore damage to this relationship and prevent further degradation; and/or
- design or create a more satisfying and accommodating future.