

Interaction of Economic and Natural Systems

Although it may appear self-evident, the actual recognition of how the (human) economic system and natural systems interact is important to promote more sustainable policies. Traditionally, in classical economics the economic system was perceived to operate outside of any natural system constraints; any required economic input was identified by its economic value according to laws of supply and demand and was assumed to be perfectly substitutable. If the supply of something became scarce, its price would soar and the market, together with new technology, would find a substitute. By this line of reasoning and market economics, it was perfectly okay to hunt the beaver to near extinction because there could be another animal skin pelt substitute to replace it.

Or conversely, if the supply of something were abundant and its price were low, it is perfectly rational and acceptable to consume that resource in the process of producing something more economically valuable. This is presently the situation, upsetting to a number of people, with the production of oil from tar sands in Canada. To obtain a more economically valuable petroleum product, large amounts of natural gas, a uniquely valuable resource for the long-term, are being consumed because of its low current market value.

The problem, then, with classical economics is that nothing has any inherent value other than its current market value; and the practice of discounting the future provides further disincentives for sustaining anything for the future. Furthermore, the economic cost of producing an item is sometimes less than the true cost because “external costs”, such as the costs of pollution to society resulting from the producing the item, are not included.¹

In earlier times, when global population and consumption were limited, these systematic deficiencies could perhaps be overlooked. Now, however, as global population reaches eight billion and beyond and as standards of living are increasing for a global population, the survival of much of life itself and the quality of life will be dependent upon a clear understanding of how the economic system and natural system interact at many geographic scales, ranging from local to global. The figure below denotes the general conceptual interaction. From the standpoint of sustainability, it is important to recognize that the economic system does not operate in a vacuum; it is dependent upon the natural system and there are important feedback impacts between the two. (A detailed discussion of this interaction is presented in the writing by Muschett entitled “An Integrated Approach to Sustainable Development” found elsewhere on this website).

A new alternative vision of economics is emerging: ecological economics which envisions the economic system as operating within and not apart from the natural system and seeks to make the science of economics more responsive and sustainable. (For additional information contact the International Society of Ecological Economics).

¹ This discrepancy leads to an “uneven playing field” and distortions in the marketplace. For example, the cost of electricity generated from fossil fuels has traditionally had a competitive advantage over renewable solar and wind electricity because the costs of climate change resulting from the use of fossil fuels are not included.

Interaction of Economic and Natural Systems: Up Close and Personal

Because the demands of the economic system can place severe impacts upon the natural system, including the depletion of natural resources, severe generation of pollution and greenhouse gases, loss of habitat and the extinction of species, it is important that consumer lifestyles reflect an environmental ethic including:

- (1) a better appreciation and understanding of the interconnectedness of all life
- (2) a reduction in unneeded and unsatisfying material consumption
- (3) more widespread and creative practices of waste reduction, including reusing and recycling and composting of food wastes (which reduces the landfill generation of the extremely potent greenhouse gas methane)
- (4) increasing utilization of energy efficiency improvements for households and transportation
- (5) trying to respect Ecosystem Integrity and Environmental Limits as noted previously.

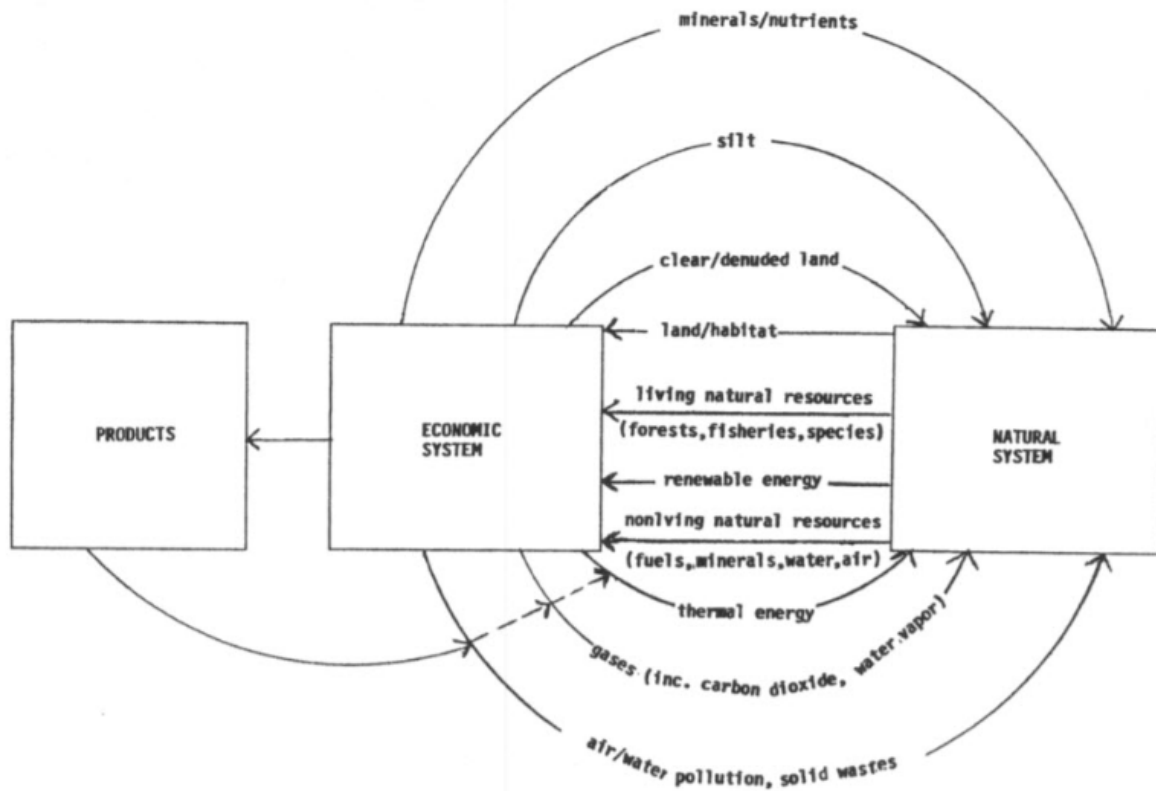


FIGURE 1.1 Conceptual interaction of economic and natural system.