SUSTAINABILITY AND ECONOMIC DEVELOPMENT

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Residents of Louisiana and other states are searching for ways to manage the environment to maximize the value of the bundle of goods and services derived from it. But there is concern that, in this search, our actions may inadvertently cross some threshold so that the environment loses its ability to sustain its productivity. Hence, many Louisianians express a desire for natural resources to be managed in a sustainable manner.

Sustainability, however, is an elusive concept. Depending on the temporal, spatial, or substantive lens through which sustainability is viewed, it means different things to different people. Economists and ecologists often disagree among themselves and with each other about what sustainability means and how to reach it. Both disciplines recognize, however, that sustainability does not mean that economic and environmental systems must remain unchanged. Rather, it means ensuring that dynamic economies and ecosystems can continue to function and evolve without making serious, undesirable errors.

Accounting For The Environment

The standard accounting systems applied to the U.S. economy largely ignore environmental assets and liabilities and provide few insights into the sustainability of actions affecting natural resources. Common indicators, such as the Gross Domestic Product (GDP), recognize environmental degradation as an improvement in the economy, sometimes counting it more than once: as the sales of products from a firm that pollutes, as the firm's subsequent expenditures to clean up the pollution, and as sales of medical services to those harmed by the pollution. Several efforts are underway to develop environmental accounting schemes, such as the Genuine Progress Indicator (GPI) and the United Nation's System for integrated Environment and Economic Accounting (SEEA), to recognize natural-resource degradation as a depletion of environmental assets.[3]

Economists typically approach the concept of sustainability with the general notion that an economy is on a sustainable path if each generation acts in a manner that allows every future generation the option of being as well-off as its predecessors. This does not mean that the economy is unchanging over time. Instead, it means that our generation passes to the next an endowment of assets, that is, a bundle of natural resources, capital resources, and knowledge, that enables it to achieve a standard of living at least as high as ours. The bundle's composition will change as assets are depleted and replaced with others. The challenge is to ensure that the depletions do not exceed the replacements.[1]

To meet this challenge, each generation must curtail its own consumption of assets—natural resources, physical capital, and human capital—and make enough investments to increase the future supply of assets so there will be a reasonable likelihood that future generations can sustain the current level of consumption. No generation, however, can predict the future with certainty. Thus, a generation trying to act in a sustainable manner must, at a minimum, strive to avoid big mistakes that would seriously jeopardize the living standards of future generations.

From an ecological perspective avoiding big mistakes requires that ecosystems must be resilient or, in other words, able to absorb a given disturbance before undergoing an irreversible change. Although ecosystem resilience is difficult to measure, it may be possible to identify early-warning signals or indicators of environmental stress. These include marked reductions in species diversity or increases in the risk that species will go extinct. We should expect that ecosystems generally will become less resilient as humans place more demands on them. Insofar as all economic activity depends upon a finite environmental resource base, unwise or careless use of the resource base reduces its ability to generate goods and services in the future. Put simply, given the finiteness of earth's resource base, it cannot sustain unlimited economic and population growth.[4]

From an economic perspective, a necessary step for avoiding big mistakes is to determine the extent to which there are substitutes for the consumption of individual assets. All else equal, the likelihood of making a big mistake diminishes where there are abundant substitutes, but increases where substitutes are scarce. Price can play a powerful role in the development of substitutes. When high prices reflect the scarcity of an environmental resource, potential consumers have incentives to ration their use of the resources, to find replacement goods or services, or to effect a change in tastes to reduce the demand.

For ecosystem resiliency or economic substitutes to be meaningful, however, resource managers—private and public—and consumers must have clear signals. If too few people, or, at worst nobody, knows that species diversity is diminishing in an ecosystem, it is unreasonable to expect they will act to prevent further decline. Similarly, if prices fail to signal the scarcity of an environmental resource, we should expect it will be consumed beyond the level that would be obtained with true pricing. This is an important point. The prices of natural resources often do not reflect their scarcity, especially when they have attributes that can be shared by many people. We all share the global climate, for example, and the productivity of the oceans and wetlands. Economists say that these attributes are public goods, because the public generally has access to the resource and my use of it does not exclude yours. If, as more people use the resource, crowding occurs, economists say the resource is congestible. Without explicit intervention to prevent it, congestible resources will become suboptimally crowded.

A desire to sustain living standards and to avoid big mistakes does not necessarily mean that the current generation should forgo consumption of a particular resource. Extraction of ore, lumber, and other products from a ecosystem might yield machinery and support research and educational activities whose value to current and future generations far exceeds the forgone value of an unexploited ecosystem. As the competing demands for natural resources increase, however, so too will questions about the potential impacts of alternative resource-management decisions on the resiliency of ecosystems and the living standards of future generations. Responding to these questions requires looking, not solely at each resource-management decision's impact on this generation's consumption, but also at the impact on the endowment of assets this generation passes to the next.

Where a detailed analysis is not possible, the assessment must look for warning flags. At a minimum, one should explicitly look for signals of diminished ecosystem resiliency, scarce resources with few substitutes, and prices that fail to respond to heightened scarcity. If Louisianians truly care about having sustainable communities, then those who would extract or develop resources whenever one or more of these signals occurs must assume a special responsibility, explicitly assessing the likelihood that the activity will yield a big mistake.

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[4] Arrow, K. et al. 1996. "Economic Growth, Carrying Capacity, and the Environment." *Ecological Applications*. 6 (1): 13-15.

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