Economics is the exchange of resources. More particularly, it has historically been the social science that deals with the production, distribution, and consumption of goods and services. Some economic theorists also add that economics deals with the theory and practice of economic management.

Historically, economics has posited that economic activity occurs when humans engage in a transaction that involves the exchange of goods and/or services between parties. This interpretation of economic activity was adequate when the human population was low and its economic activity had only a limited impact on nature. However, modernization and technology has led people to engage in economic activity in greater numbers that has led to the destruction of vast areas in nature.

Since the 1970s, economic theories have arisen that emphasize that the nature of economic costs comes with direct and indirect consequences. Therefore, to preserve the biological diversity of the earth, and to promote economic equity alternatives, economic theories and approaches have been developed, which seek to make biodiversity central to economic activity.

For all humans, the exchange of scarce resources, both renewable and nonrenewable, is necessary for the development and maintenance of life. Nonrenewable resources include minerals and petroleum, which cannot be reproduced once consumed. However, where there may be no other resources, substitutes may be used if costs of extraction and processing are acceptable to consumers in the market; for example, diamonds and oil can be synthesized. However, the key issue will always be at what price. Renewable resources are those resources that are harvested after being planted, cultivated, raised, or otherwise produced in a manner that allows for more of them to be produced from the same source. The very idea of husbandry is rooted in the idea of renewable resources. Successful farmers do not consume their seed corn or their breeding stock except in extreme emergencies. The range of human needs combined with human wants results in an economy of goods and services, which requires huge volumes of these natural resources that are is grown, caught on land or in waters, or mined.

Mined resources include minerals, inorganic building materials, soils, petroleum, and other resources that are used in building the foundation of modern industrial society. These types of resources have been produced by the geochemical processes at work in the earth's crust, and include sedimentary rocks, metamorphic rocks, and igneous rocks. They are considered nonrenewable resources because the geological conditions in which they were formed cannot be repeated by nature.
Granite, for example, is a hard, igneous rock that is found in abundant supply. It has been used in the past for cobblestone streets or in the building of large structures. Other types of mined, igneous rock include those rich in feldspar or other minerals.

Metamorphic rock can also be found in abundance. Large supplies of marble are used in sculpting or in buildings such as the United States Supreme Court. Marble for that structure was shipped from Alabama, Georgia, Vermont, Italy, and other places. In addition, marble can be ground to a fine powder and used in white paint or in hundreds of other products. There is a threat that due to the growing consumption of these mineral resources, its supply could one day be exhausted.

VALUES AND ECONOMIC TYPES
Economics is concerned with values. Some things have *intrinsic value*; they are valuable regardless of whether or not they have any use. *Instrumental value* is value derived from the utility of something. Diamonds are not of great intrinsic value. They are, however, of great instrumental value for romance and industry.

Generally speaking, there have been three types of economies: *barter economies*, *command economies*, and *market economies*. All three have been mechanisms for the exchange of goods and services. *Barter economies* were the first types of economies and still abound. They may exist in the industrial world when people trade goods or services in any number of ways. Or they may exist in the Third World, for example, when people gather honey in a forest in India to trade for meat hunted in the same forest. *Command economies* are economies in which the government directs the manufacture and/or the distribution of goods and services.

Modern wartime economies have usually been command economies. In modern times, socialist and Communist economies have been economies that have sought to establish economic justice by their power to control the production, distribution, and consumption of goods and services, and by means of “equitable” distribution of what is produced. However, all too often, socialist and Communist economies have been unsuccessful in producing goods and services as well as achieving their moral principle of equality of distribution. This moral failure has often been due to directing the production of luxuries to political forces.

*Capitalism* is a form of *market economy* that concentrates the means of production in the hands of a great many producers. Many scholars believe that capitalistic societies have been much more successful at creating vast quantities of goods and services than socialist or Communist societies. Those scholars believe that experience has shown in the last several centuries that people in pursuit of their own self-interest are producers of more goods and services in greater varieties and quantities than they are as producers for a system that distributes goods and services on the basis of inherent worth rather than productive success. Capitalism allows individuals to pursue their own economic self-interest. It therefore also promotes conditions of economic freedom to allow the trading of goods and services in market places without government intervention.

Socialism, Communism, and capitalism have had their political expressions as ideologies; that is, as systems of politico-economic thought. In the ideological partisanship that has been fought out in a variety of ways, partisans have often championed socialism, Communism, or capitalism in ways that have conveniently ignored real problems with these systems.

It is interesting to note that all three economic ideologies arose in the early days of the Industrial
Revolution, when inhumane exploitation of the working class took place. These workers were often economic refugees from the countryside. The poor were compelled by economic necessity to toil in factories at poor wages. On the other hand, liberal exponents of the free market system were focused on those who defended economic privileges, government-authorized monopolies, or the restrictions of command economics. While addressing the human problem of economics, they ignored the nature side of economics.

**NATURAL RESOURCES**

The economic resources used to produce goods and services require natural resources. As a consequence, nature—and quite often humans—have been negatively impacted by ruthless exploitation of natural resources. For example, the clear-cutting of timber may have been the cheapest way to cut the most timber, but dire consequences have resulted from this method. Clear-cutting destroys the watershed so that during heavy rains, floods result, and the silting in streams kills fish and destroys habitat. Nature, and not the timber industry, pays the severe price of clear-cutting.

For centuries, individualistic market economies were able to externalize their costs of pollution and human capital costs. The same was usually true of socialist and communist societies, which were industrial societies. The pollution in the old Soviet Union was probably as bad if not worse than that in capitalist societies. Ultimately, the success of industrialization to extract ever greater resources, and its ability to manufacture huge quantities of goods, had a tremendous impact on nature. People took notice when they realized that streams in which they had once swam or fished in years before were too polluted to drink from—even if the water was boiled.

To combat the short-sighted exploitation of the environment, nature-oriented economic ideas and studies were advanced. Oddly enough, it was not concern for nature that was the first motivation. Rather, it was the desire to rationalize markets with monopolistic control. For example, John D. Rockefeller was able to capture control of most of the oil production in the United States through his Standard Oil Company. The early days of the oil industry was centered in western Pennsylvania, Ohio, and West Virginia. The booms created many producers who pumped the oil as quickly as they could. Regard for the environment was little, if any. At times so much oil was brought to market that prices bottomed out. Excess oil was then dumped into creeks.

This form of unbridled capitalism—which was wide open to people with little or no capital—was in the end destructive. So also were the corporations mining, logging, or extracting resources without concern for the future destructive consequences. The only principle of concern was that profits were high and costs low.

Conservation was championed by President Theodore Roosevelt, a naturalist as well as an antimonopolist who supported enforcement of the Sherman Anti-Trust Act. He was began serious governmental regulation of the exploitation of nature.

**THE PRICE OF NATURE**

Concern for the environment has merged in recent decades with a concern for a fair distribution of economic production, to create several approaches to economics that involves the putting a price on all aspects of human engagement with nature. Biological conservation inevitably involved the making of economic decisions. In reality, all economic activity is human activity, and because it involves the exchange of values, it is also an ethical activity. This means that biological conservation seeks an ethical
use of resources in such a way that resources are used responsibly and also shared equitably.

This view is concerned with preserving the biodiversity of the earth. For some, all living things have intrinsic worth. However, conservation biology is concerned more with instrumental values, especially as these can be converted into economic values. The issues concern the cost-benefit ratio of maintaining biodiversity.

Cost-benefit ratios are utilitarian in character. They seek to establish the pain, damage, destruction, or financial cost of doing something versus the pleasure or benefits derived, such as building a dam or clearing a section of tropical rainforest to farm or raise cattle. Costs involve more than the financial or resource outlays needed to dig a mine or build a refinery. Costs may be in fact much greater, because species of animals or plants are driven to extinction or reduced in number. The pollution that creates beautiful sunsets is also causing damage to the environment through acid rain to and to human health by damaging lungs.

Benefits are the goods that are derived from human actions. Goods may be tangible, such as cut logs, mined ores, or crops. Or it may be the intrinsic benefit of an unspoiled vista of nature or the peaceful silence of a place far from traffic and other human noise.

In calculating the economic values of human extractions from nature, it is important to recognize that at least one and perhaps as much as 3 billion people derive goods from the biota (the animals and plants of a region). For example, firewood is needed for heating and cooking by people who have no other resource. They may in many locations use deadfall or other combustible materials without any significant impact on the environment. However, in arid locations, their scavenging may be as destructive of the environment as the goats they herd.

Resource economics is a field of study that uses the concepts of natural resources and human resources. The field of resource economics includes the study of agricultural production, bioeconomics, community economic development, environmental economics, environmental policy studies, and resource utilization.

Environmental economics is a subfield of modern economics. It focuses on issues involving the environment, and uses the methods of neoclassical economics. It is usually distinguished from ecological or green economics. Much of its focus is on environmental policies—local, national, and global. Studies it develops are economic arguments or explanations that include the cost-benefit ratio of projects on the environment. It seeks to propose alternative environmental polices that prevent pollution as an external cost and to minimize the environmental impact of economic activities.

The concept of external cost is central to environmental economic theory because its proponents argue that the cost of goods and services cannot be determined merely by their price. Rather, the impact on the environment both in the short and long term must be included.

Ecological economics argues that economics is a subfield of ecology. This is a reversal of classic economic theory, which if it considered the environment at all would have considered ecology a minor topic of concern.

The field is also concerned with the *Tragedy of the Commons*. This concept is a model for showing how free access to common resources by individuals pursuing their self-interests will be destructive as each tries to maximize their gain, and are therefore inadequate. The claim that markets are efficient is
not fully justified. Inefficiencies in the marketplace may result in market failures, requiring intervention by government to engage in the authoritative allocation of goods and services.

This idea clashes with ideas of economic liberty and property rights and with much of the historic legal doctrines of the common and civil law system. However, the right of an individual or company to pollute upstream waters has been restricted if not outright denied by the United States River Keepers Law of the 1880s. This law allows downstream users of water to seek remedies for torts caused by upstream pollution, even if the government will not or does not act.

Approaches to environmental economics are numerous. It has been a major influence in the development of natural capitalism, the basis of which is that the world and its resources are a form of capital just like the physical capital of houses, automobiles, or other values currently counted as capital in mainstream economics.

Natural capitalism is also concerned with globalization. It opposes permitting developers to use Third World resources without regard to their environmental impact. It seeks to stop profits gained by the sale of goods and services in economies that are restricting economic activity or redirecting it into more expensive technologies in order to protect the environment. Because of its critique of globalization, its participants have been associated with antiglobalization movements.

Ecological economics is either an approach to economics or a branch of economics. It incorporates the interdependence of human economies and natural ecosystems. It considers neoclassical economics as prejudiced and ineffective in meeting the challenges faced by both nature and humans. To achieve its objective of responsible economic activity, it must achieve a global common welfare with sustainable economic development. It promotes preserving biodiversity and opposes mere energy economics on the grounds that creating greater energy supplies without regard to environmental or human costs is destructive.

Green economics places the economy within the natural world as a subordinate part. It views economic transactions to include the whole of nature, rather than just the parties directly involved in the transaction. Its comprehensive approach to economics has used insights from a number of other new disciplines, including postmodernism, critical theory, ecology, and animal rights. It also uses insights from environmental economics and ecological economics. It is often associated with antiglobalization and localization theories.

In the struggle for survival, the only species with the power of exercising dominion over the earth is the human species. The power of free choice can make human economic decisions destructive or they can be exercises in stewardship.

SEE ALSO:
Biodiversity; Capitalism; Communism; Conservation Biology; Industrialization; Industrial Revolution; Institutions; Markets; Roosevelt, Theodore Administration; Socialism; Tragedy of the Commons.

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