1. **Market Failure for Environmental Goods :**

**I.1. Environment as a Public good**

Environmental quality is considered to be a public good that must be consumed in equal amounts by all. This approach starts from the premise that private property rights cannot be defined for environmental quality (or if technically feasible, that private property rights should not be defined). Then the market cannot allocate the environment, and government intervention becomes necessary. How does the government determine the desired environmental quality? One approach is to assume a social-welfare function which allows us to specify the benefits and costs of environmental quality. In a similar way, benefit-cost analysis implicitly presupposes a social-welfare function as a guideline for evaluation. Another approach is to base the evaluation of environmental quality on individual preferences. A Pareto-optimal allocation requires individualized prices of environmental quality to be assessed according to the individual’s willingness to pay. If individuals are not inclined to reveal their true willingness to pay, we have to look into institutional arrangements that may reveal and aggregate individual preferences.

**I.2. Common Property Resources**

Common property resources are natural resources owned & managed collectively by a community or society rather than by individual. Common property resources are (renewable) natural resources where current excessive extraction reduces future resource availability, and the use of which is *de facto* restricted to a specific set of agents, such as inhabitants of a village or members of a community; think of community-owned forests, [coastal fisheries](https://www.sciencedirect.com/topics/earth-and-planetary-sciences/coastal-fishery), or water reserves used for irrigation purposes. Standard economic theory predicts that the shared use of a renewable natural resource results in the resource being overexploited. In the real world, some commonly owned resources are indeed severely degraded, but others are not. Identifying why [community resource management](https://www.sciencedirect.com/topics/earth-and-planetary-sciences/community-resource-management) is successful in some instances but not in others is difficult because of the many confounding mechanisms that are present in the real world. Therefore, economists use economic experiments to pretest the effectiveness of various institutions in sustaining cooperation in resource use such as punishments, rewards, and communication.

Important contemporary examples of common property resources include the global atmosphere, the oceans, large lakes, rivers, forests, and fish and wildlife populations, including birds. Though not inevitable, the [overexploitation](https://www.sciencedirect.com/topics/earth-and-planetary-sciences/overexploitation) of common property resources is always a potential threat, and often a frightening reality. Many current environmental problems can be traced to the working of a so-called tragedy of the commons.

The classification of resources as either common or private property is an oversimplification. Many gradations exist between a total lack of access restriction (i.e., open-access) and complete individual control. For example, coastal marine resources within 200-mile fishing zones are now recognized as being under the sole jurisdiction of the coastal state, with foreign fishermen either excluded or subject to payment of fees. These resources are thus limited access, but (unless privatized) still common property by our definition. Also, private [landowners](https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/landowners) seldom have full rights to do as they wish with their property – the state may retain mineral rights, for example, and zoning regulations may restrict land use and development.

1. **Property-Rights Approach to Environmental Problem:**

The property-rights approach suggests that if exclusive property rights are adequately defined, the public-good environmental quality can be transformed into a private good, and optimal environmental allocation will be reached. Government intervention, if necessary, is needed only in assigning environmental property titles. Property rights may also evolve in an evolutionary way in order to reduce transaction costs. With property rights adequately defined, the market will find the correct allocation. Both approaches agree that actually property rights are not adequately defined for the environment as a receptacle of waste. To change the environment as a common-property resource in its role as a receptacle of waste into a private good by assigning property rights for emissions is consistent with both approaches. Whereas the public-goods approach suggests that, because of the nature of public goods, property rights cannot be specified, the property-rights approach is more optimistic in this respect.

A property right can be defined as a set of rules specifying the use of scarce resources and goods. The set of rules includes obligations and rights; the rules may be codified by law, or they may be institutionalized by other mechanisms such as social norms together with a pattern of sanctions. Property rights may be defined over a wide range of specific resource uses.

Dales (1968) distinguishes four types of property rights:

1. First, exclusive property rights cover the right of disposal and the right to destroy the resource, notably the right of sale. But even this extensive form of ownership is controlled by a set of rules which protect other individuals or maintain economic values. For instance, a homeowner may not destroy his house. In cities we are not allowed to burn garbage on our property. If there is a mineral well near the lot you own, you may not be permitted to build a factory on your property. City zoning and criminal law are examples of restrictions on exclusive property rights.
2. Second, status or functional ownership refers to a set of rights accorded to some individuals, but not to others. In this case the right to use an object or to receive a service is very often not transferable. Examples of this type of right include licenses to drive a taxi or notarize documents, and, during the Middle Ages, the right of admission into a guild.
3. Third, rights to use a public utility (merit good such as a highway) or a public good (a national park) relate to a specific purpose.
4. Fourth, common-property resources represent de facto a nonproperty because nearly no exclusion is defined.1 Property rights may be transferable, or they may be limited to a specific person or status (such as functional ownership). Property rights may be de­fined with respect to the right to use the resource directly, or they may be defin­ed such that use is allowed only in a very remote way. For instance, the right to vote in an election represents a property right in a general interpretation. The property-rights approach represents a very interesting and powerful line of economic reasoning since it permits us to integrate economics with law and other social sciences. The property-rights approach can be interpreted as a contribution to the theory of institutions, where an institution is defined as a set of rules that specifies how things are done in a society. In terms of the property-rights approach, the basic question of economics can be posed: How are property rights to be defined so that the economic system generates “optimal” results? The word optimal may mean quite a few criteria, such as freedom of the individual and correct incentives to produce, to find new technologies, and to supply resources (for example, capital and labor). Also we may ask whether property rights can be defined in such a way that externalities are internalized.
5. **Property Rights and Environmental Allocation:**

What are the implications of the property-rights approach for the environmen­tal problem? As we have seen, historically property rights have not been de­fined for the use of the environment. Under such conditions, markets cannot fulfill the allocation function, and the resulting structure of production is distorted. For instance, if the fish of the oceans are treated as a common-pro­perty resource, this resource is overused. It has been pointed out that the growing desert of the Sahel region in Africa is due to the nonexistence of property rights. As a result of heavy fighting among migrating tribes over many years, a complex system of using the land as a common property has emerged that has not contained elements for the conservation of natural resources. Parts of northern Africa were the granary of the Roman Empire; after property rights were changed into a common-property pasture system by the Arabs in the sixth century, the conservation of the land degenerated.