

Public Goods*

By Matthew Kotchen[†]

December 8, 2012

Pure public goods have two defining features. One is ‘non-rivalry,’ meaning that one person’s enjoyment of a good does not diminish the ability of other people to enjoy the same good. The other is ‘non-excludability,’ meaning that people cannot be prevented from enjoying the good. Air quality is an important environmental example of a public good. Under most circumstances, one person’s breathing of fresh air does not reduce air quality for others to enjoy, and people cannot be prevented from breathing the air. Public goods are defined in contrast to private goods, which are, by definition, both rival and excludable. A sandwich is a private good because one person’s consumption clearly diminishes its value for someone else, and sandwiches are typically excludable to all individuals not willing to pay. (This scenario does, of course, assume the proverbial no free lunch.)

Many environmental resources are characterized as public goods, including water quality, open space, biodiversity, and a stable climate. These examples stand alongside the classic public goods of lighthouses, national defense, and knowledge. In some cases, however, it is reasonable to question whether environmental resources (and even the classic examples) are public goods in a fully pure sense. With open space, for example, congestion among those enjoying it may cause some degree of rivalry, and all open spaces are not accessible to everyone. Nevertheless, many environmental resources come close to satisfying the definition of pure public goods, and even when not exact (possibly closer to an impure public good), the basic concept is useful for understanding the causes of many environmental problems and potential solutions.

From an economics perspective, public goods are of interest because—unlike private goods—they are a source of market failure. The problem is ‘free riding’: individuals have little incentive to voluntarily provide public goods when they can simply enjoy the benefits of non-rival and non-excludable public goods provided by others. To see free riding at work, consider the challenge of constructing a bridge where the societal benefits of doing so would exceed the costs. How successful do you think a campaign would be to finance the bridge with voluntary donations? It is not hard to imagine how such a campaign would fail, because many (if not most) individuals would choose to make no donation, hoping others would contribute enough to finance the bridge for everyone to enjoy. In this scenario, the market failure would be that no bridge is constructed despite the fact that a bridge would make everyone better off.

* A draft chapter prepared for *Environmental and Natural Resource Economics: An Encyclopedia*, J. Whitehead and T. Haab (eds.), forthcoming, Santa Barbara, CA: ABC-CLIO, Inc.

[†] Matthew Kotchen is associate professor of environmental economics and policy at Yale University and a faculty research fellow of the National Bureau of Economic Research (NBER).

Seeking to prevent such under-provision of public goods is one of the primary economic rationales for government. While markets allocate private goods efficiently, governmental intervention is usually required for the efficient (or even reasonable) allocation of public goods. Indeed, this explains why goods such as bridges, parks, police protection, and fire departments are usually financed with tax revenues that governments collect. Governments can thus serve as a coordinating mechanism that provides public goods for the benefit of society.

The same public-goods rationale applies to environmental protection. Because individuals and firms face free-riding incentives when it comes to protecting the environment, policies are often put in place to limit pollution, restrict resource exploitation, or create the right incentives to promote or protect environmental quality. Environmental policies that promote economic efficiency are those for which the societal benefits exceed the costs. Social cost-benefit analysis is the tool that economists use to make such determinations. Yet, with most environmental public goods, special techniques are often required to estimate the economic benefits or costs because environmental quality is rarely traded in markets and therefore does not have directly observable prices. For example, there are certainly benefits of improving air quality, but how are such benefits to be quantified?

The answer is various techniques of so-called nonmarket valuation. These range from simply asking people their willingness to pay (or willingness to accept) for changes in environmental quality to various ways of using other markets to infer implicit values for the environment. There are stated-preference techniques that are based on survey methods and include contingent valuation and conjoint analysis. There are also revealed-preference techniques that use actual market behavior and include the hedonic-price method, the travel-cost method, and averting expenditures.

The notion of public goods is also becoming increasingly important at the international and global levels. Many environmental problems transcend national boundaries, with climate change being the most prominent example, and maintaining a stable climate is essentially a global public good. Yet the efficient provision of global public goods faces an even greater set of challenges. One challenge is that free-riding incentives are even stronger when the number of people involved is larger. While individuals are typically reluctant to incur private costs for public benefits, they are likely to be more reluctant when their contributions feel like a tiny drop in an even larger bucket.

A second, and important, challenge for providing global public goods is that coordination is difficult among sovereign nations. While policies for environmental protection can be passed at a national level, international coordination requires agreements and enforcement among nations, many of which have different interests and rules of law. There are success stories with disease eradication and the Montreal

Protocol for the phase out of chlorofluorocarbons that deplete the stratospheric ozone layer. But real progress to address greenhouse gas emissions globally and mitigate climate change has thus far eluded efforts within the United Nations. While the future architecture of an international agreement for climate change remains uncertain, it is clear that economic theory on public goods is essential for understanding potential reasons for both failure and success.

References

Barrett, Scott. 2007. *Why Cooperate? The Incentive to Provide Global Public Goods*. Oxford University Press.

Olson, Mancur. 1971. *The Logic of Collective Action: Public Goods and the Theory of Groups*. Harvard University Press.