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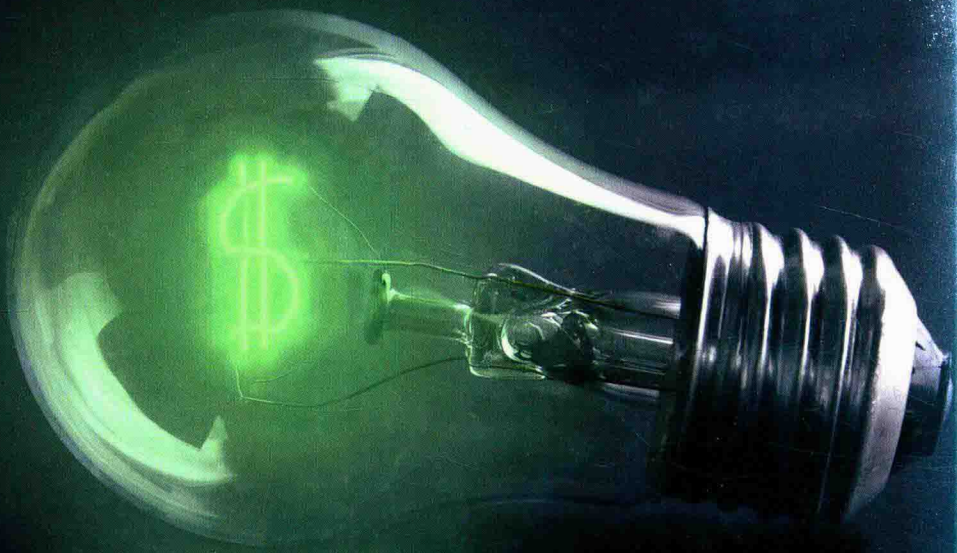

Environmental Markets

A Property Rights Approach

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Environmental Markets

Environmental Markets explains the prospects of using markets to improve environmental quality and resource conservation. No other book focuses on a property rights approach using environmental markets to solve environmental problems. This book compares standard approaches to these problems using governmental management, regulation, taxation, and subsidization with a market-based property rights approach. This approach is applied to land, water, wildlife, fisheries, and air and is compared to governmental solutions. The book concludes by discussing tougher environmental problems, such as ocean fisheries and the global atmosphere, emphasizing that neither governmental nor market solutions are a panacea.

Terry L. Anderson is the president of the Property and Environment Research Center (PERC) and Senior Fellow at the Hoover Institution, Stanford University. His work helped launch the idea of "free market environmentalism" with the publication of his book by that title, coauthored with Donald Leal. Dr. Anderson's work emphasizes that private property rights encourage resource stewardship by harnessing the incentives of free enterprise to protect environmental quality. Anderson is the author or editor of thirty-seven books including, most recently, *Tapping Water Markets* with Brandon Scarborough and Lawrence R. Watson. He has been published widely in both professional journals and the popular press and has received many awards for his research and teaching. He received his PhD in economics from the University of Washington.

Gary D. Libecap is Professor of Corporate Environmental Management in the Donald Bren School of Environmental Science & Management and Professor of Economics at the University of California, Santa Barbara. He is also a Research Associate at the National Bureau of Economic Research in Cambridge, MA; a Research Fellow at the Hoover Institution, Stanford University; and Senior Fellow at PERC, Bozeman, Montana. His research focuses on the role of property rights institutions in addressing the tragedy of the commons. He received his PhD in economics from the University of Pennsylvania.

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Preface

Environmental economics often focuses on the failure of markets to allocate and manage natural and environmental resources efficiently. Under the banner of externalities, markets fail either because private costs are less than social costs or because private benefits are less than social benefits. The former results in overuse of the environment such as overfishing, excessive air and water emissions, and overpumping of groundwater basins. The latter results in too little provision of public goods such as preservation of endangered species habitats, maintenance of adequate stream flows for recreation or pollution dilution, or investment in biodiversity.

The policy remedies for market failure include both taxes to raise private costs to social costs and regulation to hold quantities to the optimal amount. There is little discussion in the literature on the process through which taxes or regulations are devised and implemented that lead to socially beneficial improvements. Are the costs of securing tax or regulatory policies less than the benefits, or alternatively is the route one of rent seeking and interest-group politics? What motivates politicians and regulatory agencies to adopt taxes or regulations that lead to effective correction of the externality? Because taxes are rarely implemented, at least in the United States, the obvious question is why, if they are so beneficial? Is their absence an indication that political interests dominate efficiency goals? Similarly, command-and-control regulations are adopted to limit use of air, water, fisheries, forests, and other resources, but they are costly and often do not capture the incentives of resource users to engage in more optimal production. For example, in the case of fisheries, fishing season limits have been a

common regulatory response to overharvest, but they generally result in twenty-four-hour fish derbies, excessive investment in capital and labor to win the derby, and a glut of fish during the season. Regulations on the number of vessels lead to larger ones with more sophisticated equipment to find and catch fish. In some cases where neither taxes nor regulations have been adopted, public ownership and management have been called on to improve resource use. For example, more than one-third of the land area of the United States is owned by the federal government as national forests, range lands, and national parks. Again, however, political considerations through interest-group politics and political and administrative-agency agendas have trumped efficiency, leaving national parks overused and underfunded and national forest management paralyzed by litigation and the demands of competing groups.

We do not claim that all regulation or tax policy has been a failure, but we do believe that environmental economics has paid too little attention to the underlying causes of the divergence between private and social costs and benefits and too little attention to institutional options.

Meanwhile, other economic subdisciplines have carefully and critically considered the importance of institutions that determine who bears the costs and reaps the benefits of efficient use of physical, human, and natural capital. Following the lead of Ronald Coase in his seminal article on "The Problem of Social Costs," institutional economists have focused on the role of property rights, the rule of law, and transaction costs in determining incentives for resource use and the costs and benefits of various responses to the losses of excessive production. As with regulation and taxes, property rights and market exchange are costly, and it may not always be the case that it is socially optimal to solve the environmental or resource problem.

This book applies an institutional approach to environmental problems in an effort to show how property rights and transaction-cost considerations can encourage efficient natural resource use through environmental markets. We do not contend that markets can solve all environmental problems or that political approaches always fail. Rather we offer a lens through which we can tackle environmental problems using property rights and markets and compare them to the regulatory and tax alternatives.

For the economist reader, the book relies heavily on Coase's insights regarding the reciprocal nature of environmental costs. We apply his logic regarding property rights and transaction costs to a variety of environmental issues ranging from local problems such as water quality and wildlife conservation to global problems such as ocean fisheries and the atmosphere.

Where private property rights and markets are difficult to define and enforce, we explore the potential for common property solutions as developed by Elinor Ostrom. We argue that in many local settings, particularly, environmental markets are an effective and often underutilized option for improving water quality, providing habitat conservation, and encouraging investment in conservation of fish stocks. On the other hand, for broad global problems, the costs of defining property rights and use of markets may exceed the benefits. This does not necessarily imply that tax or regulatory actions are superior, but that a careful analysis of costs and benefits is necessary before implementing *any* policy.

For environmentalists, the book offers concrete solutions in the form of case studies that illustrate the importance of environmental entrepreneurship. The environmental entrepreneur identifies gains from trade and facilitates markets that improve environmental quality through profit opportunities. Whether it is a compensation fund created by environmentalists to compensate livestock owners who are harmed by the reintroduction of wolves, the riparian land owner who invests in stream reclamation in order to enhance property values, or the broker who provides information to investors for habitat or water reallocation or quality improvements, environmentalists will learn how market incentives can be harnessed to achieve environmental ends.

For policy leaders, the book goes beyond command-and-control regulations or taxes to suggest how governments at all levels can reduce transactions costs so as to encourage environmental markets and private incentives to improve and protect environmental quality. For example, we show how water markets could do more to advance water use efficiency and water quality, but they are constrained by institutions that raise the costs of defining and enforcing water rights and of allowing exchanges between willing buyers and willing sellers. In other words, government policies can help make markets where they are missing. The problem is one of *missing* markets, not market

failure, and government actions can address this problem by lowering transaction costs.

Although the book is built on a foundation of economic principles, we have tried to keep the jargon to a minimum and to maximize the use of concrete environmental examples at work. As environmental economists, we cannot resist the efficiency gains that markets can provide, but we also embrace the potential of markets to go hand-in-hand with environmental improvements. In short, this book is about the environment *and* the economy, not about the environment *or* the economy.

Terry L. Anderson and Gary D. Libecap
July 2014

Acknowledgments

This project is built on a friendship that started many years ago when we were undergraduates at the University of Montana. Between then and now our careers followed parallel paths until they came together as Senior Fellows at the Hoover Institution. There, director John Raisian asked us to co-direct the Task Force on Property Rights, Freedom, and Prosperity. This book combines the property rights theme of the task force with our mutual interest in environmental economics and policy.

Our thanks go to John Raisian for affording us the opportunity to work together on this project and to members of the task force for listening to our nascent ideas and reading drafts of chapters. It is not surprising that such a group forced us to hone both the ideas and the writing.

Support for the Task Force and this project came from the generosity of John and Jean DeNault. Their willingness to invest in "ideas defining a free society" – Hoover's motto – enabled us to find the time and resources to focus on *Environmental Markets*. We also thank John and Jean DeNault and Sherm and Marge Telleen for their support of our Hoover Fellowships.

The entrepreneurship of Henry Butler, director of George Mason's Law and Economic Center, led to a conference where we received comments from the best and brightest of law and economics scholars. Our thanks go to Henry and the conference participants who read and commented on the manuscript.

Finally, we thank one another for the friendship that has endured the years and grown stronger despite our idiosyncrasies. Combining friendship and scholarship is a rare gift.

Contents

1

Who Owns the Environment?

The objective of this book is to promote greater consideration of property rights and markets in addressing environmental problems. Although there is movement toward increased use of market approaches with the adoption of cap-and-trade in controlling air emissions, fishery harvests, and land use, there have been bumps in the road. Several environmental markets are thin with few trades, in others, prices have trended toward regulatory-set floors, and many have insecure property rights that limit incentives for long-term investment and conservation. We explore why that might be the case and what options exist for, and what benefits may be derived from, expansion. We believe that more can be done to improve the efficient provision of environmental quality through the greater definition of property rights and market exchange.

THE RECIPROCAL NATURE OF THE PROBLEM: NORMATIVE AND POSITIVE ANALYSIS

The manner in which our approach differs from standard presentations is that we recognize environmental problems as ones of reciprocal costs. Natural resource and environmental problems arise when people with diverse demands compete for the use of environmental goods. For example, the policy debate over air pollution levels reveals competition between those who want to use the air for low-cost waste disposal or to facilitate use of certain fossil fuels and those who want to breathe clean air, avoid the health effects of ingesting contaminants, have clear views of the surrounding terrain, or mitigate potential climate

change. Debates over clear-cut forests reflect competition between those who demand wood products at low cost and seek maintenance of timber-based industries and communities and those who prefer forests for hiking trails, wildlife habitat, or carbon sequestration and the expansion of ecotourism.[1] Concerns about overfishing indicate competition between those who want fish now, regardless of stock impacts, and those who want a sustainable yield into the future. In a positive sense, these are competing and conflicting demands.[2] The different effects on welfare if one use dominates the other often are not obvious, although advocates on both sides have clear opinions. The ultimate answer depends upon the benefits and costs of each alternative and their distribution across society.

THE CENTRALITY OF OPEN ACCESS

Before turning to a discussion of various institutions that can help resolve competing demands, it is important to understand that competition and conflict are at their worst when access is open to all – when there are no clear property rights to limit access or moderate use. Economists describe the results of such open access as a "tragedy of the commons."[3] The term is often associated with an article by ecologist Garrett Hardin (1968) about global population growth and individual decisions underlying it, but the idea was first applied to fisheries by economist H. Scott Gordon in 1954. He described the tragedy this way:

> As long as the user of a fishery is sure that he will have property rights over the fishery for a series of periods in the future, he can plan the use of the fishery in such a way as to maximize the present value (future net returns discounted to the present) of his enterprise. From the social point of view it can be said

[1] We recognize that there are other issues, such as erosion from clear-cut areas on down-slope parties, or that clear-cut areas may slow the advance of wildfires and the spread of insect infestation. Addressing these issues does not change our basic point.

[2] Notice that we are not emphasizing "externalities" that by definition arise from incomplete property rights. In our view, addressing externalities occurs when property rights are more completely defined so that all costs and benefits are captured in decision making by resource users.

[3] Garrett Hardin (1968), "The Tragedy of the Commons," *Science* 162: 1243–1248.

that he will bring about the "best" use of the fishery and of all other factors invested in it over future periods by thus allocating outputs and outlays over time in accordance with the current rate of discount.[4]

In 2000, Anthony Scott further clarified the problem of overfishing:

> Consider the fisherman in his role as the owner of a fishing vessel. He has all three powers over it: he can run it, sell it and take the profit from doing these things. But now consider the same fisherman in his role as occupier of the fishery itself. This role does not give him powers to manage it or dispose of it. All he has is the third power, the law of capture: the power to take and keep the fish he catches. The absence of the first two powers deprives him of any incentive to look after the fishery. To illustrate, if he were the kind of fisherman who tried to manage and exploit the fishery with care and prudence, he would not be rewarded. Although his care might have made the fishery more valuable, he would never have the powers needed to capture this extra value. His efforts would have a near-zero yield to him. That is why, lacking the necessary ownership powers, almost everyone in an offshore fishery finds it not worthwhile to look after it.[5]

Open access to a groundwater aquifer produces a similar result. Groundwater supplies more than 50 percent of the drinking water in the United States and is a major source for irrigation.[6] In most cases, water is pumped from a common aquifer under the rule of capture, in this case through pumping. The result of competitive pumping is analogous to several children with their straws in a cold soda on a hot day. Each might have an incentive to savor the flavor and avoid drinking so fast as to get a headache. However, without constraints on drinking, any restraint by one will be met by faster drinking by another to capture more of the cool drink. In the same way, multiple pumpers from the same aquifer can overpump. Similarly, water left in the aquifer will cost less to lift, will be available for future use, and will continue to support the ground above, thereby limiting subsidence. However,

[4] H. Scott Gordon (1954), "The Economic Theory of a Common-Property Resource: The Fishery," *Journal of Political Economy* 62(2): 124–142; Anthony Scott (1955), "The Fishery: The Objectives of Sole Ownership," *Journal of Political Economy* 63(2): 116–124.

[5] Anthony Scott (2000), "Introducing Property in Fishery Management," Section 3.2 in Ross Shotton, ed., *Use of Property Rights in Fisheries Management*, Rome: FAO Fisheries Technical Paper 404/1 http://www.fao.org/docrep/003/X7579E/x7579e03.htm.

[6] The Groundwater Foundation, http://www.groundwater.org/gi/whatisgw.html.