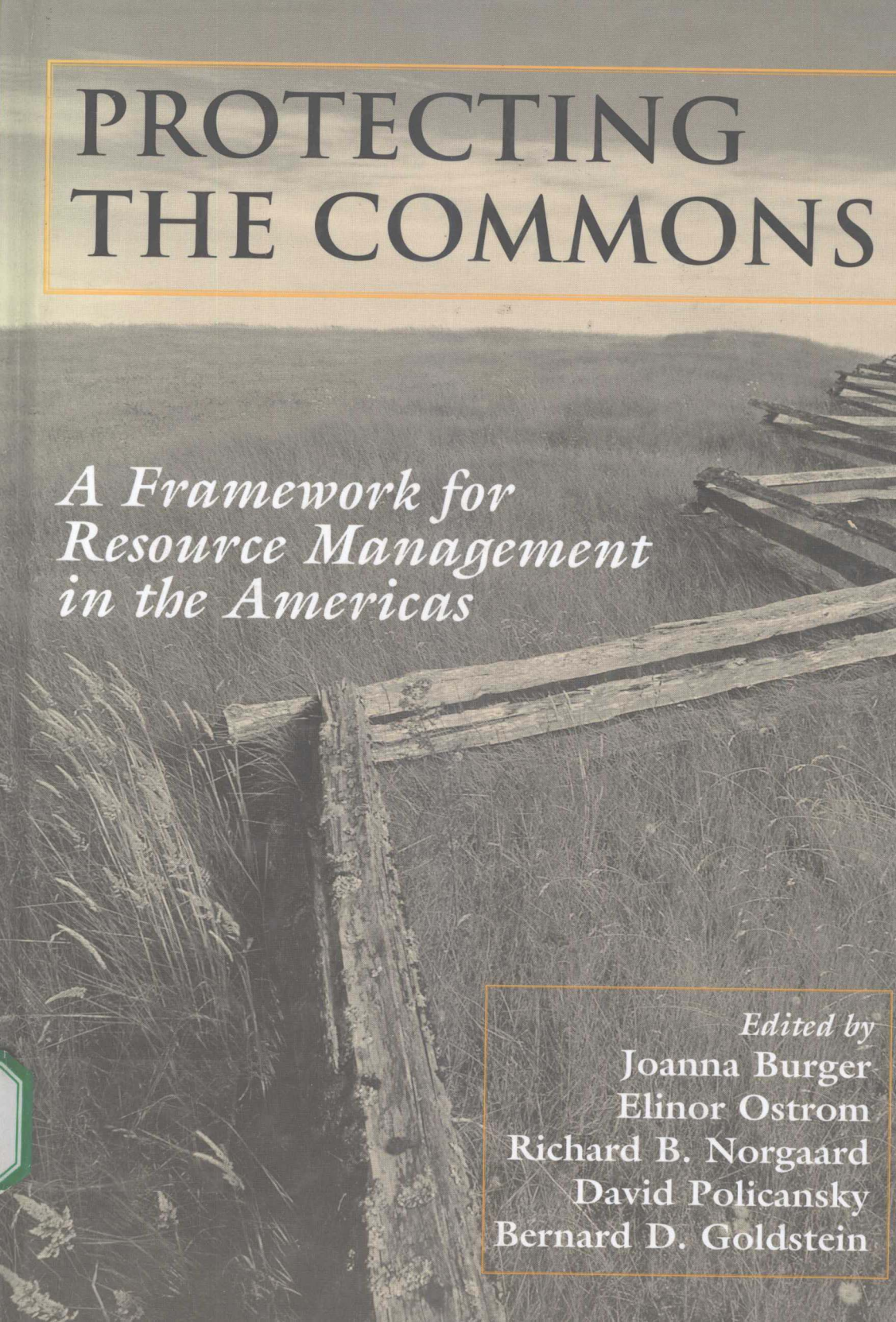
PROTECTING THE COMMONS

A Framework for Resource Management in the Americas



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Preface

The beginning of the new millennium is a proper time to evaluate how we have managed, conserved, and preserved our natural and cultural resources, and the nature of the problems remaining in the wise use of these resources. As populations continue to grow, to disperse over large areas of land, to concentrate in large cities, and to cluster along coastal regions, the management of natural and cultural resources will become even more difficult. With these changes, there are more users, and more uses, of resources held in common.

While there are many paradigms for thinking about resource use, the "commons" paradigm made popular by Garrett Hardin in his influential article "The Tragedy of the Commons" has proven a useful starting point for interdisciplinary collaborations on resource management. In the thirty years since his article was published, numerous studies have confirmed his dire predictions about overexploitation of resources held in common; however, other studies have shown that cooperation and the creation of institutions have resulted in the wise and sustained use of such resources.

In this volume we examine a variety of common-pool resources, from atmospheric and water resources, to fisheries, forests, and medical care, as they apply to the Western Hemisphere. Our goal is to provide a range of examples: from situations for which we have found successful solutions, to those where we are in the infancy of wise and sustainable management. Some problems are as old as civilization, such as dealing with forest products, fisheries, and local water resources. Others are relatively new, such as consideration of the global atmosphere and medical care as commons issues.

The idea for this volume evolved from discussions of the U.S. National Committee for SCOPE (the Scientific Committee on Problems of the Environment) and led ultimately to a symposium titled "Protecting the

Commons: a Framework for Resource Management in the Americas," which was presented at the Tenth General Assembly of SCOPE in June 1998 at the Environmental and Occupational Health Sciences Institute in Piscataway, New Jersey.

The discussions and interest generated by the symposium encouraged us to create this volume, using the speakers as the core. We have added a number of other authors to round out the Americas perspective. Common-pool resources are an integral part of our everyday lives, making the topic far too large for any one volume. Nonetheless, it is our aim to examine a range of natural and cultural resources that are important now, in the hope that they may serve as examples of sustainable resource use in the future.

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An Overview of the Applicability of the Concept and Approach to Current Environmental Problems

JOANNA BURGER, CHRISTOPHER FIELD, RICHARD B. NORGAARD, ELINOR OSTROM, AND DAVID POLICANSKY

> "When the war came to Monterey and to Cannery Row everybody fought it more or less, in one way or another. . . . The canneries themselves fought the war by getting the limit taken off fish and catching them all."
>
> John Steinbeck (*Sweet Thursday,* 1954)

Pasturelands, woodlands, fisheries, and other resources have long been shared, used in common, by local people. To the extent that these resources were sustained rather than environmentally degraded, it was because their common users agreed on the nature of the problem and established and adhered to responsibilities, rights, and other rules. Through extensive case studies, we now realize how the emergence and maintenance of such local and regional commons institutions depend on the coincidence of particular environmental characteristics, social conditions, and technological factors. These advances in our understanding put us in a better position to facilitate the development of

commons institutions in the future. At the same time, new conditions are expanding the spatial and temporal scales over which we need to manage common-pool resources, expanding the need for commons institutions, while seemingly reducing the possibilities that such institutions can emerge. These new conditions include

- more rapid rates of population growth;
- higher and continually increasing rates of consumption;
- ever-greater emphases on individualism, materialism, and economic competition;
- greater differences between individuals, locally and globally, in their access to shared resources;
- greater differences between individuals due to specialization in scientific and experiential knowledge;
- more rapid emergence of new technologies affecting our relations with nature and each other;
- broader impacts of new technologies over space and time;
- apparently greater, but difficult to foresee, specificity of impacts of new technologies on ecosystem functioning; and
- greater cumulative effects of human activity and hence tighter regional and global linkages between ecosystem impacts.

As a consequence of these new conditions, the pressure on both long-standing common-pool resources and newly realized ones is unusually high, while the challenges of establishing appropriate institutions seem to have increased. It is by no means clear that we are devising commons institutions to manage and protect common-pool resources sufficiently rapidly to sustain human well-being over the foreseeable future. The purpose of this book is to review and assess the changing nature of common-pool resources and how well developments in our understanding of common-pool resources and commons institutions are helping us meet the social and environmental challenges we face. This chapter provides an introduction.

A Brief Review of the Commons Concept

An individual using a resource in common with others receives the full benefit of using the resource more intensively while the full costs of the increased use are shared with others. Indeed, in the absence of appropriate institutions, it is in the individual's best interest to take as much as possible as soon as possible, damaging the resource further in his or her greed and haste. The resulting tension between individual gain and the collective good encourages resource degradation, perhaps to destruction. This process, however, can be ameliorated, indeed even reversed such that resource improvement occurs, by commons institutions governing individual behavior. The necessarily shared nature of

some resources, the tension between the individual and the community, resource degradation, and the possibility of ameliorating institutions have been recognized by moral philosophers and popular orators since early times. The tension has been a central issue of political economy since at least the time of Adam Smith. Thomas Malthus and others (see, for example, the lectures of W. F. Lloyd [1968], given from 1832–1836) added population growth to the argument. Gordon (1954) and Scott (1955) developed formal models of how resources used in common are exploited. Popular and scientific awareness of the interplay between shared resources, institutions, and population was greatly heightened through Hardin's classic article, "The Tragedy of the Commons" (1968).

Hardin used the example of a herder placing one more animal on grazing lands used by multiple herders. The individual herder gains the entire advantage of that animal's grazing while bearing only a small part of the cost of the depletion of the grazing lands. It is always in the individual herder's interest to add one more animal, but additional animals are not in the interest of herders overall. Thus managing common-pool resources comes down to limiting access (who will be excluded and how) and affecting subtractability (how much the taking by one person will impinge on the taking by another). Managing common-pool resources involves various ways of limiting access (deciding who will be excluded and how) and affecting harvesting efforts (how much one actor can take). Both restricting access and limiting subtraction are difficult to achieve (Berkes et al. 1989). The solution, in Hardin's view, was to impose some form of government or private ownership from the outside. His solution, however, neglected the possibility that the herders themselves could agree on common rules and enforce them collectively. Moreover, Hardin confused common property regimes, where a community of individuals have enforceable ways of limiting access and may also have rules affecting harvesting strategies, with open access. Under open access, no one can be excluded and no limits exist on harvesting strategies. This confusion stimulated a collaborative research effort by social and natural scientists to elaborate the range of environmental circumstances associated with common-pool resources as well as social circumstances affecting the development, maintenance, and performance of common-property institutions (National Research Council 1986; Berkes 1989; Ostrom 1990; Feeny et al. 1990; Burger and Gochfeld 1998; Ostrom et al. 1999).

It is important to distinguish between the characteristics of a resource and the property rights regime governing the use of the resource. Some resources, such as the agricultural potential of land, can be divided up and managed as separate parcels by individual owners. To a large extent, the management of agricultural potential by one owner does not affect the potential of the land owned by others. Of course, the introduction of pesticides and other technologies has changed this relationship, making agricultural land less divisible

than historically. Fisheries, on the other hand, are much more difficult if not impossible to divide up between users and require some form of collective management. The resource characteristics of anadromous, coastal, lake, and stream fisheries differ significantly, and these differences affect the appropriateness of different commons institutions. It is also important to recognize an asymmetry in the divisible-therefore-private, indivisible-therefore-common institutional spectrum. While divisible resources such as pastureland and forests can be managed successfully in common, less divisible resources cannot be managed successfully through private ownership.

The prototype commons involves people, or commoners, with common interests in meeting similar basic needs for food and fiber, common abilities to exploit the resource, and common levels of power or access to the shared resource. With people and their situations being relatively similar, it seems logical that common responsibilities, rights, and rules would be relatively easy to determine and agree upon. Of course, such perfect conditions have never existed, yet the prototype still serves as a conceptual anchor to much of our understanding about commons. Other social factors being equal, the farther we move from these idealized conditions, the more difficult it would appear to be to develop commons institutions and avoid environmental degradation. Yet other social factors rarely are equal and case studies of common-pool resources and commons institutions have shown that individuals from quite different circumstances have come together and acted collectively to resolve conflicts between individual incentives and the collective good under different social circumstances (Bromley et al. 1992; Ostrom et al. 1994; Agrawal 2000; Baland and Platteau 1996; McKean 2000). In fact, from a rational-choice theory of collective action, resolving such "social dilemmas" is at the root of nearly all governance (Ostrom 1998). Thus we now recognize that our prototypical commons is an interesting conceptual anchor in part because it rests on very simplified liberal-worldview assumptions about individual interests and behavior. While this worldview is certainly dominant in Western political thought, other framings can be used to refine the dominant view, providing substantially richer understandings.

Four general categories of property rights regimes are now recognized: open access, communal, state, and private (National Research Council 1986; Feeny et al. 1990; Bromley 1989, 1991; Hanna and Monasinghe 1995). These regimes differ by nature of ownership, rights and responsibilities of owners, rules of use, and center of control. Box I-1 provides a summary. It is important to keep in mind that actual property rights regimes blur the distinctions, that these categories simply provide additional conceptual anchors. To make matters more difficult, the fourfold classification of property regimes just begins to identify very broad classes of regimes. There are many variants of rules related to access, harvesting, management, determining exclusion, and

Box 1-1. Property Rights Regimes, after Feeny et al. (1990) and Others

Open access: Absence of well-defined property rights; resource often unregulated and free to everyone.

Communal property (res communes): Resource held by community of users; user community excludes outsiders; users may self-regulate; appropriate uses may still be defined by larger society or external power.

State property (res publicae): Resource rights held by government; government can regulate access and exploitation; general public may have access as granted by government; government can use force to enforce laws and can even subsidize use by some.

Private property (res privatae): Individual has the right to particularly appropriate uses of the resource as socially defined; individual also has the right to exclude others from these uses, perhaps the right to prevent uses by others that interfere with his/her rights, and the right to sell or rent the property to others.

transfer of rights. Furthermore, there are rarely perfect matches between resource characteristics and property regimes. Evidence of open-access failure, common-property failure, government failure, and market failure all exist. No simple broad type of property regime fits all common-pool resources. Even similar resource and technology combinations—such as irrigation systems—require variation in the rules that govern access, harvesting, investment, maintenance, monitoring, and sanctioning. Rules that work well for a flat valley-bottom system serving 100 farmers will not work well for a hilly system serving 15,000 farmers. Effective rules help humans cope with the complex characteristics of the resources themselves.

The enrichments in our understanding of common-pool resources and commons institutions, as well as property rights regimes more broadly, came largely through extensive case studies of common-pool resource management around the world. Much of the research on commons has dealt with local and regional fisheries, forests, irrigation systems, groundwater basins, and rangelands (see Alexander 1982; Berkes 1986, 1989; McCay and Acheson 1987; Benjamin et al. 1994; Blomqvist 1996). The case-study approach has proven very useful in identifying and illuminating the questions of common property and the institutional structures that lead to success or failure in dealing with resources used in common. Further, quantitative analyses of multiple resource systems by Tang (1992), Schlager (1990), Schlager and Ostrom (1992), Lam (1994, 1998), and Lam et al. (1997) are beginning to provide a means of examining alternative hypotheses concerning the factors that are associated

with the capacity of local users to self-organize and the success or failure of their efforts.

Our understanding of the commons has also been enriched by other lines of research. Insights on the emergence of cooperation have been gained through repeated Prisoner's Dilemma games, a line of research conducted by both biological and social scientists (Axelrod and Hamilton 1981; Axelrod and Dion 1988). Economists, political scientists, and psychologists have conducted experimental research on the factors affecting an individual's willingness to cooperate (summarized in Ostrom 1998). These lines of research cast serious doubt on the presumption that individuals act only in their narrow, material self-interest. New research on civil society and the interdependencies between nongovernmental and governmental organizations further enhances our understanding (also summarized in Ostrom 1998). The emergence of global civil society and its possible future impacts on resource management are also being explored (Young 1989, 1994; Lipschutz and Mayer 1996). While social scientists have increased our understanding of how commons emerge, biologists have argued that natural variation and the limits of scientific and experiential knowledge make it nearly impossible to agree on whether degradation is actually taking place, and hence nearly impossible to derive commons institutions that ensure sustainability (Ludwig et al. 1993). One objective of this book is to bring the insights of social and natural scientists together.

The Applicability of the Concept of the Commons to New Conditions

Our understanding of the commons concept has increased dramatically over the three decades since Hardin's evocative article of 1968. But to what extent does this increased understanding help us address the issues identified in the opening paragraph? Below we elaborate on a few of them.

Expanding Spatial Scales

Part of the reason the commons thinking of the past needs revisiting is that the scale of commons issues has expanded dramatically. Several of the most important commons problems are now truly global in scale. The scale expansion from local and regional to global involves at least three separate kinds of mechanisms. One is the increase in human population, the driver that was the focus of the early commons work and continues to be important. The second critical mechanism is the development of new technologies that change the impacts of individuals and extend the spatial scale of resource consumption. Over the last several decades, growth in human domination of many global commons has been driven more strongly by increasingly powerful technolo-

gies and rising expectations than by expanding human population. The third mechanism involves the emergence of commons issues where physical and biological processes impose effects at large spatial and long temporal scales. The global distribution of greenhouse gases and consequent climate impacts is one example, as are impacts of nutrient runoff on downstream water users in large river basins.

Numerous human activities, from the cutting of firewood in rural areas of Central and South America to the regulation of major water systems in all countries of the Western Hemisphere, have causes and consequences measured at small, medium, and large spatial and temporal scales. Commons issues are complicated by the intrinsic relevance of multiple scales of space and time. The physical and biological mechanisms that distribute resources and the consequences of takings range over diverse scales, as do the social and governmental mechanisms that regulate human actions. Many of the most challenging commons problems involve noncongruence, in time and space, between the consequences of an action for multiple resources and between the region affected by an action and the region subject to common governance (National Research Council 1996a).

A particularly important question is whether there is congruence between the spatial scale of the resource system itself and the spatial scale of the jurisdictions able to take governance and make management decisions related to that resource (National Research Council 1996a). Another is whether the temporal scale used by decision makers is similar to the temporal scale of the dynamics of the resource system (National Research Council 1996b).

Property rights systems, and governance systems more generally, tend to be nested in space ranging from the shared properties of individual families, to the shared resources of communities of families or local governments, to much larger regional and national governmental jurisdictions. Multinational protocols for protecting international and global commons present some of the thorniest problems, for at least three reasons. First, the framework for shared stewardship is rarely in place prior to negotiation. Second, the parties often utilize the commons resources for very different purposes. And third, parties with contrasting levels of economic development have access to dramatically different options for protecting the commons. Since the boundaries of governmental units are usually arbitrarily drawn when viewed from the perspective of most natural resources, very often the spatial boundaries of a particular resource are not congruent with any one particular governance unit. Groundwater basins in southern California and Mexico, for example, may underlie many different cities and counties, and developing new institutions to govern and manage any one groundwater basin may involve substantial efforts to use courts, legislatures, and administrative agencies to help constitute new enterprises for the purpose of controlling a particular commons (Blomquist