Preface

Inequality, Cooperation and Environmental Sustainability

Jean-Marie Baland, Pranab Bardhan, and Samuel Bowles, editors

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This book originated as a project of the Research Network on the Effects of Inequality on Economic Performance, headed by Bardhan and Bowles. It is part of our exploration of the ways that differences in wealth, status, and rights may influence the economic performance of firms, farms, communities, and nations. We are grateful to the other members of the network for their comments on the studies included in this book, many of which were discussed at Network meetings. We would like to thank the MacArthur Foundation for its generous funding of the Network, which allowed a rather ambitious program of field studies and theoretical work, the results of which are included here. Caren Grown at the Foundation assisted greatly in our work, and we are grateful for her help.

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Introduction to

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Does inequality exacerbate environmental problems? Would an equalization of wealth, social status, and political power contribute to environmental sustainability? Or is environmental degradation a likely byproduct of efforts to advance the economic, social and political interests of the less well-off? Inequality, as well as poverty itself, may exacerbate environmental problems by making it more difficult for individuals, groups and nations to cooperate in the design and enforcement of measures to protect natural assets ranging from local commons to global climate. But a more equal division of a given amount of income could accelerate the process of environmental degradation, for example, if the poor value environmental goods less than the rich, or if their consumption is more intensive in the use of environmental inputs than that of the rich.

This book is an attempt to provide answers to these questions, using new field studies, other empirical investigations and theoretical work on the impact of inequality on environmental sustainability. Environmental degradation often results when members of a community exploiting a local environmental asset fail to cooperate in its protection. These interactions typically have the structure of what are called social dilemmas, common pool resource, or publicgoods problems. These are situations in which all may benefit from a reduction in the exploitation of the environmental asset, but each individual's material gain is maximized by pursuing unlimited exploitation. Thus the protection of local environments often requires cooperation in public goods or common pool social dilemmas. For this reason we give special attention to the effect that inequality may have on cooperation.

The problem is often termed the tragedy of the commons. But far from pursuing the logic of individual gain to the inexorable collapse of the commons, many communities have managed common resources with great success over hundreds of years. Maine lobstermen, for example, limit their catch by means of highly local restrictions on who can set traps where. Turkish fishermen allocate fishing spots by lot and then rotate them. In both cases, governmental regulations supplement local social-network-based enforcement (Ostrom (1990), Acheson (1988)) Successful cooperation to protect forestry and water resources have also been documented (Berkes (1989), Bromley and Feeny (1992).) But failures are also common.

Is inequality to blame when the tragedy of the commons unfolds? To answer we need to know how inequality affects the ability of group members -- whether they be individuals, firms, states or other entities -- to cooperate when it is socially beneficial to
do so. There is evidence – from the effect of inequality in slowing down the diffusion of new consumer goods (Deaton and Meullbauer (1980)) – that economic differences produce social distance. Do more equal groups find fewer impediments to cooperation due to reduced social distance, more effective communication, and heightened group identity, as is suggested by some studies of bargaining (Cook, Emerson, Gillmore, and Yamagishi (1983) Lawler and Yoon (1996), Cook and Emerson (1978))? We know that ethnic and racial heterogeneity is associated with lower provision of public goods and reduced participation in community activities (Alesina and Ferrara (2000).) Does social heterogeneity also impede efforts to protect the environment?

Or does a high level of inequality support cooperation because it increases the likelihood that one or a few wealthy individuals will be able to capture enough of the benefits of cooperation to induce them to provide the public good independently of the actions of the other group members, as was suggested by Mancur Olson (1965)? Does the extension of democratic rights to the formerly excluded undermine ancient hierarchical political structures which in the past contributed to environmental sustainability, as was shown by Garcia-Barrios and Garcia-Barrios (1990) in their study of rural Mexico?

Policies to achieve more egalitarian outcomes may affect environmental sustainability in other, less transparent ways. For example, a redistribution of income from the rich to the poor could worsen the environment if the consumption foregone by the rich as a result of the redistribution had little environmental impact, while the increased consumption of the poor imposed substantial environmental costs. This will be the case even if the consumption by the rich contributes more than the poor to environmental degradation, as long as the adverse environmental impact of consumption is increasing with income at a decreasing rate, that is, the environmental impact is concave in income. (This does not require the much stronger empirical relationship called the “environmental Kuznets curve,” which asserts that environmental quality at the national level first declines with per capital income for low levels of income, but reaches a minimum and then rises.)

Here is an example of “the concavity effect.” In our study of over-extraction of firewood and forest degradation in rural Nepal (chapter 10), we found that the amount of firewood harvested increases with the income level of the family but less than proportionately. This means that holding constant other influences on firewood collection, were the poor a bit richer and the rich a bit poorer, more firewood would be extracted. In this case the effect of greater equality is to reduce the level of environmental quality at a given level of average income, that is, equality worsens the tradeoff between current income and environmental quality. However the evidence for such concavity effects is mixed. Data from a study by the U.S. Congressional Budget Office indicate that the relationship between income and “carbon-intensive consumption” shows no strong concave effects and may even be somewhat convex, depending on the method of estimation (Dinan and Lim (2000).)
We think it much more likely that the effects of inequality on the environment operate by shifting the relationship between income and environmental exploitation rather than deriving from its curvature. Some possible causal relationships involved in this curve shifting include the following.

**Policy biases:** where the wealthy are both politically powerful and able to insulate themselves from the consequences of environmental degradation, policies will be biased against environmental protection. The same will be true where the wealthy can withdraw from cooperative arrangements at little cost to themselves.

**Veblen effects:** Inequality may worsen the tradeoff between current income and environmental quality through what Thorsten Veblen (1899/1934) called “pecuniary emulation”. If the standard of consumption adequate to have a decent life style is influenced by the consumption of the rich, then increasing inequality between the rich and the rest of the society will stimulate efforts to catch up through working longer hours or saving less and consuming more out of a given income. There is some evidence that a desire to emulate the consumption standards of the rich influences individuals’ allocation of time between labor and leisure: in ten OECD countries over the period 1968-1992 a measure of income inequality is a robust predictor of work hours, with hours strongly increasing with inequality both within countries over time and across countries (Bowles and Park (2002)).

**The under-supply of leisure enhancing goods.** Highly unequal societies may fail to provide adequate public goods complementary to the use of free time (libraries, public recreational facilities and other goods that enhance the value of free time.) As a result, free time is less valuable relative to the consumption of commodities as a way of enhancing one's well being, and the composition of goods and activities making up one’s standard of living is biased towards environment-degrading consumption goods and away from environment friendly uses of free time.

In this introduction we have framed a quite broad question concerning the relationship of inequality to environmental quality, as a way of locating our own studies in a larger literature and set of policy challenges. Our book is devoted almost entirely to the question of the sustainability of local commons, and the impact that inequality may have on the kinds of cooperation necessary to deter environmental degradation at the local level. We focus on the local commons because access to common pool resources is essential to the livelihoods of many of the world's poorest families, and because of the great strides by recent research in illuminating how private incentives, group governance, and government policies might combine to better protect these essential resources.

The first two chapters are a theoretical introduction to the issue of inequality, collective action and environmental sustainability from a microeconomic perspective. In chapter 2, Jean-Marie Baland and Jean-Philippe Platteau present a survey of the literature
about inequality and collective action. They focus in particular on models of voluntary contributions to a common good, or voluntary participation to a regulatory structure as a guide to studying the relationship between inequality and collective action. They distinguish various mechanisms that are then illustrated with the stylized facts found in the empirical literature. In chapter 3, Pranab Bardhan, Maitreesh Ghatak and Alexander Karaivanov propose a general model in which producers voluntarily contribute to a collective input (like irrigation) that is complementary in production with privately owned inputs Thus the public good increases the productivity of the private inputs. The private inputs might be land, fishing equipment, or other means of utilizing an environmental asset. These private inputs are unequally distributed among the producers, giving them differing incentives to contribute to the public good. If the use of the private inputs is individually, without cooperative agreement, two types of misuse may result. First, if everyone else gains from one's own contribution, as in the case of cleaning field channels to irrigation cannal, the environmental good will be underprovided. (On the other hand, if everyone else loses from one's own extraction, as in the case of pumping groundwater irrigation, the environmental good will be over used.) The challenge is to identify the distribution of private inputs which leads to the least inefficient outcome under these conditions. The authors show that more inequality has an ambiguous impact on efficiency, as in some circumstances, it is desirable to maintain some inequality between two homogenous groups of producers.

In chapter 4, Marco Janssen and Elinor Ostrom present a novel approach to the issue, based on agent-based computational modeling. Rather than taking the institutional setting as given, as is commonly done, they study how the rules governing environmental use evolve. By simulating various artificial worlds in which agents interact and develop rules organizing their interactions, they show that high levels of heterogeneity between agents may undermine the building up of mutual trust relationships, which is a necessary condition for the emergence of conservation rules. Heterogeneity leads to the development of different identities, and to mentalities of 'us' versus 'them', which reduce the levels of cooperation and the overall performance of the society.

We then turn to empirical investigations.

In Chapter 5, Pranab Bardhan and Jeff Dayton-Johnson present the main results of two large-scale empirical studies of irrigators' communities, one located in South India and the other in Mexico. They find that economic inequality, measured by the distribution in landholdings, is associated with lower maintenance of the environmental resource and greater incidence of water-related conflicts. Bardhan and Dayton-Johnson also measured a dimension of social heterogeneity—for example, caste differences in the Indian case—and found that these social differences have a negative impact on cooperation as measured by the above outcomes. In particular, they investigate not only how inequality affects the design of local rules for managing irrigation resources, but also how the rules in place themselves affect the level of cooperation. Relatedly, they show how rule compliance in
these communities depends on the farmers' perception of the process by which these rules were created. Thus, in South India, maintenance rules are often broken because farmers believe that they were crafted by the local elite. Rules made by governmental officials who are not villagers are particularly prone to non-compliance.

Sara Singleton's contribution, Chapter 6, provides an analysis of the critical role played by distributional conflicts in the history of the Pacific Northwest salmon fishery. She investigates the ways the tribal users of the fishery addressed the questions raised by a joint management of the resource. These have partly failed, and partly succeeded in creating institutions that combine efficiency and equity. In particular, by reviewing inter-tribal negotiations, she describes how the acceptability of a rule or an agreement depended on its (perceived) distributional consequences. Thus, despite an urgent need for a coordinated management scheme, no general scheme for solving inter-tribal allocation rules could be found because each rule proposed disadvantaged at least one of the user group.

Jean-Philippe Platteau and Frederic Gaspart, in chapter 7, analyse some attempts by Senegalese small-scale fishermen to regulate catches in the 1990s. They focus on the way heterogeneity among fishermen affected the results of these attempts. They find that even though skill and technical heterogeneity are important obstacles to collective organization, they can often be overcome through the design of differentiated and adaptable rules. Wealth inequality does not always impede collective action as the wealthy local elite sometimes plays a leading role in the organization of collective action. By contrast, prolonged conflicts have impeded cooperation where migrants and local fishermen compete and make use of different equipment and fishing methods. In addition where poor fishers were indebted to fish sellers, efforts by the fishers to restrict the catch generally failed.

In chapter 8, Juan Camillo Cardenas provides an overview of his experimental work with rural communities in Columbia. The study is unusual as it brings behavioral experiments typically performed in university laboratories into the field, in this case to play common resource experiments with people whose livelihood involves exploiting a common resource. By setting-up carefully designed experiments based on real-life settings, Cardenas highlights the negative impact of inequality on collective action: wealth distance among members of the experimental groups studied inhibits cooperation. Moreover he was able to pinpoint why wealth has this effect. In experiments in which no communication was allowed, the more homogeneous groups did no better than the groups with unequal wealth. But when communication was allowed the more equal groups were much more successful in achieving mutually beneficial high levels of co-operation. Apparently, wealth inequalities impede effective communication and trust, and thereby lead to lower levels of cooperation. By contrast, poverty as such does not appear as a major obstacle for effective cooperation, as poor but homogenous groups often display high levels of collective action.
The three chapters that follow deal exclusively with the Himalayan forests. In chapter 9, E. Somanathan, R.Prabhakar and Bhupendra Singh Mehta provide new evidence based on satellite data of the Himalayan forests in North India. They investigate the impact of caste heterogeneity and land inequality on forest conservation. As these forests are managed by local village councils, they also examine the effect of female participation in such councils. They conclude that caste heterogeneity and female participation have no impact on collective action, nor on the state of the forest. There is some partial evidence that land inequality plays a negative role, but the evidence is not systematic.

In chapter 10, Jean-Marie Baland, Pranab Bardhan, Shangamitra Das, Dilip Mookherjee and Rinki Sarkar examine the determinants of firewood collection of households in rural Nepal, based on the 1995-6 Living Standard Measurement Survey. Here also, the evidence does not provide much support for the role of economic inequality on environmental degradation. However, at the village level, caste heterogeneity is associated with higher levels of firewood collection, an association that may reflect the impact of caste differences as in impediment to cooperation. In the absence of affordable fuel substitutes, consumption standards are the predominant determinant of firewood collection both across households and across villages. As we have seen, it also appears that inequality in consumption standards tends to reduce the total amount of firewood collected in a village, but this effect may be completely independent from collective action, as the relationship between collection and levels of consumption is also concave.

Bina Agarwal, in chapter 11, investigates the role of gender inequality on forest management in India. Based on her field investigations, she shows that women are systematically disadvantaged by the application of forest management rules. Their lack of involvement in the decision-making processes also reduces their ability as well as their incentives to cooperate in local forest management. Moreover, the relevant dimensions of gender inequality include not only the pre-existing inequality in endowments such as land or education, but also the prevailing norms and perceptions of gendered roles, as well as the inequalities that are built in the structure of the governing institution, which all tend to undermine women's effective cooperation.

In the final chapter, James Boyce advances the two hypotheses that social decisions on environmental protection issues favor some groups over others, and that a more unequal distribution of power will result in less general environmental protection, in particular because wealthier people are usually in a position to insulate themselves from the consequences of environmental degradation, in particular by purchasing private environmental quality. This process is illustrated with the example of the hazardous waste disposal policy in the United States, by which waste disposal facilities tend to be located in low-income areas with a high percentage of African-Americans and other minorities. Boyce also presents econometric evidence using state-level data from the U.S. His findings
are consistent with the view that income inequalities and political inequalities contribute to less effective environmental policies, which in turn result in degraded environments. The author concludes by discussing contradictory evidence from the literature on the environmental Kuznets curve.

Taken as a whole our studies do not provide a single answer to the question framing our work. Nor did we expect this to be the case. Rather our findings suggest that the effect of inequality on cooperation and thereby on environmental sustainability depend critically on two things: the institutional setting that structures the nature of interaction among the agents, and the technical nature of the environmental asset in question. We find little evidence in any of our studies that poverty per se contributes to environmental degradation, though there may be other examples in which this is the case. Indeed, alleviation of poverty without complementary policies to protect the environment may have adverse effects on natural assets. Our research has provided evidence that in some settings, inequality does indeed inhibit mutually beneficial approaches to the governance of the commons, as the cases of Mexican and South Indian water resources, and North West Coast fisheries indicate, and the comparison of U.S. states environmental policies suggests. This also means that in these cases, redistributive policies (like land reform or expansion of mass education) may have important beneficial side effects in matters of cooperation on common resources (which are not usually considered in the literature on land reforms or education). In general, the studies in this volume make us more aware of the complexities in the relation between inequality and collective action than is apparent from the standard policy pronouncements one way or the other, and of the need for more context-specific empirical investigations into the different types of alternative mechanisms through which the relevant processes may operate.
Works cited


