

INTRODUCTION

Where Do We Go from Here?

The past four issues of *Science* have examined the State of the Planet, with particular emphasis on global commons—broadly speaking, those critical resources we all must share. Climate, soil, air, water, energy resources, food, fisheries, and biodiversity are all elements of the global commons, and all have prospects that range from uncertain to perilous.

In his influential *Science* essay 35 years ago, Garrett Hardin suggested that humankind was doomed to overexploit the commons unless the freedom to breed was relinquished. Hardin's position was perceived as a simple choice between two coercive alternatives for managing the commons: centralized government and institutionalized private property.

Our special issue begins with an overview by Dietz, Ostrom, and Stern (p. 1907) of progress toward alternatives to the stark choice posed by Hardin. They conclude, with cautious optimism, that experience of the past 35 years has shown that paths to adaptive governance can indeed be opened, but not without a struggle. Aspects of this struggle are explored in the articles that follow.

Several Viewpoints discuss communication and discourse within and between institutions and disciplines concerned with the management of common resources. McMichael *et al.* (p. 1919) highlight the need for demography, economics, ecology, and epidemiology to talk to each other more effectively. Houck (p. 1926) explores the uneasy relationship between science and law in U.S. environmental policy during the decades since Hardin's article. Adams *et al.* (p. 1915) point out that disparities in the perceptions, knowledge, and beliefs of different stakeholders present barriers to effective communication between stakeholders in the management of common-pool resources, and that recognition of this problem by all protagonists is an important step on the road to policy-making. The notion of social capital, which stresses the relationship between sustainability and social norms, provides a potential escape from Hardin's solutions to tragedy: Pretty (p. 1912) provides an account of the positive outcomes that can ensue, at least at the local and regional level, when communities are able to adopt such an approach.

The remaining Viewpoints examine three of the global commons: climate, food, and health. All of these are areas where the concept of social capital needs to be scaled up from local to international, and ultimately global, and where science has a partnership with policy-making. Chronic and infectious diseases are inimical to progress toward more sustainable lifestyles; Mascie-Taylor and Karim (p. 1921) discuss the scale of the global health problem and outline solutions on a scale that extends from local to global. Rosegrant and Cline (p. 1917) show that food security in the coming years depends not just on agricultural research and improvement, but on a web of other factors from education to investment in ecosystem services. Finally, Watson (p. 1925) and Hasselmann *et al.* (p. 1923) explore the political challenges posed by global climate change, arguably the single most pressing global environmental problem.

Hardin suggested that the tragedy of the commons belonged to a class of problems that have no technical solution, effectively denying a role for science. However, as the articles in this issue imply, science now has a central and urgent part to play.

—ANDREW SUGDEN, CAROLINE ASH, BROOKS HANSON, JESSE SMITH

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REVIEW AND VIEWPOINTS

- 1907 The Struggle to Govern the Commons**
T. Dietz *et al.*
- 1912 Social Capital and the Collective Management of Resources**
J. Pretty
- 1915 Managing Tragedies: Understanding Conflict over Common Pool Resources**
W. M. Adams *et al.*
- 1917 Global Food Security: Challenges and Policies**
M. W. Rosegrant and S. A. Cline
- 1919 New Visions for Addressing Sustainability**
A. J. McMichael *et al.*
- 1921 The Burden of Chronic Disease**
C. G. N. Mascie-Taylor and E. Karim
- 1923 The Challenge of Long-Term Climate Change**
K. Hasselmann *et al.*
- 1925 Climate Change: The Political Situation**
R. T. Watson
- 1926 Tales from a Troubled Marriage: Science and Law in Environmental Policy**
O. Houck

See also the Editorial on p. 1861.

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