

Some Foundational and Transformative Grand Challenges for the Social and Behavioral Sciences: The Problem of Global Public Goods¹

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In a letter to colleagues, Myron Gutmann, Assistant Director of the National Science Foundation, invited people “to contribute white papers outlining grand challenge questions that are both foundational and transformative.” This paper will address some foundational issues that cross the boundaries of many social and natural science: the issue of how to deal with global public goods.

The problem of global public goods

Many critical issues facing humanity today -- global warming and ozone depletion, banking crises and cyber warfare, oil-price shocks and nuclear proliferation – are ones whose effects are global and resist the control of both markets and national governments. These are examples of *global public goods*, which are goods whose impacts are indivisibly spread around the entire globe. These are not new phenomena but are becoming more important because of rapid technological change.

Global public goods differ from other economic issues because there is no workable mechanism for resolving these issues efficiently and effectively. If a terrible storm destroys a significant fraction of America's corn crop, the reaction of prices and farmers will help equilibrate needs and availabilities. If scientists discover the lethal character of lead in the American air and soil, the government is likely, eventually and often haltingly, to undertake to issue the necessary regulations to reduce lead in gasoline and paint. But if problems arise for global public goods, such as global warming or nuclear proliferation, there is no market or government mechanism that contains both political means and appropriate incentives to implement an efficient outcome. Markets can work wonders, but they routinely fail to solve the problems caused by global public goods.

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Global Public Goods and the Westphalian Dilemma

In theory, global public goods are well understood as the polar case of a Samuelsonian public good. In practice, they raise the most intractable issues for real-world resolution primarily because of what has been called the Westphalian dilemma. Whenever we encounter a social, economic, or political problem, one of the first questions raised concerns the appropriate organizational level at which the problem should be addressed (it is called fiscal federalism in public finance). We expect households to deal with children's homework assignments and take out the trash; we expect local or regional governments to organize schools and collect the trash; we expect national governments to defend their borders and manage their currencies.

For the case of global public goods, there exist today no workable market or governmental mechanisms that are appropriate for the problems. With a few exceptions, there are no mechanisms by which global citizens can make binding collective decisions to slow global warming, to cure overfishing of blue-fin tuna, to form a world army to combat dangerous tyrants, or to rein in dangerous nuclear technologies.

National governments have the actual power and legal authority to establish laws and institutions within their territories; this includes the right to internalize externalities within their boundaries and provide for national public goods. By contrast, under international law as it has evolved in the West and then the world, there is at present no adequate legal mechanism by which disinterested majorities, or even supermajorities, can coerce reluctant free-riding countries into mechanisms that provide for global public goods. Participants of the Treaty of Westphalia recognized in 1648 the *Staatensystem*, or system of sovereign states, each of which was a political sovereign with power to govern its territory. As the system of sovereign states evolved, it led to the current system of international law under which international obligations may be imposed on a sovereign state only with its consent.

Because nations are deeply attached to their sovereignty, the Westphalian system leads to severe problems for global public goods. The de facto requirement for unanimity or broad consensus is in reality a recipe for inaction. Particularly where there are strong asymmetries in the costs and benefits (as is the case for nuclear non-proliferation or global warming), the requirement of reaching consensus means that it is extremely difficult to reach universal and binding international agreements. Not only does each nation face a powerful incentive to free-ride off the public-good efforts of other nations, but each is likely to perceive the costs and benefits of cooperation through a biased cognitive lens that justifies free-riding.

One answer to the political vacuum is to create international institutions. Such organizations generally work by unanimity, have few provisions that are binding on recalcitrant countries, and generally apply only to countries which have agreed to participate. Even for life and death issues such as nuclear weapons, if a state like North

Korea declines to participate in the Non-Proliferation Treaty, there is no provision for forcing its adherence.

There are important examples where the international system has responded to this set of problems. Some are rules such as prohibitions on torture, slavery, genocide, piracy, and racial discrimination. Another area, particularly important for national security, resides in the power of the U.N. Security Council, although these require consent of the five permanent Members. The rules governing international trade have evolved toward multinational decision-making. In the environmental arena, treaties to reduce ozone-depleting chemicals have been an important contribution. But the exceptions are limited and do not cover many critical areas.

The central proposition of this White Paper is that global public goods are becoming more important, and will become increasingly important in the years ahead. *The grand challenge for economics, political science, international relations, and associated social sciences is to devise mechanisms that overcome the bias toward the status quo and the voluntary nature of current international law in life-threatening issues.* The Westphalian system is an increasingly dangerous vestige of a different world. Just as economists recognize that consumer sovereignty does not apply to children, our international institutions and analyses must come to grips with the fact that national sovereignty often cannot deal effectively with critical global public goods.

Challenges in Dealing with Global Public Goods

Dealing effectively with global public goods has two *intellectual* grand challenges, which are both critical and complementary.

The first challenge is the analytical one. This involves understanding the behavioral aspects that underlie the problems associated with global public goods. I have outlined the difficulties that are at the intersection of game theory, economics, political science, and international law. There exists a substantial core of work on cooperative games and public-goods mechanisms. One critical task, then, is to explore the perverse outcomes as well as possible mechanisms involved in addressing global public goods. It should be emphasized that the nature of the syndromes may differ according to whether they are benign or harmful; on the structure of the production technologies, such as whether they are additive, best-shot, or weakest-link; on the distribution of gains and losses; and on the scale of the problem.

The second challenge consists of actual problems that pose dangers to human societies. Each of the problems mentioned in this White Paper (global warming, overfishing, and cyber warfare, as examples) has a specific structure and a “local” expertise of knowledge. (In this context, local denotes intellectual as well as geographical proximity.) To take the example of global warming, the local expertise involves climate scientists, ecologists, marine biologists, energy specialists, and the like. But the local expertise is not sufficient to deal with global public goods. It is also

necessary to recognize the analytical issues involved, the nature of the externalities, and the mechanisms for reaching solutions – and this is where the complementarity between the analysis in the first challenge and the local knowledge in the second challenge arises. To return to the example of global warming, those who have studied the history of international agreements will recognize that it is insufficient to tell countries that a terrible future awaits them if they do not act. It will be necessary to design systems in which affirmative national steps to contribute to global action serve a country's own national self-interests, particularly when the national costs of action are large and the national costs of inaction appear small.

Strategy for Research for the National Science Foundation and other Agencies

Finally, I address the strategy for the NSF and other agencies in addressing the *programmatic* study of global public goods. I do not recommend establishing a special program to deal with such issues. It is generally fruitless to attempt to establish programs in the social sciences to address specific challenges that spring up from time to time. Rather, I would suggest two complementary approaches.

First, for the NSF, I suggest that each program within the Directorate for the Social, Behavioral, and Economic Sciences make a special effort to solicit and recognize research that is targeted to research on aspects global public goods. This would also encourage cross-disciplinary research programs (such as economics and international relations, or political science and behavioral psychology) that address specific issues that arise in the context of global public goods. This goal might be accomplished by establishing matching funds to provide incentives to programs. The definition of the analytical areas to be supported as well as the specific problems that need examination should be determined by a panel specifically asked to delineate the issues.

A second approach transcends the boundaries of the social sciences and includes the study of the actual problems raised by global public goods. The federal government directly and indirectly supports a wide variety of research programs on the substantive issues discussed here. Indeed, climate change, security issues, environmental research, terrorism, and public health are extensively studied in different parts of the federal government. However, these problems are often viewed in isolation as technical, scientific, or security issues. In fact, they are just as much social and political issues. Research and policy have sometimes foundered because they did not incorporate the relevant social-science insights from the very conception. It is essential to have a mechanism by which social-scientific analyses can be included in such research programs and for social scientists to be at the table when the scope of the problems and the research programs are defined. So the grandest challenge of all is to ensure that

research on global problems be seen in the social as well as the technical context when the substantive problems are considered.

What are the stakes?

I conclude with the warning from Rockström et al. on global environmental issues:

Human activities increasingly influence the Earth's climate and ecosystems. The Earth has entered a new epoch, the Anthropocene, where humans constitute the dominant driver of change to the Earth System. The exponential growth of human activities is raising concern that further pressure on the Earth System could destabilize critical biophysical systems and trigger abrupt or irreversible environmental changes that would be deleterious or even catastrophic for human well-being. This is a profound dilemma because the predominant paradigm of social and economic development remains largely oblivious to the risk of human induced environmental disasters at continental to planetary scales.

While this warning is only a hypothesis at this stage, it does indicate the stakes involved in the grand challenge of finding solutions for global public goods.

References

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