ENVIRONMENT

Looming Global-Scale Failures and Missing Institutions

Navigating global changes requires a coevolving set of collaborative, global institutions.

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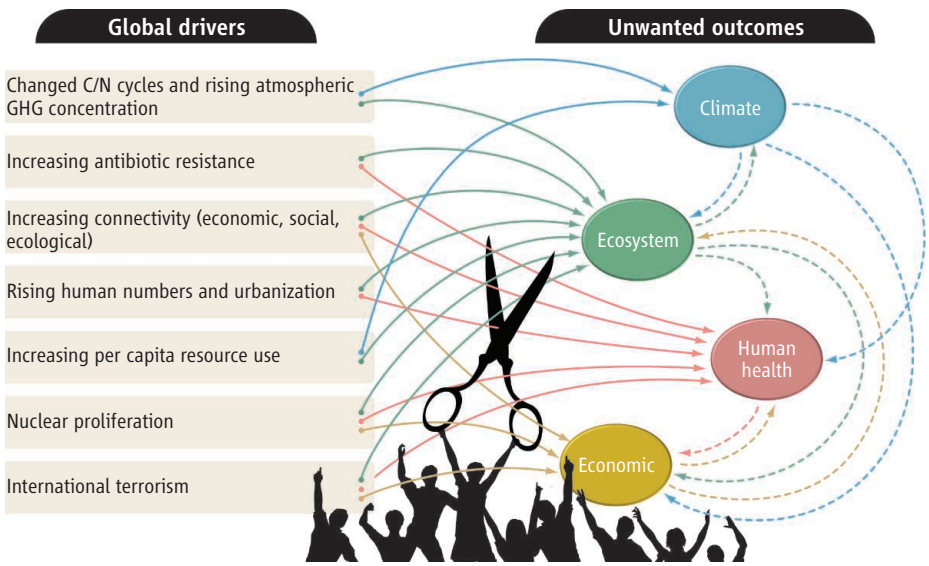
Energy, food, and water crises; climate disruption; declining fisheries; increasing ocean acidification; emerging diseases; and increasing antibiotic resistance are examples of serious, intertwined global-scale challenges spawned by the accelerating scale of human activity. They are outpacing the development of institutions to deal with them and their many interactive effects. The core of the problem is inducing cooperation in situations where individuals and nations will collectively gain if all cooperate, but each faces the temptation to take a free ride on the cooperation of others. The nation-state achieves cooperation by the exercise of sovereign power within its boundaries. The difficulty to date is that transnational institutions provide, at best, only partial solutions, and implementation of even these solutions can be undermined by internation competition and recalcitrance.

We are not advocating that countries abandon sovereignty. Lack of sovereignty can impede cooperation. Piracy is an obvious example. It is rife off of the Somali coast because Somalia lacks a government capable of enforcing laws (including international laws) against piracy. Because of this, the United Nations Security Council has authorized interventions by other states within Somalia's territorial waters and even on land—an unprecedented act. Nor are we advocating simply that today's transnational institutions be strengthened; some of these institutions prevent progress or are ineffective or inefficient [e.g., (*1*)]. Instead, we advocate a renewed focus on effective cooperation, facilitated by better-designed institutions.

Today, climate disruption is on the international agenda but other, interacting global challenges are neglected. International institutions primarily focus on single problems, ignoring system-wide interactions. Addressing climate change through forest plantations, for example, may replace ecosystems targeted by the U.N. Biodiversity Convention (*2*). Similarly, promotion of biofuels can accelerate deforestation and erode the food security of impoverished nations (*3*). Pandemic influenza is more likely to emerge where pigs and birds intermingle with people; yet no global protocols exist for appropriate animal husbandry, only for trade in animals and animal products. Although mechanisms exist to address individual drivers, their interactive effects must be dealt with comprehensively (*4*, *5*) (see figure).



Interactive effects of global drivers on unwanted outcomes in the state of the world. Some outcomes also act as drivers of others (dashed arrows).

Limited understanding and a lack of forewarning exacerbate unwanted outcomes of global drivers. Organizations that manage boundaries between knowledge and action in ways that enhance the salience, credibility, and legitimacy of the knowledge are too often lacking (*6*). For example, contributors to the Convention on Biological Diversity and to the Convention on the Prevention of Marine Pollution recently issued separate statements of concern about proposed large-scale ocean fertilization experiments, whereas parties to the Framework Convention on Climate Change said nothing, even though the experiments were to learn if fertilization could reduce atmospheric CO_2. These organizations must work together to determine what such large-scale experiments should investigate and whether they should be undertaken.

Knowledge alone is not enough. New and reformed institutions are needed for facilitating a change in human behavior, to increase local appreciation of shared global concerns (*7*), and to correct collective action failures that cause global-scale problems. For example, people sometimes reduce their energy use

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when made aware that they consume more than the social norm (*8*). Thus, changes in the way knowledge is communicated can amplify the effect of carbon pricing on behavior. However, this change in behavior assumes acceptance of a common international norm of energy use. Such norms are more likely to emerge with decreases in inequalities in distribution of income and power and more interaction across the globe (*9*), which facilitate emergence of international institutions.

Nations gain by cooperating to address global-scale problems. The challenge is to design international institutions that overcome free-riding by creating incentives to reward cooperation and to sanction violations. For example, although problems remain with the multilateral trade system, the World Trade Organization (WTO) has reduced tariffs and nontariff barriers to the benefit of its members. Countries that violate the rules are subject to proportionate retaliation (*10*). Because trade is a bilateral activity, these rules are relatively easy to enforce, but the principle of reciprocity and deferring to international bodies is important to every effort to cooperate.

A crucial question is how to secure a country's consent to binding rules in the first place. Agreements must be designed so that countries are better off participating than not. When the United States faced retaliatory restrictions in 2003 for imposing tariffs on steel imports, in violation of WTO rules, the United States did not threaten to withdraw from the agreement then or in a similar case in 2003 involving tariffs on memory chips (*11*). Doing so would not have been credible, as withdrawal would have been more damaging than compliance.

Of special importance are rules that apply universally, such as the peremptory, or jus cogens, norms proscribing activities like genocide or torture. Failure to stop genocide in Rwanda spurred efforts to establish a new "responsibility to protect" humanitarian norm (*12*). As threats to sustainability increase, norms for behavior toward the global environment are also likely to become part of the jus cogens set.

The responsibility to protect rests in the first instance with the state having sovereignty over its population. Only in the event that the state is unable or unwilling to protect its people are other states obligated to intervene. The challenge is not just to declare the principle but to ensure its acceptance and enforcement. Acceptance is needed for legitimacy, and enforcement will depend on whether states are willing to make the necessary sacrifices. If the responsibility to protect is to apply to the environment as well, these same challenges will need to be overcome. We use three examples to illustrate how institutional development might proceed.

Climate change. International climate agreements must be designed to align national and global interests and curb free-riding. Borrowing from the WTO architecture, the linkage between trade and the environment could be incorporated within a new climate treaty to enforce emission limits for trade-sensitive sectors. New global standards could establish a climate-friendly framework with supporting payments, e.g., for technology transfer, to encourage developing country participation. In this context, trade restrictions applied to nonparticipants would be legitimate and credible, because participating parties would not want nonparties to have trade advantages.

Coevolution of institutions offers a pathway to further progress. Recently, the Montreal Protocol strengthened its controls on hydrochlorofluorocarbons (HCFCs), manufacture of which produces hydrofluorocarbons (HFCs) as a by-product. HFCs do not affect ozone and are not controlled under the Montreal Protocol. However, they are greenhouse gases (GHGs), controlled under the Kyoto Protocol. The Montreal Protocol should now either be amended to control HFCs directly or else a new agreement, styled after the Montreal Protocol, should be developed under the Framework Convention to control HFCs.

High-seas fisheries. The Code of Conduct for Responsible Fisheries, which was adopted by the U.N. Food and Agriculture Organization in 1995 was a positive step, but because adherence is voluntary, it has had little effect. Another approach would be to develop a norm, akin to the responsibility to protect (*12*), requiring all states responsible for managing a fishery to intercede when a state fails to fulfill its obligations. Credible enforcement is a challenge, but efforts by major powers to enforce a U.N. General Assembly ban on large-scale drift-net fishing offers hope that an emerging norm can be enforced (*13*).

Drug resistance. Addressing drug resistance demands global standards. The International Health Regulations (IHRs) are an international legal instrument that is binding on 194 countries, including all the member states of the World Health Organization. It currently establishes minimum standards for infectious disease surveillance, but could be amended to promote standards for drug use. For example, monotherapy treatments for malaria are cheaper but more prone to encourage resistance in mosquitoes than combination therapy drugs. Their use should be limited in favor of the more expensive combination therapy drugs. One approach to global action would be an amendment to the IHRs that obligated all member countries to collective action to promote combination therapies, supported by global subsidies, and to discourage, or even prohibit, monotherapies (*14*).

Conclusions

The major powers must be willing to enforce agreements, but legitimacy will depend on acceptance by numerous and diverse countries and by nongovernmental actors, such as civil society and business. This seems to be the basis for the greater success of the Montreal Protocol relative to the Kyoto Protocol. Strong backing by a majority for collective action, even though it may restrict individual freedoms, is necessary to institute and uphold an agreement. Formal sanctions are necessary to prevent cheating and are more likely to succeed where the backing is based on transparent, common norms. Agreements should not only be instruments of change but should establish processes for change, engaging a wide set of actors.

The institution of the nation-state has helped improve the well-being of many individuals, but at the cost of reduced global resilience. To address our common threats we need greater interaction among existing institutions, as well as new institutions, to help construct and maintain a global-scale social contract.

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