

Implementing Environmental Commitments:
How Governments, Industry and NGOs Put International Environmental Agreements into
Practice

by David G. Victor and Eugene B. Skolnikoff¹

Many environmental problems are international; their causes or consequences cross political borders. Combating these problems requires coordination among states. In nearly every case, states have organized their responses to transboundary environmental problems via international agreements. The pace of negotiating such agreements has been swift and increasing. More than half of the United Nations' list of 170 multilateral environmental agreements has been added in the last 25 years. Much of the cannon of international environmental law—such as agreements to regulate trade in hazardous wastes, global warming, and depletion of the stratospheric ozone layer—has been adopted only in the last decade.

¹ The authors were co-leaders of the project on “Implementation and Effectiveness of International Environmental Commitments” at the International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria. IIASA is a non-governmental research institute sponsored by national member organizations in 17 countries; the views here are the authors' own and not necessarily those of IIASA or its member organizations. An earlier version of this essay appeared in IIASA's *Options* magazine (DATE?). DGV is Robert W. Johnson, Jr., Fellow for Science and Technology at the Council on Foreign Relations; EBS is Professor of Political Science (emeritus) at the Massachusetts Institute of Technology. The research summarized in this article is presented in more detail in: David G. Victor, Kal Raustiala, Eugene B. Skolnikoff, eds., 1998, *The Implementation and Effectiveness of International Environmental Commitments: Theory and Practice* (Cambridge, MIT Press). A list of other publications of the project is available at: <http://www.iiasa.ac.at/Research/IEC>.

As the list of environmental agreements multiplied, we led a project to assess whether and why such agreements have been *effective*. Our focus was the process of *implementation*: how intent translates into action that helps to solve international environmental problems. The International Institute for Applied Systems Analysis (IIASA), a non-governmental research institute, sponsored and housed the project at its headquarters in Laxenburg, Austria. Among the products from this multidisciplinary effort that involved two dozen scholars was a book containing 14 historical case studies on topics ranging from the regulation of acid rain in Europe to the limitation of trade in hazardous chemicals and pesticides.² The studies are summarized in table 1 and major findings are reviewed in this essay.

We examined how national governments and stakeholders have translated international commitments into national rules and changes in behavior that helped to solve environmental problems. And we also examined implementation at the international level—how, once an international agreement is adopted, international institutions have aided the monitoring, enforcement and adjustment. For nearly all the international environmental problems on the agenda today, inadequate attention to implementation at both the national and international levels explains a large part of the reason why international environmental agreements have fallen short of their promise. And as the policy agenda has grown more demanding—requiring that international agreements play an even greater role in coordinating the behavior of national governments and private firms

² For more on research methods see chapter 1 of the MIT Press book. In addition to these historical case studies, the IIASA project also sponsored a research effort to build a “regimes database” of all major variables that contribute to the effectiveness of international environmental commitments; coded with data from international regimes, the database is a research tool intended to aid hypothesis testing about the factors that explain the effectiveness of international regimes. The project also sponsored a policy-oriented game simulation. [CAN THIS LONG FOOTNOTE BE AT THE END, OR DROPPED ALTOGETHER?] David G. Victor was the project co-leader in residence at IIASA, and Eugene B. Skolnikoff, [NO NEED TO REPEAT MY AFFILIATION] Department of Political Science, MIT, USA, served as its nonresident co-leader. Project participants were: Steinar Andresen, Olav Schram Stokke, Jon Birger Skjaereth, and Jorgen Wettestad, Fridtjof Nansen Institute, Norway; Helmut Breitmeier, Univ. of Darmstadt, Germany; Ronnie Hjorth, Dept. of Political Science, Linköping University, Sweden; Owen Greene and Julian Salt, Department of Peace Studies, University of Bradford, UK; John Lanchbery, Verification Technology Information Centre, London, UK; Marc Levy, Woodrow Wilson School, Princeton University, USA; Elena Nikitina and Alexei Roginko, Institute of World Economy and International Relations, Russian Academy of Sciences; Vladimir Kotov, School of Business Management, Academy of Transport, Russia; Edward Parson, Harvard University, USA; Juan Carlos di Primio, Karlsruhe, Germany; Oran Young, Dartmouth College, USA; and, Michael Zürn, University of Bremen. The advisory committee included: Abram Chayes, Harvard Law School, USA; Gueorgui S. Golitsyn, Institute of Atmospheric Physics, Russia; Peter Sand, University of Munich, Germany, and formerly Legal Advisor, The World Bank; and Arild Underdal, University of Oslo, Norway. These scholars worked at IIASA under the project title "Implementation and Effectiveness of International Environmental Commitments."

and people—the importance of implementation has {multiplied}. GROWN APACE.
[MULTIPLIED ISN'T QUITE THE RIGHT CONCEPT]

At the national level we gave special attention to the many efforts by policy makers to engage “stakeholders.” Contrary to fears that stakeholders would take over and capture the process of social [WHY SOCIAL?] regulation, we found that active efforts to engage industry and environmental nongovernmental organizations (NGOs) often were a boon to regulation. Typically stakeholders, not governments, had the information necessary to {write} [CONSTRUCT?] and implement effective regulatory programs. The most successful efforts to engage stakeholders have been those that have altered the incentives for stakeholders to participate—for example, by opening access to useful environmental data so that public interest groups could participate on an equal footing with private firms and governments. Formal rules, such as the efforts to open access [FOR STAKEHOLDERS] to rulemaking and negotiating fora, were much less important.

Several of the IIASA studies focused on national implementation in countries that are undergoing transition from central planning. These countries are host to some of the worst industrial environmental problems—putting effective regulatory programs into place could dramatically improve some international environmental problems, like acid rain or fouling of the Baltic Sea, while also cutting severe local environmental threats [AS POLLUTED AIR] {like smog} and contaminated drinking water. We found that efforts to build market-based democratic institutions in the former communist countries are also making possible more effective implementation of international environmental commitments. But in Russia—by far the largest of the transition countries and home to many of the most severe environmental threats—many other factors have impeded implementation. Western assistance has had some impact, but much less than hoped and claimed. [BY WHOM?] Of all the countries that we examined, Russia was the only one where participation by environmental NGOs has declined—and with it the effectiveness of environmental regulation—in part due to active government efforts to stifle civil society’s interest in protecting the environment.

[THIS FIRST SENTENCE OF THIS PARA I THINK SHOULD BE AT THE END OF THE PARA] {At the international level, we found that monitoring and enforcement of commitments was often essential.} [WE FOUND THAT] In the past, high levels of compliance with international environmental commitments often reflected that commitments were trivial—in many cases, commitments simply codified rather than changed behavior. The need for strict monitoring and enforcement was low [IN THOSE CASES] because incentives to cheat were few, but effectiveness [IN CURBING ENVIRONMENTAL PROBLEMS] was also low. (Interestingly, we found that compliance with nonbinding agreements was typically much lower than compliance with legally binding “treaties” [HOWEVER, THAT CAN BE DECEPTIVE. {because}] agreements that were not binding were often more ambitious. [AND THUS] In many cases, those nonbinding agreements were ACTUALLY {also} more effective.) As efforts to tackle environmental problems have intensified, commitments have become more demanding and incentives to cheat have grown. [CORRESPONDINGLY, WE FOUND THAT MONITORING AND ENFORCEMENT OF THESE MORE DEMANDING AGREEMENTS ARE ESSENTIAL.FOR THEIR IMPLEMENTATION.]

In advanced industrial countries, NGOs have served as watchdogs and have often [SPURRED] {deterred} governments and firms [TO] {from not implementing} [IMPLEMENT] their environmental commitments—at least in cases where implementation failures would be highly visible. But in areas and societies where NGOs are less active, {implementation} failures [TO COMPLY] have been more numerous and there is a great need for international institutions that can identify and handle implementation problems.

Although implementation review [WOULD IT BE BETTER HERE TO SAY ORGANIZED OR SYSTEMATIC REVIEW OF IMPLEMENTATION?] is commonplace in national regulatory programs, the systematic monitoring, assessment and handling of implementation failures by international institutions is relatively rare. The IIASA project found that formal mechanisms for implementation review exist in nearly every recent international environmental agreement. In addition, many informal efforts to review implementation and handle cases of noncompliance often exist in tandem with formal mechanisms. We found that, together, these formal and informal mechanisms form [WHAT WE TERMED??] “systems for implementation review (SIRs).” The true capacity of an international environmental regime to spot and handle cases of poor implementation, and to adjust commitments over time, can be assessed only by looking at the formal and informal mechanisms together. For example, until a formal “Non-Compliance Procedure” was invoked, there was no coordinated response to Russia’s failure to comply with its obligations under the Montreal Protocol on Substances that Deplete the Ozone Layer. However, once that Procedure created a framework for handling the problem, the incentives that are actually having the greatest influence on Russia’s behavior—a package of subsidies as well as threats of sanctions if Russia does not comply—have actually been delivered by other institutions and governments that are formally external to the Procedure. This approach—a blend of formal and informal responses that is assembled ad hoc—is necessary because many countries have been unwilling to accept international agreements that include strict, automatic and formalized mechanisms for monitoring and enforcement.

[THE LATTER PART OF THE PARA ABOVE IS LONG AND HARD TO FOLLOW. THE FOLLOWING MIGHT BE USED INSTEAD.]
[FOR EXAMPLE, THE MOST PRODUCTIVE INCENTIVES FOR RUSSIA TO COMPLY WITH THE MONTREAL PROTOCOL PROVED TO BE A MIX OF SUBSIDIES AND THREATENED SANCTIONS, ONLY SOME OF WHICH WERE ACTUALLY INCLUDED IN THE PROTOCOL.]

Below we examine these findings—concerning implementation at the national and international levels—in more detail. We review what we expected to find, and what our colleagues actually found in the historical case studies. [IF THE ABOVE PARAS ARE A SUMMARY OF THE WHOLE, ISN’T SOME HEADING NECESSARY AT THE BEGINNING, LIKE “SUMMARY”?]

National Implementation

Most of the IIASA case studies examined the critical processes by which international environmental commitments are put into practice at the national level. The studies traced implementation in Western, market-based countries as well as in countries (mainly Russia) that are undergoing a transition to a liberal, market-based society.

The studies demonstrate that there is no standard implementation process. Even similar countries adopt very different approaches; [AND] within countries, the implementation process varies markedly among sectors. Because these differences make generalization difficult, we found that it was crucial to narrow the inquiry. The studies focused on two major aspects of national implementation: how (1) patterns of participation, and (2) the process of transition have affected both the process and outcomes of efforts to implement international commitments.

Participation

A striking attribute of efforts to manage environmental problems is the participation of many "stakeholders": government agencies, industry, and environmental pressure groups. Over the last two decades, participation has expanded dramatically. Previously, access to international and national policy processes had been exclusive to governmental officials and a few "insider" industries. Today, a wide range of public interest groups also have formal access, and there are calls for still further expansion.

In parallel with rising participation, the policy agenda more often includes environmental problems that intrinsically affect a large number of stakeholders—problems that are caused by behavior that is pervasive in society. Several of the IEC studies focused on increasingly common problems, such as regulation of land-based sources of pollution in the Baltic and North Seas {,} caused by the activities of farmers, households, firms, and municipalities. [ENVIRONMENTAL] Problems of this kind are difficult to manage because they often affect and require regulation of thousands or millions of actors, rather than a well-defined sector or group.

[The IEC project???] {has} focused on how these many stakeholders participate in the implementation process and whether [DIFFERING] patterns of participation matter.

Expectation: *Patterns of participation influence [BOTH] [WITHOUT THIS, THE HYPOTHESIS APPEARS BANAL; PERHAPS IT IS ANYWAY??] policy decisions and behavior.*

Observation: Rising participation has certainly affected the process of making and implementing international environmental [POLICIES] {commitments}. Efforts to expand participation have typically resulted in greater access and influence for public interest NGOs. As these interest groups gained a stronger voice, {often} the result has [OFTEN] been bolder environmental commitments and policies.

But the impact of rising participation on behavior—which is ultimately what matters most—is less clear. In many cases, bold commitments and policies actually led to little change in behavior. However, we did find that participation by the "targets" of regulation, [USUALLY?] {often} industry, has made regulation more effective. Targets provide

invaluable information on the feasibility of different options for implementing international commitments. That information, which is often not available elsewhere, can yield policies that are more realistic and ultimately more effective because they better reflect industry's interests and capabilities.

Expectation: *Target groups capture and weaken environmental regulation.*

Observation: Although {target} participation [BY TARGETS] yields many benefits, it also imposes risks. Most dangerous is that the policy process could merely reflect the interests of regulated industries and not the public interest. As expected, IEC found that the risks of "regulatory capture" decline sharply when groups with countervailing interests also participate. In practice, public interest{s} NGOs such as environmental pressure groups typically fill this function.

Expectation: *Oversight by environmental NGOs is extensive.*

Observation: Today it is widely asserted that NGOs play a central role in monitoring and enforcing compliance with international environmental commitments. NGOs are crucial, it is claimed, because they ensure that governments live up to their international obligations. We found that in democratic industrial countries {that} NGOs do provide some broad oversight—thus flagrant violations of international commitments by these countries {is} [ARE] rare. But only rarely do NGOs spontaneously emerge [??—ON THEIR OWN? MEANING NOT CLEAR] to provide systematic supervision of the implementation process.

The IIASA studies suggest that independent oversight and enforcement are rarely performed by NGOs because such functions require extensive information, which is expensive to obtain. The exceptions include international efforts to protect wildlife—such as the effective agreements to regulate trade in specimens of endangered species—where public interest NGOs have been in operation for decades, slowly building the databases and networks that are crucial to monitoring and enforcement. Other exceptions include cases where NGOs derive direct benefits, such as the highly visible actions to {blockade} [BLOCK??] ocean dumping and whaling ships. But the new generation of environmental problems caused by highly diffuse activities often do not lend themselves to such high profile enforcement activities. [EACH ACTIVITY {Many actions each} contribute[S] a small part of the total problem; few, if any, are attractive villains.

We conclude that balanced participation—by target groups as well as by other [WHY OTHER??] NGOs—is crucial, especially because in most cases national governments and international institutions do not on their own develop and implement [SUFFICIENT ACTION] {regulations} that [IS] {are} necessary for addressing the environmental issues on the agenda today. One of the most obvious policy tools for achieving this balance of participation—changing rules of access for potential participants—often actually has little influence on who participates, on the policies that result, or on the their practical influence.

Much more important are the costs and benefits of participation, which are difficult to influence directly. In the effort to protect the North Sea, {actually} patterns of participation both inside the major states as well as in the international negotiating fora were not much affected by changes in formal rules of access[.] [THIS NEXT SENTENCE CAN BE DELETED] [R]ather, [PARTICIPATION INCREASED FOR OTHER REASONS—

THE BENEFITS TO BE OBTAINED--AND THEN LED TO THE EASING OF {more liberal} [THE] formal rules [OF ACCESS.] {were the result of rising participation rather than the cause.} These results suggest that current policy debates, which emphasize the importance of formally allowing NGOs greater access to policy making fora, are somewhat misplaced. Formal access is necessary but not the most important factor.

*Societies in Transition*³

Countries that are making the transition from central planning face, and produce, some of the most severe environmental problems. Nuclear fallout from the Chernobyl accident is the most notorious example, but the former centrally planned countries have been among the largest contributors to acid rain in Europe, pollution of international rivers and seas, emissions of greenhouse gases, and dumping of hazardous wastes. The most serious failures to comply with the Montreal Protocol on stratospheric ozone depletion are all in countries that are undergoing transition from central planning. Russia received primary attention from IEC [IN THE IEC PROJECT??] because of its sheer size and importance. Consumption of fossil energy in the Russian Federation is more than twice that of all other transition countries combined and exceeds the total consumed by France, Germany and the UK.

Expectation: *Transition is disruptive and thus impedes implementation of environmental commitments.*

Observation: The effectiveness of environmental commitments in transition economies has been mixed. On the one hand, transition has caused regulatory problems because of poor regulatory institutions, decentralization, and ineffective {environmental} tax [COLLECTION??] es. Chains of decisions required to implement policies have grown more complex; consequently, the opportunities for implementation failure have increased. Far more actors are relevant to policy action than under central planning. The shift from central control has suddenly presented these countries with the same challenge that Western countries have faced for several decades: how to change the behavior of large numbers of dispersed actors.

In general, the cases show that transition has not led to rampant Russian noncompliance with its international commitments, but typically {this} compliance is merely the result of reduced economic output. The dramatic reduction in economic activity has caused a significant drop in pollution. However, in many cases pollution intensity (per unit of economic activity) has actually risen. For example, official statistics show that economic activity in St. Petersburg has dropped by 50 percent, but pollution output declined by only 10 percent.

Our analysis is quite pessimistic—until new regulatory structures take hold, environmental regulation will remain ineffective. In cases where implementation requires costly

³ For a review of the project's conclusions concerning countries with economies in transition, in addition to material presented in the book, see: Vladimir Kotov, Elena Nikitina, Alexei Roginko, Olav S. Stokke, David G. Victor, and Ronnie Hjorth, 1997, "Implementation of International Environmental Commitments in Countries in Transition," *MOCT-MOST Economic Policy in Transition Economies*, vol. 7, no. 2, 103-128.

investments, such as [to build] wastewater treatment plants [TO] {that} reduce pollution flowing into rivers and the Baltic Sea, carefully directed financial or technology transfers may be essential until rising profits from economic recovery are available.

On the other hand, transition has also brought many benefits, including rational pricing of resources and open political systems. Liberal politics has, in some cases, led to more stringent environmental policies. For example, policies to limit marine dumping of nuclear waste in Russia have been a direct consequence of wider participation and of wider availability of information, which has allowed more informed and influential participation by stakeholders. However, in the former Soviet Union implementation of policies remains poor; the environmental benefits of transition are not yet much in evidence.

[I WONDER IF PARA ABOVE DOESN'T SOUND HOLLOW IN THE LIGHT OF THE CURRENT INCARCERATION OF THE NAVAL OFFICER WHO BLEW THE WHISTLE ON NUCLEAR DUMPING IN THE NORTH. ALSO, CAN WE TRULY SAY THERE IS RATIONAL PRICING OF RESOURCES TODAY IN THE S.U.?)

Expectation: *The West can help a lot, especially with financial transfers.*

Observation: International resources can be important, but generally they are not decisive. It is rare that external resources provide more than one-quarter of total {money} [FUNDING] for environmental projects. Financial transfer schemes, such as "joint implementation," can yield significant efficiency gains in theory, but IEC's studies show that joint implementation can be highly complicated under conditions of transition, [BECAUSE OF] {such as} unstable property rights and poor enforcement of contracts.

Implementation Review

Because regulation of many diffuse actors is often complex, governments cannot be sure [IN ADVANCE?] whether their efforts to put international commitments into practice will be successful. Some may also intentionally violate their international obligations. Thus there is a need for systematic review of implementation [NECESSARY] {and} to handle implementation problems that arise. Moreover, implementation review can make it easier to identify [SERIOUS IMPLEMENTATION] problems with existing agreements, which can aid the process of renegotiation and adjustment. {Such} dynamic {institutions} [REVIEW PROCESSES] are especially vital when complex and uncertain problems are on the international environmental agenda—those problems, such as water pollution from land-based sources or slowing global warming, are poorly understood and involve thousands or millions of stakeholders. Only {by} through an evolutionary process that promotes learning and adjustment can the most effective solutions be identified and implemented.

We found that most international agreements that contain procedures for gathering information and reviewing implementation problems and progress [ARE LIKELY TO BE MORE EFFECTIVE THAN THOSE WITHOUT SUCH BUILT-IN PROCEDURES] {may be especially effective}. However, until now, the functions of implementation review have been neither the topic of much research nor high on the policy agenda. In part that is

due to the fact that many international environmental commitments have not been demanding—incentives to violate agreements have been few and the need for implementation review has been minimal. Yet in every agreement we studied, commitments have become more stringent, and the cost and complexity of implementation has risen [AS COMPARED TO WHAT? NEED TO REFER TO SOMETHING, EVEN IF IT IS JUST PAST AGREEMENTS ON THE SAME SUBJECT] The need for effective implementation review is growing.

Expectation: *Systems for verification and enforcement are poor.*

Observation: Research completed prior to the IIASA project had demonstrated that formal mechanisms for implementation review were scarce, weak, or rarely used. For example, most environmental agreements required governments to report data on their compliance, but reports were typically late, incomplete, and not useful.⁴ The IIASA studies show that the situation is not so bleak. In every agreement that we examined, governments are reporting more useful data than before. Moreover, in practice much implementation review [IS ACTUALLY CARRIED OUT] {actually occurs, most of it performed} by a wide array of institutions and actors that are not formally charged with these functions. In the Baltic Sea regime, implementation review has been extensive although (until recently) no body has been formally charged with the task.

[THIS NEXT PARA IS UNCLEAR AND PERHAPS UNNECESSARY, OR AT LEAST THE 1ST SENTENCE IS UNCLEAR AND CONFUSING. PERHAPS DROP 1ST TWO SENTENCES, AND GO ON TO: THE STUDIES SHOW THAT SIRS, THE FORMAL AND INFORMAL ACTIVITIES THAT TOGETHER CONSTITUTE A SYSTEM, IMPROVE THE EFFECTIVENESS.....ETC.]

Our studies demonstrate that these decentralized (often informal) activities are typically synergistic. Together with the formal procedures that exist in some international environmental agreements they constitute what we termed a "System for Implementation Review" (SIR). The studies show that SIRs improve the effectiveness of agreements by making parties more accountable for the implementation of their commitments, by helping to direct assistance that facilitates compliance, and by providing information and assessments that make it easier to adjust agreements over time.

This novel system perspective underscores the need to look far beyond the formal procedures to observe and create institutions for reviewing implementation. Indeed, some of the most delicate tasks—such as making financial assistance conditional upon adequate implementation performance—are often best handled in an ad hoc fashion by institutions that are not formally charged with the tasks of implementation review. Formal review mechanisms, although weak, help ensure that ad hoc and informal efforts {operate synergistically} [NOT CLEAR. TRY:CREATE A STRUCTURE INTO WHICH THEY CAN COUPLE, (OR SOMETHING LIKE)].

⁴ [GAO study—"International Agreements are not well Monitored..." [cited in the introductory text to section I of the MIT Press book]; Jesse H. Ausubel and David G. Victor, 1992, "Verification of International Environmental Agreements," *Annual Review of Energy and Environment*, vol. 17, pp. 1-43.

Expectation: [ITALICS!] International institutions can only “manage” violations of international commitments [WHEN] —strong “enforcement” tools are {not} available. [HAS SOMETHING BEEN DROPPED FROM THIS “EXPECTATION?”]

Observation: The IEC studies confirm what has been widely claimed: most implementation problems are “managed” with soft measures, such as persuasion and negotiation. But the studies also show that regimes examined that have been marked by the most extensive cooperation, such as the Montreal Protocol, have at their disposal more powerful carrots and sticks which they use to enforce international obligations. Increasingly, such tools are used, and they work—especially when the sanction has been to withdraw assistance. For example, in the Montreal Protocol developing countries that do not fulfill their obligation to report data are cut off from the Protocol’s Multilateral Fund, which pays much of the cost for these countries to implement their other commitments under the Protocol. In many cases the threat of a cutoff has brought swift compliance. The combination of soft management, backed by harder enforcement when necessary, has been effective.⁵ The most flagrant violations have been deterred and reversed only when strong incentives are available.

Expectation: *National data reporting is incomplete.*

Observation: Data are the backbone of implementation review; absent good data, SIRs work only poorly, or not at all. Most data are supplied by national governments in the form of regular reports. Our studies show that the problem of late and incomplete data is being solved—reporting rates have risen for nearly all countries in nearly all of the agreements that we studied. (In a few cases, such as the Montreal Protocol, high reporting is made possible because the costs of reporting are subsidized or other benefits of international cooperation are made conditional upon reporting.)

A more intractable problem remains: poor data quality. National data are often inaccurate and not comparable, which impedes all but the simplest reviews of implementation. The only effective response to such problems has been extensive attention to data reporting, backed by efforts to use and compare data. Such capacity requires much time to build, typically at least a decade of active support. The IIASA studies confirm that data on policies and implementation activities are especially poor; yet such information is necessary if implementation review is to assess whether countries are on track to meet commitments in the future, and to target assistance and other incentives as needed, rather than merely to assess ex post whether countries have complied.

Implications: Theory and Practice of Environmental Protection

In the end, just how effective are international institutions and agreements at changing the behaviors [THEY ARE INTENDED TO AFFECT??] {that cause environmental problems}? IEC’s research shows that most changes in behavior are not a consequence of

⁵ For more on the debate between “management” and “enforcement” approaches, see: [Chayes and Chayes]; [Downs et al.]

institutions and agreements. Rather, external factors—such as the end of the Cold War that had impeded cooperation in the Baltic region, or the shock of mysterious seal deaths in the North Sea, which galvanized public concern—have been the most important turning points in effecting regulatory action. Moreover, intrinsic features of problems—such as the costs and benefits of regulating certain activities—strongly determine which efforts to address international environmental degradation will be most consequential.

Institutions and agreements make cooperation easier, but rarely are they decisive. Nonetheless, they are the main tools available to policy makers. IEC's research shows how to make them more effective. To close, we briefly discuss the relevance of our work to four topics that theorists and policy makers regularly address and which have often been debated in the pages of *Environment* magazine.

First, can the “tragedy of the commons” be solved? When the environment is available to everyone, and nobody pays the full cost of environmental degradation, tragedy often results. Each individual may degrade only a small part, but collectively the environment is destroyed. One typical reply to this tragedy is regulation. But most observers conclude that international regulation is bound to be ineffective because international institutions are weak. Our research shows that international institutions [CAN BE] {have been} effective, and thus the tragedy is not inevitable.

However, international institutions have been most effective under conditions that don't always exist. Cooperation is most effective when cooperation involves societies that are all committed to environmental protection—typically the advanced industrial democracies, catalyzed by visible and severe environmental problems such as {the} seal deaths and algae blooms in the North Sea. [NEXT SENTENCE IS PAPER: DELETE] Whether cooperation will become more effective in the future is difficult to predict. As the international environmental agenda expands, effective cooperation will require engaging countries that are more reluctant to pay the costs of environmental protection. [THEIR RESPONSE WILL DEPEND ON] {But} the spread of environmental values and political structures that are responsive to the public interest, [BUT ALSO ON THE TRADEOFFS WITH THE OTHER ISSUES THE COUNTRIES MUST FACE.] {should increase the willingness to pay}.

In some cases, international institutions have helped to compensate reluctant countries for the costs of implementing international environmental commitments, which has made cooperation much more effective. The Montreal Protocol's Multilateral Fund, which pays developing countries the full extra cost of complying with the Protocol, is the best example. Other examples include many bilateral funding programs to help pay for the cost of projects needed to cut pollution that flows into the Baltic Sea from countries that are undergoing economic transition, as well as projects to improve the capacity of developing countries to regulate trade in hazardous chemicals and pesticides. Compensation can be vital, but in cases where the price tag is high—such as the current effort to slow global warming—compensation alone may not be adequate. Different incentives—such as trade sanctions and other sticks—may be needed. To date, sanctions have not been used often, but when applied they have been effective.[THIS LAST ASSERTION IS A STRONG ONE, AND NOT CONVENTIONAL WISDOM. SHOULD IT BE MODIFIED TO

INDICATE ITS PERTINENCE IN SPECIFIC ENVIRONMENTAL SUBJECTS?] A looming challenge is to determine when and how sanctions can be made compatible with the international trade rules [OF??] {and} the World Trade Organization—potential conflicts between the sanctions that have sometimes been vital to international environmental cooperation and rules that require sanction-free trade have not been tested or settled.

Second, what do our studies reveal about the use and effectiveness of market-based mechanisms for protecting the environment? [NOT A GREAT DEAL] Experience at the national level, especially in the United States, show[S] that market-based mechanisms such as tradable [TRADEABLE?] emission permits or effluent fees can [ALLOW] {free} firms to find the easiest and least costly means for protecting the environment. The same logic could be applied at the international level. Indeed, the 1997 Kyoto Protocol envisions creating a system of international trad[E?]able emission rights that can be used to lower the cost of cutting emissions of the gases that cause global warming.

The most important lesson from our research is that the use of market-based incentives is virgin territory. There are no [DIRECT] historical precedents, and thus efforts to create the institutions that will be needed for successful use of market-based systems will start [LOW??] high on the learning curve. [However,] Experience at the national level strongly suggests that monitoring and enforcement are vital for effective market-based systems [and].

Our studies show that these functions generally have not been well performed. {And} instances where monitoring and enforcement have been most effective—such as in handling Russia's noncompliance with the Montreal Protocol—critical functions have been supplied [BY] ad hoc [INFORMAL ARRANGEMENTS.]. That does not bode well for market-based systems, which are {probably} most efficient when supported by transparent, systematic rule-of-law. Better institutions for monitoring and enforcement will be needed if market-based institutions are to operate effectively at the international level.

Several of our studies did examine bilateral financial transfers of the type that are likely to occur under market-based schemes that are often termed “joint implementation (JI).” Through JI, typically a downwind or downstream country invests in projects that cut pollution from an upwind or upstream source.[I FIND PRECEDING SENTENCE CONFUSING, A COMBINATION OF FACT AND METAPHOR. WHY NOT JUST COMBINE WITH NEXT SENTENCE?] Often the investor's own facilities are already relatively clean, and thus it is much cheaper to regulate pollution elsewhere—through financial transfers, the environment is cleaner at lower cost. The experience with Baltic Sea pollution control—where mainly West European governments invested in pollution control in the East European littoral states—shows that JI can work. But the level of JI activity depends heavily on the ability to identify, negotiate, and implement projects—together, often termed “transaction costs.” Such projects have been numerous in countries and sectors where transaction costs have been low; one particularly severe impediment has been the difficulty of obtaining a secure contract in countries, like Russia, where political power has fragmented, property rights are uncertain, and the legal system is poor. Our study of the failed decade-long effort by Finland, Sweden and Norway to clean up a nickel smelter on Russia's Kola Peninsula illustrates that these conditions often block JI-type financial transfers.

Third, our studies contribute to the ongoing debate in the social sciences that is often termed “the new institutionalism.” The debate concerns whether and how institutions affect the behavior of people and societies. Our studies clearly show that international institutions [CAN AFFECT BEHAVIOR] {matter}. They also reveal how policy choices in the design of institutions can affect outcomes.

One area of particular interest concerns the importance of policy choices between binding and nonbinding agreements. The IIASA research confirms what many others have claimed: *compliance with legally binding commitments has been high*. However, our results suggest(s) that the level of compliance is a poor indicator of whether institutions have actually had an effect on behavior. Rather, in the past[,] high compliance has often reflected [ONLY] that governments made a special effort to adopt only those commitments with which they can comply.

Ironically, we found that compliance with *nonbinding* commitments has been lower, but such commitments can often have a larger influence on behavior. When governments want to address international environmental problems but are uncertain of their ability to implement ambitious commitments, they gain flexibility by codifying commitments in nonbinding form rather than as binding treaties. Because governments are often more tolerant of failures to comply when their commitments are nonbinding, they have been more willing to experiment with ambitious commitments that are not legally binding. The IIASA studies on nonbinding agreements, such as the nonbinding scheme to regulate trade in hazardous chemicals and pesticides, demonstrate that a flexible nonbinding agreement allows rapid learning and adjustment with experience.

When flexibility, learning, and rapid adjustment are important, a nonbinding agreement is more effective than a binding approach. But nonbinding commitments are not always superior. At minimum, learning and adjustment occur mainly when there is extensive review of implementation—that is, when SIRs are active. Moreover, nonbinding agreements do not appear effective in deterring willful violations. In those cases, a binding approach is more effective. Our studies of cooperation in the North Sea and the Baltic Sea show that a hybrid approach may be most effective—nonbinding commitments to set the pace and general direction of cooperation, and binding commitments to codify specific practices and standards into law.

These findings suggest that [IN] the early stages of handling the new generation of environmental problems—such as global warming and loss of biological diversity— [IT] would be more effective if nonbinding agreements were used. These problems are marked by the need for sometimes costly but uncertain changes in behavior. Flexibility can promote ambitious cooperation and learning, with the best solutions codified later into binding law. Th[IS]{e} finding differs sharply from conventional wisdom, which maintains that the most effective international commitments are legally binding.⁶

⁶ For a review of the IIASA project’s findings on the use and effectiveness of nonbinding agreements—including attention to the conditions under which nonbinding legal regimes are more effective than binding ones, ways that nonbinding and binding agreements can be

Fourth, and finally, is the role of governments. Many observers have declared that government is on the decline. In its stead is civil society, represented by NGOs such as public interest groups and industry associations. Our studies confirm that access and participation [IN INTERNATIONAL ENVIRONMENTAL AFFAIRS] by civil society has multiplied. Most international environmental issues are on the agenda because public concerns put them there. [HOWEVER, (skip to 2nd sentence next para.) WHILE....{Open societies have allowed ideas to spread. The result is both learning and coordination of issues and agendas from the grassroots. (Philosophers have rightly asked whether this phenomenon has merely replaced one state-based hegemony with another, with the NGOs that control ideas and agendas acting as the new hegemons. Our studies did not examine this phenomenon systematically.)

Our studies underscore that it would be wrong and dangerous to declare the state dead.} While the spread of democratic decision making has, by design, limited the power of the state, governments still negotiate, sign and ratify governments. Thus governmental decision making processes ultimately determine the content of international law. Many factors, such as the characteristics of the issue at hand and the interests of societies to reap the benefits and pay the costs of environmental cooperation, may be beyond the power of states. But our studies show that government representatives {(diplomats)} [TOO RESTRICTED] make most decisions on institutional design, which our studies show are critically important. Moreover, often only governments have the resources to run costly programs in the public interest, such as data gathering and research activities that are essential to reviewing the adequacy of international environmental commitments. Indeed, as the organization of modern societies becomes more democratic and market-based the need for an entity to perform these functions will grow—acting alone, without government, no private actor will provide these essential public goods on its own. Governments recognize that ecological interdependence reduces their ability to act unilaterally—nearly every country on Earth participates in at least a few international environmental agreements, and most countries are active members of several dozen agreements. But ecological interdependence has not extinguished governments from the scene—rather, it has forced them to find ways to use the tools of international cooperation to coordinate their behavior. Our studies show that, increasingly, they succeed.

used in tandem, and implications for policy—see chapter 16 of the book from MIT Press as well as: David G. Victor, 1997, “The Use and Effectiveness of Nonbinding Instruments in the Management of Complex International Environmental Problems,” *Proceedings of the American Society of International Law*, 91st Annual Meeting, pp. 241-250.

Table 1: Summary of the 14 case studies

| Issue | Case Study |
|---|---|
| Conservation and Preservation of Fauna and Flora Stratospheric Ozone Depletion | Long-term trends in systems for implementation review The Montreal Protocol's system for implementation review The Montreal Protocol's Non-Compliance Procedure |
| Baltic Sea Pollution | The Baltic regime's system for implementation review Implementation in the former Soviet Union Implementation in Poland |
| Trade in Hazardous Chemicals and Pesticides | The UNEP/FAO scheme for prior informed consent (PIC) |
| Acid Rain in Europe | The LRTAP data, review and modeling system Implementation of NO _x controls in the Netherlands, Norway and the United Kingdom Implementation in the former Soviet Union Implementation of controls on Norilsk Nickel |
| North Sea Pollution | Implementation of North Sea pollution controls in the Netherlands, Norway and the United Kingdom |
| Whaling | Regulation of whaling in Iceland and Norway |
| Marine Dumping of Nuclear Waste | Implementation of controls in the former Soviet Union |