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Collective Action on Climate Change: The Logic of Regime Failure

ABSTRACT

The international climate regime, primarily designed to limit the emissions of pollutants causing global warming, has failed. Why has international cooperation to combat global warming been so difficult, and what factors must change to improve the situation — assuming it is even possible? Using Mancur Olson's classical theory of collective action, this article endeavors to explain the failure of the climate regime. Other international environmental agreements and the associated regimes, such as the Mediterranean Action Plan and the Montreal Protocol on ozone depletion, demonstrate that collective action to address international environmental problems is possible. Both agreements contain the ingredients that classical theory suggests are necessary to achieve collective action. But the flipside of collective action theory — that collective action in larger groups is very difficult or unlikely — can also apply to international agreements and action on climate change. Despite the Mediterranean and Montreal successes, relatively speaking, and in spite of so much effort over two decades to create an effective climate regime, it is by no means apparent that the elements for success will exist for the foreseeable future. We should expect a continued muddling along that may, at best, reduce slightly — but not reverse — global warming at some point in the relatively distant future. Climate change is with us to stay.

It is now patently clear that the world is facing a growing set of environmental dangers. The greatest among them is probably climate change — changes to Earth's climate system, manifested in events such as drought, floods, sea-level rise, major temperature rises in some regions (e.g., the Arctic) and potentially precipitous falls in others (e.g., Europe), extinction of species, and spread of pests (to give but a sampling of the myriad

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adverse impacts of climate change).¹ Climate change arises from global warming, which is caused by humankind's pollution of the atmosphere with greenhouse gases (GHGs), notably carbon dioxide coming from the burning of fossil fuels.² This human-induced global warming was, until recently, viewed as a *future* problem. However, there is now a realization that *ongoing* climatic changes are very probably consequences of global warming.³ The international legal instruments intended to *avert* dangerous interference with the Earth's climate—the stated aim of the Framework Convention on Climate Change (FCCC)—are increasingly about mitigating that dangerous interference and putting in place mechanisms for adapting to it.

International cooperation is required to address climate change because it is caused by pollution originating in countless locations in every country of the world, and its consequences will be so harmful that only with international assistance will the weakest and poorest peoples and states be able to adapt to future environmental conditions. Climate change is a collective action problem *par excellence*. As Duncan Snidel points out, "The problem of international cooperation is essentially one of collective action applied to the particular circumstances of the international system."⁴ Although there are many constraints that tend to limit collective action, especially among disparate states, there have been a few instances in which international environmental cooperation has been relatively successful. Among these are the Mediterranean Action Plan (Med Plan) for reducing pollution of the Mediterranean Sea and the Montreal Protocol on Substances that Deplete the Ozone Layer, an agreement for limiting damage to the earth's protective layer of stratospheric ozone. Climate change has required, and will continue to require, similar international cooperation, but on a much greater scale.

About two decades ago, governments came to recognize the need for just such cooperation, and in 1992 most of them signed the FCCC. The core objective of the FCCC is

stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to

1. See generally INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC), CLIMATE CHANGE 2001: IMPACTS, ADAPTATION, AND VULNERABILITY (2001).

2. See generally INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2001: THE SCIENTIFIC BASIS (2001).

3. Editorial, *Climate Change Is All Around Us*, NEW SCIENTIST, Mar. 18 2006.

4. Duncan Snidel, *Coordination Versus Prisoners' Dilemma: Implications for International Cooperation Regimes*, 79 AM. POL. SCI. REV. 923, 923 (1985).

ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.⁵

Diplomats subsequently negotiated the Kyoto Protocol to the FCCC, which requires developed country parties to reduce their emissions of GHGs by about five percent below 1990 levels by 2012.⁶ However, not all developed countries are parties to the Kyoto agreement. Most notably, the United States, the source of about one-quarter of the pollutants causing global warming, has refused to ratify the agreement (although the Clinton administration signed the treaty in 1992) and, over the last half decade under President George W. Bush, has sought to undermine it at every turn.⁷

Scientists tell us that emissions of carbon dioxide and other GHGs must be cut by at least 60 percent just to stabilize their concentrations in the atmosphere and to prevent chaos in the global climate system.⁸ Yet, even with full implementation as negotiated among the parties, the Kyoto Protocol will result in reductions of well under five percent of parties' emissions because the manner in which parties are allowed to meet their commitments (e.g., emissions trading and land use changes [carbon sinks]) will not in fact result in significant national emissions cuts. The Kyoto Protocol is, at best, a small (but potentially very important) baby step toward greater action. In the meantime, global GHG emissions will continue to rise precipitously, notably because large developing countries (especially China and India), along with the United States, will be increasing their use of fossil fuels as their economies grow. Climate change will continue, virtually unabated, short of new, *much more aggressive* collective action to reduce GHGs. However, strong signals of the more robust action needed are distinct in their absence. The most that can be expected at present is a muddling along that will, at best, slightly reduce global warming at some point in the relatively distant future. Despite the Kyoto Protocol entering into force in February 2005, the climate regime has been a failure.

What explains this failure? Why has international cooperation to combat global warming been so difficult, and what factors must change to

5. United Nations Framework Convention on Climate Change art. 2, May 9, 1992, available at <http://unfccc.int/resource/docs/convkp/conveng.pdf>.

6. Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC), Annex B, Dec. 11, 1997, available at <http://unfccc.int/resource/docs/convkp/kpeng.pdf>.

7. BRUCE E. JOHANSEN, 1 GLOBAL WARMING IN THE 21ST CENTURY: OUR EVOLVING CLIMATE CRISIS 118-24 (2006).

8. World Resources Inst., *The Difficulty of Stabilizing Emissions*, in WORLD RESOURCES 1996-97: THE URBAN ENVIRONMENT, available at http://population.wri.org/pubs_content_text.cfm?ContentID=792. Some scientists, notably the Lamont-Doherty Earth Observatory's Wallace Broecker, argue that GHGs must be brought to zero later in this century. BBC World Service, *Global Business*, Jan. 2, 2005.

improve the situation—or is significant improvement even likely? Using Mancur Olson's theory of collective action (CAT),⁹ this article endeavors to explain the failure of the climate regime to stabilize, let alone significantly cut, emissions of GHG pollutants. The Med Plan and the Montreal Protocol demonstrate that classical CAT is applicable to international environmental problems. Both agreements contain some of the ingredients that Olson says are necessary to achieve collective action. But the flipside of the theory—that collective action in large groups is unlikely—also applies to international environmental cooperation. Despite the Mediterranean and Montreal successes (at least compared to climate change), it is by no means apparent that the elements for success will exist for climate change in the foreseeable future.

Other theories could be brought to bear, and indeed have been, to show the complex, multi-level factors shaping cooperation on transnational environmental issues, including climate change.¹⁰ But even basic attributes of cooperation highlighted by CAT are lacking in the climate regime, while the obstacles highlighted by the theory are manifest. Classical CAT, despite its limits, was enough to predict the failure of climate regime even in its earliest days, and it points to some issues that need to be addressed as more complex frameworks are used to find ways of provoking the much greater cooperation that is required in the future. One primary aim of this article, then, is to show that the climate regime faces some of the most fundamental obstacles to cooperation. This is not to say that all of the research on international environmental cooperation (including my own, I hope¹¹) that has gone well beyond classical CAT has been for naught. To the contrary, many of the answers to this collective action problem are indeed found in domestic politics, multiple levels of analysis, and so forth. But the focus of these newer approaches is a bit like explaining the integrity of a building by focusing on its occupants and furnishings, or at its internal walls and the

9. MANCUR OLSON, *THE LOGIC OF COLLECTIVE ACTION* (1965).

10. As examples of a growing literature, see EDWARD L. MILES ET AL., *ENVIRONMENTAL REGIME EFFECTIVENESS* (2002); John Barkdull & Paul G. Harris, *Environmental Change and Foreign Policy: A Survey of Theory*, 2 *GLOBAL ENVTL. POL.* 2, 63 (2002); Matthew Paterson, *Theoretical Perspectives on International Environmental Politics*, in *PALGRAVE ADVANCES IN INTERNATIONAL ENVIRONMENTAL POLITICS* 54 (Michele Betsill et al. eds., 2006); and *EUROPE AND GLOBAL CLIMATE CHANGE* (Paul G. Harris ed., 2007).

11. See, for example, books from the Project on Environmental Change and Foreign Policy: Paul G. Harris, *INTERNATIONAL EQUITY AND GLOBAL ENVIRONMENTAL POLITICS* (2001); *CLIMATE CHANGE AND AMERICAN FOREIGN POLICY* (Paul G. Harris ed., 2000); *THE ENVIRONMENT, INTERNATIONAL RELATIONS, AND U.S. FOREIGN POLICY* (Paul G. Harris ed., 2001); *INTERNATIONAL ENVIRONMENTAL COOPERATION* (Paul G. Harris ed., 2002); *GLOBAL WARMING AND EAST ASIA* (Paul G. Harris ed., 2003); *CONFRONTING ENVIRONMENTAL CHANGE IN EAST AND SOUTHEAST ASIA* (Paul G. Harris ed., 2004); *EUROPE AND GLOBAL CLIMATE CHANGE*, *supra* note 10.

personalities of neighbors, while ignoring that it lacks a proper foundation and is built on loose ground. Classical CAT is no longer cachet among students of global environmental politics, to be sure, but it is still quite helpful in explaining why international cooperation and the development of robust international law on climate change—or, more precisely, international action to do something about it—remain extremely difficult. It helps bring us back to basics.

The remainder of this article consists of five sections. The first section describes a number of features of Olson's CAT. The second and third sections look at the Med Plan and the Montreal Protocol, with emphasis on some of the factors that contributed to relatively successful collective action in those areas. The fourth section examines the issue of climate change and references CAT to explain the lack of a more robust international regime to prevent it. Fifth and finally, prospects for the climate regime are discussed. Some of the "early" literature on climate change cooperation from the late 1980s and early 1990s is cited here to show that literature from that period was prescient in anticipating the difficulties of collective action, demonstrating that it is possible to predict the likelihood (or not) of collective action in this issue area, despite all of the complicated theoretical work done in recent years.

COLLECTIVE ACTION THEORY

On the final page of the oft-cited *Theory of International Politics*, Kenneth Waltz reaffirms the importance of collective action: "collective efforts are needed if common problems are to be solved or somehow managed."¹² He acknowledges that "global problems can be solved by no nation singly, only by a number of nations working together"¹³ and reaffirms the need to garner an understanding of collective action and the extent to which it is possible in relations among states. The notion of the collective action problem is not a new one. Rousseau describes it in his *Second Discourse* when he writes of "the rare occasions when common interest should make [a man] count on the assistance of his fellow men..."¹⁴ In his well-known story of the stag hunt, Rousseau explains that men could acquire the

idea of mutual engagements and of the advantages of fulfilling them, but only insofar as present and perceptible interest could require; for foresight meant nothing to them,

12. KENNETH N. WALTZ, *THEORY OF INTERNATIONAL POLITICS* 210 (1979).

13. *Id.*

14. JEAN-JACQUES ROUSSEAU, *THE FIRST AND SECOND DISCOURSES* 144–45 (Roger D. Masters & Judith R. Masters trans., 1964) (1750).

and far from being concerned about a distant future, they did not even think of the next day. Was it a matter of catching a deer, everyone clearly felt that for this purpose he ought faithfully to keep his post; but if a hare happened to pass within reach of one of them, there can be no doubt that he pursued it without scruple, and that having obtained his prey, he cared very little about having caused his companions to miss theirs.¹⁵

Thus Rousseau introduces the difficulty of undertaking collective action.

In the introduction to his seminal work, *The Logic of Collective Action*, Mancur Olson points to a commonly held belief: assuming that they are rational, self-interested actors, everyone in a group with a common interest will act collectively to achieve that common interest.¹⁶ But, as Olson shows, this is actually not the case; empirical evidence does not support this apparently logical view of collective action.¹⁷ Absent incentives separate from the good being sought, rational actors will not necessarily act collectively to achieve a common good that they all have an interest in obtaining. This is true even if the actors involved have reached a consensus on what the good is and how best to achieve it (a condition that is, astonishingly, still absent from the climate change question, at least in the United States where there are still influential climate skeptics – President George W. Bush apparently among them – who discount the problem while finding it increasingly difficult to deny its importance). As Olson argues, “unless the number of individuals in a group is quite small, or unless there is coercion or some other special device to make individuals act in their common interest, *rational, self-interested individuals will not act to achieve their common or group interests.*”¹⁸

To explain this phenomenon, it is useful to highlight some of the underlying logic and principles associated with Olson’s theory. A “common” or “collective” good is one that is available to every individual, regardless of whether or not he or she pays for it. Collective goods have two characteristics: “if they are available to one country they are available to all countries (access cannot be restricted), and one country’s use of the good does not reduce its availability to others.”¹⁹ Collective goods are those that are characterized by “jointness” of supply and the impossibility of exclusion.²⁰ There is an interest in the protection of collective goods—a

15. *Id.* at 145.

16. OLSON, *supra* note 9, at 1.

17. *Id.* at 20.

18. *Id.* at 2.

19. PETER M. HAAS, *SAVING THE MEDITERRANEAN: THE POLITICS OF INTERNATIONAL ENVIRONMENTAL COOPERATION* 253 n.7 (1990).

20. RUSSELL HARDIN, *COLLECTIVE ACTION* 17 (1982).

stable climate system—from collective “bads,” namely atmospheric pollution and its consequences. As Russell Hardin indicates, “collective action problems, especially those that are political issues, have as their best outcomes the elimination of harm rather than the provision of good or goods.”²¹

Even if there is a common interest in a collective good being sought by a group, there is seldom a common interest in paying for that good. Each member of the group wants other members to pay the costs of providing it because, by definition, each member will benefit from the good regardless of whether or not he or she pays for it. As Waltz characterizes it, “all have reason to hang back, hoping that others will bear the costs—something that nobody may have an incentive to do.”²² According to Oran Young, “rational egoists operating in the absence of effective rules or social conventions often fail to realize feasible joint gains and end up with outcomes that are suboptimal (sometimes dramatically so) for all concerned.”²³ Furthermore, Hardin suggests, “many of those who want their collective interests to be served may weigh their own self-interests heavily, even too heavily to cooperate in serving their collective interests.”²⁴

Some scholars believe that cooperation is somewhat easier than Olson’s CAT suggests. For instance, Robert Keohane has said that, although cooperation is rare in world politics, it is possible even among rational, self-interested actors if they are concerned about their reputations or if an international institution exists to facilitate cooperation.²⁵ The question is whether pressure can be brought to bear effectively and what those institutions must look like to bring about cooperation.

Using Olson’s definition, a “group” is understood to mean “a number of individuals with a common interest.”²⁶ Here this definition is expanded to cover nation-states. In so doing, it is assumed that states seek to use rational means to achieve their desired ends; they are rational, self-interested, more-or-less unitary actors with motivations similar to those of the individuals in Olson’s groups.²⁷ Olson describes three types of groups:²⁸ (1) “privileged” groups in which each member is willing to pay for provision of the collective good; (2) “intermediate” small groups in which

21. *Id.* at 50.

22. WALTZ, *supra* note 12, at 196.

23. ORAN R. YOUNG, *INTERNATIONAL COOPERATION* 199 (1989).

24. HARDIN, *supra* note 20, at 9–10.

25. ROBERT O. KEOHANE, *AFTER HEGEMONY: COOPERATION AND DISCORD IN THE WORLD POLITICAL ECONOMY* 8 (1984).

26. OLSON, *supra* note 9, at 8.

27. States are not, in fact, unitary actors, but assuming that they are works well in getting the big picture.

28. OLSON, *supra* note 9, at 49–51.

no one member has an interest in bearing the costs of providing the good, but in which there is some possibility for cooperation because the members are unable to recognize those who are "free riding"; and (3) "latent" large groups in which the collective good will not be provided unless one member is willing to absorb the costs of doing so, short of selective incentives. Olson describes a large group that has been energized by selective incentives as a "mobilized" latent group.²⁹

Some small groups can undertake collective action without coercion or positive incentives. If one member (or subgroup of members) of the group gets a large enough portion of the benefits of providing the public good to make paying for all or most of it worthwhile, he or she will be willing to pay much (or all) of the costs of action.³⁰ Importantly, however, the benefit going to the member(s) paying for the good must exceed the cost being paid by the member(s) willing to bear the costs. But, as Olson suggests, the provision of the collective good by these small groups will not be optimal, despite the fact that optimal provision would be in the interests of all members of the group.³¹ Sub-optimal provision of the good results because those members who do not pay for the collective good still benefit from it. This phenomenon becomes more important as the group gets larger.

Three factors conspire to prevent large groups from undertaking collective action that would further the interests of the group.³² First, the larger the group, the less benefit each member receives and the further the group is from providing an optimal supply of the collective good.³³ Second, because of the small benefit each member of a large group receives, there is little likelihood that any one member (or a few members) will pay the cost of providing even some of the good.³⁴ Finally, larger groups are more expensive to start and operate, thereby creating an economic obstacle to collective action.³⁵ The upshot is that "[i]n a large, latent group there will be no tendency for the group to organize to achieve its goals through the voluntary, rational action of the members of the group, even if there is perfect consensus."³⁶ Thus, according to Olson, in the absence of coercion or incentives beyond or outside the good being sought, large groups will not provide a collective good.³⁷

29. *Id.* at 51.

30. *Id.* at 44.

31. *Id.*

32. *Id.* at 48.

33. *Id.*

34. *Id.*

35. *Id.*

36. *Id.* at 59-60.

37. *Id.* at 48.

Olson states that the typical participant in a large group will be unwilling to devote energies sufficient to optimally further the group's goals because each participant's contribution will be relatively small and the resulting benefit to that individual will be exceeded by the cost of his efforts.³⁸ It is for this reason, "among others, that organizations so often turn to the small group; committees, sub-committees, and small leadership groups are created, and once created they tend to play a crucial role."³⁹ As Olson points out, "'action taking' groups and subgroups tended to be much smaller than 'non-action taking' groups and subgroups....[S]maller groups could act more decisively and use their resources more effectively than large groups...."⁴⁰ Committees and working groups should be small to be effective.

According to Olson, in order for the individuals in a large group to undertake the costs of collective action, there must be some sort of sanction or incentive distinct from the good being sought: "Only a *separate and 'selective' incentive* will stimulate a rational individual in a latent group to act in a group-oriented way."⁴¹ As Keohane points out, the success of some large groups can be explained by their having provided private goods as a by-product of membership.⁴² The incentive—either positive or negative—must work selectively on individuals in the group, not on the group as a whole.⁴³ Groups can use negative inducements against those individuals not joining in action and give positive inducements or rewards to those who do. A variety of incentives are possible to foster group participation and cooperation.⁴⁴ Perhaps the most common category of incentives would be one that brings economic benefit—or difficulty—to the recipient. Other moral, psychological, or social incentives could also prove useful in garnering support for collective action. For instance, the prestige, respect, and friendship associated with group membership may help induce an individual to participate. Likewise, ostracism from the circle of individuals comprising the group may help push a non-participant to join the group and contribute toward achievement of the collective good.

Olson suggests that *social* incentives will only work in small groups or large "federal" groups (federations of smaller groups). Olson qualifies this point by suggesting that mass media propaganda may be a social incentive capable of mobilizing large groups:

38. *Id.*

39. *Id.* at 53.

40. *Id.* at 53–54.

41. *Id.* at 51.

42. KEOHANE, *supra* note 25, at 77.

43. *Id.*

44. See OLSON, *supra* note 9, at 60–65.

If the members of a latent group are somehow continuously bombarded with propaganda about the worthiness of the attempt to satisfy the common interest in question, they may perhaps in time develop social pressures not entirely unlike those that can be generated in a face-to-face group, and these social pressures may help the latent group to obtain the collective good.⁴⁵

As the story of the Montreal Protocol suggests (see below), the media can be an important stimulant for collective action.⁴⁶

Information is also important to cooperation. According to Hardin, "the degree of cooperation may depend on the quality of knowledge generally available."⁴⁷ Keohane argues that collective action is especially difficult when "uncertainty is great and actors have different access to information...."⁴⁸ Information proved to be a critical factor in the creation of the Med Plan cleanup and ozone-protection regimes. Information is proving to be even more critical for climate change.

Arild Underdal has suggested a "law of least ambitious program," which summarizes much of Olson's logic:

where international management can be established only through agreement among all significant parties involved, and where such a regulation is considered only on its own merits, collective action will be limited to those measures acceptable to the least enthusiastic party, [but that party may join if there are adequate] arguments, side-payments, or various kinds of political pressure.⁴⁹

The consequence is that parties will hold back, even if they have strong interests in acting collectively. They have to be pushed rather hard to join in if the costs of doing so are more than modest.

PROTECTING THE MEDITERRANEAN SEA

Among successful international environmental agreements are the Montreal Protocol and, albeit less so, the Mediterranean Action Plan. The former is effective because collective action has been sufficiently robust for scientists to predict that ozone depletion will be reversed and reduced, with

45. *Id.* at 63 n.18.

46. MOSTAFA K. TOLBA & IWONA RUMMEL-BULSKA, *GLOBAL ENVIRONMENTAL DIPLOMACY: NEGOTIATING ENVIRONMENTAL AGREEMENTS FOR THE WORLD, 1973-1992*, at 66 (1998).

47. HARDIN, *supra* note 20, at 182.

48. KEOHANE, *supra* note 25, at 12.

49. Quoted in Peter H. Sand, *International Cooperation: The Environmental Experience*, in *PRESERVING THE GLOBAL ENVIRONMENT* 241 (Jessica Tuchman Mathews ed., 1991).

the stratospheric ozone layer expected to recover over the next 50 years or so.⁵⁰ The latter has been modestly effective because it has resulted in a set of cooperative arrangements, monitoring, and regulation over a large and extraordinarily disparate group of states, thereby limiting the impact of myriad pollution sources on the Mediterranean Sea. Both the Med Plan and the Montreal Protocol contain requisites for collective action discussed by Olson, especially selective incentives or side-payments. These international agreements can tell us a great deal about the efficacy of CAT in the environmental context and how Olson's theory relates to the climate regime.

Pollution of the Mediterranean was perceived to be a collective goods problem because pollutants from states bordering the sea were thought to be washing up on other states' beaches.⁵¹ This perception contributed ultimately to the creation of the Med Plan, a regime that is "a collectively negotiated, ongoing set of arrangements for the progressive control of Mediterranean marine pollution."⁵² Negotiated and agreed to in the mid-1970s, the Med Plan is the product of the Barcelona Convention for the Protection of the Mediterranean against Pollution.⁵³ The plan brought together littoral states and the then European Community to protect the sea's environment and, later, to promote environmentally sustainable development in the Mediterranean region.⁵⁴ The plan now comprises a host of cooperative arrangements among about two dozen governments and the European Union, working with the United Nations Environment Program (UNEP) and nongovernmental actors, in a "coordinating unit" (secretariat) and regional activity centers.⁵⁵

Not all analysts have described the Med Plan as successful given its apparently modest impacts on polluting behaviors.⁵⁶ However, according to Peter Haas, who pioneered research on it, the Med Plan has been

moderately successful because it induced member governments to take new policies that enhanced environmental quality in the region, and that those governments would not

50. Patrick L. Barry & Tony Phillips, *Earth's Ozone Layer Appears to Be on the Road to Recovery*, SCIENCE@NASA, May 26, 2006, http://science.nasa.gov/headlines/y2006/26may_ozone.htm.

51. Peter M. Haas, *Do Regimes Matter? Epistemic Communities and Mediterranean Pollution Control*, 43 INT'L ORG. 377, 378 (1989) [hereinafter Haas, *Do Regimes Matter?*]; HAAS, *supra* note 19, at 70.

52. Haas, *Do Regimes Matter?*, *supra* note 51, at 381.

53. Convention for the Protection of the Mediterranean Sea Against Pollution (1976) and Protocols (1980, 1982), entered into force Feb. 12, 1978, available at <http://eelink.net/~asilwildlife/barcelona.html>.

54. See United Nations Environment Program (UNEP), Mediterranean Action Plan, <http://www.unepmap.org/html/homeeng.asp>.

55. *Id.*

56. MILES ET AL., *supra* note 10, at 311-12.

have adopted in the absence of the Med Plan. While the environmental data is choppy and not very good, it does appear to be the case...that the Med is certainly no worse in quality than it was before the Med Plan, and that the level of coastal population and economic activity has doubled or tripled in the intervening years. Not to mention the unintentional and unanticipated effects of establishing a political model for multilateral cooperation.⁵⁷

Thus, the Med Plan has done what the climate regime is supposed to have done: stabilize pollution despite economic growth.

Several factors contributed to collective action that addresses Mediterranean pollution. Contrary to some other scholars, Haas declares that "coercion, public opinion, and anticipation of benefits do not fully explain the extent of compliance," although these were important contributing factors.⁵⁸ He suggests that the most significant factor leading to collective action and the Med Plan was the existence of "epistemic communities," which he describes as "ecologists and marine scientists who set the international agenda and directed their own states toward support of international efforts and toward the introduction of strong pollution control measures at home."⁵⁹ According to Haas, the success of epistemic communities in this instance can be largely attributed to their ability to increase "governmental learning," a process whereby scientists and ecologists informed domestic and foreign policy makers about the extent of the problem so as to elicit their interest in protecting the Mediterranean.⁶⁰ The process Haas outlines is complex, but it is based on a professional campaign to spread information, and on the power that is frequently associated with information. As Olson suggested, information eases the move to collective action.⁶¹

An important additional factor contributing to the success of the Med Plan negotiations included the involvement of an international organization, namely UNEP. UNEP provided information and resources from its Regional Seas Program. UNEP also served as a coordinator, enabling scientists and diplomats to pool their efforts toward the goal of a cleaner Mediterranean. Through its efforts, UNEP helped the littoral states reduce transaction costs and assisted them in opening additional diplomatic channels, thereby easing the move toward collective action.⁶² This function is analogous to Olson's small leadership forums.

57. E-mail from Peter Haas to the author (Dec. 20, 2004; 9:35 PM) (on file with author).

58. Haas, *Do Regimes Matter?*, *supra* note 51, at 401.

59. *Id.* at 384.

60. *Id.*

61. MANCUR OLSON, *THE RISE AND DECLINE OF NATIONS* 25 (1982).

62. HAAS, *supra* note 19, at 184.

Haas's account of the Med Plan further demonstrates the salience of Olson's basic CAT. Selective incentives were used to promote cooperation.⁶³ Monitoring and research provisions of the Med Plan gave symbolic recognition to Mediterranean states' scientific stature. Research funds, technology, and scientific equipment were transferred from the developed to the developing participants in the plan. UNEP spread pollution-control construction contracts around the Mediterranean and hired consultants and distributed offices in such a way that the states most resistant to joining the plan benefited from it.⁶⁴

Haas believes that epistemic communities and UNEP were sufficiently able to influence states for them to "recalculate their interests in light of new information, or as they are penetrated by new groups. Thus, following such involvement, governments were able to overcome the domination of stronger states, and smaller states recognized the need to protect the Mediterranean."⁶⁵ The important components of the Med Plan's modest success—epistemic communities and UNEP—helped form a consensus and provided crucial information. These factors then led to the creation of a regime that had a variety of incentives as part of its structure. Thus, the Med Plan shows the utility of key components of CAT in the context of international environmental cooperation. However, the Med Plan has its own weaknesses. For example, its attempt to control so many pollutants over such a wide area with too few resources, and the involvement of so many actors makes coordination among them difficult.⁶⁶ This is a warning to those who are negotiating the climate regime that must follow the Kyoto Protocol commitment period (2008–2012).

PREVENTING STRATOSPHERIC OZONE DEPLETION

The stratospheric ozone is a layer of gas surrounding the earth that filters dangerous ultraviolet radiation from the sun.⁶⁷ Several chemicals emitted into the atmosphere—chlorofluorocarbons (CFCs) and other ozone-depleting chemicals (ODCs)—deplete this layer.⁶⁸ Among the adverse effects of this depletion are increased levels of skin cancer and eye cataracts, crop damage, and harm to the marine food chain, including fisheries.⁶⁹

63. *Id.*

64. *See id.*

65. *Id.* at 189.

66. *See* MILES ET AL., *supra* note 10, at 326–27.

67. STEPHEN ISON ET AL., ENVIRONMENTAL ISSUES AND POLICIES 143 (2002).

68. *Id.*

69. UNEP, *Environmental Effects of Ozone Depletion and Its Interactions with Climate Change: 2002 Assessment*, <http://www.unep.org/ozone/pdf/eeap-report2002.pdf#search=%22Environmental%20Effects%20of%20Ozone%20Depletion%20and%20its%20Interactions%20with%20Climate%2>

According to Richard Benedick (then chief U.S. diplomat in the ozone negotiations), the Montreal Protocol addresses "an unprecedented global ecological threat, one that required governments to balance distant but possibly catastrophic dangers against the very real short-run economic dislocations that would be caused by preventive measures."⁷⁰ These factors—potentially catastrophic dangers and economic dislocations—are also applicable to the climate regime.

Benedick defined the dilemma of protecting the common good of stratospheric ozone: "The very nature of ozone depletion meant that no single country or group of countries, however powerful, could effectively solve the problem. Without far-ranging cooperation, the efforts of some nations to protect the ozone layer would be vitiated."⁷¹ The obstacles facing those wanting to develop an international regime to address ozone depletion were immense. Industrial interests, scientific uncertainties, and technological hurdles were standing in the way of collective action. Nevertheless, an agreement to act collectively was reached and ultimately strengthened at subsequent meetings of parties to the protocol.

Benedick attributed the success of the Montreal Protocol to several factors.⁷² Like Haas, he gives much credit to scientists (Haas's epistemic communities) who were active in working groups set up to determine provisions of the treaty. According to Benedick's account, "Close collaboration between scientists and key government officials who became convinced of the long-term dangers ultimately prevailed over more parochial and short-run interests of national politicians."⁷³ It was partly due to the influence of scientists that political leaders took action on ozone despite there still being considerable uncertainty about the full nature of the problem. Scientists, along with environmental nongovernmental organizations, also played a role in educating the public, thereby mobilizing public opinion and prompting media attention. Additionally, leadership of the U.S. government and (as with the Med Plan) UNEP (and its head, Mustafa Tolba) were "critical in mobilizing an international consensus."⁷⁴ U.S. leadership was evident in its preemptive action to limit emissions of ODCs.⁷⁵ This action created an environment in which industry had an

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70. RICHARD E. BENEDICK, *OZONE DIPLOMACY: NEW DIRECTIONS IN SAFEGUARDING THE PLANET* xiii (1991).

71. Richard E. Benedick, *Protecting the Ozone Layer: New Directions in Diplomacy*, in *PRESERVING THE GLOBAL ENVIRONMENT*, *supra* note 49, at 143.

72. *Id.*

73. *Id.* at 144.

74. *Id.* at 145.

75. *Id.*

economic incentive to find a technological solution to the problem (namely, substitutes for ODCs, which U.S. industry was first to develop).⁷⁶

Side-payments, another very important factor contributing to collective action on ozone, were offered to poorer countries that might not otherwise accede to the agreement. The protocol calls for developed countries to “facilitate access” to financial assistance and the technologies necessary to produce substitutes for ODCs.⁷⁷ Among other incentives geared toward convincing states to join the protocol, the European Community was allowed to aggregate its consumption limits to the benefit of individual members, the Soviet Union was allowed to use CFC plants already under construction, small-scale producers of ODCs were permitted to transfer production increases among themselves, and developing countries were allowed to continue producing CFCs for a substantial additional period of time.⁷⁸ In addition to such positive incentives, the treaty called for the gradual prohibition of purchases of ODCs and products produced with or containing them.⁷⁹ Such prohibitions imposed sanctions on states outside the protocol that might exploit the end to production of ODCs by parties to it.⁸⁰ Furthermore, a multilateral ozone fund, paid for by wealthy governments, was created to assist developing-country parties in switching to ODC alternatives.⁸¹

The ozone regime demonstrates the importance of Olson’s small working groups and committees. As Benedick repeatedly argues, it was the work of such groups that provided the basis for so much of the success at Montreal.⁸² He points out that the “complicated ozone protection issue was separated into manageable components, and informal collaborative efforts – workshops, conferences, consultations – laid the foundation for the eventual international consensus.”⁸³ Importantly, the Montreal ozone agreement was purposely made flexible in order to reflect future changes in the scientific knowledge or the political consensus; the agreement, “far from being a static solution, ... constitutes an *ongoing process*.”⁸⁴ Indeed, in subsequent meetings of the parties, restrictions on ODCs were increased, as were specific financial incentives and trade disincentives to bring new members into the effort.

76. *Id.* at 146.

77. *Id.*

78. Sand, *supra* note 49, at 242.

79. Benedick, *supra* note 71, at 127.

80. *Id.* at 126.

81. *Id.* at 141–42.

82. *Id.* at 148.

83. *Id.*

84. *Id.*

The Montreal Protocol fulfills many of Olson's criteria for collective action. Incentives, disincentives, information, leadership, small groups, and iterated diplomatic engagement all played their parts in fostering cooperation and, indeed, extending and deepening it as the problem became better understood. There are lessons here for the climate regime, although ozone depletion is a vastly simpler problem to address than is global warming.

PROTECTING THE CLIMATE SYSTEM

Most (or possibly all) countries will be affected by climate change, most (and probably all) of them in adverse ways.⁸⁵ Consequently, most of them have an interest in collective action that will limit the emissions of GHGs polluting the Earth's atmosphere, and concerted action is required to address it. It was clear to diplomats as they entered negotiations for the FCCC in the late 1980s and early 1990s that dealing effectively with climate change would require the creation of an international regime in which most of the world's governments would agree to act collectively to reduce the emissions of GHGs. However, the number of countries causing the problem is quite large and growing, and the costs of doing something significant about it are high (at least to many economic sub-sectors). Many governments were not convinced that it would be in their immediate interests to pay those costs, and many still retain this view.⁸⁶ As George Rathjens suggested a decade and a half ago, "even putting aside the complicating fact of great uncertainty, getting agreement on some instrumentality to insure that everyone—or at least a significant number—makes an appropriate contribution to a group effort to achieve the benefits of a well-maintained commons will be more difficult than in the usual case" of commons problem.⁸⁷ How right Rathjens was.

To achieve an effective climate regime it is necessary to address the constraints placed on collective action outlined by Olson. The Med Plan and the Montreal Protocol suggest that collective action on climate change is possible *if* these constraints can be overcome. Agreement depends on achieving some consensus regarding the nature and magnitude of global warming and resulting climatic changes, the best ways to mitigate them and cut pollution causing them, and how best to pay for those actions. It has been fairly clear from the beginning that if one large country or group of

85. See IPCC, *supra* note 1; ROBERT T. WATSON ET AL., THE REGIONAL IMPACTS OF CLIMATE CHANGE (1998).

86. See IAN ROWLANDS, THE POLITICS OF GLOBAL ATMOSPHERIC CHANGE 133–42 (1995).

87. George W. Rathjens, *Energy and Climate Change*, in PRESERVING THE GLOBAL ENVIRONMENT, *supra* note 49, at 173.

states were willing to assume much of the costs of collective action, or if sufficient incentives could be offered to participants, then international cooperation on climate change could take place. Unfortunately, climate change has so far fit perniciously into Olson's "indeterminate" category, whereby no single international actor has perceived a sufficiently large benefit from the collective good to justify paying most of the costs of providing it, but in which its contribution to the problem is so large that its failure to participate is central to effective action.⁸⁸ The Europeans seem willing to take on this burden,⁸⁹ but actualizing that willingness is not yet significant from the perspective of affecting global GHGs, and at times it seems tenuous. That is, collective action on climate change remains problematic – at best.

Scientists agree that GHGs are responsible for warming the planet more than would occur without such pollutants, and they agreed long ago that concentrations of these gases were increasing at "unprecedentedly rapid rates."⁹⁰ There are very few exceptions to this accepted wisdom, but where "climate skepticism" does exist, mostly in the United States, its impact on policy has been disproportionately great, although this seems to be slowly changing as news reports of changing climate and its impacts become more common.⁹¹ However, fairly significant uncertainty and some disagreement remain on the *specific impacts* of climate change. Thus, Thomas Schelling was right to conclude even before the FCCC was negotiated that "[u]ncertainties are huge, and most of them will persist."⁹² Despite the scientific consensus, there is not, even now, a political consensus among the world's governments on the threat posed by climate change. Most of them agree with the FCCC's general notion that there is a problem that must be dealt with, but this still runs up against the difficulties of actually allocating the responsibilities and costs of doing something about it. Political actors have pushed sufficiently hard to thwart the development of a consensus in the United States and a few other developed countries (e.g., Australia), as well as in some major developing countries, because they do not yet see the adverse consequences as being great enough to justify what they perceive

88. See OLSON, *supra* note 9, at 44.

89. Paul G. Harris, *Europe and Environmental Change: Sharing the Burdens of Global Warming*, 17 COLO. J. INT'L ENVTL. L. & POL'Y 309-55 (2006).

90. WORLD RESOURCES INST., WORLD RESOURCES 1990-91, at 12 (1990). See IPCC, *supra* note 1.

91. JOHANSEN, *supra* note 7, at 117-45.

92. T.C. Schelling, *Economic Responses to Global Warming: Prospects for Cooperative Approaches*, in GLOBAL WARMING: ECONOMIC POLICY RESPONSES 197, 199 (Rudiger Dornbusch & James M. Poterba eds., 1991).

to be the short-term costs of taking action.⁹³ As in the case of ozone depletion, there is disagreement, but in this case it is much more important because the costs for some groups of people, influential industries, and economic sectors, if not for whole countries, of meeting the provisions of an effective climate regime are vastly greater than the costs of the ozone protection regime.⁹⁴ Unwillingness to act is dissipating, but much too slowly to prevent what seems to be an *already* "dangerous anthropogenic interference with the climate system"⁹⁵ (to parrot the FCCC).

The costs of preventing climate change are immediate, but the benefits will not be seen for many decades. However, the cost-benefit ratio must be viewed as favorable before actors will join in strong collective action.⁹⁶ This suggests that most governments will not be willing to make the major sacrifices necessary to effect a halt to (let alone reverse) global warming.⁹⁷ As classical CAT points out, for large groups, if the costs of action are high, collective action is not likely; the larger the contribution that each member of the group must provide to achieve the collective good, the less likelihood there is for collective action.⁹⁸ This is not rocket science, but it is a basic idea that is sometimes ignored by those who, quite justifiably, vociferously demand aggressive collective international action on climate change.

Classical CAT tells us that groups having access to selective incentives will be more likely to act collectively than will those not having such incentives,⁹⁹ thus explaining, at least in part, the relative successes of the Med Plan and the Montreal Protocol. It will be inordinately difficult to achieve more effective international cooperation on climate change without similar provisions for coercion (negative inducements) and side payments (positive inducements). Selective incentives commonly used in environmental treaty bargaining are access to funding, resources, markets, and technology.¹⁰⁰ The developing countries have made it clear that they want to be "paid" for their participation in a climate regime.¹⁰¹ The requested

93. See, e.g., CLIVE HAMILTON, *RUNNING FROM THE STORM: THE DEVELOPMENT OF CLIMATE CHANGE POLICY IN AUSTRALIA* 53-86 (2001).

94. Costs across an economy may not be excessive and might even result in savings, but costs to certain economic sectors (e.g., fossil fuel energy producers and those parts of the economy dependent on these fuels) are likely to be huge. These sectors have resisted accepting the consensus on climate change.

95. UNFCCC, *supra* note 5, art. 2, at 4.

96. OLSON, *supra* note 61, at 29.

97. Cf. Rathjens, *supra* note 87, at 179.

98. OLSON, *supra* note 61, at 28.

99. *Id.* at 34.

100. Sand, *supra* note 49, at 241.

101. Paul G. Harris, *Fairness, Responsibility, and Climate Change*, 17 *ETHICS & INT'L AFFAIRS* 152 (2003).

payments include access to experts and technology, training of indigenous scientists and technicians, and grants to aid development in general and adherence to the regime in particular.¹⁰² Effective action to prevent global warming will arguably "require resource transfers...greater than all of the foreign aid, multilateral and bilateral aid in current programs."¹⁰³ Positive inducements include the transfer of technology and financial aid from the developed world to the developing world, as was done in the Med Plan and as has been incorporated into provisions for implementing the Kyoto Protocol.¹⁰⁴ But the latter efforts have been feeble so far, failing to provide positive inducements to strong action.¹⁰⁵ Incentives will have to be strengthened mightily and given vastly more financial backing. Coercion might come in the form of trade penalties similar to those found in the Montreal Protocol.

The economic resources to provide financial aid (bribes) to developing countries might come from a carbon tax imposed on those members of the regime that are producing the most GHGs per capita. Carbon taxes were proposed in the early 1990s as one of the selective incentives that might be useful in any climate regime.¹⁰⁶ Such taxes would provide an incentive, albeit negative, for improved efficiency and could provide financial resources to assist the poorer participants in the regime. However, as Schelling predicted at the time, it was never likely that an international carbon tax would be implemented.¹⁰⁷ He pointed out that such a tax would cost the United States alone well in excess of \$125 billion,¹⁰⁸ and he "utterly dismiss[ed] the possibility that the United States would contribute in any fashion...upwards of \$100 billion per year, or that the Senate would ratify any treaty incurring such financial commitments."¹⁰⁹ For the United States, despite being the world's most profligate global polluter, the notion of an international carbon tax is a complete non-starter. The lack of a tax means that there is no strong negative inducement for the greatest developed-country polluters to cut GHG emissions. What is more,

102. Durwood Zaelke & James Cameron, *Global Warming and Climate Change – An Overview of the International Legal Process*, 5 AM. U. J. INT'L L. & POL'Y 283 (1990).

103. Schelling, *supra* note 92, at 219.

104. PAMELA S. CHASEK ET AL., *GLOBAL ENVIRONMENTAL POLITICS* 223–30 (4th ed. 2006); SEBASTIAN OBERTHUR & HERMANN E. OTT, *THE KYOTO PROTOCOL: INTERNATIONAL CLIMATE POLICY FOR THE 21ST CENTURY* 232–33 (1999).

105. OBERTHUR & OTT, *supra* note 104.

106. *Id.* at 44.

107. Schelling, *supra* note 92, at 208.

108. *Id.* at 215.

109. *Id.* Indeed, in 1997, the United States passed a resolution declaring its opposition to any climate treaty that would harm the U.S. economy. Paul G. Harris, *Common but Differentiated Responsibility: The Kyoto Protocol and United States Policy*, 7 N.Y.U. ENVTL. L.J. 27, 37 (1999).

without some kind of global source of money that a universal carbon tax could provide, the international funds that have been created to induce countries to take the climate regime seriously—some financing from the Global Environment Facility, along with the Special Climate Change Fund, the Least Developed Country Fund, and the Kyoto Protocol Adaptation Fund—arguably will never have enough resources to persuade major developing countries to join collective action on climate change.¹¹⁰ Indeed, the growing use of funds to help them *adapt* to climate change may have the perverse effect of giving them some incentive to avoid limiting GHG pollution.

Alternative strategies much less anathema to the U.S. government, such as emissions trading, have so far achieved very little in the way of GHG emissions reductions.¹¹¹ Government-mandated trading of carbon dioxide emissions began in the European Union in January 2005,¹¹² and informal trading has been going on for some time in London and Chicago. These efforts hold promise for reducing GHG emissions, but the emissions limits underlying them will have to be profoundly increased if there is to be significant movement toward meeting the FCCC's objective of stabilizing emissions and preventing even more upset to the Earth's climate system than is already guaranteed by past emissions. This profound increase in GHG emissions limitations is not foreseen at present. Successful collective action is unlikely in the near future, especially if the United States remains unwilling to enthusiastically participate.

Even coercion is unlikely to be effective in promoting collective action toward a truly effective climate regime. Early in the climate negotiations, Rathjens suggested that some economically weaker countries would be susceptible to coercion by economic means,¹¹³ but this is unlikely to be the case for many other states, such as China or India, which must join in collective action against climate change if such action is to be a long-term success. (China's emissions are shooting up as it develops and adopts a U.S.-style transport infrastructure. It is expected to overtake the United States very soon to become the largest source of GHG pollution.¹¹⁴)

110. See Suraje Dessai & Emma Lisa Schipper, *The Marrakech Accords to the Kyoto Protocol: Analysis and Future Prospects*, 13 GLOBAL ENVTL. CHANGE 149, 150 (2003).

111. See JOHN M. REILLY & SERGEY PALTSEV, MIT JOINT PROGRAM ON THE SCI. & POLICY OF GLOBAL CHANGE, REP. NO. 127, AN ANALYSIS OF THE EUROPEAN EMISSION TRADING SCHEME (Oct. 2005), available at web.mit.edu/globalchange/www/MITJPSPGC_Rpt127.pdf.

112. *Id.* at 5.

113. Rathjens, *supra* note 87, at 176.

114. See Paul G. Harris & Hongyuan Yu, *Environmental Change and the Asia Pacific: China Responds to Global Warming*, 17 GLOBAL CHANGE, PEACE & SECURITY 45–58 (2005); Paul G. Harris & Chihiro Udagawa, *Defusing the Bombshell? Agenda 21 and Economic Development in China*, 11 REV. INT'L POL. ECON. 618, 620 (2004).

Sanctions or coercion would probably also require U.S. participation, but it is unlikely that the United States will show much enthusiasm in this regard. Nor are the Europeans likely to want to take this route because it is not fair to the world's poor. This again begs the question of where the positive inducements – strong ones not evidenced so far – will come from.

From the start of negotiations on the climate regime, the framework Vienna Convention on ozone protection and the resulting Montreal Protocol were seen as models for collective action.¹¹⁵ The United Nations and the Intergovernmental Panel on Climate Change therefore supported a framework convention and subsequent protocols based on those agreements.¹¹⁶ The result was the FCCC and the follow-on Kyoto Protocol. But informed skeptics never shared the view that Montreal was a good model. To wit:

The Montreal Protocol...is no harbinger for suppression of CO₂. Economically, what is at stake is two or three orders of magnitude greater for fossil fuels than for CFCs, and the prospects for technological replacement of CFCs are much brighter. (The ozone protocol does illustrate the need for worldwide collaboration to make restrictions worthwhile....) But in one respect it may be revealing. Developing countries successfully insisted on more than \$200 million of help from several developed-nation contributors.¹¹⁷

An article in the June 16, 1990 edition of *The Economist* described the Montreal protocol as “the nearest thing to a dry-run for a climate-change convention” and acknowledged that the ozone regime “was made possible by special circumstances which may not be there with climate change.”¹¹⁸

Indeed, climate change differs from ozone depletion for several reasons.¹¹⁹ CFCs were produced by a small number of industries and have limited uses. Fossil fuels are produced everywhere and are used by everyone in modernized societies. The costs of preventing climate change are much higher than those for saving the stratospheric ozone, and these costs are not evenly distributed. And many important states (e.g., Australia, the United States, China, and most of the oil-exporting states) are *still* not enthusiastic about undertaking collective action to prevent climate change.

115. OBERTHUR & OTT, *supra* note 104, at 282; see also CHRISTIAN EGENHOFER ET AL., EUROPEAN CLIMATE PLATFORM, THE EU EMISSIONS TRADING SCHEME: TAKING STOCK AND LOOKING AHEAD (July 2006), available at http://shop.ceps.be/BookDetail.php?item_id=1360 (“download pdf”).

116. OBERTHUR & OTT, *supra* note 104, at 282.

117. Schelling, *supra* note 92, at 217–18.

118. A Cool Look at Hot Air: *The Environment Is the New Stuff of Diplomacy* (Green Diplomacy), THE ECONOMIST (US), June 16, 1990, at 17.

119. *Id.*

As *The Economist* put it way back in 1990, "Some countries will prefer to be free-riders rather than sign."¹²⁰ This remains nearly as true now as it was then. To be sure, resistance to action is weakening, but the pace of this weakening is glacial, and it has not been supplanted by enthusiasm among governments for major action. The conference of the FCCC parties in December 2005 had trouble even agreeing on whether to have *talks* on future emissions restrictions (although U.S. attempts to prevent them were thwarted in the end), let alone moving toward implementing significant GHG cuts.¹²¹ Indeed, as Scott Barrett argues, the Kyoto Protocol is, inevitably, a failed treaty because it does not overcome the incentives of states to free ride,¹²² much as classical CAT would anticipate might happen under the circumstances.

Haas believes that the process of "interest recalculation" brought on by epistemic communities in the Med Plan case would be generally applicable to collective action on other international environmental problems.¹²³ His assessment indicates that epistemic communities were important not only to the Med Plan, but also to the Montreal protocol and the European Community's collective policies for control of acid rain.¹²⁴ However, Haas declared 15 years ago that "the distribution of costs and benefits from possible global climate change is sufficiently well estimated so as to inhibit the US government from delegating authority to ecologically inclined atmospheric scientists."¹²⁵ This succinctly describes the approach of the Bush administration and its industry allies even today. More generally, scientists have had more difficulty influencing climate change policy than other environmental cases due to the very high anticipated costs associated with action on climate change and the relatively high degree of scientific and economic uncertainty.¹²⁶ They have promoted action, but with an effect that has been far too limited. This shows again how CAT is applicable in the case of climate change, but in a pessimistic sense. That is, CAT applies to climate change (as it did to the Mediterranean and ozone agreements), but in this case collective action will be harder to achieve. The

120. *Id.*

121. For a summary of the talks, see *Summary of the Eleventh Conference of the Parties to the UN Framework Convention on Climate Change and First Conference of the Parties Serving as the Meeting of the Parties to the Kyoto Protocol: 28 November–10 December 2005*, 12 EARTH NEGOTIATIONS BULL., Dec, 12, 2005, available at <http://www.iisd.ca/vol12/>.

122. SCOTT BARRETT, ENVIRONMENT AND STATECRAFT ch. 15 (2003). See also MICHAEL FINUS, GAME THEORY AND INTERNATIONAL ENVIRONMENTAL COOPERATION (2001).

123. See Haas, *Do Regimes Matter?*, *supra* note 51, at 402.

124. *Id.*

125. *Id.* at 403.

126. See generally Neil E. Harrison, *Political Responses to Changing Uncertainty in Climate Science*, in SCIENCE AND POLITICS IN THE INTERNATIONAL ENVIRONMENT 109 (Neil E. Harrison & Gary C. Bryner eds., 2004).

behavior Olson describes for large groups lacking incentives, or when no single member is willing to pay most of the costs, describes the circumstances surrounding international efforts to respond to climate change. From this perspective, international collective action to *substantially* address climate change remains unlikely.

Keohane has argued that, "if there is neither a hegemonic leader nor an international regime, prospects for cooperation are bleak indeed, and dilemmas of collective action are likely to be severe."¹²⁷ In the case of climate change, it is likely that a more effective regime *and* a (benign) hegemonic leader are required. The regime cannot be very successful without the participation—some argue leadership—of the United States. The United States is important because it produces a quarter of the pollutants causing global warming—more GHGs than any other country¹²⁸—and it is potentially the most effective supplier of incentives useful in garnering support for collective action. But, as suggested above, robust U.S. participation is not likely for some years. There is some grassroots action there, and some U.S. states are mandating GHG emissions limitations, but the pace and scale of action is infinitesimal compared to what is required to slow global warming. Indeed, the current U.S. government is doing all it can to prevent other countries from working together to limit global warming.¹²⁹ It has put off action to become more energy efficient and less reliant on fossil fuels, making reducing GHG emissions *more* costly as time passes—and hence creating greater resistance to action within the United States. The longer the United States puts off action, the more it will have to pay to implement a truly effective climate regime—and the more intense will be resistance from some economic sectors to undertaking the increasingly costly action required. From the beginning, the United States has viewed the costs of a "serious attempt" to cut GHGs as exceeding the potential benefits,¹³⁰ notwithstanding the efforts of the Clinton administration to start acting on the country's GHG emissions. Though climate change is likely to affect the United States in harmful ways (it may be doing so already, as suggested by Hurricane

127. KEOHANE, *supra* note 25, at 240.

128. Gregg Marland, Tom Boden & Robert Andres, *Global, Regional, and National CO₂ Emissions* (2005), available at http://cdiac.ornl.gov/trends/emis/em_cont.htm.

129. Notwithstanding U.S. leadership in creating the so-called Asia-Pacific Partnership on Clean Development and Climate, which arguably is an attempt to undermine the Kyoto Protocol and the climate regime rather than an effort to strengthen international efforts to address climate change. See generally Remarks of Energy Secretary Bodman, U.S. Department of Energy, Asia-Pacific Partnership Ministerial Statement (Jan. 12, 2006), <http://www.energy.gov/news/2964.htm>.

130. A Cool Look at Hot Air, *supra* note 118.

Katrina in 2005¹³¹), most Americans will be able to adapt—unlike most people in the poorest parts of the world.¹³²

As Thomas Schelling put it well before the Kyoto Protocol was negotiated,

in searching out the national interests around the globe that may motivate countries to participate in cooperative approaches to global warming, I conclude that most of the countries that can afford to do anything may perceive very little interest of their own, and most of the countries that perceive themselves potentially vulnerable have urgent needs that leave no resources to invest in greenhouse abatement.¹³³

This attitude is shifting in Europe, where they are witnessing genuine efforts to implement some GHG emissions cuts and emissions trading.¹³⁴ But words surpass deeds, even as Europe and the United States move further apart on this issue. And there should be no expectation of more than token contributions to the climate regime from the developing world. Indeed, they still very much view action on climate change as a question of justice.¹³⁵ They point out that the wealthy countries of the world have caused most of the problem, and that those countries ought to act robustly *before* even asking the poor ones to begin limiting their own emissions of GHGs.¹³⁶

Schelling outlined ten reasons why the problem of climate change would be (and remains) “daunting”.¹³⁷ (1) it is a global problem that no single country can solve, even if that single country were willing to do so; (2) the magnitude of potential abatement costs are perceived as being “immense”; (3) there is a disparity between the equitable distribution of costs and the optimal distribution of abatement; (4) the climate regime must be flexible yet able to survive at least 50 years (an understatement); (5) all countries consume fossil fuels, thus all must participate in the regime (an overstatement given that some contribute very little to the problem); (6) the distribution of energy sources and use differs drastically among countries; (7) states have varying abilities to pay for carbon emissions abatement and to adjust practices to achieve that abatement; (8) the rate at which

131. John Schwartz, *2 New Studies Link Hurricane Intensity and Global Warming*, INT'L HERALD TRIB., June 1, 2006, at 2.

132. See AFRICAN DEV. BANK ET AL., *POVERTY AND CLIMATE CHANGE* (2003), available at www.oecd.org/dataoecd/60/27/2502872.pdf.

133. Schelling, *supra* note 92, at 203.

134. Harris, *supra* note 89, at 336–41.

135. See Harris, *supra* note 101.

136. See PAUL G. HARRIS, *INTERNATIONAL EQUITY AND GLOBAL ENVIRONMENTAL POLITICS* (2001).

137. Schelling, *supra* note 92, at 198–99.

population and fuel use increases differs among states, and their rates of economic expansion vary; (9) nuclear power – the main alternative source of electricity – is expensive and unpopular in many countries (but this seems to be changing incrementally as the urgency of acting to address climate change grows and the nuclear-power industry steps up lobbying); (10) significant uncertainties remain – and will persist for some time. Zaelke and Cameron add that “[a]nother hurdle is the difficulty of defining and determining concepts of liability, responsibility, and illegality for ensuring adequate compensation for the measurable harmful impacts of global warming.”¹³⁸ Daunting indeed!

Despite the successes of the Med Plan and the Montreal Protocol, all of these potential obstacles suggest that the climate change problem will continue to be a much more difficult collective action problem, similar to the scenarios of unsuccessful collective action envisioned by Olson’s theory. CAT tells us that, unless the disadvantages of large groups are overcome, “valuable institutions that would benefit a set of individuals will not necessarily be created.”¹³⁹ As George Rathjens points out pessimistically,

Because of the uncertainty, the very long lag-times involved, and the fact that effective mitigative action is likely to require something approaching a global consensus, the prospects for near-term action *directed at reducing global warming* must be seen to be poor. These factors...tend to make mitigation a less likely response to the “threat” than delay and eventual adaptation. Public policy would be well advised to face this reality.¹⁴⁰

This is precisely what has happened. Increasingly, international diplomacy regarding climate change, and practical responses to it, are about *adaptation*, not about limiting global warming.¹⁴¹ Considering the circumstances surrounding the climate change problem, as Oran Young told us in the 1980s, “it is no cause for surprise that the foundations for an international regime designed to protect the ozone layer are now in place, whereas a regime to deal with global climate change is not yet in sight.”¹⁴² There is now a regime, comprised of the FCCC and the Kyoto Protocol, but there is not yet an effective one.

138. Zaelke & Cameron, *supra* note 102, at 251.

139. KEOHANE, *supra* note 25, at 81.

140. Rathjens, *supra* note 87, at 184.

141. Harris, *supra* note 101, at 154; Paul G. Harris, *A Political Setback in the War on Global Warming*, S. CHINA MORNING POST, Nov. 21, 2002, at 18.

142. Oran R. Young, *The Politics of International Regime Formation: Managing Natural Resources and the Environment*, 43 INT’L ORG. 349, 368 (1989).

Such pessimism does not exclude the possibility that some significant reductions in GHGs will be possible, but it suggests that such reductions will often be a result of actions undertaken because they are justifiable on cost-benefit grounds in their own right (e.g., reduced emissions due to energy conservation prompted by a desire to improve local air quality, to use less petroleum as its price increases, or to improve energy security).¹⁴³ To be sure, the only effective method to limit climate change is to reduce GHG emissions associated with energy use. Given the increasing desire to improve energy efficiency and to improve the local environment, the prospects of favorable changes are very good. Indeed, the Europeans are taking substantial action in this regard. Alas, that action is *very* far short of what is required to address and limit global warming and to avert dangerous climatic change.

CONCLUSION

The climate regime has not been a *total* failure — an optimist would say that it is a work in progress that may one day have a significant positive impact on climate change — but it would be disingenuous to say it has been even slightly successful so far. Governments have come nowhere near meeting the goal set in 1992, with the signing of the FCCC, of returning GHG emissions to 1990 levels (by 2000) and stabilizing greenhouse gas concentrations in the atmosphere, let alone achieving the *cuts* in emissions of GHGs called for in the Kyoto Protocol, which themselves are grossly inadequate compared to what scientists say is necessary. There is no prospect whatever of this substantially changing before the end of the Kyoto commitment period (2008–2012). It seems likely that the collective action necessary to protect the Earth from climate change is not very likely in the medium term, either. More agreements and promises by governments to act are likely, and increasing action at local levels may be about to take off, but those countries that enact major new commitments will be few (if any). As Schelling put it a decade and a half ago, “Prospects for serious abatement [of GHG emissions] in the near future are not good.”¹⁴⁴ Prospects have not changed since. There will most likely be some action so that the problem will not be as bad as it would be if nothing were done, but there is unlikely to be a binding post-Kyoto international agreement accompanied by major collective action toward stopping, least of all reversing, global warming.

143. See MICHAEL GRUBB ET AL., *THE KYOTO PROTOCOL: A GUIDE AND ASSESSMENT* 313–19 (1999).

144. Schelling, *supra* note 92, at 206.

Despite all the new theory that has been developed since Olson's treatise on collective action, his classical theory remains extremely useful in explaining the failure so far of the climate regime, and it may be equally useful in predicting future cooperation. Olson's CAT suggests that an *effective* climate regime is an unlikely prospect, at least until the impacts of climate change become much more pronounced. As Young argued quite some time ago (but it is as true today as it was when he said it), "Talk of a creeping crisis with regard to global warming simply cannot produce the impact of the exogenous shocks...as a force in breaking the logjams that commonly arise in institutional bargaining. This is no doubt frustrating to those working on a number of important collective-action problems,"¹⁴⁵ including climate change. Until then, adaptation may be the preferred strategy of many states.

Olson said that selective incentives, separate from the good being sought, must be provided to bring about collective action.¹⁴⁶ This elegantly and simply explains Russia's ratification of the Kyoto Protocol in late 2004: Despite ongoing domestic debates about whether ratification would benefit Russia or hurt it, Europe's willingness to trade support for Russian accession to the World Trade Organization (WTO) for ratification of the protocol provided the necessary incentive.¹⁴⁷ The added incentives of the prestige, respect, and status that WTO membership could bring, as well as moving Russia closer to the European market, could only help induce its accession to the agreement. It also does not hurt that Russia really does not need to do much at all to meet its Kyoto commitments and likely will profit handsomely from emissions trading. But incentives necessary to bring other countries on board are few. Relative to the need for emissions cuts, as well as the scale of resistance to action in countries most important to the regime but which are resistant to limiting, let alone cutting, their emissions (i.e., the United States and large developing countries such as China, India, and Brazil), the disincentives to joining, namely the costs to extant economic interests and institutions, is perceived to be much greater than any incentive to cut GHG emissions drastically. In the cases of the large developing economies, much larger "side payments," alongside creative disincentives (e.g., trade restrictions like those used in the context of the Montreal Protocol), are required to entice them to limit future emissions. The Clean Development Mechanism and climate fund designed to help implement the Kyoto Protocol are puny relative to the enticements of aggressive, energy-intensive economic growth.

145. Young, *supra* note 142, at 372.

146. OLSON, *supra* note 9, at 51.

147. CHASEK ET AL., *supra* note 104, at 126.

The Montreal Protocol and Med Plan successes relative to the climate regime fit the logic of CAT. In each case, a large latent group of states was mobilized to undertake collective action to achieve a common good. Both have made real progress toward their objectives. It was those states with the greatest economic and diplomatic resources that worked most vigorously toward collective action. For example, in the case of the Med Plan, France played this important role: "Because of its dominant position, France was able to take, and did take, a leadership role in the early phase of the Med Plan....During the early years of the program the greatest national contributions came from France; without this support the program would not have gotten off the ground."¹⁴⁸ In the case of the Montreal Protocol, the United States took on the leadership role, pushing other states to act on its proposals to limit ODCs (albeit to benefit U.S. producers of CFC alternatives).¹⁴⁹ Conversely, in the case of climate change, the United States recently tried to veto more aggressive action, and Europe's leadership lacks vitality. Things would be worse without European efforts to lead on the issue, but collective action necessary to genuinely address climate change needs much more leadership than any states have displayed so far. If Europe wants to continue leading, and to see genuine results from the leadership, it will have to work much harder. It must move forthrightly to adopt even more aggressive policies that set a powerful example for the world, not least the United States, despite the costs, while also encouraging through its trade and economic policies climate-friendly production beyond its borders.

If more robust European leadership is forthcoming, it is possible that other states, along with their peoples, will increasingly define their national interests in terms of protecting the common atmospheric good and not being part of (or being seen as being part of) the unfair and harmful despoiling of that good.¹⁵⁰ Scientific assessments suggesting that global warming could lead, paradoxically, to drastic temperature decreases in Europe may provide a stimulus for more European concern and action.¹⁵¹ The question is whether such a "reconstruction" of national interests, arguably underway among European Union members, will bear fruit in time. In this regard, one must tend toward pessimism. Things are expected to get much worse, not only because the scientists tell us change is inevitable no matter what is done now, but because the amount of action required to put a major dent in the problem — on the order of at least 60 to

148. HAAS, *supra* note 19, at 176.

149. CHASE ET AL., *supra* note 104, at 108.

150. See A. BARRIE PITTOCK, CLIMATE CHANGE: TURNING UP THE HEAT 252-83 (2005).

151. *Id.* at 125.

70 percent cuts in GHGs¹⁵² — is simply not going to happen anytime soon — if even in our lifetimes. The cost of *adaptation* is — rightly or wrongly, correctly or not — viewed by the United States and some other rich states, and many not-so-rich ones, as being lower than robust action to cut GHG pollutants.¹⁵³

Besides much stronger leadership, what would increase the likelihood of effective international collective action on climate change? CAT suggests a number of variables that need to change. Knowledge and information are essential in this case. Scientists should of course continue trying to improve our understanding of global warming and resulting climate change, and they should continue to actively cooperate to persuade governments of the importance of acting on their findings as well as working with nongovernmental organizations and the media to educate the public and policy makers. But knowledge brokers should not be neutral (after all, those who *oppose* action have not been neutral); they should consciously and systematically endeavor to show governments that national interests are harmed by inaction. It needs to be demonstrated that governments are shirking their most basic duty of defending the national interest by not acting aggressively to combat this problem. Improved science and more news coverage are starting to have an effect, as noted earlier. In the United States, for example, local municipalities and some state governments are implementing laws and regulations to limit GHG emissions, having recognized that the federal government is not doing enough.¹⁵⁴

Furthermore, the notion of costs can be reinterpreted: the cost of inaction exceeds the cost of action. This of course requires careful consideration of those economic sectors most affected by the necessary transition away from fossil-fuel intensive economies. This will be terribly difficult, but there is still too little focus by governments and the media on the economic *advantages* of transitioning to the genuine move “beyond petroleum” (to borrow one oil company’s slogan). Alongside this is the equally difficult effort to create new incentives for action by the developing world, starting with the world’s wealthy countries reducing their GHG emissions and providing much more financial assistance to developing countries. Without this action by the developed countries to fulfill their common but differentiated responsibilities associated with climate change, the developing world will continue to follow their bad example.

152. See World Resources Inst., *supra* note 8.

153. See PITTOCK, *supra* note 150, at 133–49.

154. Associated Press, *Schwarzenegger to Link California to U.S. Northeast’s Program to Reduce Greenhouse Gases*, INT’L HERALD TRIB., Oct. 17, 2006, available at http://www.ihl.com/articles/ap/2006/10/17/america/NA_GEN_US_Global_Warming_Schwarzenegger.php.

Doing these things is obviously tremendously difficult; otherwise there would be more movement already. Looking on the bright side, international collective action to address environmental problems has been proved doable by the evolution of a number of international regimes, such as those manifested in the Montreal Protocol and the Med Plan. Classical CAT shows which criteria should be met before similar success can be achieved in the case of climate change. Unfortunately, the comparatively favorable circumstances that obtained in the ozone and Mediterranean cases—themselves difficult enough—are absent in the case of climate change. The failure of the climate regime so far is “logical” from the perspective of classical CAT. Thus, we would be well advised to prepare ourselves to weather the effects of climate change and a future that will be significantly different from the present. Sadly and shamefully—but not surprisingly—climate change is here to stay.