

---

## A Framework for Analysis

Harold K. Jacobson and Edith Brown Weiss

In 1972, countries gathered in Stockholm at the United Nations Conference on the Human Environment to launch a global effort to protect, preserve, and enhance the environment. International environmental accords—treaties and other binding international agreements—became central components of the strategy that was adopted. International agreements orient and coordinate the behavior of states and ultimately of enterprises, nongovernmental organizations (NGOs), and individuals, steering behavior away from activities that are environmentally destructive and toward those that are environmentally benign. At the time of the Stockholm conference, there were only a few dozen multilateral treaties dealing with environmental issues.

By 1992, when countries gathered again to deal with the global environment at the United Nations Conference on Environment and Development at Rio de Janeiro, there were more than 900 international legal instruments (mostly binding) that were either fully directed to environmental protection or had more than one important provision addressing the issue.<sup>1</sup> The substantive and procedural duties contained in the accords had become more stringent, detailed, and comprehensive, and the range of issues subject to such accords had expanded (Brown Weiss 1993). Two major treaties were signed at Rio, one on climate change and the other on biodiversity, together with several important nonbinding legal instruments. The negotiation of international treaties and other international legal instruments to protect the global environment has continued.

Yet we know very little about national implementation and compliance with the treaties and other international legal instruments that have been negotiated, despite their importance and growing number. Even if no more accords were to be negotiated, it would be essential to make those that are in force work effectively.

International accords are only as effective as the parties make them. Effectiveness is the result not only of how governments implement accords (the formal legislation or regulations that countries adopt to comply with the accord) but also of compliance (the observance of these regulations and the commitments contained in the international accord). Weak legislation can produce weak compliance; unenforced

strong legislation can have the same effect. One cannot simply read domestic legislation to determine whether countries are complying. While some claim that most states comply with most international treaties most of the time, there are reasons to believe that national implementation of and compliance with international accords is not only imperfect but often inadequate, and that such implementation as takes place varies significantly among countries.

It is not known to what extent international environmental accords have or have not evoked compliance, or whether the same factors that presumably motivate compliance with arms control, trade, or human rights agreements motivate compliance with environmental accords. There have been only a few systematic studies of factors affecting compliance with international environmental accords into which countries have *already* entered (Mitchell 1994). Our study takes a major step toward drawing empirically from the experience of existing international environmental law those lessons that might instruct us how better to proceed in the future.

### The Stylized View of Compliance and Reality

A traditional, stylized view of international law might maintain that (1) countries accept treaties only when their governments have concluded that the treaties are in their interest; (2) because of this, countries generally comply with treaties; and (3) when countries do not comply with treaties, sanctions are employed both to punish offenders and to serve as deterrents designed to encourage first-order compliance.

Reality with respect to many types of treaties, particularly environmental accords, is quite different. While countries may join only treaties that they regard as in their interest, there are various reasons that countries find them in their interest, and these reasons affect their willingness and ability to comply with the treaties. Governments may choose to accept a treaty because of a desire to climb onto an international bandwagon, or because of pressures from other governments—both inducements and threats—with leverage over them. Or there may be domestic interests that force the issue. In some cases, countries may enter treaties without intending to modify their behavior significantly so as to comply fully. Even if they intend to comply, some countries may find it difficult or impossible, because they lack the capacity to do so.

Scattered evidence suggests that implementation of and compliance with international environmental accords are often haphazard and ragged. Parties rarely resort to adjudication of violations or employ significant sanctions against non-complying parties. While blandishments may be used to encourage compliance, these are rarely of major proportions. Nevertheless, as the experience with some human rights treaties and labor agreements illustrates, over time many countries gradually do more to implement treaties and improve compliance.

This and com discover treaties t are murk exception that the and will variation

Com change, view of t states ha being or principal armies, t issues, su now mar zations ( and indiv 1998 edi organiza tasks, esp

New oping, ir form alr uation th ages amc treaty sec

Inter private i domestic and nonl These de

Our not direc ing comp rules of c precise b Moreove

This less elegant reality of imperfect, varied, and changing implementation and compliance is the starting point for this study. The purpose of this study is to discover factors that lead to improved implementation of and compliance with treaties that cover environmental issues. We assume that cost-benefit calculations are murky, military sanctions are out of the question, and economic sanctions are exceptional and may violate international trading arrangements. We also assume that the propensity of various countries to comply with different treaties will vary and will change over time. Our task is to understand the factors that shape the variation and propel the change.

Compliance takes place in an international system that is in the process of change, and our analyses will highlight several of these changes. The traditional view of the international system as hierarchical and focused almost exclusively on states has evolved into one that is nonhierarchical. Effective power is increasingly being organized in a nonhierarchical manner. While sovereign states continue as principal actors, and are the only ones that can levy taxes, and conscript and raise armies, these functions have declined in importance relative to newly important issues, such as environmental protection and sustainable development. There are now many relevant actors in addition to states: international governmental organizations (IGOs), nongovernmental organizations, enterprises, other nonstate actors, and individuals. The *Yearbook of International Organizations* records in its 1997/1998 edition 6,115 intergovernmental organizations and 40,306 nongovernmental organizations (UIA 1997). Nonstate entities are performing increasingly complex tasks, especially in the newer issue areas.

New information technologies empower nonstate actors to participate in developing, implementing, and complying with international law. Interest groups can form almost instantaneously on the Internet to press for actions in a country, a situation that can both help and hinder compliance. The technologies facilitate linkages among nonstate actors and communications among nonstate actors, IGOs, and treaty secretariats.

International law is also changing in form. The sharp lines between public and private international law are blurring, the sharp divide between international and domestic law is fading, and the difference between the effectiveness of legally binding and nonbinding international instruments is being questioned (Brown Weiss 1996). These developments are reflected in our analysis.

Our research focused on compliance with specific international treaties and did not directly address issues of compliance with customary international law. Assessing compliance with these rules presents additional problems. It is difficult to identify rules of customary international law and, once they are identified, to determine their precise boundaries, unless the rules are codified in international legal instruments. Moreover, it is difficult to identify failures to implement the rules or to comply with

them, since there are no formal parties to monitor compliance with them. However, it is reasonable to expect that the framework of analysis and the model developed later in this study would apply to national compliance with customary international law, although it would be more difficult to acquire data needed for the analysis.

### Assessing Implementation, Compliance, and Effectiveness

An essential first step in the analysis is to have clear definitions of implementation, compliance, and effectiveness.

*Implementation* refers to measures that states take to make international accords effective in their domestic law. Some accords are self-executing; that is, they do not require national legislation to become effective. But most international accords require national legislation or regulations to become effective. Countries adopt different approaches, ranging from accounting procedures to incentives such as tax relief to induce compliance, and from public admonishment to sanctions for noncompliance. This study seeks to identify systematically the various methods that are employed for implementing international accords and to analyze which strategies are used with what degree of effectiveness in securing compliance.

*Compliance* goes beyond implementation. It refers to whether countries in fact adhere to the provisions of the accord and to the implementing measures that they have instituted. The answer cannot be taken as given even if laws and regulations are in place. Measuring compliance is more difficult than measuring implementation. It involves assessing the extent to which governments follow through on the steps that they have taken to implement international accords. In the end, assessing the extent of compliance is a matter of judgment.

Compliance has several dimensions. Treaties contain specific obligations, some of which are procedural, such as the requirement to report, and others that are substantive, such as the obligation to cease or control an activity. In addition, preambles or initial articles in treaties place these specific obligations in a broad normative framework, which we refer to as the spirit of the treaty.

Compliance is probably never perfect; substantial compliance is what is sought by those who advocate treaties and agreements. We seek to assess the extent to which substantial compliance is achieved with the procedural and substantive obligations contained in treaties, as well as with the spirit or broad norm involved in the treaties, and to compare the extent of success within and among political units and over time.

In principle, the compliance of countries with their obligations under international environmental accords can be measured, but we found precise measurement elusive. In examining procedural obligations such as the requirement to submit

reports, i  
been sub  
sufficient  
prohibite  
measurin  
tioners i  
weighted  
to rely o  
made at  
complan  
complan  
among c  
*Effec*  
be in co  
attaining  
objective  
address.  
of an ac  
increase  
sequence  
species o  
imation  
borders  
Tabl  
effectiver  
and com

Table 1.1  
Implemen

I.	Impl
II.	Corr
	A.
	B.
III.	Effec
	A.
	B.

reports, it is relatively straightforward to determine whether a report has or has not been submitted on time, though it is more difficult to assess whether the report is sufficiently complete or is accurate. Similarly, one can tell if the production of a prohibited substance, such as chlorofluorocarbons, has been discontinued. But measuring emissions resulting from changing refrigerants in automobile air conditioners is much more problematic. And how should an occasional emission be weighted in relation to the overall cessation of production? In the end, we have had to rely on our own expert judgments to assess compliance. Our assessments are not made at precise intervals but, rather, in rough orders of magnitude—substantial compliance, moderate compliance, weak compliance, or no action taken toward compliance. But even these rough ordinal measures allow us to detect differences among countries and treaties, as well as change over time.

*Effectiveness* is related to, but is not identical with, compliance. Countries may be in compliance with a treaty, but the treaty may nevertheless be ineffective in attaining its objectives. And even treaties that are effective in attaining their stated objectives may not be effective in addressing the problems that they were intended to address. To illustrate the point, compliance with a treaty may result in the cessation of an activity that contributed to pollution, but it may also lead to an overall increase of pollution by encouraging other activities as substitutes whose consequences are even worse. Or a treaty prohibiting international trade in a certain species of monkey could effectively stop the trade but have little impact on the decimation of the monkey populations, which may be consumed within the national borders where they are located, rather than abroad, after being exported.

Table 1.1 shows the several dimensions of implementation, compliance, and effectiveness. Our project is particularly concerned with assessing implementation and compliance. Effectiveness is crucially important, but until implementation and

**Table 1.1**  
Implementation, compliance, and effectiveness

---

I.	Implementation
II.	Compliance
	A. Compliance with the specific obligations of the treaty
	1. Procedural obligations
	2. Substantive obligations
	B. Compliance with the spirit of the treaty
III.	Effectiveness
	A. In achieving the stated objectives of the treaty
	B. In addressing the problems that led to the treaty

---

compliance are better understood, the contribution of treaties to solving international environmental problems cannot be known. Learning about implementation and compliance is an essential first step to learning about effectiveness.

Many factors may affect a country's implementation of and compliance with international accords. We are interested in how several interrelated factors affect the extent to which, and the way in which, countries have met their commitments. These factors include characteristics of the activity; characteristics of the accord; the international environment; and factors involving the country.

### Characteristics of the Activity

Environmental accords are about human activities—activities that extract resources, produce pollutants or other emissions, change ecosystems, or reduce biodiversity. Some substances or activities have little economic importance, while others have consequences for entire economies. Some also have little intrinsic economic value, but the process of compliance can disrupt economic activities in many other areas. Some are easy to monitor, while others can be detected only through very intrusive measures. The costs and benefits of regulating substances and activities, and their distribution among various social classes and geographical regions, can also be important. The organization of the activities—whether they are conducted by large multinational organizations or small firms or individuals—could also make a difference.

### Characteristics of the Accord

The characteristics of the treaty or agreement are an important factor. Some issues relate to the process by which the accord was negotiated. By whom and how was the process initiated? What form did the negotiations take? What were the extent and the depth of agreement? The substantive characteristics of the accord also raise important issues. What is the nature of the obligations contained in the accord? Are the duties general or precise? Are they binding or hortatory? What implementation and compliance mechanisms are contained in the accords? How does the agreement treat countries that do not join?

The Montreal Protocol on Substances That Deplete the Ozone Layer and the Convention on International Trade in Endangered Species obligate parties not to trade controlled substances with countries that are not parties to the agreement. How effective is this provision in inducing countries to join and comply? What benefits accrue to countries that are parties to the accords? What special dilemmas do the accords produce, such as the problem of how an item, once placed on the World Heritage Convention's list of protected sites, ever gets taken off that list?

**The Inter**  
The actio  
affect a st  
noncomp  
to abide l  
and oblig  
loader un  
Inter  
implemer  
countries  
important  
as the Ur  
tional co  
Internatic  
be impor

**Factors I**  
The socia  
influence  
broad po  
pace of i  
cultural  
make wh  
Does it n

Wha  
democrat  
nation ar  
ments? V  
adopt th  
How str

A co  
another  
before ac  
existence  
negotiati

It is  
and effec  
Some co  
others h  
sequence

### The International Environment

The actions of other states in implementing and complying with the accord can also affect a state's compliance with an agreement. To what extent have other countries' noncompliance or compliance with the accord affected the willingness of countries to abide by the accord? How does the answer to this question vary with the subject and obligations of the international accord? To what extent can a state be a free-loader under the accord?

International governmental organizations have important roles in promoting the implementation of and compliance with international accords. We investigate how countries relate to the IGOs that have responsibilities for these accords. What importance, if any, was attached to involvement by international organizations, such as the United Nations, the World Bank, and regional development banks? International conferences, such as those held at Stockholm and Rio, could also play a role. International nongovernmental organizations and the worldwide media could also be important.

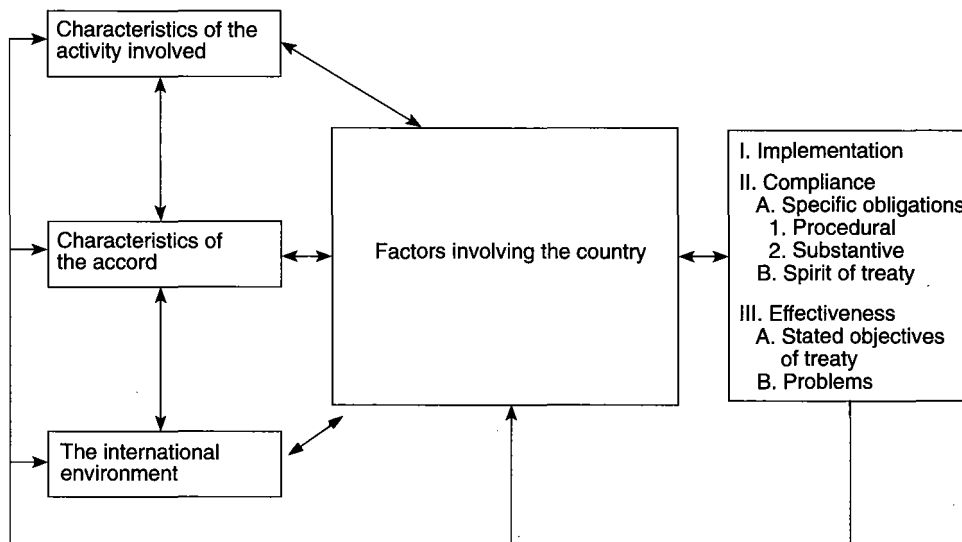
### Factors Involving the Country

The social, cultural, political, and economic characteristics of the countries clearly influence implementation and compliance. We assess the relative importance of its broad political culture, the level of its economic development, and the trajectory and pace of its economic growth or decline in shaping a country's actions. Are there cultural traditions that influence how a country complies? What difference does it make whether the country has a market or a planned economy, or if it is mixed? Does it make a difference in which sector the substance or activity is included?

What are the effects of the characteristics of the political system? Is the country democratic? How strong and effective is the bureaucracy? How effective is coordination among the relevant ministries and between the national and provincial governments? What is the nature of the legal system? What procedures are required to adopt the regulations or other strategies necessary to implement the agreement? How strong and independent is the country's judicial system?

A country's policy history regarding the substance or activity being regulated is another basic factor. What was the country doing about the substance or activity before adhering to the international accord? Had the country already recognized the existence of an environmental problem? What role did the country play in the negotiation of the accord?

It is clear that people make a difference. Some leaders are more committed to and effective in promoting compliance with international environmental accords. Some countries have drawn leadership on an issue from the scientific community; others have not had such communities on which to draw. What are the consequences of changes in and differences among leaders?



**Figure 1.1**  
A model of factors that affect implementation, compliance, and effectiveness

Nongovernmental organizations can play important roles at the national level, just as they can at the international level. What is the strength of nongovernmental groups, including those engaged in lobbying and domestic and international agenda-setting?

It is broadly assumed that the more information there is about an environmental issue and the clearer the understanding of the issue, the more effective implementation and compliance will be. This assumption impels much of the work of international organizations. We want to assess how the availability of information about and the extent of understanding of the environmental issues covered in the treaties affects national implementation and compliance. Another important issue is whether a culture of compliance exists within the country.

Figure 1.1 presents a graphic representation of the interaction of these factors with a state's implementation of and compliance with an accord and the effectiveness of the accord. This graphic representation constitutes a wiring diagram or a rudimentary depiction of a model. It includes feedback effects from implementation, compliance, and effectiveness. The fact that many of the arrows go in both directions indicates that we expect there to be interactive effects.

In examining these factors, we want to explore the hypotheses that are nested within the questions posed in the paragraphs above. It would be pretentious to claim that we could test the hypotheses. We have too many variables and too few cases, and several of our crucial variables are, at best, measured inexactly.

Som  
others ha  
tutions,  
data tha  
relations  
General  
ence on

Base  
theory, c  
associate  
probabil  
tions wo  
impleme  
would se  
higher it  
pliance.  
tribution  
economy

Sinc  
tant mec  
tions, m  
adheres  
ticipation  
have als

The  
outset o  
our ana  
these hy  
and trea  
particul  
that rich  
or that  
Country  
might er

The  
manipul  
the char  
involvin

Ma  
cesses, h



Some of these hypotheses have been deduced from rational choice assumptions, others have been derived from the existing literature on international law and institutions, and still others have been derived from preliminary analyses of empirical data that we gathered. Many of the hypotheses simply state common sense. Some relationships are obvious. Some have been identified in assessments by the U.S. General Accounting Office and the secretary-general of the United Nations Conference on Environment and Development (USGAO 1992b; UN 1992).

Based on the realist and rational choice assumptions that undergird game theory, one would expect that the smaller the costs and the greater the benefits associated with an accord, however difficult they may be to calculate, the greater the probability of implementation and compliance. The likelihood of significant sanctions would be included in the prospective cost element of this hypothesis. Since implementation and compliance require monetary and bureaucratic resources, it would seem logical that the larger a country's gross national product (GNP) and the higher its per capita GNP, the greater the probability of implementation and compliance. Because costly measures can be accommodated with minimal or no redistribution in a period of rapid economic growth, the higher the rate of a country's economic growth, the greater the probability of implementation and compliance.

Since pressure from domestic groups and the mass public comprises an important mechanism for promoting implementation and compliance with treaty obligations, many scholars and policy makers have assumed that the more a country adheres to democratic norms concerning political and civil rights and political participation, the greater the probability of implementation and compliance. Several have also assumed that decentralization would promote more effective compliance.

These hypotheses are so strongly grounded in common sense that from the outset of our work, we expected them to be supported by the evidence produced by our analyses, to bound other findings. We expected that the variables involved in these hypotheses would explain the largest share of the variance among countries and treaties, but we also were very conscious that it would not be very surprising or particularly helpful to those interested in improving compliance for us to discover that rich countries are more likely to comply with treaties than are poor countries, or that countries are more likely to comply with treaties that impose few burdens. Countries cannot be made rich overnight, nor can the burdens that compliance might entail always be eliminated.

The relationships that hold greatest fascination for us are those that can be manipulated in the relatively short run through policy interventions. They include the characteristics of the accords, the international environment, and some factors involving the countries.

Many of these, particularly those involving domestic and international processes, have been identified in broad general studies by Abram and Antonia Handler

tion  
obligations  
rational  
relative  
treaty

assess  
objectives

s

national level,  
environmental  
agenda-

environmental  
implementation  
of international  
agreements about  
treaties  
whether

these factors  
effective-  
program or a  
representation,  
directions

are nested  
to claim  
few cases,

Chayes (1993, 1995), Roger Fisher (1981), Peter M. Haas (1990, 1992), Robert O. Keohane (1984, 1986, 1988), and Elinor Ostrom (1990). Factors that one or more of them have stressed are (1) creating communities of interested parties, especially scientists and specialists in the topic, or what have been termed "epistemic communities"; (2) increasing the amount, quality, and availability of information about the issues involved, so that they can be understood; (3) involving domestic officials and bureaucracies, so that their personal interests and reputations become issues at stake; and (4) generating international momentum toward compliance, which increases the benefits of compliance, and the costs and consequences of non-compliance, for adhering countries.

Hypotheses concerning these factors are straightforward. Since epistemic communities are deeply committed to the goals of particular accords because of their knowledge and professional interest, the greater the size, strength, and activism of epistemic communities, the greater the probability of implementation and compliance.

With respect to information, the hypothesis is: The greater the flow of scientific and technical information about targeted activities, in a form that is understood by governments and public pressure groups, the greater the likelihood of implementation and compliance. Particularly with environmental accords, these actors must rely on scientific and technical information flows to identify and assess risks, address targeted activities, and identify available technical options to enhance compliance.

Hypotheses concerning domestic processes are straightforward. Two are very important. Because repeated encounters and associations with counterparts and concern for reputations have a powerful impact on behavior, the more involved a country's domestic officials and bureaucracies are in the preparation, implementation, and oversight of an accord, the greater the probability of implementation and compliance.

With respect to international momentum, the most direct hypothesis is: The greater the number of countries that have ratified an accord and the greater the extent of their implementation and compliance, the greater the probability of implementation and compliance by any individual adhering country. Countries have a deep and abiding interest in creating and maintaining a relatively stable and predictable international political environment. The more stable and predictable an environment is, the higher the costs of disrupting it, and thus the greater the probability of strong implementation and compliance. International momentum also has broader aspects, such as how committed international public opinion is to the issue. International nongovernmental organizations (INGOs) capture and articulate important sections of international public opinion; hence, the stronger and more active the INGOs are in the area of the treaty, the greater the probability of strong implementation and compliance.

We a  
of transp  
more cor  
probabili  
sons. To  
leaders is  
tions, bec

Tran  
apparent  
encourag  
ter of the  
affect the  
inducing  
mentatio  
hypothes

Final  
menting  
be, increa  
The great  
it is that  
economic  
attitudes.

Our  
that they  
examine  
directed  
order to  
accords.

Stati  
may mak  
been con  
extremely  
work tha  
our anal  
others at

In v  
of most  
pare acc  
pliance v

We are also interested in other process factors, such as leadership and the extent of transparency surrounding the activity covered by the accord. We assume that the more committed a country's leaders are to the goals of an accord, the greater the probability of implementation and compliance. Leaders are chosen for many reasons. To some extent, in terms of the focus of this research, a country's choice of leaders is a stochastic process. We study how leaders, whatever their initial inclinations, become more engaged in ensuring compliance with the accord.

Transparency may promote compliance because it makes noncompliance more apparent and makes it easier for international and domestic actors to take actions to encourage and enforce accountability. Transparency is closely linked to the character of the issue covered by the treaty and democratic norms. Cultural factors may affect the acceptability of transparency internally, and hence its effectiveness in inducing compliance. We test the hypothesis that transparency promotes implementation and compliance, and seek to identify the conditions that bound the hypothesis. We also analyze the extent to which transparency can be promoted.

Finally, since administrative and bureaucratic capacity is essential for implementing accords, we explore the extent to which such capacity has been, and could be, increased independent from broader economic, political, and social development. The greater the capacity of the political unit to implement the accord, the more likely it is that it will comply. Administrative and bureaucratic capacity depends upon economic resources, but it also involves education, technical training and skills, and attitudes.

Our research efforts focus on these factors because previous research indicates that they are important. The evidence for them, however, is largely anecdotal. We examine them empirically on a multicountry basis. Since the factors are subject to directed and purposeful modification, policies could be adopted that target them in order to increase implementation and compliance with international environmental accords.

Stating the hypotheses that have guided our research as starkly as we have may make the investigation appear overly mechanistic. The analyses could not have been conducted in a mechanical and simplistic way. Context and institutions are extremely important. The hypotheses are important because they provide a framework that guides and directs the investigation, useful both as a way of structuring our analyses and guiding comparisons, and also as a way to link our study with others at a basic, practical level as well as at a theoretical one.

In varying degrees, the factors that are involved in the hypotheses that are of most concern to us are subject to deliberate manipulation by those who prepare accords and are responsible for overseeing their implementation and compliance with them. The research seeks to develop a basis for reasoned speculation

about how manipulation of these factors might improve implementation and compliance.

### The Countries and the Treaties

To investigate these hypotheses and issues, we chose to focus on eight countries and the European Union, and five international treaties covering different areas of environmental concern. We chose the nine political units and the five treaties in the hope that the study will yield knowledge that will have worldwide utility and will pertain to most kinds of environmental accords concluded in the future.

#### Political Units of Great Importance and Widely Differing Character

The eight countries are Brazil, Cameroon, China, Hungary, India, Japan, the Soviet Union/Russian Federation, and the United States. We also include a group of countries, the European Union (EU). We chose these countries because they are crucially important to the effective implementation of broad international environmental accords. They include those that have contributed most to the anthropogenic effects that bring about global change (Japan, Russia, the United States, and the European Union and its members), and those that have the potential of making major contributions to anthropogenic effects (Brazil, India, and China).

We included Cameroon and Hungary to illustrate the problems and processes of implementation and compliance in smaller countries that, although their total contribution to global environmental problems may be individually small, comprise by far the largest number of states in the global political system.

We chose the European Union because it is increasingly behaving as a state actor through directives and regulations that are applicable in all member states.<sup>2</sup> It represents a new form of governmental organization, one that conceivably could be duplicated elsewhere, such as among the states that constituted the former Soviet Union. It merits study for that reason, as well as for the reason that the EU will be a major political and economic actor in future negotiations. Although the EU was a party to only two of the treaties, its member states (who join treaties as individual states) were generally parties to most of them.

In the 1990s these countries included about three-fifths of the world's population, their gross national products constituted about four-fifths of the world product, and they contributed more than two-thirds of the global greenhouse emissions. Table 1.2 presents data that show the importance of the nine political units for environmental issues. They spanned the globe and encompassed a range of forms of political organization and culture. Furthermore, they included low-, middle-, and high-income countries, some with mixed-market economies and others that were

Table 1.2  
The political units and their characteristics

CFC net annual      Percentage

gh countries and  
ent areas of envi-  
eities in the hope  
and will pertain  
Japan, the Soviet  
a group of coun-  
they are crucially  
al environmental  
ropogenic effects  
and the European  
taking major con-  
and processes of  
h their total con-  
nally, comprise by  
having as a state  
member states.<sup>2</sup> It  
ceivably could be  
the former Soviet  
t the EU will be a  
gh the EU was a  
ties as individual  
the world's pop-  
ths of the world  
greenhouse emis-  
political units for  
range of forms of  
w-, middle-, and  
others that were

**Table 1.2**  
The political units and their characteristics

Political unit	Population (millions)	GNP per capita (U.S. dollars, 1990)	GNP per capita growth rate, 1965-1990	CO <sub>2</sub> emissions per capita, 1989 (tons of carbon)	CFC net annual atmospheric increase, 1986 (thousands of metric tons)	Percentage change in forest and woodland, 1989
Brazil	150	2,680	3.3	0.38	9	-0.4
Cameroon	12	960	3.0	0.14	0	-0.4
China	1,134	370	5.8	0.59	18	0.0
EU <sup>1</sup>	343	17,058	2.5	2.20	228	1.1 <sup>2</sup>
Hungary	11	2,780	—	1.65	1	0.6
India	850	350	1.9	.21	0	-0.2
Japan	124	25,430	4.1	2.31	58	0.0
Russia	148.7	3,220 <sup>3</sup>	—	3.60	—	—
United States	250	21,790	1.7	5.37	197	-0.1
Average	—	8,293	2.8	1.8	63.88	0.08
World average	—	4,964	1.6	1.09	5.4	-0.13
Total	3,022.7	—	—	—	511	—
World total	5,222	—	—	—	659	—

Source: World Bank, *The Environment Data Book: A Guide to Statistics on the Environment and Development* (Washington, DC: World Bank, 1993), 10-13.

<sup>1</sup> Not including Luxembourg.

<sup>2</sup> Not including Belgium.

<sup>3</sup> 1991.

restructuring centrally planned economies. Some of these countries could be particularly affected by global change.

#### Five International Environmental Treaties

The five international treaties were chosen so as to maximize the knowledge that could be gained about ways of managing global environmental change. We deliberately selected both agreements that control pollution (the brown issues) and that protect natural resources (the green issues). There is considerable variety among these treaties in what they address and how they deal with it. We selected only treaties to which there is a significant number of parties and for which there is already some experience with implementation and compliance. A study of proposed accords that have not yet been implemented would tell us little about what makes for crafting a successful agreement. The five treaties we chose include three that deal with the management of natural resources and two that are aimed at controlling pollution.

#### Natural Resource Treaties

1. The United Nations Educational, Scientific and Cultural Organization Convention for the Protection of the World Cultural and Natural Heritage, November 16, 1972, 27 U.S.T. 37, T.I.A.S. no. 8226 (referred to as the World Heritage Convention).
2. The Washington Convention on International Trade in Endangered Species of Wild Fauna and Flora, March 3, 1973, 27 U.S.T. 1087, T.I.A.S. no. 8249 (referred to as CITES).
3. The International Tropical Timber Agreement, November 18, 1983, U.N. Doc. TD/Timber/11/Rev. 1 (1984) (referred to as the International Tropical Timber Agreement). The 1994 International Tropical Timber Agreement replaced this agreement as of January 1, 1997, when it entered into force.

#### Pollution Control Treaties

4. The International Maritime Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, December 29, 1972, 26 U.S.T. 2403, T.I.A.S. no. 8165 (referred to as the London Convention of 1972 and formerly referred to as the London Ocean Dumping Convention). The 1996 Protocol will replace this agreement when ratified by the requisite number of countries.
5. The Montreal Protocol on Substances That Deplete the Ozone Layer, September 6, 1987, 26 I.L.M. 1550 (referred to as the Montreal Protocol), together with
  - 5a. The Vienna Convention for the Protection of the Ozone Layer, March 22, 1985, 26 I.L.M. 1529 (referred to as the Vienna Convention). This is the framework treaty under which the Montreal Protocol was negotiated. We look at this treaty only insofar as it relates to the Montreal Protocol.

These treaties have been chosen because (1) they address both pollution and natural resource problems; (2) they involve several key environmental issues con-

**Table 1**  
**Adherer**

Political  
Brazil  
Camero  
China  
Europea  
Hungary  
India  
Japan  
Russia  
United S

nected v  
various  
differen  
borders.  
been in  
mentati  
the treat  
Tab  
treaties.  
Five  
to four.  
states w  
in 1973  
Heritage  
Cha  
procedu  
into bein  
treaties.

#### Method

The rese  
Practical  
We reco

**Table 1.3**  
Adherence of the political units to the treaties (year joined)

Political unit	World Heritage	CITES	Tropical Timber	London Convention	Vienna Convention	Montreal Protocol
Brazil	1977	1975	1985	1982	1990	1990
Cameroon	1982	1981	1985		1989	1989
China	1985	1981	1986	1985	1989	1991
European Union			1985		1988	1989
Hungary	1985	1985		1976	1988	1989
India	1977	1976	1986		1991	1992
Japan	1992	1980	1985	1980	1988	1989
Russia	1988	1992	1986	1976	1988	1989
United States	1973	1975	1990	1975	1988	1989

nected with global change; (3) they contain a range of types of obligations and use various techniques to promote implementation and compliance; (4) they involve different jurisdictional frameworks and issues that occur primarily within states' borders, that cross borders, and that are inherently global in nature; (5) they have been in effect long enough that there is an adequate database to analyze implementation and compliance; and (6) all of the countries are parties to at least three of the treaties, and most are parties to all of them.

Table 1.3 shows the years in which the nine political units joined the respective treaties.

Five of the political units were parties to all five treaties, and three were parties to four. The European Union was a party to only two of the treaties, but its member states were parties to all of them. These nine political units began joining the treaties in 1973 and continued through 1992, when Japan became a party to the World Heritage Convention and India a party to the Montreal Protocol.

Chapter 5 describes the treaties in detail: the obligations they impose, and the procedures and institutions they create. More important, it analyzes how they came into being and how they have evolved over time. It presents a living history of the treaties.

### Methodological Issues

The research tasks involved in this project are inherently difficult in several respects. Practicality required that we limit the number of countries and treaties in the study. We recognize that countries that are very important for several of the treaties are not

included, such as Australia for the World Heritage Convention, and Malaysia and Indonesia for the International Tropical Timber Agreement. We know that a number of interacting external and internal factors affect the extent to which countries implement and comply with treaties, as well as the pace and character of the actions that they take. Measurement of the extent of implementation and compliance, and of the factors that affect countries' actions concerning implementation and compliance, is imprecise at best. Moreover, some of the data essential to the analyses could be gained only through interviews.

One aspect of our research design consists of structured focused comparisons of the experience of diverse political units in implementing these specific international treaties. The comparisons follow the methodology set forth by Alexander L. George and Richard Smoke (1974:95-103). Comparison is necessary because there are considerable differences among the ways in which countries, even at similar levels of economic development, frame and implement policies designed to protect the environment (Jasanoff 1986, 1991). Since we are interested in the effects of different types of problems and legal arrangements, we are interested in comparing the records of individual countries with respect to different treaties as well as comparing the records of different countries. International and global regulatory efforts must take account of these practices.

A second and perhaps more important aspect of the research design consists of comparisons over time. We are interested in whether countries' compliance improves or declines over time. For those interested in using international environmental accords to protect the global environment, the relevant issue is how to strengthen all countries' compliance over time.

In some respects we have a larger number of observations than it may appear at first glance. Because we are interested in changes in political units' implementation of and compliance with their treaty obligations over time, our number of observations is the number of political units involved in the study, times the number of treaties they have ratified, times the number of years each unit has been a party to each treaty. Calculated in this manner, our number of possible observations is 502. We also observe the behavior of the political units in the period before negotiations that led to the treaties. Including this, we could have 1,485 observations. Unfortunately, the obligations imposed by the five treaties are comparable only in limited ways, so in several analyses we have been forced to keep our comparisons within a single treaty.

Measurement of implementation and compliance poses serious difficulties, as was noted above. Some measures, for instance, on the time lag between a state's becoming a party to a treaty and its adoption of implementing legislation and regulations, can be precise and other issues, such as whether reports were filed and vio-

lations w  
difficult t

Resc  
measures  
Many na  
compliance  
say exact  
budgets.  
judgment  
essential  
and qua  
Sinc  
interacti  
specified  
findings

#### The Plan

The ana  
a conte  
experien  
legislati  
and the  
that eve  
units, fi  
authoriti  
expect  
nationa  
United  
showing  
enforce

Ch  
control  
pliance  
are also  
its subj

Ch  
environ  
answer  
This ch



lations were noted and reported, can be coded "yes" or "no," although it is more difficult to capture the extent to which the reports are complete and accurate.

Resources devoted to implementation and compliance in principle could be measured precisely. Yet there are difficulties, and in practice the data are murky. Many national and international officials who are involved in implementation and compliance efforts spend only part of their time on these tasks, and find it difficult to say exactly how much time they do spend. The same problem occurs with respect to budgets. Finally, there are many issues where we must rely on our own expert judgments. Whether a country is in substantial compliance with a treaty is in the end essentially a matter of judgment. Thus the study contains a mixture of quantitative and qualitative analytical techniques.

Since we have several poorly measured variables, many causes, and numerous interactions among the variables, we know that our study cannot yield clearly specified causal propositions. It can and will, however, yield interesting and useful findings even though they may be imprecise.

### The Plan of the Book

The analysis that follows can be divided into sections. The first section provides a context for the analysis. The first chapter in this section, chapter 2, reviews the experience within countries in securing compliance with domestic environmental legislation and regulations. The analysis focuses primarily upon the United States and the European Union. Compliance is less than perfect in both units. This shows that even in political systems with hierarchical systems of authority, subordinate units, for a variety of reasons, do not always execute the directions of superior authorities. Sometimes we expect far too much from international law because we expect perfect compliance. We forget that even within countries, compliance with national laws is almost never perfect. Looking at the domestic experience within the United States and the European Union helps to frame the subsequent analyses by showing how complex and difficult compliance is, even when regulations can be enforced through the coercive power of the state.

Chapter 3 reviews the broad experience in a variety of fields, including arms control, labor, and trade, in securing compliance with international accords. Compliance with international environmental accords poses special problems, but there are also many generic problems that apply to any international accord, regardless of its subject matter.

Chapter 4 deals with the nature of scientific knowledge. Often in debate about environmental matters there is a simple assumption that science can produce clear answers that include unambiguous prescriptions for individual and common action. This chapter shows how problematic this assumption is.

The second section, chapter 5, reviews the development of the five treaties, how their terms have changed through amendment and interpretative documents such as guidelines, and how their implementation has evolved. It compares the evolution of the agreements.

The next section, chapters 6 through 14, comprises analyses of what the nine political units in our sample have done to implement and comply with treaty obligations. The first three of these chapters, 6 through 8, deal with the United States, the European Union, and Japan, all developed democratic countries. The next three chapters, 9 through 11, include analyses of the Soviet Union/the Russian Federation, Hungary, and China, countries in varying stages of transition from centrally planned to market economies. The final three chapters, 12 through 14, address India and Cameroon, low-income countries, and Brazil, a middle-income country. The country chapters are arranged in this order to facilitate comparisons among countries in somewhat similar conditions.

Chapter 15, the conclusion, analyzes compliance across the countries and across time, and presents a theoretical explanatory model. It offers insights and policy prescriptions to policy makers, scholars, and citizens who are concerned with strengthening treaty implementation and compliance.

## Notes

1. This number is derived from a comprehensive collection of legal instruments that includes agreements with important provisions relating to the environment (Weiss et al. 1992). The commonly cited figure of about 150 multilateral environmental agreements is taken from UNEP data and includes only multilateral agreements totally directed to environmental issues (UNEP 1991b).
2. Our analysis focused primarily on the period when the European Union had twelve members: Belgium, Denmark, the Federal Republic of Germany, France, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, and the United Kingdom.

## 2

## How C Domes

David Vog

This chapter  
the United  
private sector  
noncompliance  
these factors

Both the  
between the  
sible for in  
statutes are  
ever, the a  
government  
implement  
must then  
the implem  
And in fa  
national re

For ex  
salience of  
1990 the I  
mental im  
the passag  
integrated  
of its petr  
after the p  
streams ha  
1986:165-

In the  
violations  
Although  
50,000 ch