

## Introduction

# Global Environmental Change and the Nation State

---

*Frank Biermann and Klaus Dingwerth\**

“Breathless and fragmented, the world lurches into the new millennium,” begins a recent report by a European governmental advisory board<sup>1</sup>—a claim that seems hardly exaggerated given the restlessness of economic, social and cultural globalization. Most nations continue to expand their production and consumption (on average by 4 percent every year); national economies, once separate, are steadily growing together in one global market place; and spreading global communication lines bring together disparate communities into an emerging world society. This breathlessness of human activity, however, increasingly leaves its traces in the earth system: an earth system in transformation, if not in crisis, through global environmental change.

Many writers have pointed to the inherent difficulty of attaining the sustainable development of a globally interdependent system by relying on a dividing concept inherited from the 19<sup>th</sup> century—the nation state.<sup>2</sup> Many political scientists have thus investigated options for building strong and effective international institutions and establishing new forms of global governance.<sup>3</sup> Others,

\* The authors were conference chair and conference manager, respectively, of the 2001 Berlin Conference on the Human Dimensions of Global Environmental Change “Global Environmental Change and the Nation State,” at which the contributions to this GEP special issue, among numerous other papers, were first presented (see [www.glogov.org/publications/bc2001/index.html](http://www.glogov.org/publications/bc2001/index.html) for the complete conference proceedings). Special thanks go to Rainer Brohm and David Wabnitz for invaluable assistance in putting together this volume, as well as to Aarti Gupta, Carsten Helm, Klaus Jacob, Ronald B. Mitchell and Bernd Siebenhüner for valuable comments on earlier versions of this argument. Financial support has been provided by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, Government of Germany.

1. German Advisory Council on Global Change 2001, 13.

2. See for example Schellnhuber 1998 and 1999; Schellnhuber and Biermann 2000; Streeten 1989.

3. See for example Young 1990 and 1997.

however, remain cautious and point to the continuing relevance of the nation state system. They argue, for example, that economic globalization will not hinder environmental improvements, but foster the diffusion of successful policies and more efficient technologies between nation states, without the intervention of international institutions.

Given these opposing views, this special issue of *Global Environmental Politics* intends to explore the relationship between global environmental change and the nation state in more depth. All contributions are representative of intensive two-day discussions of 166 experts and colleagues at a conference on “Global Environmental Change and the Nation State,” held in December 2001 in Berlin within the framework of the “Berlin Conferences on the Human Dimensions of Global Environmental Change” and endorsed by the international Institutional Dimensions of Global Environmental Change core project of the IHDP.<sup>4</sup> Other contributions on this topic can be found in the official conference proceedings.<sup>5</sup>

The argument of our introductory article unfolds in three main steps. In a first section, we give an overview of the impacts of global environmental change on the idea and practice of the nation state. In a second section, we discuss how nation states—either on their own or in cooperation with other states—respond to the challenges posed by global environmental change.<sup>6</sup> Third and finally, we reconsider the theoretical implications of the relation between global environmental change and the nation state and ask to what extent the transformation of the world’s environment requires us to adapt our conceptual and theoretical toolkit. We close by outlining how the other contributions to this special issue relate to our ideas.

### **Global Environmental Change: The Challenge for the Nation State**

Global environmental change challenges the nation state in two ways. First, it increases the demand for mitigative and adaptive action, which places additional stress on the overall capacities of nation states to promote and protect the welfare of their populations. Second and related to the first, global environmental change increases the mutual dependence of nation states, thereby further undermining the idea of sovereignty as enshrined in the traditional Westphalian system. Both dimensions will be addressed in the following.

4. This is the International Human Dimensions Programme on Global Environmental Change, the main framework program for social science research in this field. See [www.ihdp.org](http://www.ihdp.org) for an overview.

5. See Biermann, Brohm and Dingwerth 2002.

6. Note that a third dimension of this interaction exists—namely, activities of nation states that *cause* global environmental change. This dimension, however, will not be addressed in more detail in this issue.

### *Challenging the Mitigative and Adaptive Capacities of Nation States*

Increasing global environmental change puts additional pressure on societies in terms of their capacities to mitigate, or adapt to, the transformations that lie ahead. The 1997 Human Development Report gives a dramatic overview of the many transformations that individuals and communities are faced with around the globe:

The world is rapidly changing, with the globalization and liberalization of the world economy, with the rise of new conflicts, with the spread of HIV/AIDS, with the steady deterioration of environmental resources, with demographic changes, with the failures of economic growth in Sub-Saharan Africa, Latin America and the Caribbean and the Arab States and with the transition to free market economic systems and democratic government. All this change puts added stress on the lives of people. And the people who already suffer deprivation in many aspects of their lives suffer most.<sup>7</sup>

To respond to these transformations, states need to mobilize additional capacities. In some cases, when global environmental change puts additional stress on societies—for instance through drought, regional climate changes, or sea-level rise—the capacities to cope with additional stress may even become overstretched, with local and regional crises as a likely consequence. Given the uneven geographic distribution of adverse consequences of global environmental change, some nation states will face more demands for adaptation than others. In addition, given the uneven distribution of adaptive capacities, for some societies the development and provision of these new services and technologies will come at significant costs, while for others it may even turn out to be economically beneficial, e.g. by promoting economic sectors in which adaptation technologies are being developed. The vulnerability, adaptive capacity and disaster preparedness of nation states are therefore inextricably linked to the level of economic development as well as to a number of additional socioeconomic factors. As a general statement, however, global environmental change, by requiring states to prepare for and adapt to its consequences, increases the demand for the administrative, organizational, technological and financial capacity of the nation state—a demand which some states will find easier to meet than others. In sum, it can be expected that global environmental change, by putting added stress on core capacities of the nation state, poses a significant challenge to the provision of internal security and to effective government.

Some examples from the most recent reports of the Intergovernmental Panel on Climate Change (IPCC) may serve to illustrate this argument. According to the IPCC's *Third Assessment Report*, higher maximum temperatures, more hot days and heat waves over nearly all land areas are "very likely" (denoting a 90–99 percent chance) during the 21<sup>st</sup> century. The projected impacts of such a

7. United Nations Development Programme 1997, 65.

temperature rise (with high confidence of occurrence in some areas) range from an increased incidence of death and serious illness in older age groups and urban poor and increased heat stress in livestock and wildlife, to a shift in tourist destinations, an increased risk of damage to a number of crops, and increased electronic cooling demand in combination with reduced energy supply reliability.<sup>8</sup> Other developments are considered “likely” (66–90 percent chance), such as increased Asian summer monsoon precipitation variability (with the projected impact of increased flood and drought magnitudes and damages in temperate and tropical Asia) and increased tropical cyclone peak wind intensities and mean and peak precipitation intensities, which could lead to more infectious disease epidemics, coastal erosion and damages to coastal infrastructure and ecosystems. Since the ability of human systems to cope with climate change depends on, among other factors, “wealth, technology, education, information, skills, infrastructure, access to resources, and management capabilities,” the report notes “those with the least resources have the least capacity to adapt and are the most vulnerable.”<sup>9</sup>

What does this mean for the idea and practice of the nation state? States are usually defined by four attributes as enshrined in the 1933 Montevideo convention—a permanent population, a defined territory, an effective government, and internal as well as external sovereignty.<sup>10</sup> In addition to this narrow legal definition, states can also be defined by reference to their basic functions—see, for instance, the definition of the state as “that particular, subsidiary, functional organization of the body politic which has for its proper object the promotion of the temporal good.”<sup>11</sup> Other authors have further specified the role of the state and arrived at a complex and encompassing set of functions such as (i) guaranteeing internal and external security and protection of civil rights; (ii) guaranteeing political participation and cultural integration; (iii) setting the economic framework conditions for peaceful competition among economic actors; (iv) creating certain minimal social conditions that allow for individual freedom; (v) the conservation and sustainable development of the natural environment; (vi) and the creation of a knowledge-based infrastructure to avoid uncontrollable risks.<sup>12</sup>

If we accept such a functional definition of the state, some implications of global environmental change become apparent. Starting with the first function—to guarantee internal and external security and to protect the civil rights of its citizens—it should be easily visible that all elements of this function are heavily dependent on the quality of a state’s environment. Since this environ-

8. Intergovernmental Panel on Climate Change 2001, 7. On the changing role of nation states in IPCC and other assessment bodies, see Siebenhüner 2003.

9. Intergovernmental Panel on Climate Change 2001, 8.

10. See Montevideo Convention on the Rights and Duties of States, done Montevideo, 26 December 1933, in force 26 December 1934, article 1 (d). The convention does not speak of sovereignty, but of the “capacity to enter into relations with the other states.” See in more detail Shaw 1996, 139–147.

11. Dunner 1964, 498.

12. See Willke 1994.

mental quality itself depends not only on the activities of the state in question, but also on those of other states, guaranteeing security and protecting civil rights becomes possible only in a social system that transcends the narrow boundaries of the nation state. In turn, the conservation and sustainable development of the natural environment—itsself conceived of as a state function by some commentators—is most visibly not in the hands of a single state to achieve.

In addition, the added stress that global environmental change puts on nation states makes the fulfillment of other state functions such as guaranteeing political participation and creating certain minimal social conditions that allow for individual freedom more difficult for many states to achieve. Thus, where additional capacities are required, decision-making may become more hierarchically structured in order to save time and resources, thus allowing for less participation; whereas the guarantee of minimal social conditions will become the more difficult the more numerous and complex the demands on the capacities of less developed states become as a result of the global transformations sketched above. Given these transformations, the creation of a knowledge-based infrastructure to avoid uncontrollable risks is likely to become an even more important core function of the nation state. However, as with most other functions, its fulfillment depends to a great deal on the capacities states have at their disposal—which seem, again, to be more restricted in developing countries<sup>13</sup> and which are likely to decrease as a result of the additional stress on nation states due to global environmental change.

### *Creating New Interdependencies*

The causes and consequences of international interdependence have been discussed by students of international politics dating back to Albert Hirschman's seminal volume of 1945,<sup>14</sup> or, in a more general sense, even to Immanuel Kant's writing. Global environmental change, however, adds new dimensions to an old debate, inasmuch as ecological interdependence is—unlike economic interdependence that was the focus of discussion in the 1960s and 1970s—in most cases truly global, indissoluble and inescapable, even for the most powerful nations. Such interdependence is both direct and systemic, and indirect through intermediary problems.

(1) First, global environmental change creates new forms of *direct, systemic* interstate interdependence that have been unknown in the heydays of the Westphalian system. All nations are affected, for example, by the depletion of the stratospheric ozone layer or by global climate change. While some adaptation to climate change may seem feasible—though costly—in the richer countries, developing countries are faced with increasing vulnerability to a global environmental problem that has only marginally been caused by their own greenhouse gas emissions. Regarding the depletion of the ozone layer, no adap-

13. Biermann 2002b.

14. Hirschman 1945.

tation is possible at all. In both cases, nation states are bound to suffer from environmental harm that has been caused by the community of nations as such. Complex interdependence as a new phenomenon of international relations has been analyzed before, notably by the widely quoted study of Keohane and Nye of 1977, which built on a lively debate in the early 1970s. This debate mainly centered on economic interdependence, which theoretically left nation states the option to limit their interdependence with other states, if the costs of interdependence were seen as outweighing the benefits. Ecological interdependence, caused by global environmental change, clearly differs. No exit option remains for the nation state: the modern complex ecological interdependence binds all nations, which creates a new dependence of individual nation states—even the largest, most powerful ones—on the community of all other nations.

(2) Second, beyond the direct, systemic interdependence created through climate change or diminishing stratospheric ozone, global environmental change will create *new indirect interdependencies* through increased stress on the adaptive capacity of other states—with the possible result of failed state action in neighboring countries. A vast literature on the relationship between environmental degradation and societal conflict has pointed to possible violent conflicts that could result from extended environmental stress and the failure of nation states to cope with these new problems.<sup>15</sup> In addition, economic crises, mass migration or local environmental problems due to increasing global environmental change have been discussed—again problems that cannot be confined to particular states or regions, but that will affect all nation states through increasing indirect interdependence.

### **Global Environmental Change: The Response by the Nation State**

Given these challenges, it seems imperative that nation states make every possible effort to mitigate and adapt to global environmental change. Two ways of responding to these challenges are possible: states can either react on their own, that is, by devising or adapting national environmental policies; or they can coordinate their efforts and design bilateral or multilateral environmental policies. Since in practice states do both, two specialized fields within political science have emerged along the lines of these two strategies—comparative environmental politics and international environmental politics. This section summarizes the main findings from both literatures.

#### *Horizontal Diffusionism: Global Environmental Protection through National Front-Runners*

Many researchers from comparative law and politics, innovation studies and environmental policy have asserted that the role of the nation state remains central, and that international institutions in many cases are epiphenomenal in

15. See Biermann, Petschel-Held and Rohloff 1999 with further references.

counteracting global environmental change (see Jänicke and Jacob, this issue). Their claim is that the globalization of national environmental policies, rather than international institutions, has been responsible for the many environmental successes of the last decades.<sup>16</sup> Contrary to critics of globalization and proponents of the “free-rider” hypothesis, a number of empirical studies offer evidence for an environmental “race to the top” rather than a “race to the bottom.” According to this literature, industries do not emigrate to “pollution havens,” as opposed to other observers who fear that precisely this will be the outcome of a globalized economy based on competitive nation states.<sup>17</sup> This is mirrored for instance in minister Trittin’s contribution to this special issue, when he claims that even “the communitarization within Europe does not prevent members from becoming front-runners in environmental policy.”

Some researchers have even claimed that the globalization of environmental policy in recent years is to be explained “in very large measure” as the outcome of horizontal policy diffusion instead of the influence of international regimes (even though regimes are seen as important agents of diffusion of policies and technologies).<sup>18</sup> According to many participants in these debates, environmental research thus needs to focus on the processes by which nation states cause or influence the diffusion of innovative environmental policies around the world<sup>19</sup>—a variant of global environmental governance that has been, it is claimed, “almost completely ignored.”<sup>20</sup>

Comparative research in the area of environmental policy development thus usually focuses on domestic factors that facilitate or hinder the development or promotion of national environmental policies. The regional focus is mainly (but not exclusively) on OECD countries. The analytical framework is based on the notion that in order to “explain cases of success or failures (policy outcomes) in environmental protection, we must analyze the dynamic interaction between proponents and opponents of action.”<sup>21</sup> Hence, comparative environmental policy analysis usually contains as major elements research on (1) actors and actor constellations; (2) actor strategies, including their general approaches towards the problem, the instruments at their disposal and the ways in which they use them;<sup>22</sup> (3) structural framework conditions; (4) the situative context, that is, short-term variable factors such as floods or heat-waves; and

16. See for instance Conrad 1998; Jänicke and Jörgens 1998 and 2000; Jänicke and Weidner 1997; and Tews and Busch 2002.

17. See Vogel 1995 on the “race to the top” hypothesis. See for an extensive review of economic literature, Althammer et al. 2001.

18. Kern, Jörgens and Jänicke 2001, 1.

19. Kern 2000; Kern, Jörgens and Jänicke 2001; and Tews and Busch 2002.

20. Kern, Jörgens and Jänicke 2001, 3.

21. Jänicke 1997, 9.

22. Here, it is important to note that polluters do not necessarily oppose regulation, but can also have an interest in environmental policies that support, for example, technological innovation. See for instance the case of DuPont in the ozone regime, where the company as the world’s largest producer of ozone-depleting substances pushed for a phase-out of these substances because it hoped—correctly, as it turned out—for first-mover advantages based on the relatively advanced stage of its own search for alternative substances.

finally (5) the overall character of the problem, which may differ for example regarding the urgency of the problem and the availability of technological solutions.<sup>23</sup>

With regard to structural framework conditions, comparative research has developed the concept of “systemic opportunity structure” to denote structural conditions that facilitate or hinder environmental policy measures within nation states. The systemic opportunity structure includes the “conditions under which environmental knowledge is produced, distributed, interpreted and applied”<sup>24</sup> (cognitive-informational framework conditions), as well as the network of relevant norms, rules and institutions that are in place in nation states (political-institutional framework conditions) and the state of economic and technological development (economic-technological framework conditions). With regard to the latter, a close relationship between GNP per capita and environmental indicators has been identified, even though the data still seem to be contradictory, and analysts agree that in general “there is no tendency to ‘get rich and get clean.’”<sup>25</sup>

*Vertical Institutionalism: Global Environmental Protection Through International Regimes and Organizations*

In sharp contrast to this comparative approach, a second group of researchers, trained mainly in the field of International Relations (IR), focus on international environmental institutions as agents of environmental governance in the global realm. This research program is closely embedded in the general IR discourse on states and institutions. In many IR theories, the nation state is seen as the pivotal actor that shapes the international system and the expectations of other state actors. Such statism stands at the center, for example, of the realist research program,<sup>26</sup> which denies any significant independent role for intergovernmental institutions and organizations, or for nonstate actors. Likewise, many game theoretical or economic approaches share the statism of the realist paradigm.<sup>27</sup> Realist statism has been challenged for many decades:<sup>28</sup> Institutionalists have asserted new forms of complex interdependence relationships between industrialized countries<sup>29</sup> and have argued that intergovernmental cooperation is both theoretically possible and empirically undeniable;<sup>30</sup> global structuralists and neo-Marxists have posited global (class) structures as core concepts to understand the capitalist world system,<sup>31</sup> and constructivists have challenged stat-

23. Jänicke 1997, 6–8.

24. Jänicke 1997, 7.

25. Jänicke and Weidner 1997, 300.

26. Waltz 1959 and 1979; and Grieco 1988 and 1990.

27. See for example Helm 1998 and 2000.

28. See for example Keohane 1986.

29. Keohane and Nye 1977.

30. See for example, Axelrod 1984; Oye 1986; and Keohane 1984.

31. See for example on the 1970s-debate Caporaso 1978; Senghaas 1977; and Cox 1989.



ism by pointing to the context-dependency of the definition of states, which are seen as far from unitary and rational.<sup>32</sup>

Since the mid-1980s, international environmental policy too has become a mainstream topic for IR scholars, within the analysis of international regimes as the central meeting ground for different schools in the IR community.<sup>33</sup> Theoretical discourse on international environmental policy has followed the cycle of political developments: Research focused first on the emergence of international environmental regimes and of the norm-setting process within regimes. Then, following the enormous growth in the number of international regimes in the 1980s and 1990s, scholars turned their attention to the actual influence these regimes had on policies pursued by nation states—a debate about “regime effectiveness” that has produced an impressive amount of literature in recent years.<sup>34</sup>

The key premise of this literature is that the global environmental crisis requires intergovernmental institutions to constrain the behavior of nation states. It is argued, often rather implicitly, that in a world with no intergovernmental institutions and with only nation states acting independently, the state of the global environment would be significantly worse. The political motive driving this stream of IR research then is the question of how to design institutions in a way that makes them more effective—or, in the words of minister Trittin in his contribution to this issue, “Our priority must be to ensure that global environmental institutions and environmental law are given much greater weight.” The rationale for this premise is often some version of Hardin’s parable of “the tragedy of the commons.”<sup>35</sup> Without any constraints, nation states—like other self-interested actors—would seek maximum benefits for themselves while neglecting the potential damage of their action for the greater good, such as the atmosphere. In a world where only individual state rationality has its reign, collective outcomes would inevitably be sub-optimal.

IR research on environmental regimes has provided a number of useful insights into the factors that could make regimes exert more influence on state action.<sup>36</sup> Some research points to the relevance of regime design.<sup>37</sup> In the case of oil pollution, for example, it has been shown that different international norms and verification procedures can have entirely different outcomes on the overall effect of the regime.<sup>38</sup> Different modes of regime allocation are also likely to influence regime effectiveness, for example in climate policy.<sup>39</sup> Crucial, too, is

32. See for example Albert 1994; Liftin 1994; Ulbert 1997; and Wendt 1992.

33. For an excellent overview, see Mitchell 2002.

34. For an overview about different conceptualizations of regime effectiveness, see Jakobeit 1998; and Young 2001.

35. Hardin 1968.

36. See Mitchell 2002.

37. For an overview about research on institutional arrangements, see Prittwitz 2000; and J. Gupta 2002b.

38. Mitchell 1994a and 1994b.

39. Tóth 1999; and J. Gupta 2002a.

whether a given regime includes systems for reciprocity and sanctions or rewards, which would require as a first step a credible verification system that assures all actors that their, and others', behavior is known.<sup>40</sup> Some scholars—especially those who base their arguments on game theory—have argued in favor of strict sanction systems to punish free-riding nation states. Others see less confrontational approaches as more likely to be effective, since most nation states do not willingly breach agreements, but rather do so for lack of the necessary resources.<sup>41</sup> The cooperative approach taken by the parties to the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer vis-à-vis the default of the Russian Federation is a widely quoted example.<sup>42</sup>

Apart from the design of regimes—which could be altered in theory by nation states in subsequent negotiations—IR research points to a number of additional, external factors that might explain variation of success among regimes. Crucial variables are the structure of problems and issue areas: controlling the phase-out of chemicals for which substitutes are widely available is quite different from halting soil degradation in arid countries through international law. In the case of regional regimes, the characteristics of their members are key factors in explaining cross-regional variation in regime effectiveness. Finally, the overall context matters, such as the general economic situation or non-environmental political concerns that might explain, for example, Soviet policies in the regime on long-range transboundary air pollution in Europe.<sup>43</sup>

Notwithstanding the vast amount of literature on the influence that inter-governmental regimes have on national environmental policies, the IR community still lacks a generally accepted definition of effectiveness,<sup>44</sup> which has given rise to a number of conceptual papers on this elusive dependent variable.<sup>45</sup> Concepts of regime effectiveness or success range from assessing the *output* of the regime in terms of legal promulgations or policies enacted (an approach typical for much legal writing) and *behavioral change* among political actors (outcome) to an appraisal of the eventual *environmental impact*, that is, whether changes in state behavior have actually improved the state of the ecosphere.<sup>46</sup> In addition, while a few international regimes such as the ozone regime, the climate change regime, and the long-range transboundary air pollution regime have been the focus of numerous studies, a large number of less well-known bilateral and multilateral agreements have yet to be studied in more detail in order to test and

40. Mitchell 1998.

41. Chayes and Chayes 1993 and 1995.

42. Victor 1996; and Benedick 1998.

43. Levy 1993.

44. See for example Young (2001, 107), who observes that “[t]here can be no doubt that the tendency to conduct in-depth case studies using somewhat different definitions of key concepts or even altogether different concepts is a real problem in this field of study.”

45. See for example Bernauer 1995; Biermann and Bauer 2003; Helm and Sprinz 2000; Keohane 1996; Underdal 2002; and Young 2001.

46. Cioppa and Bruyninckx 2000.

improve existing theories about the conditions for effective international environmental politics.

*The Emergence of “Collaborative Governance”*

In sum, states do make considerable efforts to counteract global environmental change, both by way of unilateral action—which may eventually lead to the adoption of similar policies by other states—and through international environmental regimes. However, the relative as well as the absolute effectiveness of both these approaches is difficult to determine. Beyond the often cited success stories of the international regime for the protection of the ozone layer, or the prominent failure of international climate negotiations to come to a meaningful agreement, the extent to which nation states, whether on their own or jointly, are able to prevent or mitigate global environmental change is hardly known. These were the key questions addressed in the more than hundred papers presented at the 2001 Berlin Conference on the Human Dimensions of Global Environmental Change “Global Environmental Change and the Nation State,” of which this special issue presents some representative examples.

One finding that emerged from these discussions is that over the last years, in particular nonstate actors have assumed an increasing role in transnational environmental politics. This holds true for horizontal processes of policy diffusion in which business actors usually play an important role, but also for vertical global decision-making processes in which nongovernmental organizations, the scientific community and business associations have either joined states in devising transnational rules, or circumvented the state altogether in setting global standards among their own.<sup>47</sup>

This development may indeed point to the decreasing capacities of the state to solve the complex problems posed by global environmental change. As a result, the transformations summarized by the term “global environmental change” appear to signal the demand not only for cooperation among governments, but also for cooperation among sectors, as well as among different scales of policy-making, exemplified for instance by the “global anticipatory governance”<sup>48</sup> on biosafety. This demand for new forms of governance is increasingly being met by “coalitions of the willing” that on one occasion may comprise a number of states and on another occasion business corporations collaborating with civil society groups at different governance levels. While we have only begun to take notice of the emergence of these “new mechanisms of global envi-

47. See, for example, the detailed guidelines developed by the World Commission on Dams (Dingwerth 2003a and 2003b) and by the Forest Stewardship Council (Pattberg 2003). See also Karkkainen’s contribution to this issue, as well as the numerous contributions in Hisschemöller et al. 2001.

48. See A. Gupta 2001a and 2001b.

ronmental governance," their evaluation in descriptive, analytical and normative terms has yet to follow.

### **Global Environmental Change and the Nation State: The Contributions in Perspective**

So far, we have presented the following three arguments: First, the added stress that global environmental change puts on nation states by increasing the demand for adaptive and mitigative activities, further diminishes the scope of resources that states have at their disposal for fulfilling their core functions. Since developing countries will suffer most from a lack of capacities to address the social, economic and environmental problems within their territorial boundaries, it can be expected that the capacities of these states will be stretched most significantly by global environmental change. Second, because of the essentially transboundary nature of global environmental change, the capacity of nation states to effectively fulfill their functions *without the cooperation of other states* (and/or nonstate actors) is decreasing. While international cooperation may be a way out of this dilemma, we still lack precise knowledge about the absolute as well as relative effectiveness of international environmental institutions. Third, as a result of both of these trends, "collaborative governance"—the finding and implementation of solutions to specific problems by a diverse array of social actors, including governments, international governmental and nongovernmental organizations, business associations and scientific communities—is emerging as one new mechanism of global environmental governance.

We have stressed, however, that the precise role of states in both mitigating and adapting to global environmental change is still in question. Consequentially, the contributions to this special issue of *Global Environmental Politics* attempt to shed light on questions such as: What is the role of horizontal diffusion of environmental policies? Which national behavior can be ascribed to the effects of international institutions? To what extent are states giving way to other actors in the making and implementation of environmental policies? The contributions reveal that, in theoretical terms, the interaction between global environmental change and the nation state is linked to three core ideas of international relations theory: sovereignty, agency, and policy levels.

#### *From Westphalia to Interdependence? Rethinking Sovereignty*

Some ideas that emerge from the various sub-fields of political science are mirrored in much recent writing in the field of international law. While it has long been accepted among international legal theorists that a state may not use its territory in a way that causes serious harm to other states,<sup>49</sup> it was felt in

49. This was decided in the landmark Trail Smelter Arbitration 1938/1941; discussed in Nanda 1989; Biermann 1995; and Sands 1995.

recent decades that this simple prohibition of transboundary pollution would only inadequately meet the challenges of global environmental problems such as climate change.<sup>50</sup> Lawyers have thus embarked on developing new legal approaches that would place new constraints on state behavior. It has been proposed, for example, to conceptualize the atmosphere as a “shared resource”<sup>51</sup> of all nations or as a “common heritage of humankind.”<sup>52</sup> In recent legal documents, the threats to both the climate and biological diversity have been declared a “common concern of humankind,”<sup>53</sup> though the legal consequences of this concept remain unclear.<sup>54</sup>

In line with these propositions, Peter Sand argues that, while recent legal developments have emphasized the central status of nation states, the normative restrictions that already exist render the analogy of “ownership” rights less compelling. Instead, “the role of the nation state becomes more akin to a kind of public trusteeship” (see Sand, this issue). Sand shows how this idea of public trusteeship has gained ground not only in public international law, but also in comparative environmental law and in so-called “stewardship economics.” Sand describes the main features of a legally circumscribed international environmental trusteeship and shows how the concept of public trust may be transferred from the national to the global level, thus also addressing the issue of scope and policy levels. While Sand’s arguments demonstrate the extent to which sovereignty is “bounded” by international environmental law, the author stresses that this boundedness implies a “greening of sovereignty” rather than a threat to sovereignty. In contrast to rather vague notions such as the “common concern” or “common heritage of mankind,” Sand’s notion of a public trusteeship grants states a major role in the global efforts to protect the environment.

In addition to Peter Sand’s contribution, Bradley Karkkainen’s article also includes the challenge to state sovereignty in its title. Environmental governance, Karkkainen argues, is becoming “collaborative” and “post-sovereign,” thus losing its traditional focus on state activities. Karkkainen begins his argument with the observation that most research on international environmental policy, in particular research from International Relations scholars, has been essentially state-centric. While the author acknowledges that some of the more recent approaches to global environmental politics have begun to question this state-centric orientation, his contribution explicitly aims to “pick up where Rosenau and others leave off” and to provide insights into an emerging type of governance, which he calls “post-sovereign.” Post-sovereign governance has, according to Karkkainen, three distinguishing characteristics in that it is “non-

50. See for example Palmer 1992; and Schrijver 1997.

51. See Toronto Declaration 1988; Ottawa Declaration 1989. On the older concept of “shared resources,” see Birnie and Boyle 1992, 215–50; and Biermann 1995.

52. See Malta’s proposal at the 43rd session of the UN General Assembly in 1988.

53. See UNGA Resolution 43/53 (1988); United Nations Framework Convention on Climate Change 1992, preamble; Convention on Biological Diversity 1992, preamble.

54. See Biermann 1995, 2002a; and Brunnée 1989.

exclusive, non-hierarchical, and post-territorial." By examining two leading North American cases—the Chesapeake Bay Program and the US-Canadian Great Lakes Program—Karkkainen illustrates how and why collaborative problem-solving arrangements emerge and how they function. Within such arrangements, states can be seen as "first among equals" but their sovereignty is effectively bounded because they require the assistance of a diversity of other actors to fulfill their functions.

*Global Governance by Nonstate Actors? Rethinking Agency*

A second theme that surfaces in all contributions is the question of agency: who are the relevant actors when it comes to counteracting global environmental change? As the above discussion of internal and external sovereignty indicates, in recent years nonstate actors have gained relevance in global environmental governance.<sup>55</sup> Of course, private actors are not new to the study and practice of international relations: commercial corporations with transnational reach have had a major influence since medieval ages, from the political power of larger banks in renaissance economy to the empires run by private European holdings in the early colonial times. Non-profit groups also had some influence in the past, for example regarding the abolishment of slavery.<sup>56</sup> However, the growing complexity of problems has increased the visibility of nonstate actors in the negotiation of international treaties as well as in national environmental policies. The growing power of nonstate actors, as asserted by many, sheds new light on the role of the nation state.

According to the contributions of Peter Sand and of Martin Jänicke and Klaus Jacob, despite all the interest in nonstate actors, states are still the main actors of global environmental governance. This is mirrored in minister Trittin's contribution to this issue, who argues, "Politically, however, we still define ourselves as citizens of a particular nation state." On Peter Sand's account, nation states are crucial because they are capable of acting as the trustees in his concept of international environmental trusteeship; for Jänicke and Jacob they are mainly providers of lead markets for technological innovations. Jänicke and Jacob argue that for a number of reasons, national pioneers in environmental policy are an important trigger for innovations in environmental technologies. Based on the observation that the achievements of pioneer states regularly, and often rapidly, diffuse across borders, the authors examine how actors become pioneers in the first place. In their analysis, they find that so-called lead markets in which technology-based innovations can demonstrate their feasibility, are a main driving force for the development and diffusion of environmentally friendly technologies. Since the conditions for these markets need to be established and guaranteed primarily by states, Jänicke and Jacob conclude that the nation state remains the central actor in global environmental governance.

55. For an early debate on nonstate actors, see Keohane and Nye 1972; see also Jakobeit 1996, and for US research, Princen, Finger and Manno 1995; Raustiala 1997; and Wapner 1996.

56. See for example Nadelmann 1990.

In contrast, Bradley Karkkainen as well as Philippe Cullet and Jawahar Raja argue that nonstate actors are as important as states. Whereas Karkkainen claims that the role of nonstate actors in environmental governance has shifted and that new and diverse governance arrangements are partly taking over functions that have previously belonged exclusively to the domain of nation states, Cullet and Raja hold that international institutions are pivotal—unfortunately not only in mitigating environmental change, but also in preventing nation states from counteracting environmental change. In their analysis of the impact of international trade and environment regulations on national biodiversity management in India, Cullet and Raja come to the conclusion that due to the stronger enforcement that goes hand in hand with international trade rules, these rules have a considerable impact on national policy formulation, whereas international environmental regulations that lack a corresponding enforcement mechanism are in an inferior position. They illustrate their argument with reference to Indian biodiversity politics in the context of both the Agreement on Trade-Related Intellectual Property Rights (TRIPS Agreement) and the Convention on Biological Diversity. The authors thus show that intergovernmental organizations—in this case the World Trade Organization (WTO)—or certain structural features of the international system can have an important impact on national policy formulation.

#### *When Global is Local: Rethinking Policy Levels*

Finally, the contributions to this issue show the continuing relevance of a better understanding of the complexities of multilevel environmental policy-making, in particular the need for improved knowledge about the appropriateness of different governance levels for different policies and problems. Recent studies have evidenced the intrinsic inter-level linkages in situations “when global is local”<sup>57</sup> (or vice versa), and the international research program Institutional Dimensions of Global Environmental Change<sup>58</sup> has recently decided to select this “problem of scale” as one its core fields of inquiry. Interestingly, the four contributions in this issue provide for four different answers to the problem. Karkkainen, while to some extent favoring the local level because of its advantages in fostering social learning, argues within the theoretical frame of the governance approach, which generally tends to be less sensitive to policy levels than most other approaches. Instead, governance theory rests on the more or less implicit assumption that similar dynamics can be found at all relevant policy levels.

In contrast, Sand’s contribution focuses on the international policy level, where his idea of a public trusteeship introduces a new international legal mechanism. This mechanism, while according states a central role in its design and implementation, ultimately bears the potential of transforming the current

57. See Gupta forthcoming.

58. IDGEC 1999; and Young 2002.

interstate system into something more akin to a global community of states or even peoples. In this way, Sand's article places the international system at the center of humanity's efforts to mitigate and adapt to global environmental change—if we want to save the planet, we should start with transforming the international system.

Wrong, argue Jänicke and Jacob: in order to protect the global environment, nation states should be the main addressees, because it is they who provide lead markets for technological as well as for policy innovations. Finally, Cullet and Raja occupy something of a middle ground by placing the interplay among national and international environmental policies at the center of their research. As this divergence of views demonstrates, the “problem of scale” is likely to remain on the research agenda of global environmental governance for some more time.

## Conclusion

Global environmental change does not pose an immediate threat to the continued *existence* of nation states, with few possible exceptions such as small island states. However, we have argued that global environmental change decreases the capacity of nation states to effectively fulfill their definitional functions without the cooperation of other states (and, potentially, nonstate actors) and that, in addition, the added stress which global environmental change puts on nation states increases the demand for adaptive capacities, thereby further diminishing the resources states have at their disposal for fulfilling their core functions. Since developing countries suffer most from a lack of capacities to address the social, economic and environmental problems that exist within their territorial boundaries, we expect that the capacities of these states will be stretched most severely by global environmental change.

Based on our overview of the complex interplay between global environmental change and the nation state—the deep impact the former may have on the latter as well as the various ways in which the latter may mitigate or adapt to these impacts—we have argued that a reconsideration of core theoretical concepts such as sovereignty, agency and policy levels is required if we are to improve our understanding of the complexities involved in global environmental governance. We believe that the contributions comprised in this special issue of *Global Environmental Politics* provide a fertile ground for further research on some of the pressing questions outlined in this introduction.<sup>59</sup>

## References

Albert, Mathias. 1994. ‘Postmoderne’ und Theorie der internationalen Beziehungen. *Zeitschrift für Internationale Beziehungen* 1 (1): 45–63.

59. See also the fifty conference contributions included in the edited volume Biermann, Brohm and Dingwerth 2002, as well as the additional conference papers at [www.environmental-policy.de](http://www.environmental-policy.de).



- Althammer, Wilhelm, Frank Biermann, Susanne Dröge, and Michael Kohlhaas. 2001. *Handelsliberalisierung kontra Umweltschutz? Ansätze für eine Stärkung umweltschützender Ziele in der Welthandelsordnung*. Berlin: Analytica.
- Axelrod, Robert. 1984. *The Evolution of Cooperation*. New York: Basic Books.
- Benedick, Richard E. 1998. *Ozone Diplomacy: New Directions in Safeguarding the Planet*. 2<sup>nd</sup> enlarged edition. Cambridge, MA: Harvard University Press.
- Bernauer, Thomas. 1995. The Effect of International Environmental Institutions: How We Might Learn More. *International Organization* 49 (2): 351–77.
- Biermann, Frank. 1995. *Saving the Atmosphere: International Law, Developing Countries and Air Pollution*. Frankfurt am Main, New York et al.: Peter Lang.
- \_\_\_\_\_. 2002a. Common Concerns of Humankind and National Sovereignty. In *Globalism: People, Profits and Progress. Proceedings of the 30<sup>th</sup> Annual Conference of the Canadian Council on International Law, Ottawa, 18–20 October, 2001*. Dordrecht: Kluwer, 158–212.
- \_\_\_\_\_. 2002b. Institutions for Scientific Advice: Global Environmental Assessments and their Influence in Developing Countries. *Global Governance* 8 (2): 195–219.
- Biermann, Frank, and Steffen Bauer. 2003. *Managers of Global Governance: Assessing and Explaining the Effectiveness of Intergovernmental Organizations*. Paper presented at the 44th Annual Convention of the International Studies Association, Portland, Oregon, United States of America, 25 February—1 March 2003.
- Biermann, Frank, Gerhard Petschel-Held, and Christoph Rohloff. 1999. Environmental Degradation as a Cause of Conflict? Theoretical Conceptualization and Empirical Analysis of the Relationship between 'Environment' and 'Security'. *Law and State* 59–60, 158–95.
- Biermann, Frank, Rainer Brohm, and Klaus Dingwerth, eds. 2002. *Global Environmental Change and the Nation State. Proceedings of the 2001 Berlin Conference on the Human Dimensions of Global Environmental Change*. Potsdam, Germany: Potsdam Institute for Climate Impact Research. Available at <http://www.glogov.org/publications/bc2001>.
- Birnie, Patricia, and Alan E. Boyle. 1992. *International Law and the Environment*. Oxford: Clarendon Press.
- Brunnée, Jutta. 1989. 'Common Interest': Echoes from an Empty Shell? Some Thoughts on Common Interest and International Environmental Law. *Zeitschrift für ausländisches öffentliches Recht und Völkerrecht* 49 (3–4): 791–808.
- Caporaso, James A. 1978. Dependence, Dependency, and Power in the Global System: A Structural and Behavioral Analysis. *International Organization* 32 (1): 13–43.
- Chayes, Abram, and Antonia Handler Chayes. 1993. On Compliance. *International Organization* 47 (2): 175–205.
- \_\_\_\_\_. 1995. *The New Sovereignty: Compliance with International Regulatory Agreements*. Cambridge, MA: Harvard University Press.
- Cioppa, Tom, and Hans Bruyninckx. 2000. *The Effectiveness of International Environmental Regimes: What About the Environment?* Paper presented at the 41st Annual Convention of the International Studies Association, March 14–18, 2000, Los Angeles (Calif.) (on file with authors).
- Conrad, Jobst. 1998. *Environmental Management in European Companies: Success Stories and Evaluation*. Amsterdam: Gordon and Breach Science Publishers.
- Cox, Robert W. 1989. Production, The State, and Change in World Order. In *Global Changes and Theoretical Challenges: Approaches to World Politics for the 1990s*, edited

- by Ernst-Otto Czempiel and James N. Rosenau, 37–50. Lexington, MA: Lexington Books.
- Dingwerth, Klaus. 2003a. *The Democratic Legitimacy of Global Public Policy Networks: Analysing the World Commission on Dams* (Global Governance Working Paper No 6). Potsdam, Berlin, Oldenburg: The Global Governance Project. Available at [www.glogov.org/workingpapers/workingpaper6\\_en.pdf](http://www.glogov.org/workingpapers/workingpaper6_en.pdf).
- \_\_\_\_\_. 2003b. Globale Politiknetzwerke und ihre demokratische Legitimation: Eine Analyse der Weltstaudammkommission. *Zeitschrift für Internationale Beziehungen* 10 (1): 69–109.
- Dunner, Joseph, ed. 1964. *Dictionary of Political Science*. London: Vision Press.
- German Advisory Council on Global Change. 2001. *World in Transition: New Structures for Global Environmental Policy*. London: Earthscan.
- Grieco, Joseph. 1988. Anarchy and the Limits of Cooperation: A Realist Critique of the Newest Liberal Institutionalism. *International Organization* 42 (3): 485–507.
- \_\_\_\_\_. 1990. *Cooperation among Nations: Europe, America and Non-Tariff Barriers to Trade*. Ithaca, NY: Cornell University Press.
- Gupta, Aarti. 2001a. Advance Informed Agreement: A Shared Basis to Govern Trade in Genetically Modified Organisms? *Indiana Journal of Global Legal Studies* 9 (1): 265–81.
- \_\_\_\_\_. 2001b. *Searching for Shared Norms: Global Anticipatory Governance of Biotechnology*. Doctoral Dissertation. New Haven, CN: Yale University Graduate School of Arts and Sciences.
- \_\_\_\_\_, forthcoming. When Global is Local: Negotiating ‘Safe Use’ of Biotechnology. In *Earthly Politics, Worldly Knowledge: Local and Global in Environmental Governance*, edited by Sheila Jasanoff and Marybeth Long-Martello. Cambridge, MA: MIT Press.
- Gupta, Joyeeta. 2002a. Environment and Development: Towards a Fair Distribution of Burdens and Benefits. In *Ontwikkelingsproblematiek: The winner takes it all? Vraagstukken in de wereld*, edited by J. J. F. Heins and G. D. Thijs, 35–50. Amsterdam: Vrije Universiteit Amsterdam Press.
- \_\_\_\_\_. 2002b. Global Sustainable Development Governance: Institutional Challenges from a Theoretical Perspective. *International Environmental Agreements: Politics, Law and Economics* 2 (4): 361–388.
- Hardin, Garrett. 1968. The Tragedy of the Commons. *Science* 162: 1243–8.
- Helm, Carsten. 1998. International Cooperation Behind the Veil of Uncertainty: The Case of Transboundary Acidification. *Environmental and Resource Economics* 12 (2): 185–201.
- \_\_\_\_\_. 2000. *Economic Theories of International Environmental Cooperation*. Cheltenham: Edward Elgar.
- Helm, Carsten, and Detlef F. Sprinz. 2000. Measuring the Effectiveness of International Environmental Regimes. *Journal of Conflict Resolution* 44 (5): 630–52.
- Hirschman, Albert O. 1945/1980. *National Power and the Structure of Foreign Trade*. Berkeley, CA: University of California Press.
- Hisschemöller, Matthijs, Rob Hoppe, William N. Dunn and Jerry R. Ravetz, eds. 2001. *Knowledge, Power and Participation in Environmental Policy Analysis*. New Brunswick, USA and London: Transaction Publishers.
- IDGEC—Institutional Dimensions of Global Environmental Change Programme. 1999. *Science Plan*, by Oran R. Young with contributions from Arun Agrawal, Leslie A. King, Peter H. Sand, Arild Underdal and Merylyn Wasson (IHDP Report No. 9): Bonn: IHDP. Available at [www.ihdp.org](http://www.ihdp.org).

- Intergovernmental Panel on Climate Change (IPCC). 2001. *Climate Change 2001: Impacts, Adaptation, and Vulnerability. Summary for Policymakers of the Working Group II*. Geneva: IPCC.
- Jakobeit, Cord. 1996. Nonstate Actors Leading the Way: Debt-For-Nature-Swaps. In *Institutions for Environmental Aid: Pitfalls and Promise*, edited by Robert O. Keohane and Marc A. Levy, 127–66. Cambridge, MA: MIT Press.
- \_\_\_\_\_. 1998. Wirksamkeit in der internationalen Umweltpolitik. *Zeitschrift für Internationale Beziehungen* 5 (2): 345–66.
- Jänicke, Martin. 1997. The Political System's Capacity for Environmental Policy. In *National Environmental Policies: A Comparative Study of Capacity-Building*, edited by Martin Jänicke and Helmut Weidner, 1–24. Berlin: Springer.
- Jänicke, Martin, and Helmut Weidner. 1997. Summary: Global Environmental Policy Learning. In *National Environmental Policies: A Comparative Study of Capacity-Building*, edited by Martin Jänicke and Helmut Weidner, 299–313. Berlin: Springer.
- \_\_\_\_\_, eds. 1997. *National Environmental Policies: A Comparative Study of Capacity-Building*. Berlin: Springer.
- Jänicke, Martin, and Helge Jörgens. 1998. National Environmental Policy Planning in OECD Countries: Preliminary Lessons from Cross-National Comparisons. *Environmental Politics* 7 (2): 27–54.
- \_\_\_\_\_. 2000. Strategic Environmental Planning and Uncertainty: A Cross-National Comparison of Green Plans in Industrialized Countries. *Policy Studies Journal* 28 (3): 612–32.
- Jasanoff, Sheila, and Marybeth Long-Martello, forthcoming. *Earthly Politics, Worldly Knowledge: Local and Global in Environmental Governance*. Cambridge, MA: MIT Press.
- Keohane, Robert O. 1984. *After Hegemony: Cooperation and Discord in the World Political Economy*. Princeton, NJ: Princeton University Press.
- \_\_\_\_\_, ed. 1986. *Neorealism and Its Critics*. New York: Columbia University Press.
- \_\_\_\_\_. 1996. Analyzing the Effectiveness of International Environmental Institutions. In *Institutions for Environmental Aid: Pitfalls and Promise*, edited by Robert O. Keohane and Marc A. Levy, 3–27. Cambridge, MA: MIT Press.
- Keohane, Robert O., and Joseph S. Nye, eds. 1972. *Transnational Relations and World Politics*. Cambridge, MA: Harvard University Press.
- Keohane, Robert O., and Joseph S. Nye. 1977. *Power and Interdependence: World Politics in Transition*. Boston: Little, Brown.
- Kern, Kristine. 2000. *Die Diffusion von Politikinnovationen: Umweltpolitische Innovationen im Mehrebenensystem der USA*. Opladen: Leske und Budrich.
- Kern, Kristine, Helge Jörgens, and Martin Jänicke. 2001. *The Diffusion of Environmental Policy Innovations: A Contribution to the Globalization of Environmental Policy* (Discussion Paper FS II 01–302 of the Social Science Research Centre Berlin). Berlin: Social Science Research Center Berlin.
- Levy, Marc A. 1993. European Acid Rain: The Power of Tote-Board Diplomacy. In *Institutions for the Earth. Sources of Effective International Environmental Protection*, edited by Peter M. Haas, Robert O. Keohane and Marc A. Levy, 75–132. Cambridge, MA: MIT Press.
- Lifitin, Karen T. 1994. *Ozone Discourses: Science and Politics in Global Environmental Cooperation*. New York: Columbia University Press.
- Mitchell, Ronald B. 1994a. *Intentional Oil Pollution at Sea: Environmental Policy and Treaty Compliance*. Cambridge, MA: MIT Press.

- \_\_\_\_\_. 1994b. Regime Design Matters: Intentional Oil Pollution and Treaty Compliance. *International Organization* 48 (3): 425–58.
- \_\_\_\_\_. 1998. Sources of Transparency: Information Systems in International Regimes. *International Studies Quarterly* 42: 109–30.
- \_\_\_\_\_. 2002. Of Course International Institutions Matter: But When and How? In *Global Environmental Change and the Nation State: Proceedings of the 2001 Berlin Conference on the Human Dimensions of Global Environmental Change*, edited by Frank Biermann, Rainer Brohm, and Klaus Dingwerth, 16–25. Potsdam: Potsdam Institute for Climate Impact Research. Available at <http://www.glogov.org/publications/bc2001/mitchell.pdf>.
- Nadelmann, Ethan A. 1990. Global Prohibition Regimes: The Evolution of Norms in International Society. *International Organization* 44: 479.
- Nanda, Ved P. 1989. Global Warming and International Environmental Law: A Preliminary Inquiry. *Harvard International Law Review* 30 (2): 375–92.
- Ottawa Declaration. 1989. Protection of the Atmosphere: Statement of the Meeting of Legal and Policy Experts, Ottawa, 22 February 1989. *American University Journal of International Law and Policy* 5 (1990): 528.
- Oye, Kenneth A., ed. 1986. *Cooperation under Anarchy*. Princeton, NJ: Princeton University Press.
- Palmer, Geoffrey. 1992. New Ways to Make International Environmental Law. *American Journal of International Law* 86: 259–83.
- Pattberg, Philipp. 2003. *Private Environmental Governance and the Sustainability Transition: Functions and Impacts of NGO-Business Partnerships*. Paper presented at the 2003 Berlin Conference on the Human Dimensions of Global Environmental Change “Governance for Industrial Transformation,” Berlin, 6–7 December 2003 (on file with authors).
- Princen, Thomas, Matthias Finger, and Jack Manno. 1995. Nongovernmental Organizations In World Environmental Politics. *International Environmental Affairs* 7 (1): 42–58.
- Prittwitz, Volker von, ed. 2000. *Institutionelle Arrangements in der Umweltpolitik: Zukunftsfähigkeit durch innovative Verfahrenskombination*. Opladen: Leske and Budrich.
- Raustiala, Kal. 1997. States, NGOs, and International Environmental Institutions. *International Studies Quarterly* 42 (4): 719–40.
- Sands, Philippe. 1995. *Principles of International Environmental Law Vol. 1*. Manchester: Manchester University Press.
- Schellnhuber, Hans-Joachim. 1998. Earth System Analysis: The Scope of the Challenge. In *Earth System Analysis: Integrating Science for Sustainability*, edited by Hans-Joachim Schellnhuber and Volker Wenzel, 3–195. Berlin: Springer.
- \_\_\_\_\_. 1999. ‘Earth System’ Analysis and the Second Copernican Revolution. *Nature* 402 (Millennium Supplement, 2 December 1999), C19–C23. Available at [www.pik-potsdam.de/nature\\_supp\\_esa.pdf](http://www.pik-potsdam.de/nature_supp_esa.pdf).
- Schellnhuber, Hans-Joachim, and Frank Biermann. 2000. Eine ökologische Weltordnungs politik: Globales Umweltmanagement statt Untergangskultur. *Internationale Politik* 55: 12, 9–16.
- Schrijver, Nico. 1997. *Sovereignty over Natural Resources: Balancing Rights and Duties*. Cambridge, UK: Cambridge University Press.
- Senghaas, Dieter. 1977. *Weltwirtschaftsordnung und Entwicklungspolitik: Plädoyer für Dissoziation*. Frankfurt am Main: Suhrkamp.

- Shaw, Malcolm N. 1996. *International Law*. 4<sup>th</sup> edition. Cambridge: Cambridge University Press.
- Siebenhüner, Bernd. 2003. The Changing Role of Nation States in International Environmental Assessments: The Case of the IPCC. *Global Environmental Change* 13: 113–123.
- Streeten, Paul P. 1989. Global Institutions for an Interdependent World. *World Development* 17 (9): 1349–59.
- Tews, Kerstin, and Per-Olof Busch. 2002. Governance by Diffusion? Potentials and Restrictions of Environmental Policy Diffusion. In *Global Environmental Change and the Nation State: Proceedings of the 2001 Berlin Conference on the Human Dimensions of Global Environmental Change*, edited by Frank Biermann, Rainer Brohm and Klaus Dingwerth. Potsdam: Potsdam Institute for Climate Impact Research, 168–182. Available at <http://www.glogov.de/publications/bc2001/tews.pdf>.
- Toronto Declaration. 1988. The Changing Atmosphere: Implications for Global Security. Reprinted in *American University Journal of International Law and Policy* 5 (1990): 515.
- Tóth, Ferenc, ed. 1999. *Fair Weather? Equity Concerns in Climate Change*. London: Earthscan.
- Trail Smelter Arbitration. 1938/1941. USA v Canada, 1938/1941. UNRIIA III, 1911.
- Ullbert, Cornelia. 1997. Ideen, Institutionen und Kultur: Die Konstruktion (inter-)nationaler Klimapolitik in der BRD und in den USA. *Zeitschrift für Internationale Beziehungen* 4 (1): 9–40.
- Underdal, Arild. 2002. One Question, Two Answers. In *Environmental Regime Effectiveness: Confronting Theory with Evidence*, edited by Edward L. Miles, Arild Underdal, Steinar Andresen, Jørgen Wettestad, Jon Birger Skjærseth, and Elaine M. Carlin, 3–45. Cambridge, MA: MIT Press.
- UNGA [United Nations General Assembly] Resolution 43/53. 1988. Protection of Global Climate for Present and Future Generations of Mankind, 6 December 1988. UN Doc. A/RES/43/53 (27–01–1989), reprinted in: *International Legal Materials* 28, 1326 (1989).
- United Nations Development Programme. 1997. *Human Development Report 1997*. Oxford: Oxford University Press.
- Victor, David G. 1996. *The Early Operation and Effectiveness of the Montreal Protocol's Non-Compliance Procedure*. Laxenburg: International Institute for Applied Systems Analysis.
- Vogel, David. 1995. *Trading Up: Consumer and Environmental Regulation in a Global Economy*. Cambridge, MA: Harvard University Press.
- Waltz, Kenneth N. 1959. *Man, the State, and War: A Theoretical Analysis*. New York: Columbia University Press.
- \_\_\_\_\_. 1979. *Theory of International Politics*. Reading, MA: Addison-Wesley.
- Wapner, Paul. 1996. *Environmental Activism and World Civic Politics*. Albany, NY: State University of New York Press.
- Wendt, Alexander. 1992. Anarchy is what States make of it: The Social Construction of Power Politics. *International Organization* 46 (2): 391–425.
- Willke, Helmut. 1994. Die Steuerungsfunktion des Staates aus systemtheoretischer Sicht. In *Staatsaufgaben*, edited by Dieter Grimm, 685–711. Baden-Baden: Nomos.
- Young, Oran R. 1990. Global Environmental Change and International Governance. *Millennium Journal of International Studies* 19 (3): 337–46.

- \_\_\_\_\_, ed. 1997. *Global Governance: Drawing Insights from the Environmental Experience*. Cambridge, MA: MIT Press.
- \_\_\_\_\_. 2001. Inferences and Indices: Evaluating the Effectiveness of International Environmental Regimes. *Global Environmental Politics* 1 (1): 99–121.
- \_\_\_\_\_. 2002. *The Institutional Dimension of Environmental Change: Fit, Interplay and Scale*. Cambridge, MA: MIT Press.