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Research Article

An Analysis of the Major Challenges to the Implementation, Compliance and, Effectiveness of Global Environmental Governance

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Abstract: Global Governance is the catchphrase of the moment in international relations. Rapidly evolving political discourse focused on environmental issues at the "global" level requires analysis. This paper discusses some of the major challenges of global environmental governance (GEG) as they relate to implementation, compliance and effectiveness. The strides made by institutions like United Nations Environmental Program (UNEP) in trying to solve environmental problems through the formulation of multilateral environmental agreements (MEAs) is well acknowledged. In an effort to understand some of the challenges that GEG faces in solving environmental problems, a critical analysis of its architecture is made. Nonetheless , summarizing the effectiveness of global environmental governance is no easy task, and an overarching conclusive analysis of all aspects of the global environmental governance is near on impossible. However, by looking at two key areas, the institutional architecture of the GEG system and treaty creation, it can be concluded that challenges to the effectiveness of GEG arise due to its complexity. This complexity derives from the numerous understandings of the concept of 'global environmental governance' itself as well as the characteristics of environmental problems themselves . In short, how we define GEG impacts upon how we think it should be arranged or approached, and such diversity is clearly apparent within the physical character of the global environmental system, as the multitude of environmental institutions demonstrates as a case in point. Finally, this paper contends that the effectiveness of global governance in addressing environmental challenges is hampered not only by the complexity and differing perspectives of the concept of "global environmental governance," but also by other factors such as conflicting interests and power asymmetries among global actors, as well as the complexity of environmental problems themselves.

Keywords: Environment, Environmental Politics, Global Governance, Global Environmental Governance, Environmental Problem.

Introduction

A number of ways can be used to define global environmental governance and takes different meanings depending on the context at hand. However, for the purposes of this paper, environmental governance is synonymous with interventions aiming at alterations in environment-related incentives, knowledge, institutions, decision making, and behaviours. More specifically, "environmental governance" is used to refer to the set of regulatory processes, mechanisms and organizations through which political actors influence environmental actions and outcomes (Agrawal, 2014). It is critical to remember that governance is not synonymous with government. Governance covers not just the acts of the state, but also actors such as communities, corporations,

and non-governmental organizations (NGOs) (Carter, 2007). The political economic linkages that institutions express, as well as how these interactions influence identities, behaviors, and consequences, are central to various kinds of environmental governance (Ostrome, 2001; Jagers & Stripple, 2003; Agrawal, 2005).

Environmental governance can take many forms, including international treaties, national laws and legislation, local decision-making processes, transnational institutions, and environmental non-governmental organizations (NGOs). Governance may also be formed by non-organizational institutional mechanisms (for example, market incentives and self-regulatory procedures), and there is no getting around it for anybody concerned about environmental results. Environmental governance is varied in form, critical in importance, and near ubiquitous in spread (Agrawal, 2014).

The analytical case for global environmental governance is based on the "public bads" consequences of environmental processes and results. Environmental issues such as ozone depletion, carbon emissions, water and air pollution, and climate change, to name a few, cannot be solved by a single country. To address them, global collaboration and institutional structures are required. Historically, this conception of environmental issues and solutions meant that nation states were considered as appropriate actors of environmental action (Agrawal, 2005; Carter, 2008) and international regimes as appropriate governance mechanisms (Agrawal, 2005; Carter, 2008). This was out of a realisation that environmental problems are complex and uncertain to an extent that they require concerted efforts in addressing them. In view of the same, the United Nations Environmental Programme (UNEP) was born to specifically-deal with such problems, through policy formation of multilateral environmental agreements (MEAs).

Conceptualising global environmental governance

The first major hurdle to effective global governance of the environment lies not in its practical problems and applications, but in the difficulty of decrypting the very concepts that define them. Indeed, the term "global environmental policy" is a contentious and imprecise one in and of itself. According to Biermann, a coherent definition of "global governance" has yet to be agreed upon. For each author, global governance implies something different." (Biermann, 2004, p. 06). What`s more, “the distinct conceptualizations of global environmental governance (GEG) cannot be defined in reality as opportunity interpretations or motives of a typically agreed phenomena. Rather the distinct approaches to the triad of concepts (“global,” “environmental,” “governance”) recognizes the means of those phrases in essentially distinct ways” (Paterson *et al.*, 2003, p. 02). Here, concerns arise as to what we mean by employing governance (that is, who governs and how), how we can delineate the environment (the supremacy of the ecocentric or anthropocentric), and who and what is considered global. Of fact, there are several conceptualizations of GEG, each with advantages and disadvantages (Biermann, 2004, p. 08). However, experimentally, it is considerably more plausible to see favorable variances between the cutting-edge regime of GEG and various types of governmental control over environmental concerns.

Before anything else notion of the ‘global’ denotes greater inclusion and a far broader meaning than that of ‘national’ or ‘international’, which focus upon ‘nation’ states as their main unit of analysis. Similarly to Saunier and Meganck, global embraces the official and unofficial governance activities of a long list of institutions and actors inside and outside of government, and across national and institutional boundaries, all of which are responsible for the administration and management of our planet (Saunier & Meganck, 2004, pp. 03-04). These include, to name only a few, civil society, international institutions such as the United Nations Environmental Programme (UNEP), national governments and non-governmental organizations such as Greenpeace; all of which can operate between and at varying levels, such as the sub-national, national, international or global.

Along similar lines to James Rosenau therefore, “in a more interdependent world where what happens in one corner or at one level may have consequences for what occurs at every other corner

and level, it seems a mistake to adhere to a narrow definition in which only formal institutions at the national and international levels are considered relevant" (Rosenau, 1995, p. 13). Yet, other writers assert that such definitions are too vague, as "when transferred to the global level, such all-encompassing definitions hardly leave room for anything that is not *global* governance" (Biermann, 2004, p. 06).

Furthermore, 'governance' as a concept differs from that of 'government'. Presently, there is no world government, and instead a far looser global system has emerged. In essence, the global system remains an arena whereby states are the highest sovereign bodies. To draw out this point, "states, as sovereign entities under international law do not have to accept international agreements or join institutions on a universal level they do not wish to participate in", including environmental treaties and institutions (Desombre, 2006, p. 04).

Subsequently the term 'governance' "enables us to penetrate and understand the government-like events that occur in a world of states among other players, even in the absence of government" (Finklestein, 1995, p. 368). However, as a 1995 report by the Commission on Global Governance (CGG) asserts, while "global governance is not global government… it is hard to tell the difference" (Rabkin & Sheenan, 1999, p. 55).

In the third place, the term 'environment', the very focus area of GEG, is hotly contested. As Gupta and Asher proclaim, "the word environment has been around for a long time, but the importance and usage of the word has increased dramatically over the last forty years" (Gupta and Asher, 1998, p. 03). Therefore, whilst there is growing consensus that the spotlight for global governance is at least on the impact that human activities have had on the environment, a myriad of issues still surface as to whether our efforts should concern the management, or prevention, of such activities.

Moreover, questions arise as to whether these efforts should be for the sake of the environment itself, or for the benefit of humankind. It is imperative to note then that "the ways in which we conceptualize environmental problem has a great deal of influence on how we try to address them" (Lipschutz, 1990, p. 102).

For Green theorists such as Eckersley, "environmental governance should be about protecting not only the health and well-being of existing human communities and future generations but also the larger web of life, made up of nested ecological communities at multiple levels of aggregation (such as gene pools populations, species, ecosystems", highlighting it's ecocentric philosophy (Eckersley, 2007, p. 251). In contrast, neoliberals focus upon the centrality of the markets as the main regulative mechanism in tackling environment problems, hence, "the… management of natural resources and environmental issues through market-oriented arrangements" (Pellizoni, 2011, p. 796).

Such a philosophy can be tied to the current policies of 'carbon trading' and the EU Emissions Trading Scheme, suggesting that environmental problems can be tackled as a consequence of effective market-based initiatives. This is problematic for Green theorists, who argue that markets cannot insure that the "scale of the economy operates within the ecological carrying capacity of ecosystems" (McGregor, 2008, p. 03). In sum, ecological protection is not viewed as an end in itself for neoliberal advocates. Overall, the vagueness and complexity of the concept 'global environmental governance' clearly hinders the effectiveness of GEG in addressing environmental issues, as discourse can focus on definitional debates rather than tackling the challenges that they seek to address. Furthermore, such conceptual confusions and differences can often lead to internal inconsistencies in the outlook and policies of global governance actors. Thus, it is hard to ignore that the conceptual debates have necessary impacts upon the practical effectiveness of the global governance of the environment, as shall be explored throughout the rest of this paper. In sum, the conceptual/theoretical elements of GEG inform the practical and vice versa, highlighting its co-constitutive relationship.

Architecture of Global Environmental Governance

It is hardly surprising, then, that this definitional ambiguity has found its way into the design of the global environmental system itself. Most notably, the number of international organizations involved with environmental management is huge and continuously developing, showing both the growing importance of environmental challenges internationally and the plethora of institutions with an interest in global environmental management. According to Oberthur and Gehring, "a 1992 analysis revealed more than 15 unique worldwide environmental regimes" (Oberthur and Gehring, 1992 p. 360). Yet, before we can explore the key impediments to the implementation, compliance and efficacy of this architecture, it is important to justify why a system of *global* environmental governance is needed at all. Or in other words, why environmental challenges should be governed above and beyond the level of the state.

A question we should ask ourselves is "why should we go outside the state for natural problem administration if states can combine environmental aims, legislation, and activities into national natural programs and fulfill the goals they set for themselves?" . The Canadian declaration of natural location over Ice waters in 1970 and its capture of a Spanish angling vessel in 1995; the British bombardment of the Torrey Cannon oil tanker in 1967; the United States limitations on tuna and shrimp caught in ways that harm dolphins and ocean turtles separately-in all of these cases, one state continued autonomously, on its claim specialist, with small (if any) inclusions (Bodansky, 2000, p. 340). Clearly, nations have acted and continue to act in their own national ways to protect the environment, a viewpoint similar to that of neorealists. However, the main issue with this logic is the postulation that environmental problems can be tackled and somewhat 'contained' within individual nation states. It is no more apparent than in the environmental policy areas that is simply not possible. In short, problems such as pollution, rising sea levels and global warming know no boundaries, and this is not merely due to our level of 'interdependence' in the era of globalization.

In respect to atmospheric problems, Elizabeth Desombre accurately argues that "the atmosphere is not controlled by any one state, and acts made by states in one area influence the environment in other regions. "As a result, states cannot safeguard their own populations from atmospheric environmental concerns just by managing their own domestic activity" (Desombre, 2006, p. 97). As a result, environmental issues are inextricably linked to the global commons.

As one might anticipate, dismissing unilateral initiatives to address environmental challenges as useless is incorrect. In fact, unilateral actions can be beneficial for greater global governance of such challenges as well as in and of themselves. When actors act unilaterally, they can create a precedent that encourages, and even forces, other players to make similar policy decisions or enter into multilateral accords; this is known as "multilateral standard-setting" (Bodansky, 2000, p. 344). Furthermore, such initiatives ensure that environmental problems remain high on the agendas of global governance players. "Unilateralism is thus not always bad in itself." (Bodansky, 2000, p. 339). Given the intrinsic global character of environmental concerns, it is not unexpected that a global environmental governance framework has arisen. While it is difficult to pinpoint the exact moment when environmental concerns and voices became materialized on a global scale, a number of authors agree that the Stockholm Conference of 1972, and the subsequent establishment of the UNEP, served as the first major marker of the institutionalization of global environmental governance (Biermann & Bauer, 2005, pp. 03-04). Since then, the GEG architecture has grown to incorporate a diverse set of international organizations, secretariats, and summits, including the United Nations Framework Convention on Climate Change (UNFCCC, 2011).

Challenges and limitations of global environmental governance in addressing contemporary environmental problems

Lack of administrative autonomy in UNEP

Despite the efforts made by the United Nations with regards to putting in place global institutions to specifically handle global environmental problems, scholars such as Roy and Ivanova have argued

that the current architecture of the global environmental regime is weak, limiting how far the system can successfully address contemporary environmental challenges (Roy & Ivanova, 2007, pp. 48-49). Most prominently, unlike other issue regimes such as trade or health, global environmental governance lacks a central institution or authority. In other words, whilst there is a World Trade Organization (WTO), which is "the only global international organization dealing with the rules of trade between nations", there is no equivalent World Environment Organization (WEO) with equal international standing, authority and distinctiveness (WTO, 2011). As a result, several authors identify the UNEP as the "anchor" of the global environmental governance system. According to Desombre, the "UNEP is the closest thing there is to an overarching global environmental institution" (Desombre 2006, p. 09; Biermann, Siebenhuner & Schreyogg, 2009; Poole, 2012). Roy and Ivanova's point is obvious in the phrasing of the UNEP, which is referred to as a program rather than an autonomous institution or specialized UN agency. As a result, assessing the performance of the GEG system as a whole requires an examination of its efficacy as an organization in addressing environmental concerns.

Fragmented environmental Institutions

In addition to the lack of a centralized authority, another major source of worry has been the amount of institutional fragmentation and, as a result, a lack of coordination across global environmental agencies. Even the UN has considered how the institutional fragmentation of environmental issues has impacted the UNEP's effectiveness, arguing that "the flourishing of new international institutions poses problems of coordination, eroding responsibilities and resulting in duplication of work as well as increased demand upon ministries and government" (United Nations 1998 cited in Andersen, 2001, p. 19).

With a focus solely on the United Nations, the "UNEP competes for responsibility, political support, and resources with more than a dozen other UN bodies, including the UN Commission on Sustainable Development (CSD), the UN Development Program (UNDP), the World Meteorological Organization (WMO), and the International Oceanographic Commission (IOC)" (Global Environmental Project 2011). This might indicate not only a lack of coordination, but also a level of competition among these entities. "The relationship between UNEP and the Convention on Biological Diversity (CBD) has been marked by turf wars and declining responsibilities," for example (Andersen, 2001, p. 22).

GEG's structural makeup includes more than just specialist environmental groups. Many other international organizations, such as the World Trade Organization (WTO) and the World Bank, take environmental considerations into account. For instance, in 1994, the WTO established the Committee on Trade and Development (CTD), set up to "identify the relationship between trade measures and environmental measures in order to promote sustainable development" (WTO, 2011). Adding complexity, and, it is argued, further fragmenting the GEG system. The environment is therefore not simply a standalone issue, but is tied to various other policy areas, including trade, finance, health and poverty.

Lack of financial autonomy

Aside from institutional fragmentation, the UNEP lacks independent control over its financing systems. The Global Environmental Facility (GEF), and its position as a funder for numerous treaties and initiatives, weakens the UNEP's authority in environmental management even more (Desombre, 2006, p. 13). "Despite UNEP's crucial position in worldwide environmental policy formation, UNEP's relationship with the GEF has been kept weak, and it has been denied the one tool that could have given it actual power," Najam writes (Najam *et al.*, 2006, p. 42). More broadly, "the insufficiency and dispersion of the current financial mechanisms-dispersed throughout the Global Environmental Facility, UN Development Program, World Bank, and other institutions such as the Montreal Protocol Finance Mechanism" fractures the system even more (Global Environmental Project 2011).

Complexity and uncertainty nature of environmental problems

Policy making may be hampered by the complexity and uncertainty that characterise many environmental problems. It is often difficult to identify the complex and interdependent relationships between natural and human-made phenomena. The interconnectedness of ecosystems means that many problems are non-reducible: they cannot be resolved by addressing individual parts in isolation (Carter, 2007). Indeed, policies that deal with one discrete problem may have unintended and damaging consequences elsewhere. For example, in the 1950s local air pollution in Britain's industrial towns was reduced by building taller factory chimneys, only for it to be discovered many years later that this 'solution' had simply exported the pollution to fall as acid rain in Scandinavia. Similarly, cars can be fitted with catalytic converters to reduce the nitrogen oxide emissions that cause acid rain, but the resulting reduction in engine efficiency increases fuel consumption and, therefore, the carbon dioxide emissions that contribute to global warming (Agrawal, 2005).

The relevance of research, scientists, and professional competence in environmental policymaking is highlighted by complexity and ambiguity. Climate change and ozone depletion are examples of problems that cannot be detected without the use of science. Some environmental deterioration is quite apparent, such as traffic fumes, or relatively simple to detect, such as declining fish stocks, but scientific understanding is required to provide an accurate evaluation of the nature of either problem. However, scientists are people, and as such, they are not immune to bending their conclusions to suit entrenched interests, such as corporate donors, or even to boost their own prospects of getting future research funding. As a result, policymaking is complicated by ambiguity and complexity. It is certainly simpler for policymakers to devise effective remedies when they understand the sources of an issue, yet they frequently have to act with inadequate knowledge. In the face of ambiguity, should they take a preventive approach to an issue or continue depleting an environmental resource until scientific data shows that action is required? Policymakers' responses will be determined by their viewpoint on the ecocentric–technocentric split, with ecocentrics preferring caution and technocentrics more inclined to be confident that things will turn out well.

The irreversibility nature of some environmental problems

The irreversibility of many environmental problems exacerbates the problem of ambiguity. When the Earth's carrying capacity is surpassed, environmental assets may be irreparably harmed. Scarce resources may be depleted, and species may become extinct as a result. Some environmental assets are interchangeable, but the procedure is rarely simple or inexpensive. Solar energy and wind power may ultimately be able to totally replace exhausted fossil fuels as energy producers, but only if there is a huge general drop in energy use. Irreversibility puts even more pressure on policymakers to get it right, because unlike fiscal or welfare policy, where a poorly judged tax rate or benefit payment can be corrected in the following year's budget, an earlier mistake caused by an error in putting up an environmental policy may not be correctable (Desombre, 2006; Carter, 2007).

Temporal and spatial nature of environmental problems

Many environmental concerns are compounded by the fact that their long-term impact will most likely harm future generations rather than current generations, but corrective strategies must be implemented before the full detrimental impacts of a problem are realized. Indeed, politicians who want to address ethical problems for future generations face substantial practical limits. Although action to protect future generations may be required now, most politicians are concerned with the short term such as tomorrow's papers, upcoming opinion polls, or the next election. More challenging for developing-country leaders, who must choose between soliciting foreign direct investment to provide employment for the many jobless youths and implementing regulations to prevent long-term environmental repercussions. Many political leaders also understand how difficult it is to persuade people to accept self-sacrifice today in order to protect those who have not yet been born (Carter, 2007). In short, policies that respond to today's political demands are simpler to implement than policies that address tomorrow's environmental challenges. Similarly, the regional impact of environmental concerns varies greatly. As an example, Flooding in Bangladesh is caused

by the decline of Himalayan forests. Rising sea levels driven by global warming would wreak the most havoc on low-lying countries like Egypt and the Maldives. Sulfur dioxide emissions from British manufacturers end up as acid rain in Scandinavia. Bringing it back home the pollution of the Zambezi River in Zambia will have a negative impact on countries which share the river downstream like Zimbabwe and Mozambique. Spatial and temporal variability means that the costs of environmental problems, and their solutions, are unevenly distributed. Inevitably, environmental policies will produce winners and losers. The challenge for governments is to balance competing interests, but this raises important issues of equity and social justice between current and future generations (Poole, 2012).

Conflicting interests and power asymmetries among global actors

The weaknesses of UNEP as an example of an organization that embodies global environmental governance are seen not just in the system's architecture and design, but also in the actions that different players conduct within this system. The formation and spread of multilateral environmental accords and treaties has been one of the most visible forms of global environmental governance, particularly because they offer the legal basis for resolving modern environmental concerns. According to Kanie, "differing approaches for counting MEAs have resulted in varied figures, but many academics and analysts believe that there is a proliferation of MEAs, characterizing [it as] a significant aspect of the contemporary environmental governance system" (Kanie, 2007, p. 68).

According to estimates, there are "more than 500 MEAs registered with the UN, including 61 atmosphere-related" agreements (Kanie, 2007, p. 68). However, there are a number of challenges that global players encounter during the negotiation and implementation of MEAs, which can impact the overall efficacy of these agreements in addressing environmental issues. These include the extent of negotiation and engagement by players at the outset of proceedings, as well as the efficacy of MEAs in attaining the general goals they specify. When it comes to pressing matters on the agenda, different treaty members do not have the same negotiating strength. Those in the global west have greater authority than those in the global south. Therefore, this creates problems when it comes to the implementation of such decision hence hampering the effectiveness of such policies as they tend to be imposed on these states with less bargaining power (Poole, 2012).

Climate Change as a policy example

Climate change will be used as a policy example to demonstrate competing interests and power imbalances among global entities. In the global environmental governance network, the grounds for a focus on climate change are almost self-evident." The worldwide regime on climate change is one of the biggest and most complicated international governance systems in the sphere of environment and beyond," writes Sebastian Oberthür. Climate change, one of the most serious environmental issues of the twenty-first century, has a wide range of effects on both the natural environment and human society" (Oberthur, 2006, p. 53).

With this in mind, it is hardly unexpected that the problem of climate change, which has received widespread attention in the media, has risen to the top of the policy agenda in international organizations. As a result, many of the issues confronting global governance players in dealing with climate change may be applied more generally as concerns for global environmental governance in a range of subject areas. Global players have had to overcome several obstacles in the formation of functional MEAs since the beginning of discussions. One of the most pressing issues here is the issue of 'fairness' in respect to the proposed agreements among governmental actors. Concerns have arisen in emerging nations about how prohibitions on specific acts deemed hazardous to the environment may impede their growth (Poole, 2012).

For example, in relation to a call for the wider reduction of global greenhouse gases “at the Rio Summit in 1992, Least Developed Countries (LDCs) insisted that affluent nations ought to bear the full burden…since affluent nations after so many decades of industrial development, were more

responsible for the existing build-ups of greenhouse gases and better able to bear the cost of reducing new emissions" (Rabkin and Sheenan, 2005, p. 21).

Effectively, the crux of the argument here is that MEAs based upon 'reduction' would, in the words of Agrawal, 'kick away of the ladder' for developing states. Thus, it is argued that developed states hold an 'environmental debt' to the LDCs in order to ensure 'global equity' of environmental challenges (Agrawal, 2005).

Authors such as Steven Shirley go further, claiming that through MEAs "we are seeing a new type of imperialism emerging, an imperialism based not on the acquisition of territory, but on a radical environmentalist agenda, an agenda that seeks to reserve the earth and its resources for the wealthy and elite, to freeze energy use at current levels, and to restrict nation states from exploiting indigenous resources for the benefit of their people" (Shirley and Soumin, 2009, p.848).

As a practical policy example, LDCs were concerned that the Montreal Protocol, and its limits on CFCs (Chlorofluorocarbons) and other climate-altering gases, would unfairly impact them financially and their ability to develop industrially. Such uncertainty is clearly evident when we consider that "Mexico was the only developing country producer of ODS Ozone Depleting Substances (ODS) that signed the Protocol when it was first open to signature" (Desombre, 2006, pp. 109-112).

Consequently, various adjustments have been made to address these concerns and 'balance the scales' of environmental duty. For example, the introduction of the Multilateral Fund for the Implementation of the Montreal Protocol in 1991 aided in the financial support of LDCs as well as the technology transfer required for the manufacturing, acquisition, and use of new refrigerants (Desombre, 2006, pp. 109-112). Furthermore, a modification to the Montreal Protocol in 1992 stated that complete removal of CFC production and usage would not apply to LDCs until 2010 (Desombre, 2006, pp. 109-112).

However, it is not simply LDCs who have their 'national interests' at heart, as these environmental concessions are not generally embraced by rich countries. One of the most egregious examples is the United States' reluctance to ratify the Kyoto Protocol to date. According to the US Chief Negotiator at the Fifth UNFCCC Conference of the Parties, the refusal was based in part on "the Protocol's exclusion of poor nations from its emission limiting rules" (American Society of International Law 2001, p. 648). They stated, in particular, that "the agreement is weak because it does not oblige big emerging nations, such as China, to implement obligatory emission reductions" (Eckersley, 2007, pp. 259-260). It was put forward that this would unjustly impact upon US macroeconomic policy, because "if the United States… restricted their economies' use of energy, then competitors from less-developed countries would have an advantage in international markets" (Rabkin and Sheenan, 1999, p. 67). The repercussions of this rejection for effective global environmental protection are all but apparent, if one considers that "in 1990 [the Protocol base year] the US alone was responsible for as much as 36 percent of total emissions by industrial countries" (Hovi *et al.*, 2003, p. 04).

As a result, negotiations have frequently been confrontational and time-consuming, aiming to reconcile nations' vested interests with the need for rigorous and comprehensive environmental objectives. This was evident during the most recent UNFCCC Conference of the Parties in Durban, where deliberations dragged on for 36 hours before a settlement was reached (The Guardian, 2011). As a result, many agreements have led to collective bargaining efforts, implying that "merely reaching agreement appears to have become the goal, to such an extent that a performance focus [and even the depth and realistic achievability of the targets set] is nearly entirely absent from the discourse" (Najam *et al.*, 2006, p. 46). According to Dunne *et al.*, "even with the United States' full participation in the Kyoto Protocol, the negotiated aggregate target of around 5% will do very little to stem the problem of global warming, given that atmospheric concentrations of greenhouse gases

must be reduced by 60-80% to protect the Earth's atmosphere" (Eckersley, 2007, p. 260). More recent research by Zelli backs this up, noting how "the Copenhagen summit failed to produce a binding and comprehensive agreement... [to the extent that] negotiations have been in part turning to a voluntary 'pledge and review' model as a second-best solution, implying a set of individual soft commitments instead of an all-encompassing deal" (Zelli, 2011, p. 258).

This is linked to another issue that impedes the efficiency of GEG, which exists beyond the procedures of treaty creation, namely the difficulties of treaty overlap and contradiction. These issues can be ascribed to the above-mentioned over-emphasis on policy consensus, as well as cohesion flaws among the plethora of entities who comprise the existing GEG architecture. Because of their sheer quantity, agreements may not only overlap in content, but also contradict one another.

As an example, "the Montreal Protocol for the Protection of the Ozone Layer implicitly supports the use of certain greenhouse gases (hydrofluorocarbons, HFCs), undercutting the goal of the Kyoto Protocol to the United Nations Framework Convention on Climate Change" (Oberthur and Gehring, 2006, p. 29). This is problematic because "legal inconsistencies may jeopardize the credibility and coherence of international law," confuse state actors, and thus undermine the effectiveness of these treaties in promoting environmental protection more broadly (Roy and Ivanova, 2007, p. 52).

Conclusion

While the prospect for GEG appears dismal, it would be stupid not to recognize the achievements of the existing global environmental management system. In general, environmental concerns have become tightly entrenched in the formal components of global governance. "The world community has obviously embraced the environment as a crucial concern in global politics" and has worked to effect change, albeit with difficulty and under heavy criticism (World Resources Institute, 2011). Thus, it might be argued that any alteration or enhancement to the environment is preferable to none. Furthermore, the above-mentioned flaws have not gone overlooked by the worldwide environmental community. In terms of MEAs, "the three 'Rio MEAs'... have all come to acknowledge the challenge of fragmentation and promote synergistic alternatives." (Najam *et al.,* 2006, p. 33).

Summarizing the effectiveness of global environmental governance is no easy task, and an overarching conclusive analysis of all aspects of the global environmental governance is near on impossible. However, by looking at two key areas, the institutional architecture of the GEG system and treaty creation, it can be concluded that challenges to the effectiveness of GEG arise due to its complexity. This complexity derives from the numerous understandings of the concept of ‘global environmental governance’ itself. In short, how we define GEG impacts upon how we think it should be arranged or approached, and such diversity is clearly apparent within the physical character of the global environmental system, as the multitude of environmental institutions demonstrates as a case in point.

While it is recognised that this complexity does not imply imprecision, it must be emphasized that it necessitates a high degree of co-ordination, negotiation, and coherence among GEG actors. This is essential for finding effective and efficient solutions to the worldwide environmental challenge. Finally, keep in mind that GEG is in a constant state of flux, striving to address and adapt to the complex nature of environmental problems and their worldwide management. In Wapner's words, "Rome was not built in a day..." [and] global environmental... issues do not resolve themselves in a couple of months" (Wapner, 2003, p. 01).

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