

## The Role of Science in Global Environmental Policy Making: Research Design

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## 1) Preface

'Policy making' can be understood as the application of judgment to problems, on the part of those empowered to make choices that will affect the matters in question. As a sub-set, global environmental policy making involves heightened difficulties related to the process of conceptualizing and acting upon the world. With regards to such large and complex matters as climate change and the functioning of ecosystems, our understanding of the objective nature of the world is uncertain. This applies both to the functioning of the natural world in the absence of specific human prompts and to the impact that choices made by human beings and organizations will have within the context of natural processes. On the one hand, for instance, we have an imperfect understanding of the functioning of ecological food webs in the absence of human involvement. On the other, we have an incomplete understanding of the effects the agricultural use of pesticides on those processes. Both kinds of uncertainty are relevant to policy making.

Science is the major vehicle through which policy-relevant empirical questions about the nature of the world and the consequences of human action are addressed. 'Science' exists as a collection of methodologies, epistemic communities, and ideals. While the role of science as an entity involved in policy making may initially seem straightforward, complexities arise rapidly. Crucially, these involve the differences between making judgments about ontological questions under conditions of uncertainty and the process of choosing between alternative courses of action. In the first case, for example, scientists can assess the distribution of fallout from atmospheric nuclear tests conducted above islands in the Pacific; in the second groups of concerned scientists can call for the discontinuation of such tests.

The perceived appropriateness of each of those roles, on the part of scientists, is reflective of the credibility of scientists as individuals and members of communities and organizations, as well as the political understandings that exist about the relationship between expert knowledge and power.

All viable environmental policies must be created in light of existing and emerging expert knowledge, but the question of arbitration between descriptive and prescriptive claims is one that raises fundamental issues about how science and policy do, can, and should relate.

## 2) The Question

This thesis will examine the relationship between science and global environmental policy making on two conceptually separable but intertwined levels. It will do so firstly on the practical level of how environmental science and scientists have been involved in the development of two specific environmental instruments and secondly at the more theoretical level of the perceived relationship between the actual communities and idealized roles of scientists and policy makers. While the general answers for each level will be generated through different methodological means, it can be hoped that the insights generated will be mutually reinforcing.

In order to engage with the practical questions of how science has affected policy making, this thesis will examine two case studies: the 2001 *Stockholm Convention on Persistent Organic Pollutants* and the 1997 *Kyoto Protocol to the United Nations Framework Convention on Climate Change*. The first can be seen as an example of a mechanism where a scientific understanding emerged of the issue in question and a reasonably effective legal regime for its mitigation emerged (See 3a). The second example demonstrates a situation in which, for reasons which shall be examined, a similar progression from issue identification to effective policy action has not taken place (See 3b). Because of the similarities between the cases (both are attempts at international agreements to deal with the atmospheric consequences of industry and agriculture) and the differences (one led to a reasonably effective agreement that has been implemented, the other did not), it can be hoped that these cases will contrast in ways that are useful for the analysis of underlying dynamics and questions. The contrast between the cases will hopefully allow for the isolation of important variables, on the basis

of the comparative study of preparatory documentation and the first-hand impressions of the participants.

Examination of the whole literature surrounding the agreements is neither possible nor necessary. Because of the enormous amount of matter available on the Kyoto Protocol, I will choose two or three critical moments within the process to which particular attention will be devoted. An example would be the American-led decision to create the Intergovernmental Panel on Climate Change (IPCC) in 1988 to provide expert scientific assessments on the nature of global warming as a climatological and potentially anthropogenic phenomenon.<sup>1</sup> In the case of the Stockholm Convention, the thesis will focus on the progression from the identification of the persistent organic pollutants (POPs) issue in the mid-1980s to the development of the Northern Contaminants Program (NCP) as a large scale scientific study for its comprehension. It will then examine the role that this scientific process played in generating and shaping the international negotiations that led to the agreement. The thesis will not extensively discuss either the possible consequences of climate change or the science behind POP toxicity and biological effects. Instead, the focus will be on the relationship between such scientific questions, those who produce answers to them, and the global policy making process.

The theoretical component of this thesis will include examination of several controversial situations in which scientists and policy makers openly discussed and debate the legitimate role of science and scientists. One example is the role of various scientific organizations in campaigns against the testing of nuclear weapons (See 3c). Another is the controversy surrounding the publication of Bjorn Lomborg's The Skeptical Environmentalist in 2001.<sup>2</sup> Particularly on the

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<sup>1</sup> Jacobson, Harold. "Climate Change: Unilateralism, Realism, and Two-Level Games." in Patrick, Stewart, Shepard Forman, and Center on International Cooperation (New York University). Multilateralism and U.S. Foreign Policy : Ambivalent Engagement. Center on International Cooperation Studies in Multilateralism. Boulder, Colo. ; London: Lynne Rienner, 2002. p. 418

<sup>2</sup> Bjørn Lomborg, The Skeptical Environmentalist : Measuring the Real State of the World (Cambridge: Cambridge University Press, 2001).

question of climate change, the Lomborg debate provides insight into the perceived roles that science and scientists should play in the making of decisions that entail both potentially enormous costs and equally serious risks (See 3d). The response taken in the face of uncertainty, whether precautionary or more optimistic, is a critical determinant of the cost and nature of environmental policies. The justification for one approach or another is necessarily both scientific and political. The theoretical discussion will also involve the examination of the secondary literature on the philosophy of science, as well as the relationship of science and policy in related fields: such as global health and development studies.

The thesis will consider the competing hypotheses that the general understanding of science as a descriptive adjunct to the prescriptive policy making process is broadly valid, that it is overly simplistic given the multifaceted nature of the epistemic communities involved, and that it might be a fundamentally inappropriate way of representing a corpus of thinking, institutions, and individuals which is actually incapable of operating without concealed normative maneuverings. These possibilities will be assessed through consideration of the examples listed above, as well as the analysis of primary and secondary documentation. The over-riding purpose will be to develop new insight into the connections between science and policy making, in this context, and to express those insights in a manner accessible to scholars of international relations, environmental scientists, policy makers, and interested members of the public at large.

### 3) Background

Given the extent to which the *Stockholm Convention on Persistent Organic Pollutants* is significantly less well known than the Kyoto Protocol, this background discussion will place greater weight upon its explanation. The purpose of this general background is to illustrate the relevance of the case studies and examples to the research question. A listing of specific sources, including brief discussion of their relevance, can be found in Appendix A.

### **a. Persistent Organic Pollutants and the Stockholm Convention**

Persistent organic pollutants (POPs) are a class of highly toxic chemicals that do not break down in the environment or inside the bodies of plants and animals they are poisoning. They bioaccumulate and bioamplify: becoming more concentrated as they rise up in the food chain. Also, due to their evaporative properties, they rise into the atmosphere in the areas where they are produced and used – either as pesticides, industrial chemicals, or the unintentional by-products of activities like burning garbage – and then get deposited in cold areas: particularly the Arctic.<sup>3</sup> Given the unusual dependence of Arctic native groups<sup>4</sup>, such as the Inuit, upon so-called ‘country-foods’ including fish and marine mammals, people in such groups are being directly and adversely affected by the accumulation of POPs in their native territory.<sup>5</sup> Scientific evidence about these chemicals and phenomena began to emerge and strengthen in the 1960s; since then, there have been various national, regional, and global attempts to address the problem of POPs.

After the initial identification of the problem of POPs in the Arctic in 1985, comprehensive confirmation of those results came about through the Northern Contaminants Program: a six-year research program coordinated by Indian and Northern Affairs Canada (INAC). John Buccini – chair of the subsequent Stockholm Convention negotiations – identifies “early agreement on the scientific basis for international action” as a “factor... that influenced the process [and] content of the

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<sup>3</sup> P. W. Bartlett, B. Commoner, K. Couchot, B. Bush, H. Eisl and P. Cooney, "Modeling Source-to-Receptor Atmospheric Transport: Atrazine, Pcb's and Dioxin in North America," Halogenated environmental organic pollutants and POPs: Dioxin 2000, ed. M. S. Denison (Monterey, CA: Emmenzeta, 2000), vol.

B. Commoner, P. Bartlett, H. Eisl and K. Couchot, "The Link between Anthropogenic Sources of Dioxin and the Human Food Chain: Source-to-Receptor Air Transport," Halogenated environmental organic pollutants and POPs: Dioxin 2000, ed. M. S. Denison (Monterey, CA: Emmenzeta, 2000), vol.

<sup>4</sup> I've used the term 'Arctic native' to avoid the error of identifying the Inuit as the sole native group affected by POPs and involved in the Stockholm Process. Sheila Wall-Cloutier - an Inuit woman and key participant in the global drive to deal with POPs - identifies the Inuit, Métis, Dene, and Yukon First Nations as those whose interests were represented by the Canadian Arctic Indigenous Peoples Against POPs (CAIPAP) group.

<sup>5</sup> Shearer, Russel and Siu-Ling Han. "Canadian Research and POPs: The Northern Contaminants Program." in T. Fenge, David Leonard Downie and Inuit Circumpolar Conference., Northern Lights against Pops : Combatting Threats in the Arctic (Montreal ; Ithaca: Published for the Inuit Circumpolar Conference Canada by McGill-Queen's University Press, 2003).

[Stockholm] convention.”<sup>6</sup> The Canadian response to the POPs issue contrasts markedly with that which took place in the United States – a contrast that should prove helpful in tracing the bureaucratic issues of why problems get prioritized within some systems and languish in others. It seems probable that assigning responsibility for the issue to INAC instead of the normal environment ministry led to it having a much higher priority than it would have had otherwise.

The Stockholm Convention, negotiated in 2001, entered into force on 17 May 2004. The Convention places obligations upon signatories to ban the production and use of twelve POPs, including DDT.<sup>7</sup> It also mandates the safe destruction of stockpiles of these chemicals. At present, it has 151 signatories: including Canada, the European Community, the United States, and Japan – all of whom have subsequently ratified the agreement.<sup>8</sup> The EU has expanded upon the Stockholm Convention with an ever more wide-reaching restriction of POP production and usage.<sup>9</sup>

## **b. Climate change and the Kyoto Protocol**

Quite possibly the most talked-about global environmental issue at present is climate change. The reasons for this are fairly obvious: it risks becoming a severe catastrophe for humanity, if the more pessimistic estimates are correct, and, because carbon emissions are generally tied directly to economic output, this environmental problem threatens to worsen as economies grow, both in the developed and the developing world. While countries like Britain and Japan have developed to the point where the immediate ecological effects of industry, such as smoke and heavy metal contamination, have been contained, such a process of wealth-generated environmental improvement will not happen with climate change. While alternative technologies might allow for the reduction of carbon emissions with only relatively modest impacts on welfare in both the

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<sup>6</sup> Buccini, John Anthony. “The Long and Winding Road to Stockholm: The View from the Chair.” in Fenge, Downie and Inuit Circumpolar Conference., Northern Lights against Pops : Combatting Threats in the Arctic.

<sup>7</sup> See: United Nations Environment Program. “Stockholm Convention on POPs to become international law, launching a global campaign to eliminate 12 hazardous chemicals.” 14 May 2004.  
<<http://www.pops.int/documents/press/EIF/pr5-04POPsEIF-E.pdf>>

<sup>8</sup> See signature status at: <<http://www.pops.int/documents/signature/signstatus.htm#notes>>

<sup>9</sup> See: <[http://www.eu.int/comm/environment/pops/pops\\_infonote.pdf](http://www.eu.int/comm/environment/pops/pops_infonote.pdf)> 2 June 2004.

developed and developing world, the total costs seem likely to be high. There are also major ethical considerations, with regards to states that have become rich through dirty industrialization forbidding the rest of the world from following a similar path. Such practical and ethical considerations exist in the space defined, on the one hand, by the physical nature of the world, as accessed through science, and, on the other hand, political calculations.

Given the complexity of the climatic system, it is understandable that scientific certainty about the likely extent of the consequences of global warming has not been achieved. Likewise, given the enormous political and economic importance of mitigating carbon emissions out of concern about the possible harmful effects of climate change, it is inevitable that the science involved cannot escape controversy, doubt, and contradiction. The Kyoto Protocol is therefore an example of a ‘hard case’ for the interaction between science and policy making – one where complex linkages exist in both directions and the initial model that I sketch out in the methodology section (4a) cannot be easily identified.

The Kyoto Protocol<sup>10</sup> is an extension of the *United Nations Framework Convention on Climate Change* (UNFCCC), negotiated at the Third Session of the Conference of the Parties (COP III) in December of 1997.<sup>11</sup> The protocol requires the developed “Annex I” countries to reduce their total output of greenhouse gasses (GHGs) to a certain fraction below their 1990 emissions levels by some point between 2008 and 2012. Debate about the precise counting mechanism (for instance, whether and how to include ‘carbon sinks,’ such as forests) is ongoing. Likewise, the failure of the United States to ratify the protocol, combined with the fact that it includes no binding provisions for countries in the developing world, has led many people to doubt its efficacy. Additionally, there are

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<sup>10</sup> Full text available at: <<http://unfccc.int/resource/docs/convkp/kpeng.html>>

<sup>11</sup> Jacobson, Harold. “Climate Change: Unilateralism, Realism, and Two-Level Games.” in Patrick, Stewart, Shepard Forman, and Center on International Cooperation (New York University). *Multilateralism and U.S. Foreign Policy : Ambivalent Engagement*. Center on International Cooperation Studies in Multilateralism. Boulder, Colo. ; London: Lynne Rienner, 2002. p. 416



concerns that even with the widespread ratification and implementation of Kyoto, the anthropogenic sources of climate change may not be sufficiently mitigated to avoid the worst future consequences of the problem.

### **c. Scientists and nuclear disarmament**

During the Cold War, a major area of scientific and political controversy related to the testing of nuclear weapons on the part of the United States, Britain, France, China, and the Soviet Union. Tests were conducted both underground, where relatively little radioactive fallout was released into the wider environment, and in the form of more contamination-prone airbursts. Figures from the United States – which are most readily available – confirm the significant extent of these tests, with 925 tests of nuclear and thermonuclear bombs conducted in Nevada (825 of those underground) and another 129 elsewhere, primarily in the Marshall Islands.<sup>12</sup> Serious health and environmental consequences from the tests and the radiation that they left behind have been widely documented.

Starting with objections raised by members of the Manhattan Project itself – the secret American program that developed the world's first nuclear weapons, including those dropped on Nagasaki and Hiroshima in 1945 – there have always been concerns within the scientific community about the production and testing of nuclear weapons. For the purpose of this thesis, I shall examine written debates between scientists, as well as between scientists and policy makers, about the validity of nuclear testing as a policy. A specific example of a situation in which a group including scientists has taken on an explicitly prescriptive agenda is the Pugwash Conferences on Science and World

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<sup>12</sup> In a report by the National Cancer Institute, released in 1997, it was determined that ninety atmospheric tests at the Nevada Test Site deposited high levels of radioactive iodine-131 (5.5 exabecquerels) across a large portion of the contiguous United States, especially in the years 1952, 1953, 1955, and 1957—doses large enough, they determined, to produce 10,000 to 75,000 cases of thyroid cancer. (See: National Cancer Institute, [National Cancer Institute Study Estimating Thyroid Doses of I-131 Received by Americans from Nevada Atmospheric Nuclear Bomb Tests](#) (1997).)

Affairs.<sup>13</sup> Also included within such debates are the efforts of advocacy groups, such as the Campaign for Nuclear Disarmament.<sup>14</sup> Particular attention will be paid to the matter of the credibility of scientists (as perceived by policy makers, the public, and the scientists themselves), as well as their legitimacy as active members of the policy debate. While it will not be examined directly, the importance of professional ethics within the scientific community is naturally raised as soon as matters such as the development of nuclear weapons are discussed.

#### **d. The Lomborg controversy**

Bjorn Lomborg, a Danish statistician, created an enormous storm of controversy among environmental scientists with the publication of The Skeptical Environmentalist: an extensively researched tome that questions what Lomborg calls ‘the litany’ of belief in the inevitable progression of humanity and the earth towards an ever-greater state of environmental decay.<sup>15</sup> He does so on the basis of statistical examination of the same sources cited as evidence of this long-term decline. Lomborg also criticizes what he perceives as the closed-mindedness of the scientific community, and its unwillingness to seriously examine alternative perspectives. Both those attacking and those defending Lomborg do so in a way that is illustrative of way the relationship between science and policy making is understood: particularly insofar as it concerns the question of whether scientists should be active advocates, marshalling evidence behind prescriptive arguments, or whether they should present data passively, leaving decision making to others. The relevance of this example to the thesis lies in how it serves as a conduit through which important theoretical questions can be identified and examined.

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<sup>13</sup> See: Wikipedia. “Pugwash Conferences.” <[http://en.wikipedia.org/wiki/Pugwash\\_conferences](http://en.wikipedia.org/wiki/Pugwash_conferences)>  
Also: “About Pugwash.” <<http://www.pugwash.org/about.htm>>

<sup>14</sup> See: Wikipedia. “Campaign for Nuclear Disarmament.”  
<[http://en.wikipedia.org/wiki/Campaign\\_for\\_Nuclear\\_Disarmament](http://en.wikipedia.org/wiki/Campaign_for_Nuclear_Disarmament)>

<sup>15</sup> Lomborg, The Skeptical Environmentalist : Measuring the Real State of the World.

#### 4) Methodology

##### **a. Environmental agreement case studies**

By examining the primary and secondary documentation surrounding the Kyoto and Stockholm agreements, this thesis will identify the direct role that scientists and scientific organizations played in their formulation. Such influence can be expected to have taken place both during the negotiations themselves and through the production of scientific studies that defined the respective problems in the period prior to negotiations. Of particular importance is the way in which scientific information was approached by negotiating parties. The assessment of these phenomenon will take place through close reading of the associated documents, as well as through the interviewing of individuals involved in the negotiations and the scientific work that preceded them.

The choice of case studies is determined primarily by two inter-related forms of variation between the agreements. While the Stockholm Convention was created on the basis of fairly unambiguous and broadly accepted science dealing with the nature and extent of the POPs problem<sup>16</sup>, the Kyoto Protocol was created in response to science that is much more extensively disputed. The disagreement within the scientific community relates much more to the magnitude of the consequences global warming will have and the costs of mitigation than to the existence of global warming as an anthropogenic phenomenon.<sup>17</sup> That said, the possibility that it is the differing levels of scientific agreement about the nature and extent of the problems being addressed that explains the variation in overall effectiveness between Stockholm and Kyoto. One element of the analysis to be included in this thesis will be an evaluation of the plausibility of that perspective, in the

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<sup>16</sup> See: "Canadian Research and POPs: The Northern Contaminants Program" in Fenge, T., David Leonard Downie, and Inuit Circumpolar Conference. Northern Lights against Pops : Combatting Threats in the Arctic. Montreal ; Ithaca: Published for the Inuit Circumpolar Conference Canada by McGill-Queen's University Press, 2003.

<sup>17</sup> The possibility that this disagreement is as much the effect of political controversy as the cause is a question worth considering. That is especially true when it transpires that a great deal of the environmental science disputing the evidence behind global warming has been directly funded by groups – such as the petrochemical industry – that have a direct interest in stymieing action on the matter.

face of competing theories, such as that the difference lies in the considerably differing costs of implementation.

Both case studies deal with the atmospheric effects of human industry and intensive agriculture. Both deal with phenomenon that are, by their very nature, transnational. Both problems have been identified by most scientists and policy makers involved with them as requiring global solutions. These similarities, when set beside the differences between the cases, will hopefully reveal some of the important operating dynamics behind which environmental problems translate into international agreements. It is my hope that a comparative evaluation of the role played by science in each will highlight possibly useful strategies for the effective integration of scientific examination and political action in dealing with future environmental problems.

#### **b. Theoretical questions**

My initial theoretical endeavour will be to construct a model of a standard, straightforward relationship between environmental science and global environmental policy making. That is to say, a model in which the scientific establishment identifies the existence of environmental issues that are problematic for human beings, investigates the matter to the point where consensus emerges about the cause and magnitude of the problem, and then presents this information to policy makers in a way that is broadly neutral in prescriptive terms. Policy makers then operate in conjunction with experts – including scientists – to develop legal instruments that can address the problem in an efficient, and possibly equitable, manner. The critical components of this view include the placement of scientists and policy makers in separate ‘silos’ that only interact in obvious and straightforward ways, and objectivity on the scientific side, with regard to which questions are investigated and which answers are developed and accepted.

*Prima facie*, it seems that this model has some relevance for assessing the Stockholm Convention, though it is much more problematic when applied to the Kyoto Protocol. On the basis

of the examination of those agreements, as well as secondary literature, the above conception of the science-policy relationship will be interrogated. Issues such as the independence of science from politics will be discussed, especially in the context of matters like climate change, where such involvement is likely to be extensive. Likewise, the general extent to which the form of causality in policy making described above is valid will be assessed, on the basis of primary and secondary research and interviews. It seems highly likely that the actual functional and institutional interconnections between science and policy making are both far more elusive and far more extensive than those posited in the model above. These complexities relate both to the bureaucratic politics of science – as an activity bound up in questions of money and interests – and in the philosophical character of scientific truths themselves, a problem to which I will briefly turn now.

A significant portion of the theoretical component of the thesis will be the application of some ideas from the philosophy of science to the discipline of international relations, and specifically to the study of global environmental policy making. The importance of doing so is considerable, since it is only through considered analysis of the character of science as an approach and a discipline that a comprehensive understanding can be reached of its political role. The credibility of science is critically connected to its perceived command over questions of empirical truth, as well as its perceived ability to avoid and reveal bias through methods such as duplication and peer review. Contemporary trends in public and elite faith (or lack thereof) in the validity of scientific findings are connected to perceptions about how matters such as funding structures condition the ways in which science is carried out: which questions are asked, which explanations favoured, and which results deemed important. In areas such as environmental politics, where uncertainties are often rife, such issues are of re-doubled importance.

### **c. Anticipated problems**

The most significant problem I anticipate is one of focus. The areas into which this thesis could expand are broad. Discussion of either of the case studies could easily fill many books, as could questions like the legitimacy of scientists in lobbying for particular policies. The counter to this is to maintain perspective and to concentrate on the importance of making an original contribution. To anticipate that contribution prior to doing the research is impossible, but the importance of having a unifying argument to give definition to the thesis and set boundaries is obviously critical. As a fundamentally inter-disciplinary work, the thesis will be able to make reference to external debates and issues, without getting too deeply entangled in them. I anticipate that this will be particularly important with regards to debates within the philosophy of science, as well as highly technical debates within environmental science. While a great deal of work has been done within different fields on matters like climate change and POPs, the opportunity for developing important and novel ideas in the spaces between fields is considerable.

A second potential problem is one of overall methodological construction. When dealing with a problem as complex and interconnected as the role of science in environmental policymaking, the construction of simple hypotheses that can be objectively validated or falsified is probably not possible. That is not to say that no standard of evaluation exists, simply that it is unlikely to be one based upon statistical analysis or predicate logic. The standard is rather closer to that adopted within the scientific field itself: review and approval from those who also have a claim to expertise in the field. This standard is based primarily on plausibility, quality of argumentation, and comprehensiveness of research.

A third problem related to highly technical knowledge relates to my own ability to discern between well-supported and justified assertions of a highly technical kind and those which are not based on a rigorous and accepted approach. In order to avoid such dangers, the limitations of my

scientific and philosophical training will be clearly identified, and I shall attempt more to comment upon the debates ongoing within these fields than engage in them myself. Also, I have secured agreement from individuals far more well-versed than myself in these fields to examine my research in an ongoing and informal fashion, in order to flag areas of misunderstanding, on my part.

#### 5) Discussion of sources

Appendix A to this document consists of the present version of my annotated bibliography for this project, broken down categorically. The purpose of this section of the design essay is not to examine particular sources, but rather to identify different kinds of sources, the importance they will have, and the manner in which they will be integrated into the thesis in support of my arguments. I certainly do not anticipate any scarcity of sources on these matters; the greater challenge will be to identify those sources which have the greatest pertinence.

One welcome feature this research question is that, for a number of reasons, a very good number of sources are available over the internet. This reflects both the high level of recent discussion of the issues and the high level of technological expertise and concern for widespread communication among those commenting. While concerns about the authority of internet sources must obviously be borne in mind, the availability of information from myriad reputable sources, including the United Nations specialized agencies and European Union, should aid in the development of an extensive collection of analyses and perspectives. The internet will also be a vital channel for the process of informal review by environmental scientists and philosophers of science who I know and mentioned above.

##### **a. Documents relating directly to the agreements**

As agreements reached globally through the auspices of the United Nations, both the Stockholm Convention and the Kyoto Protocol are extensively documented. Particularly in the case of the Kyoto Protocol, such documentation far exceeds what can be realistically and usefully

examined over the course of an M.Phil thesis. On the basis of a preliminary examination, I will therefore select two or three critical instances or junctures at which the issues connected to the relationship between science and policy are at the forefront. An example is the decision to create the Intergovernmental Panel on Climate Change (IPCC) in 1988 as an expert group to advise negotiators.<sup>18</sup> The final agreements, as well as drafts, committee documents, and the like will provide a vital path through which to assess the role played by the scientific community in their development.

Likewise, secondary literature about these agreements generally is likely to include both substantive and analytical material that will be valuable for the examination of the questions this thesis will pose. Extensive secondary documentation exists on both agreements, from a number of different perspectives, including those of international law, environmental science, political science, and international relations.

#### **b. Documents relating to the science / policy controversies**

Controversies about science and policy, such as the nuclear testing and Lomborg examples discussed above, are likewise extensively documented. My examination will focus not on the substantive issues of whether Lomborg is correct or whether nuclear testing is a good policy. Rather, the concentration will be on the understandings of science that are used to justify or attack either position. The purpose is not to settle these disputes, but to gain access to the critical considerations that inform different perspectives on the relationship between science and policy, so that they can be further analyzed.

In the case of Lomborg, there exist a large number of newspaper and journal articles written by him, in defence of him, and in response to him on a number of different grounds. For the

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<sup>18</sup> Jacobson, Harold. "Climate Change: Unilateralism, Realism, and Two-Level Games." in Patrick, Stewart, Shepard Forman, and Center on International Cooperation (New York University). *Multilateralism and U.S. Foreign Policy : Ambivalent Engagement*. Center on International Cooperation Studies in Multilateralism. Boulder, Colo. ; London: Lynne Rienner, 2002. p. 418



purpose of examining the perceived role of science among scientists and members of other epistemic communities, the actual validity of Lomborg's claims about the state of the environment are not enormously important. More so are the arguments by which he is attacked and defended: whether based on deontological concerns about free expression and the process of peer review or on teleological grounds based on the kind of actions that need to be taken in order to achieve effective solutions to problems such as climate change.

Similarly, there are a large collection of statements made by groups opposed to nuclear testing (both wholly scientific groups like the Union of Concerned Scientists and those that merely use scientific arguments as backing for their policy claims). There are also governmental, scholarly, and journalistic responses. As with the Lomborg case, the focus will not be upon the issue *per se* but upon the conceptions of science that underlie the arguments.

### **c. Secondary literature on science and policy**

The first body of sources, under this heading, are the writings of those who study the philosophy of science: such as Thomas Kuhn and Karl Popper.<sup>19</sup> While extensive discussion of the issues that concern them exceeds the scope and purpose of this thesis, the importance of having a background understanding of philosophical thinking about science is important for the production of a document that can speak effectively to members of multiple disciplines, as well as interested members of the public at large. In order to produce a thesis that can be recognized as useful by members of the various fields that will be addressed within, developing a general knowledge of the philosophy of science and the extent to which it applies to the question of the role of science in global environmental policy making seems very important.

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<sup>19</sup> Thomas S. Kuhn, The Structure of Scientific Revolutions, International Encyclopedia of Unified Science ; V. 2, No. 2 (Chicago ; London: University of Chicago Press, 1962).  
Karl Raimund Popper, The Logic of Scientific Discovery (London: Hutchinson, 1959).

The second body of sources of this type are those that discuss related questions in other fields: for instance, the role of science in global health or development policy. Many of the issues involved in dealing with the problems of infectious disease mirror those of dealing with environmental problems: uncertainty, the existence of information only properly comprehensible to relatively small groups, and ethical questions about such matters as the sharing of costs and responsibilities between the developed and developing world. This literature will hopefully provide examples of mechanisms by which questions of the type being posed in this thesis can be rigorously and effectively answered.

#### **d. Interviews with experts and involved parties**

The first, and quite possibly most important, type of interview I shall be conducting is the informal discussion of my research with numerous students and faculty members both at Oxford and back at the University of British Columbia, where I completed my undergraduate degree. These include philosophers of science, environmental scientists, political scientists with an environmental focus, international lawyers, and those with personal involvement in the Kyoto and Stockholm processes. I have also begun to interact with relevant organizations at Oxford, including the Global Health Group and the Environmental Change Centre. The importance of these discussions is to retain the much-mentioned interdisciplinary validity, as well as to gain awareness of important sources and ideas. Communication with colleagues back at UBC has already yielded several highly relevant theses written on related matters there recently. I have begun to correspond with the author of one such recently defended thesis about sources and methodological approaches.

The thesis will also hopefully involve formal interviews conducted with individuals involved with the Kyoto and Stockholm processes. I have already drafted a letter requesting an interview with John Buccini – chair of the Stockholm Convention negotiations – who could provide invaluable information about the immediate experience of dealing with scientists and scientific facts as the

negotiators were exposed to them. Another interesting potential subject for interviews is Shiela Watt-Cloutier – President of the Inuit Circumpolar Conference and Stockholm delegate. Both Buccini and Watt-Cloutier are reputedly willing to be interviewed, though the logistics of the matter have yet to be sorted out. I would likewise be interested in interviewing environmental scientists, diplomats, and UN bureaucrats who participated in both sets of negotiations. On the theoretical side, it would certainly be interesting (if unlikely) to interview Bjorn Lomborg or some of his more prominent detractors and defenders.

Sources cited directly in research design essay

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*Note: A far more extensive bibliography is included in Appendix A.*