Overexploitation of a Valuable Resource? New Literature on the Precautionary Principle

Jaye Ellis*

Leben, C. (ed.), *Le principe de précaution: Aspects de droit international et communautaire*. Paris: Pantheon; (Dt Intern.), 2002. ISBN : 2913397212.

O'Riordan, Tim, James Cameron and Andrew Jordan (eds), *Reinterpreting the Precautionary Principle*. London: Cameron May, 2001. Pp. 284. £75.00. ISBN: 1874698236.

Sunstein, Cass R. *Risk and Reason: Safety, Law, and the Environment*. Cambridge: Cambridge University Press, 2002. Pp. 342. £15.99. ISBN: 0521016258.

Trouwborst, Arie. *Evolution and Status of the Precautionary Principle in International Law*. International Environmental Law and Policy 62. Dordrecht: Kluwer, 2002. Pp. 395. £70. ISBN: 9041117857.

Abstract

The precautionary principle in international law has attracted intense and sustained attention in the last ten to 15 years. It is thus becoming increasingly difficult for authors to make meaningful contributions in this area. Nevertheless, there remain a number of important research questions to be explored or further developed. In this review essay, the author considers four recent works on precaution and examines the extent to which they are able to break new ground in this crowded field. Four themes are taken up. First is the question whether precaution has become a rule of customary international law, which, the author suggests, does not require further sustained academic attention at this time. Second, the impact of precaution on the relationship between science and law is considered. Third, the limits of precaution are explored. Given the extraordinarily high expectations that many jurists have of this principle, consideration of the appropriateness of these expectations seems timely. Finally, the doctrinal implications of precaution are taken up. Despite the

* Assistant Professor, Faculty of Law and School of Environment, McGill University. Email: jaye.d.ellis@mcgill.ca.

EJIL (2006), Vol. 17 No. 2, 445–462 doi: 10.1093/ejil/chl005

attention that jurists have bestowed upon the principle, the identification of these implications remains an elusive goal.

1 Introduction

The precautionary principle has received an extraordinary amount of attention from domestic and international jurists in the last decade or so, becoming one of the most well-known and talked-about international environmental rules. With the principle becoming entrenched in international environmental protection and resource management regimes, and spilling over into the areas of health and international trade, stocktaking exercises seem appropriate. More specifically, this seems a good time to assess the literature on the principle rather than the progress of the principle itself – to ask what the precautionary research agenda has accomplished, where it is going, and what directions should be mapped out for the future.

The most oft-cited version of the principle appears in the 1992 Rio Declaration on Environment and Development as Principle 15:

> Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

As Christopher Stone has pointed out, the principle is comprised of three negatives: no scientific uncertainty does not mean that no measures should be taken.[1] It sets forth no positive obligation; it simply reminds legislators that they cannot wait for proof of a cause–effect linkage between a given substance, process or activity and environmental harm before acting to reduce or eliminate the risk of this harm. However, despite this apparent modesty, the principle has incited an astonishing amount of interest, attention and controversy. Indeed, the implications of precaution are significant: as a statement of policy, it calls for fundamental changes in the way in which decisions about the environment are made, and for new forms of interaction among scientists, legislators and members of the public. Its implications as a legal principle are less well-understood and have received much less scholarly attention, but it has the potential to affect the rights and obligations of states and other relevant actors, including policy-makers, affected individuals and industry.

Scholarly works on precaution are published at an alarming rate, and have been for more than a decade. The resulting crowding of the field makes for a good deal of overlap and repetition, and scholars struggle to find new and compelling perspectives from which to observe precaution's growing influence internationally and domestically. Yet there remains much to be learned about the precautionary principle. Careful thought should at this point be devoted to the development of future research agendas on precaution in order to avoid treading in certain well-worn paths.

This article considers four contributions to precautionary scholarship: two monographs and two edited collections. The authors come from across Europe and

[1] Stone, 'Is there a Precautionary Principle?', 31 *Environmental Law Reporter* (2001) 10790.

North America, as well as Australia. They focus variously on international and domestic arenas, on law and policy, and on a wide range of themes and issues. Many of the authors are jurists, but they also include philosophers and political scientists, as well as some with a background in the natural sciences.

Le principe de précaution: Aspects de droit international et communautaire, edited by Charles Leben and Joe Verhoeven [hereinafter *Le principe de précaution*], is a somewhat eclectic collection of essays ranging from conceptual through historical to doctrinal analyses of precaution. Its focus, however, is concentrated on the legal implications of the principle domestically, regionally and internationally.

Reinterpreting the Precautionary Principle, edited by Tim O'Riordan, James Cameron and Andrew Jordan [hereinafter *Reinterpreting*], is a collection of essays addressing three strands of inquiry: a comparative study, examining five jurisdictions; a conceptual strand focusing on the confrontation between science and regulation; and a more doctrinal strand focusing on international law, particularly international trade. The editors developed an ambitious thematic programme for this volume, which spans a range of disciplines and places a good deal of emphasis on precaution and policy. Unfortunately for the contributors, this rather pricy book has not had the benefit of thorough copy-editing.

Risk and Reason: Safety, Law, and the Environment by Cass R. Sunstein [hereinafter *Risk and Reason*] focuses not on the precautionary principle as such but on the concept of risk more generally, and presents a highly critical discussion of how risk is dealt with by government, focusing on the United States. He presents a case for greater involvement of scientists and greater reliance on cost–benefit analysis in regulatory decision-making.

Finally, *Evolution and Status of the Precautionary Principle in International Law* by Arie Trouwborst [hereinafter *Evolution and Status*] seeks to demonstrate that the precautionary principle has attained the status of customary international law. In the course of making this argument, the author delves into a wide range of material on the implementation of precaution in international and domestic law and policy.

Although the discussions in these volumes range widely, a certain number of common themes emerge. Two of these themes, namely precaution as international customary law and the influence of precaution on science and policy, have received a good deal of attention among precautionary scholars, while a third, exploring in more detail the legal implications of precaution internationally and domestically, has received somewhat more superficial treatment: although precaution is accepted by many scholars and by a number of jurisdictions as a legal principle, its place within a system of law is surprisingly difficult to identify and analyse.

2 Precaution as Customary Law

The question whether the precautionary principle is a principle of customary international law has received a great deal of attention, particularly since the principle's inclusion in the Rio Declaration. The trajectory of precaution is treated by Pierre-Marie Dupuy in his contribution to *Le principe de précaution* and by Trouwborst in *Evolution*

and Status. It percolated into international law first in the form of policy statements, then in preambles to international texts, and finally in the operational provisions of international conventions. It has been incorporated into a large and rapidly growing number of international environmental protection regimes. Its customary status, however, is a matter of dispute among international scholars. Dupuy, a renowned scholar of public international law and a pioneer in the field of international environmental law, avoids making this affirmation in his contribution, noting rather that the principle has not yet been recognized as customary before an international tribunal. The absence of authoritative recognition of the principle's customary status, along with the ambiguous evidence of state practice, makes it difficult to decide the question, and the debate among international jurists continues.

Trouwborst, for his part, holds that precaution has already achieved customary status. In presenting his case, he covers a vast array of materials drawn from international law and policy as well as state practice. The book is thus an excellent reference source for scholars of precaution. Furthermore, Trouwborst includes in his study texts, instruments and decisions that make both explicit reference to the principle and those in which precaution remains implicit. This is commendable, but given that the author's goal is to identify evidence of state practice and *opinio juris*, it is not appropriate to treat all evidence as having equal weight: a more systematic approach would have been required.

In his section on state practice, Trouwborst includes environmental impact assessments (EIAs), strict and absolute liability for offences which may cause environmental damage, and prior approval of drugs, pesticides and other substances before their introduction to the market as evidence of precaution. Similarly, when examining practice at the international level, the author includes in his study instruments that make reference to possible harm to the environment for the purposes of triggering obligations to notify potentially affected states and to conduct EIAs. There is little doubt that these forms of action are compatible with the precautionary principle and further its aims; indeed, it may well be that they were deliberately adopted as precautionary measures. However, a more helpful analysis would have sought to categorize this wide range of measures in an attempt to deal with them more systematically and critically.

Such a systematic analysis would also have better served the author's purpose of demonstrating the customary status of the principle. The fact that a state accepts an obligation to notify its neighbours of potential environmental impacts could serve as evidence of an acceptance of precaution as a binding principle of international law, but it is clearly not evidence of the same quality as, say, reference to precaution in major environmental legislation as a guiding legal principle. After all, many obligations to notify predate the precautionary principle and are more closely aligned with preventing known risks than with exercising precaution in the face of poorly understood risks. Subjecting data on domestic and international practice to a more critical form of analysis would also have served to further a different kind of research agenda, namely an inquiry into the myriad ways in which precaution comes to be operationalized in different locales and different substantive contexts.

Trouwborst's approach seems to lead him to exaggerate the role that precaution plays in Canada and the United States. He summarizes Canada's stance on precaution with reference to a 2000 Friends of the Earth report which states that 'Canada has fully incorporated the precautionary principle into her governance'.[2] Juli Abouchar's account of precaution in Canada, in *Reinterpreting*, is more circumspect: she refers to 'seeds of precaution'.[3] Internationally, Canada, along with the United States, has denied that the principle has customary status, a fact which Trouwborst acknowledges but does not seek to square with his glowing assessment of Canada's domestic record on precaution.

Similarly, Trouwborst's optimistic assessment of precaution in the United States does not appear to be sufficiently nuanced. Tickner and Raffensperger in *Reinterpreting* note the many strengths of American environmental policy, and observe, along with Trouwborst, the areas in which the US has set the standard. Tickner and Raffensperger's overall assessment is that 'explicit acceptance and endorsement of the precautionary principle is not likely to occur at the federal level [in the United States] in the foreseeable future and … real implementation will probably take place at the state and local levels'.[4] Indeed, the overall impression given by *Reinterpreting* is that many of the OECD states are only beginning to incorporate certain elements of precautionary thinking into their domestic environmental law and policy. The question whether this is sufficient evidence of state practice is not addressed by Trouwborst.

A question that is virtually never asked in the literature on precaution as customary law is why it is important for precaution to be recognized as a legal principle. This should not be taken to suggest that the difference between legally binding and non-binding principles is purely formal and essentially uninteresting. But there are two features of precaution that tend to reduce the significance of the customary law issue: first of all, a number of features that it shares with most principles, namely its vagueness and generality, and the absence of positive obligations; second, the immense influence that the principle already enjoys. Despite the resistance that it has encountered – resistance that may be explained, at least in part, by its success – the principle enjoys widespread support. It has generated a veritable flurry of law- and policy-making at both the domestic and international levels, and has been applied by judges in a number of international tribunals. Of course, the principle's supporters wish to make it stronger, more resilient and more difficult to avoid, but it is not at all clear that granting it the status of a customary principle would accomplish these goals.

In any event, the question whether precaution is customary law appears to have been virtually exhausted as a research agenda, with perhaps one or two exceptions. One such exception might be a doctrinal analysis of the transformation of principles into customary law. Rather than seek to answer the question whether precaution has attained this status, it would be interesting to approach the question from the point of

[2] *Evolution and Status*, at 184, citing Friends of the Earth Canada 2000.

[3] Abouchar, 'Implementation of the Precautionary Principle in Canada', in *Reinterpreting*, 235 at 235.

[4] Tickner and Raffensperger, 'The American View on the Precautionary Principle', in *Reinterpreting*, at 183.

view of customary law, presenting precaution as a case study of the development of customary law.

Another possible exception may be found in the intersection between precaution and international trade. Debates over hormone-treated beef, the outbreak of bovine spongiform encephalopathy (BSE) and genetically modified organisms (GMOs) have once again focused attention on the customary status of precaution. It is often conjectured, by both opponents and proponents of the principle, that if it were considered a binding legal principle, it could justify the creation of exceptions to other rules and principles of international law, notably trade rules. Of course, precaution, in one form or another, has already been incorporated into certain international trade instruments, notably the Agreement on Sanitary and Phytosanitary Measures and the Cartagena Protocol on Biosafety. Interest in a general customary principle persists for essentially two reasons: to apply in cases where precautionary obligations do not appear in the governing convention; and to guide the interpretation of precautionary language where it does appear. Inquiries into the influence that a customary principle of precaution could have on conventional rules such as international trade rules are of potential interest. Gabrielle Marceau takes up this question briefly in her contribution to *Le principe de précaution*, but does not pursue the inquiry beyond a brief observation that World Trade Organization (WTO) dispute settlement bodies are obliged to take account of rules of international law applicable between the parties.

The most interesting aspect of the discussions of state practice in the four volumes is the light that they shed on the myriad rules, regimes and decision-making procedures that precaution has spawned, and on the controversies and difficulties that the principle has provoked. Comparative analyses of precaution are often fascinating because the open-endedness of the principle leaves much room for regulators to manoeuvre, and because the application of precaution in a wide range of different contexts makes for great variety. Each of these volumes addresses this issue to a greater or lesser extent. Unfortunately, many of these comparative contributions satisfy themselves with presenting descriptions of international conventions, domestic legislation, policies and jurisprudence with little accompanying analysis and with little attention to the impact on the precautionary principle at the international level, with the exception of the customary law question.

3 Science and Precaution

Science is at the core of precaution. The principle invites analysis of the relationship between legislators and scientists, as it calls upon legislators to make decisions about environmental protection rather than seek to delegate such decisions to scientists. Of course, scientists do not make regulatory decisions, even in cases where precaution is not invoked. However, legislators can seek to avoid responsibility for making difficult and potentially costly decisions by deferring them to such time as scientific evidence of their necessity can be provided. Precaution seeks to reinforce an appropriate division of labour between science and law-making: scientists can provide data and analysis regarding actual and potential sources of risk, but they cannot determine what

level of risk is acceptable, or what measures and trade-offs are justified in an effort to avoid or diminish risk. This is the task of legislators, ideally in close consultation with affected individuals, including industry and members of the public.

The difficulty is that science and the scientific method are often poorly understood by policy-makers, lawyers and scholars. Particularly useful, therefore, are examinations of the methods through which scientific knowledge is produced and communicated to legislators and members of the public. This issue is a central preoccupation of *Reinterpreting*, and receives a good deal of attention in *Le principe de précaution* as well.

The most important triggering condition for precaution is, of course, uncertainty. Where risks can be quantified with some degree of confidence and where causal mechanisms between substances or technology and environmental or health effects are relatively well understood, legislators operate in the zone of prevention. This is the focus of *Risk and Reason*. Legislators have less difficulty justifying their decisions to impose regulations because they can point to scientific data that indicates a need for such regulation. More difficult, as Sunstein points out, is knowing when *not* to regulate, or making decisions about how best to regulate in order to avoid imposing unjustifiable costs on society or, worse, exposing a population to more serious risks. After all, excessive deference to science is not the only source of bad policy-making: equally dangerous is excessive deference to members of the public who have become conscious of a particular source of risk but who are ill-informed as to its nature and the probability of its realisation.

There are thus good reasons for thinking critically about the relationship between science and legislation. Where a correlation between, say, the release of a substance and environmental contamination has not been observed, or where the causal mechanisms behind environmental impacts are poorly understood, legislators cannot rely solely on science to justify the imposition of regulatory measures with their attendant impacts on businesses and members of the public generally. Scientists can provide what information they have, but ultimately a decision to regulate is political: legislators themselves must make decisions and cannot simply claim to be implementing a scientific conclusion. This side of the debate unfortunately receives little attention in Sunstein's discussion.

All decisions about environmental regulation are ultimately political, of course, because they are based on concepts of acceptable versus unacceptable risks, as well as assessments of acceptable versus unacceptable costs of regulation. That precautionary decisions are political is hardly remarkable; they are simply more obviously so than decisions based on known risk factors. However, when legislators are under pressure to justify regulatory measures that may impose substantial costs on business and industry, they are much more exposed in cases where the justification is precautionary rather than preventive. Precautionary decisions are vulnerable to the accusation that they are political in the worst sense of the word, in that decision-makers have caved in to public and interest group pressure and have made irrational, unjustifiable decisions to appease a certain segment of the population. This is a central preoccupation in Sunstein's book.

Sunstein devotes a good deal of attention to the ways in which risk is perceived by members of the public, an issue of central importance that does not receive much

notice in the other volumes. Sunstein paints a vivid picture of the various ways in which people fail to appreciate fundamental components of risk, notably the probability of its occurrence and the risks associated with alternative substances or processes. Furthermore, he argues, special interest groups exploit the tendency of members of the public to make mistakes when assessing their exposure to risk. As a result, Sunstein is wary of greater public involvement in regulatory decisions, wishing instead to enhance the role of experts in regulatory processes. It is hard to take issue with this argument: certainly, regulation must not ignore scientific data and conclusions. Unfortunately, Sunstein sets up an artificial opposition: regulation is either a simple reaction to uninformed public fears, or it is driven by rigorous scientific assessments based on expertise. The discussion taking place in precautionary literature on the roles of scientists and members of the public in regulatory decision-making is much more nuanced than this, seeking to shed light on the nature, including the limits, of scientific knowledge and to strike an acceptable balance between rigorous science and respect for democratic principles. By presenting his argument in an essentially binary form, Sunstein does not address the well-known objections to his conclusion that scientists should be given greater weight in regulatory decision-making.

A good understanding of the processes through which scientific information is gathered and scientific knowledge generated and disseminated helps legislators and scholars confront and critique this vision of precautionary decision-making as irrational and lacking in rigour. Insights from fields such as philosophy of science and policy studies can help provide this understanding. For example, scholars of precaution now have a working understanding of the various gradations of scientific knowledge, from ignorance through uncertainty to knowledge of a risk; they have become conversant with concepts such as the difference between Type I and Type II statistical errors. Further insights into these issues are always welcome, of course, but to make a contribution along these lines, scholars must now delve deeper into the nature of scientific knowledge.

The area of risk assessment is of interest because it is a zone where science and lawmaking converge. It represents to many an excellent example of rigorous, scientific policy-making, and is often contrasted with precautionary decision-making in these respects. Stirling and McGarvin, in their contributions to *Reinterpreting*, take on this conception of risk assessment and conclude that precautionary decision-making is just as scientific as risk assessment – and risk assessment just as political as precautionary decision-making. Stirling argues that the essential difference between risk assessment and precaution is simply that the former is a narrower, more constrained process which provides less complete information on actual and potential risks and that, furthermore, glosses over the difficulties inherent in reaching scientific conclusions regarding events in complex systems. It would have been interesting to see Sunstein's response to this argument, as opposed to the more extreme argument that environmental and health regulation should simply respond to public concerns without serious consideration of science.

The argument that risk assessment is not a purely objective, scientific, apolitical process has been made in many ways by scholars working in various fields, but it is a

point that apparently bears repeating, as it remains poorly understood among virtually all the players in the process of environmental policy-making: scientists, politicians, lawyers, business and industry, and members of the public. Precaution provokes fears that innovation will be stifled and business and industry overwhelmed with regulation; that science will be jettisoned while politicians fall victim to environmental fear mongers. This is one of Sunstein's major points, and he presents a number of case studies which draw attention to a facet of environmental and health regulation that is too often ignored: namely, the various costs that such regulations impose. Sunstein is quite right to point out that legislators too often fail even to attempt to inform members of the public about scientific data regarding risks that have attracted a good deal of public attention: often, as Sunstein demonstrates, the path of least resistance is to adopt a regulation without paying heed to the consequences of such action, thus quieting public fears without actually procuring any public benefit. Sunstein's proposed remedy is greater reliance on cost–benefit analysis.

Although Sunstein focuses on cases in which the risk in question is relatively well understood, he argues that cost–benefit analysis is appropriate in cases of uncertainty as well, with the caveat that a much wider spectrum of possible consequences of different courses of action will be presented. This is no doubt true, and indeed cost–benefit analysis figures prominently in Principle 15 of the Rio Declaration, cited above. The real question for precautionary scholars such as Stirling and McGarvin, however, is how to make appropriate decisions with a cost–benefit analysis in hand. At this point in his analysis, Sunstein presents something of a black box: regulatory agencies will make decisions informed by cost–benefit analysis, but should be called upon by the executive and by the courts to justify their decisions, again in light of the results of cost–benefit analysis. Sunstein wishes to ensure, on the one hand, that regulations are based on solid scientific data and not uninformed public fears, and on the other hand, that the consequences of regulatory action have been studied and carefully weighed against the benefits. Both of these are laudable goals, and one would hope that in any robust, rigorous decision-making process both would be pursued vigorously. Stirling and McGarvin certainly do not suggest otherwise.

A further difficulty with Sunstein's argument is that he refers to, but fails to address, the very cogent criticism that has been directed at cost–benefit analysis. Lawyers and other scholars who study the precautionary principle will be aware of these criticisms and will wonder how Sunstein proposes to address or avoid the various difficulties encountered in cost–benefit analysis, most notably the valuation of non-monetary costs and benefits. Sunstein notes that the most well-accepted approach involves a willingness-to-pay measurement. However, Sunstein does not even allude to the possibility that different individuals will value the same cost or benefit differently, or to the possibility that they will 'get it wrong,' as it were, by assigning a low value to a keystone species that provides essential ecosystem services. This is a surprising omission, considering Sunstein's prescient comments regarding the inability of individuals accurately to assess the magnitude of various risks.

Proponents of precaution reject a characterization of the principle as calling for decision-making that is hostile to science, but it does provoke a number of questions:

if environmental and public health regulations are not based on scientifically demonstrated risk, what are they based on?

Many scholars of precaution, including a number of the authors surveyed here, have called for a more democratic decision-making process in which members of the public participate. It is argued that lines of communication should not be one-way: while it is important for scientists to educate the public and for legislators to communicate with the public regarding policy options, the public should also be able to provide input to scientists and legislators. Critics of precaution argue that this does not make any sense: if scientists have difficulty grappling with the vast complexities of ecosystems and the impacts of various inputs into those systems, how are members of the public to make sound decisions on such matters?

As Stirling, O'Riordan and others emphasize, the choice does not lie between sound science and fear mongering, between rationality and irrationality. The limitations of the scientific method must be recognized and confronted; legislators must acknowledge the already-existing political aspects of environmental protection measures. By confining environmental protection to an expert discourse, one simply disguises or ignores the need to make political choices about levels of acceptable risk and the nature of trade-offs among priorities.

Larrère, in her contribution to *Le principe de précaution*, comes at the problem from a different direction, namely that of ethics. Larrère takes as her starting-point *Das Prinzip Verantwortung. Versuch einer Ethik für die technologische Zivilisation,* by the German philosopher Hans Jonas. Larrère's focus, like Jonas', is on the way in which environmental degradation forces policy-makers to confront ethical issues. Certain of the themes addressed are, however, of particular relevance to law. The first such theme is complexity; the second, which will be addressed below, is the reversal of the burden of proof. Larrère notes that precaution focuses on the way in which nature is apprehended while science, in its efforts to understand phenomena taking place in nature and through humans' interactions with nature, seeks to reduce complexity and to isolate systems and phenomena, the better to analyse them. The same could, of course, be said of law: one of the dilemmas posed to law by precaution is that the latter reintroduces the complexity that rules such as those dealing with burdens of proof and balances of probability have sought to reduce. Precaution, Larrère argues, compels us to take complexity seriously; to recognize that our actions and decisions take place in a much broader context that cannot be ignored.

As noted above, the need for a democratization of public science has been widely discussed: more difficult to tackle is the question of bringing about this end. O'Riordan, in his contribution entitled 'The Precautionary Principle and Civic Science', devotes the most attention to the project of democratizing science, but his discussion is tantalizingly vague. In addition, a clear distinction between the role of science and that of law-making is lacking. Obviously, these roles overlap in important respects, and one would not want to fall into the trap of arguing that all questions of values, judgments and priorities fall on the policy side, while the scientists reach purely objective, dispassionate conclusions. However, O'Riordan's discussion shifts from science to policy in a way that seems to confound the two.

For example, in the section entitled 'Implications for Science', O'Riordan begins by outlining the way in which scientists approach hypotheses that have not yet been proven, and then moves on to a discussion of the basis on which policy decisions should be made, arguing for an ethical approach under which 'those least able to defend themselves should be protected by greater use of the false negative approach'. At some point in this process, scientists reach conclusions and communicate them to legislators, who then make decisions. However, O'Riordan makes it appear as though the scientists themselves are making the policy decisions. This impression is strengthened further on in the same section, in which O'Riordan argues for the application of the maximin approach, whose aim, he states, 'is to ensure that [the most vulnerable] are no worse off, by means of an explicitly weighted process of social risk evaluation'. O'Riordan does not clarify the link between the maximin approach and the scientific method.

4 The Limits of Precaution

The implications of precaution to which the authors in these four books have drawn attention are certainly profound and wide-reaching: a new relationship between science and policy; new approaches to science, including its democratization; rethinking the relationships among humans, technology and nature; and contemplating technology as an ethical issue, to name a few. In addition, precaution is seen as part of a larger picture: for example, O'Riordan, Cameron and Jordan argue that precaution is a key element of sustainability, whose central insights include the interrelationship between the environment, the economy and society and the placing of the economy within society, which is in turn encompassed within the environment.

This heavily charged programme invites the question whether too much is being expected of the precautionary principle. The attention it has garnered and the hopes being placed on it are immense; furthermore, it is striking that so few of its proponents discuss its weaknesses, limitations and pitfalls. For this reason, Olivier Godard's contribution to *Le principe de précaution* is welcome and refreshing. It includes a rigorous and detailed analysis of the outbreak of bovine spongiform encephalopathy (BSE) in Britain and subsequent regulatory action in Britain and Europe. This discussion is presented against a backdrop of critical analysis of the precautionary principle: Godard argues that various expressions and applications of the principle owe a great deal to input from the general public. This is, apparently, as it should be: as many of the authors in these books have noted, one of the important implications of precaution is that members of the public should participate in regulatory decisions and that their concerns should be heard. However, Godard argues that the best way to incorporate the 'raw ideas' of members of the public into policy and law is through a process of filtration and refinement, carried out by scholars, policy-makers and other experts, the results of which should then be translated into legal concepts and principles. Godard argues that certain precautionary laws and policies seem to have escaped this process of filtration and to have been translated directly into legal concepts, with often unfortunate results.

The BSE outbreak is generally understood as one of the poster children for precaution: a risk, poorly evaluated or underestimated by public scientists and policy-makers, is realized, with disastrous consequences. Had precaution been applied in this case, it is very often argued, British beef cattle would not have received meat products in their feed and the entire catastrophe would have been averted. Godard takes issue with this assessment and, with the aid of three policy documents, one French and two European, he traces the history of the BSE outbreak and seeks to identify the difference that precaution would have made.

Godard is not, to all appearances, a detractor of precaution. His vision of precaution is robust, and bears a striking resemblance to those presented elsewhere in these volumes, with the notable exception of Sunstein. Nevertheless, he places emphasis on the limitations of the precautionary principle and identifies its frontiers. Again and again he emphasizes that the final decision is a political one – a similar conclusion is reached by many precautionary scholars. With this in mind, Godard confronts what he calls the retrospective illusion that he believes affects so many analyses of the BSE crisis. Through a detailed analysis, he seeks to demonstrate that the various decisions that led to changes in the processing of animal feed – the change that is generally regarded as having caused the BSE outbreak – were justifiable and reasonable at the time they were made. With the benefit of hindsight, and only with such benefit, Godard argues, do the implications of these decisions become apparent.

Another crucial element in Godard's analysis, also clearly reflected by Sunstein, is the presentation of the complexity of the cases addressed. Scholars of precaution have an annoying tendency to think in linear terms, even as they are emphasizing the need for plural perspectives and for an appreciation of the complexity of ecosystems. As Godard underlines, the decision-makers in the BSE case were not faced with one risk that they could choose to accept or avoid, but a whole panoply of risks associated with different alternatives, all of which had to be analysed and managed. Furthermore, the risks of not taking precautionary action are not all of an economic nature: Godard argues that the decision to change feed processing methods could be justified at the time based on considerations of environmental protection, energy efficiency, workplace security and production costs. Sunstein's analysis, accompanied by detailed case studies, also alerts the reader to the vast range of variables that regulators must consider when seeking to reduce environmental or health risks. He notes that where regulators take too narrow a view, focusing only on the risk posed by a particular substance or process, the resulting regulation is inefficient and costly to implement, at best, and results in exposure to different, possibly greater risks, at worst.

Godard is sympathetic to those who seek reassurance in the precautionary principle in the face of a long list of environmental and public health catastrophes and the realization that technology is just as much a problem as a solution. He notes: 'When things go wrong, we need to find out who is responsible, or better, identify the guilty parties and impose sanctions.'[5] It seems that law understands melodrama but fails to

[5] Godard, 'Le principe de precaution face au dilemma de la traduction juridique des demandes socials. Leçons de méthode tirées de l'affaire de la vache folle', in *Le principe de precaution,* 29, at 33 (author's translation).

understand tragedy.[6] Precaution will not rid us of tragedies. Fateful decisions that trigger a chain of unforeseen, unintended and thoroughly undesirable events will continue to be made, and when their consequences become apparent, we will often find that there is no villain, but rather a group of decision-makers who did the best they could with the limited knowledge at their disposal.

As noted above, discussions of the weaknesses and limitations of the precautionary principle make an important contribution to our understanding of the principle, and Sunstein's book certainly provides a critical appraisal. However, because Sunstein concerns himself mostly with cases in which the risks are relatively well known and well understood, rather than cases of uncertainty, this book does not address directly the issue of precaution, which receives comment on only a few occasions. Nevertheless, because Sunstein is concerned with public apprehension of risk and regulatory and judicial decisions regarding the control and reduction of such risks, his arguments are of direct relevance to precautionary scholarship.

Sunstein, unlike Godard, is not particularly sympathetic to the precautionary principle, which seems to manifest itself in a lack of interest. There is certainly a good deal of hyperbole in precautionary literature: the principle is said to reverse the burden of proof and to compel regulators to ban substances and processes when they may pose risks. As a result, members of the public may be forgiven for believing that precaution aims at eliminating risk – an impossible task – and that it will lead to regulatory, industrial, economic and societal paralysis. Unfortunately, this is the version of the precautionary principle with which Sunstein chooses to take issue. As with his discussion of scientific versus popular decision-making, Sunstein presents an extreme and unreasonable version of the argument he wishes to contradict, and then proceeds to defeat it. However, the precautionary principle is left standing at the end of the analysis, because it has not been squarely addressed.

Sunstein summarizes the precautionary principle as follows: 'Avoid steps that will create a risk of harm. Until safety is established, be cautious.'[7] The second sentence comes closer to characterizing precaution than the first, but neither is a particularly accurate or comprehensive representation, and they do not square with the versions of precaution found in various international conventions and declarations which he then goes on to cite. He raises two major objections to precaution: first, that we would become impoverished while trying to reduce or eliminate all sources of risk; and second, that in seeking to eliminate one source of risk we would create others. He concludes that precaution 'bans every imaginable step, including inaction itself'.[8] However, he goes on to argue that if precaution could be understood as calling for a kind of insurance in the form of regulation against catastrophic but remote risks, it would make sense.

This extreme form of precaution is not found in serious scholarly literature on the topic, at least not in works that give precaution any kind of sustained attention. The version that Sunstein agrees may be acceptable is much closer to that on which precautionary

[6] I am grateful to Desmond Manderson for this observation.

[7] *Risk and Reason*, at 102.

[8] *Ibid.*, at 104.

scholars agree. Sunstein is right to argue that an extreme form of precaution should be avoided, but this tells us little about the principle and either its strengths or its weaknesses.

5 The Doctrinal Implications of Precaution

Rivers of ink have been spilt over the precautionary principle, and lawyers are responsible for more than a few tributaries. However, much of this writing fails to sink its teeth into the implications of the principle for legal systems. This is particularly true of North American scholarship on the principle, and most emphatically the case with international scholarship, recent work on precaution in international trade law constituting an important exception. For this reason, the doctrinal contributions to *Le principe de précaution* are particularly welcome.

Part of the difficulty that jurists have with the precautionary principle is that they seek to interpret it as a rule, identifying the obligations that it imposes on various actors and the ways in which these obligations would be enforced. However, in any legal system, principles function differently than rules.[9] Their main function is not to impose obligations directly, although it is possible for them to do so. Instead, they guide processes of interpretation and application, as well as processes of norm formation. When authors seek to identify with precision the obligations that precaution imposes and the criteria that operate as triggering conditions for the principle, they generally end up making vague statements about what the principle accomplishes in these respects; alternatively, they conclude that the content of the principle needs to be further developed and clarified before it can acquire the status of a legally binding norm.

Boisson de Chazournes begins her analysis of precaution by taking its flexibility seriously. She seeks to define its juridical content with the aid of a series of criteria, namely damage, uncertainty, risk and the capacity to impose measures. In each case, she notes the impossibility of determining, in the abstract, how these various criteria will function in a given context. Boisson de Chazournes describes precaution, accurately, I believe, as a meta-juridical principle which provides a conduit between legal and non-legal forms of normativity. More specifically, she argues that precaution permits the incorporation into law of certain emerging values concerning our rapport with nature. She also describes precaution as a point of convergence of a range of principles and legal techniques, including intergenerational equity and public participation in decision-making. One could argue that these roles are essential to all legal principles and even of rules, but it may be that they are more apparent and explicit in the case of the precautionary principle.

A recurring theme in Boisson de Chazourne's analysis is the in-between nature of precaution: for example, she places it between obligations of means and obligations of result. Her justification for characterizing precaution as an obligation of means is based on a tendency in international environmental instruments to attenuate obligations that may flow from precaution by acknowledging that not all states have the means to

[9] R. Dworkin, *The Philosophy of Law* (1977), Ch. 2; F. Kratochwil, *Rules, Norms, and Decisions: On the Conditions of Practical and Legal Reasoning in International Relations and Domestic Affairs* (1989), at 193–194.

take extensive environmental protection measures, and on the reference, implicit or explicit, to cost-benefit analysis as a means of making precautionary decisions. With respect to characterization as an obligation of result, Boisson de Chazournes notes that in certain conventions an obligation of result is imposed to prevent potential forms of environmental damage, and that the burden of proof is reversed.

Regarding the inclusion of obligations of result in environmental conventions, Boisson de Chazournes does not refer to any conventions or other sources of law in which an absolute obligation to prevent environmental damage is expressed; it is doubtful that such an obligation exists or, if it does, that it could be meaningfully applied. Godard, for his part, emphasizes that precaution does not impose an obligation of result: the fact that precautionary action is taken will not prevent harm in every circumstance, and the manifestation of harm will not necessarily result in the liability of public officials. He also stresses the fact that precaution does not reduce the range of choices to a binary go/no go formula: rather, it calls for the identification of a spectrum of possible actions.

Seeking to categorize the principle as one of means or result is not, in my view, a useful exercise. It bears highlighting once more that the principle does not impose any positive obligations, although precautionary rules adopted in specific regulatory contexts may do so. The principle does not compel actors to take certain measures, nor legislators to impose obligations to take such measures; rather, it compels legislators to take certain factors into consideration, to be cognizant of certain values, to strive to meet certain objectives. Characterizing the principle as imposing obligations of means or result tends to push it in the direction of a binary structure: either the obligation to take measures exists or it does not. Boisson de Chazournes is much closer to the mark when she discusses the way in which the principle influences interpretations of other rules and principles, and in her observations of the principle's function as conduit between legal and non-legal norms and values.

As noted above, Boisson de Chazournes raises the vexed issue of the reversal of the burden of proof. It is true that a small number of conventions do reverse the burden of proof, but Boisson de Chazournes does not emphasize the highly exceptional nature of such provisions. I agree wholeheartedly with Julien Cazala when he states that the reversal of the burden of proof, 'abusively associated with the principle of precaution, is more sensational than representative of reality'.[10] Since precaution is not directed uniquely at the goal of environmental protection, but is part of the larger programme of sustainable development, Cazala argues that to compel proponents of activities to prove their environmental innocuousness would be counterproductive.[11]

[10] Cazala, 'Principe de précaution et procédure devant le juge international', in *Le principe de précaution*, 151, at 167 (author's translation).

[11] O'Riordan, 'The Precautionary Principle and Civic Science', in *Reinterpreting*, at 95, Cameron, 'The Precautionary Principle in International Law', in *ibid.*, at 113, and Jordan, 'The Precautionary Principle in the European Union', in *ibid.*, at 143, agree; they emphasize the relationship between precaution and sustainability. Similarly, Laurence Boisson de Chazournes notes in 'Le principe de precaution: nature, contenu et limite', in *Le principe de précaution*, at 65, that the principle offers a point of connection to other principles, although she does not mention sustainable development specifically.

The question is also taken up by Larrère in her discussion of responsibility. Jonas is interested in ethical responsibility, while Larrère focuses on the implications of Jonas' ethics for policy-making and, to a lesser extent, for law. Larrère places emphasis on the fact that the environmental crisis can be attributed, in large measure, to unintended and in some cases unforeseen consequences, whereas ethical and legal conceptions of responsibility generally treat foreseeability as a condition of responsibility. The precautionary principle is widely understood as accomplishing such a reversal, obligating proponents of new technologies to demonstrate that they are innocuous. Larrère correctly notes that since it is impossible to prove the absence of risk, an obligation to prove innocuousness would be an insurmountable burden and would make it impossible to act in myriad cases.

As is so often the case, the implications of precaution for law are difficult to discern, while the implications for policy are much easier to bring into focus. Having dismissed the notion that precaution reverses the burden of proof, Larrère's claims about what it does accomplish are located not in law but in the realm of decision-making and policy. She argues that the reversal of the burden of proof should result in a new approach to the notion of responsibility, as well as a new approach to making regulatory decisions: rather than permit proponents of technology to proceed, and to hold them responsible for damage caused by that technology after the fact, proponents are required, under precaution, to render an account to decision-makers and stakeholders: to argue that the benefits of the new technology outweigh its disadvantages. Larrère underlines that she is not speaking of a cost–benefit analysis, but rather of 'a political debate on the aims of these innovations'.

If one seeks to grasp the doctrinal implications of precaution, a very interesting approach is to descend from the level of general observations on the principle's content and function and to consider its impact on particular rules and regimes. For example, Julien Cazala discusses the influence of precaution on procedure in international tribunals;[12] and Gabrielle Marceau[13] and James Cameron[14] on precaution and international trade law. The decisions of WTO panels in the *Beef Hormones* and *Agricultural Products* cases have been subjected to numerous analyses, and any author taking up this issue today must struggle to come up with a new angle or some fresh insights into the issue of precaution and trade law. Marceau does not exactly break new ground with her contribution, but it is a rigorous and systematic analysis which reaches beyond *Hormones* and the SPS Agreement to take into consideration the obligation of WTO dispute resolution panels to apply general principles of international law as well as other WTO cases that have an indirect bearing on the interpretation of trade rules in light of precaution.

Cazala's contribution is doctrinal and quite modest in scope, but perhaps for precisely these reasons it presents some interesting observations on the implications of

[12] Cazala, *supra* note 10, passim.

[13] Marceau, 'Le principe de précaution et les règles de l'Organisation mondiale du commerce (OMC), in *Le principe de précaution*, *passim*.

[14] Cameron, *supra* note 12, *passim*.

precaution. After all, the main contribution of precaution is generally recognized to be procedural, although authors generally have in mind policy-making procedures rather than judicial ones. He works outwards from certain hints dropped by international judges to speculate on the influence that precaution could have on questions of proof, provisional measures and prescription.

6 Concluding Comments

Does the precautionary principle merit all the scholarly attention that it has received? The answer is yes, and the volumes reviewed here help us to understand the importance and scope of influence of the principle. However, with the field of precautionary research being exceedingly crowded, scholars are well advised to consider carefully how they can make a contribution to the field.

It is surprisingly difficult for jurists studying precaution to identify promising research agendas. The principle's implications for policy have been much discussed, but its relevance to law is much more difficult to pin down. To date, much international legal scholarship on precaution has been concerned with seeking to determine whether it is a customary norm; tracking the adoption of precautionary language in international, regional and domestic law and policy; and seeking to clarify the content and conditions for the application of precaution. Of course, each of these activities advances precautionary scholarship, but each has been the object of so much scholarly attention over the last decade or so that it seems high time to seek to identify new directions for precautionary research.

Interdisciplinary work on precaution holds out a good deal of promise. Jurists have much to learn from their colleagues in political science, philosophy, economics and the natural sciences. Collections such as *Reinterpreting* and *Le principe de précaution* are certainly valuable in this respect, but even more valuable is collaboration across disciplines to develop and pursue research agendas. *Le principe de précaution* is the result of a day-long workshop during which the participants were able to confront and challenge one another, but more sustained forms of interdisciplinary collaboration would draw this process out and give scholars greater opportunities to see precaution from different points of view. Collaboration between the social and the natural sciences, in particular, is called for.

Turning to the question of a *legal* research agenda, much might be gained simply by shifting the focus of attention. To date, legal scholars have been concerned with the principle itself, asking how its content could be fleshed out to make more explicit the obligations that it imposes. It might be fruitful to turn the question around by asking what happens to law when it is confronted with precaution. I have already referred to the possibility of taking such an approach to the eternal question of precaution as customary law, by using the principle as a jumping-off point for an exploration of the modes of formation of customary law. Some of the authors considered here indicate further steps that might be taken in such a direction, including Cazala in his focused doctrinal analysis and Boisson de Chazournes with her more broad-ranging and conceptual treatment of the confrontation between precaution and law.

Precaution certainly poses challenges to law on a number of levels. Law seeks to impose boundaries; to bring certainty and clarity to situations that are ambiguous, confused and in flux; to assess responsibility for events and actions that occurred in the past, and to allow people to project themselves into an uncertain future and to impose certain limits on the limitless chains of events unleashed by human action. Precaution seems destined to defeat these attempts with its fluidity and flexibility, the amorphous nature of the boundaries that are meant to identify and constrain the scope of its application, and with its injunction to keep changing the rules of the game as new knowledge and understandings are accumulated. However, a careful analysis of the interrelationship between law and precaution would provide a basis on which to question these characterizations of the differences between the two, and in particular to explore the fluidity, amorphousness and uncertainty that are, of necessity, at the core of law.