Is the Precautionary Principle a Sound Basis for International Policy?

YES: Paul L. Stein, from “Are Decision-Makers Too Cautious With the Precautionary Principle?” Paper Delivered at the Land and Environment Court of New South Wales Annual Conference (October 14 & 15, 1999)


ISSUE SUMMARY

YES: Paul L. Stein, a justice of the New South Wales Court of Appeals, argues that the precautionary principle is now a cornerstone of international environmental law and that the courts have a duty to implement the principle even beyond the requirements of legislation.

NO. Henry I. Miller, a research fellow at Stanford University’s Hoover Institution, and policy analyst Gregory Conko argue that the precautionary principle leads “regulators to abandon the careful balancing of risks and benefits,” blocks progress, limits the freedom of scientific researchers, and restricts consumer choice.

The traditional approach to environmental problems has been reactive. That is, first the problem becomes apparent - life or people sicken and die, or drinking water or air tastes foul. Then researchers seek the cause of the problem, and regulators seek to eliminate or reduce that cause. The burden is on society to demonstrate that harm is being done and that a particular cause is to blame.

An alternative approach is to presume that all human activities - construction projects, new chemicals, new technologies, etc. - have the potential to cause environmental harm. Therefore, those responsible for these activities should prove in advance that they will not do harm and should take suitable steps to prevent any harm from happening. This “precautionary principle” has played an increasingly important part in environmental law ever since it first appeared in Germany in the mid-1960s. On the international scene, it has been applied to climate change, hazardous waste management, ozone depletion, biodiversity, and fisheries management. In 1992 the Rio Declaration on Environment and Development, listing it as Principle 15, codified it thus:

In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. When 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.

Other versions of the principle also exist, but all agree that when there is reason to think - not absolute proof - that some human activity is or might be harming the environment, precautions should be taken. This has come to be broadly accepted as a basic tenet of ecologically or environmentally sustainable development.

The precautionary principle also contributes to thinking in the areas of risk assessment and risk management in general. Human activities - the manufacture of chemicals and other products; the use of pesticides, drugs, and fossil fuels; the construction of airports and shopping malls; and even agriculture - can damage health and the environment. Some people insist that action need not be taken against any particular activity until and unless there is solid, scientific proof that it is doing harm, and even then risks must be weighed against each other. See, for instance, Wendy Cleland-Hamnett, “The Role of Comparative Risk Analysis,” EPA Journal (January-March 1993). Others insist that mere suspicion should be grounds enough for action and that there is a broad middle ground. For instance, Robert Costanza and Laura Cornwell, in “The Approach to Dealing With Scientific Uncertainty,” Environment (November 1992), argue that when uncertainty about potential harm is high, those who are potentially responsible should be required to post in advance a bond sufficient to cover the costs associated with the worst possible results.

Since solid, scientific proof can be very difficult to obtain, the question of just how much proof is needed to justify action is vital. Not surprisingly, if action threatens an industry, that industry’s advocates will argue against taking precautions, generally saying that more proof is needed. A good example can be found in Stuart Pape, “Watch Out for the Precautionary Principle,” Prepared Foods (October 1999): “In recent months, U.S. food manufacturers have experienced a rude introduction to the ‘Precautionary Principle.’... European regulators have begun to adopt extreme definitions of the Principle in order to protect domestic industries and place severe restrictions on the use of both old and new materials without justifying their action upon sound science.”

In the following selection, Paul L. Stein argues that the precautionary principle is now a cornerstone of international environmental law and that the question is no longer whether to implement the principle but how. He maintains that the courts must not shirk their responsibility to apply it, even when legislation is vague. In the second selection, Henry I. Miller and Gregory Conko argue that the precautionary principle blocks progress, limits the freedom of scientific researchers, and restricts consumer choice.
Are Decision-Makers Too Cautious With the Precautionary Principle?

Precaution, (1603) a measure taken beforehand to ward off an evil.
—Shorter Oxford English Dictionary

Overview

Over the last decade the principles of ecologically sustainable development (ESD) have permeated inexorably into the interstices of environmental law. Many of the principles, particularly the precautionary principle, have become part and parcel of international, national and domestic laws and custom.

The core principles of ESD have come into regular use by decision-makers at a federal, state and local government level. This is partly because of governmental policies and practices and in part because of statute law, the highest form of expression of government policy. The legislation of all nine governments in Australia contain numerous references to ESD and its core principles. There are more Acts which include ESD in New South Wales [NSW] than anywhere else in Australia. Most important for our purposes are those now contained in the objects of the Environmental Planning and Assessment Act 1979 and the Protection of the Environment Administration Act 1991, as well as the new federal environmental legislation.

What may be noted, however, is that the inclusion of the principles in Australian legislation has been largely confined to objectives of statutes or agencies without any real guidance to decision-makers as to whether and how to apply the core principles or what weight to give them. Moreover, some of the principles contain vague statements, some might call them aspirations, as well as ambiguities, inconsistencies and uncertainties. Difficulties of interpretation and application are manifest. There is even discussion on whether the principles are merely guiding or whether they are also operational. In these circumstances, who can blame the courts for proceeding, like the precautionary principle, with a degree of caution. Nonetheless, my thesis is that there is the opportunity, if not the obligation, in the absence of clear legislative guidance, to apply the common law and assist in the development and fleshing out of the principles.

Our task is to turn soft law into hard law. This is an opportunity to be bold spirits rather than timorous souls and provide a lead for the common law world. It will make a contribution to the ongoing development of environmental law.

Introduction

The Origins of the Precautionary Principle

The origin of the precautionary principle lies in the German concept of Vorsorgeprinzip, literally translated as meaning the 'foresight principle' or 'precautionary principle'. The principle first appeared in the mid 1960's when environmental issues were becoming a major political theme in Germany. At around the same time the hypothesis of 'implementation shortfalls' emerged. The hypothesis identified that there existed a clear discrepancy between legal provisions and the goals of environmental policy, on the one hand, and its practical application on the other. The precautionary principle was originally used as a yardstick by which to judge political decisions. By the early 1970's the principle could be found in domestic West German legislation in respect of environmental policies aimed at combating the problems of global warming, acid rain and maritime pollution.

The precautionary principle has played an instrumental role in the policy reform of marine pollution. Despite regulation of both land based pollution and ocean dumping by regional bodies, the quality of the North Sea was seen to be continuing to decline. The German government, when calling the first North Sea meeting in 1984, had as a negotiating aim, the inclusion of the precautionary principle, Vorsorgeprinzip.

The earliest international agreement which explicitly refers to the precautionary principle is the Ministerial Declaration of the Second International Conference on the Protection of the North Sea, issued in London in November 1987. It was accepted that:

...in order to protect the North Sea from possibly damaging effects of the most dangerous substances, a precautionary approach is necessary which may require action to control inputs of such substances even before a causal link has been established by absolutely clear scientific evidence.

The precautionary principle has since been widely used in international environmental law and has been applied to areas such as climate change, hazardous waste and ozone layer depletion, biodiversity, fisheries management and general environmental management. Many treaties, some of which are extracted below, illustrate the various circumstances in which the precautionary principle has been utilised.

Principle 15 states:

In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. 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.

The revision to the Treaty of Rome as agreed at Maastricht states:

The Community policy on the environment shall be based on the precautionary principle and on the principle that preventative action should be taken, that environmental damage should as a priority be rectified at source and that the polluter should pay. Environmental protection requirements must be integrated into the definition and implementation of other Community policies. [emphasis added]

Article 3.3 of the 1992 U.N. Framework Convention on Climate Change states:

The parties should take precautionary measures to anticipate, prevent or minimise the causes of climate change and mitigate its adverse effects. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures, taking into account that policies and measures to deal with climate change should be cost-effective so as to ensure global benefits at the lowest possible cost.

Agenda 21, agreed to at the 1992 Rio conference, recommends in relation to radioactive waste that States should not:

...promote or allow the storage or disposal of high-level, intermediate level and low-level radioactive waste near the marine environment unless they determine that scientific evidence, consistent with the internationally agreed principles and guidelines, shows that such storage or disposal poses no unacceptable risk to people and the marine environment or does not interfere with other legitimate uses of the sea, making, in the process of consideration, appropriate use of the concept of the precautionary approach.

Agenda 21 on the Oceans expressly requires:

new approaches to marine and coastal area management and development at the national, subregional, regional and global levels, approaches that are integrated in content and are precautionary and anticipatory in ambit.

The June 1990 Amendments to the Montreal Protocol on Substances that Deplete the Ozone Layer states:

[The Parties to this Protocol are] determined to protect the ozone layer by taking precautionary measures to control equitably total global emissions of substances that deplete it, with the ultimate objective of their elimination on the basis of developments in scientific knowledge, taking into account technical and economic considerations and bearing in mind the developmental needs of developing countries.

The 1992 OSPAR Convention (Convention for the Protection of the Marine Environment of the North East Atlantic) provides in Article 2 that Contracting Parties shall apply:

...the precautionary principle, by virtue of which preventative measures are to be taken when there are reasonable grounds for concern that substances or energy introduced, directly or indirectly, into the marine environment may bring about hazards to human health, harm living resources and marine ecosystems, damage amenities or interfere with other legitimate uses of the sea, even when there is no conclusive evidence of a causal relationship between the inputs and effects.

The Convention on Biological Diversity signed at the United Nations Conference on Environment and Development in 1992 notes in its preamble:

...that where there is a threat of significant reduction or loss of biological diversity, lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimise such a threat.

These are but a few of the international instruments which have incorporated the precautionary principle. Australia has ratified almost all of these environmental treaties and conventions which are relevant to our part of the world.

Defining the Precautionary Principle

The Intergovernmental Agreement on the Environment (the IGAE) endorses the precautionary principle in the following terms:

Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:

(i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment; and

(ii) an assessment of the risk-weighted consequences of various options. [emphasis added]

Defining the application of the precautionary principle with any degree of precision has proved problematic because of the rapidly evolving nature of the concept. While the precautionary principle has proved to be useful in reformulating the way in which the law structures decision-making processes, 'ambiguity in the conceptualisation of the precautionary principle at the policy level has led to it being given a wide range of divergent meanings, providing a fundamental barrier to attempts at implementation'.

The precautionary principle has been described as a decision-making approach which ensures that a substance or activity posing a threat to the environment is prevented from adversely affecting the environment, even if there is no conclusive scientific proof linking that particular substance or activity to environmental damage. Briefly stated, the precautionary principle, both in its conceptual core and its practical implications, is preventative. The principle...
The Precautionary Principle and Ecologically Sustainable Development

The precautionary principle needs to be considered in the broader context of the wider principles and philosophies forming the concept of ecologically sustainable development (ESD). It is accepted that ESD should be treated as a complete package where no one principle should dominate over any other. This requires that the precautionary principle be applied with consideration of other principles forming part of ESD.

The modern manifestation of ESD stems from the 1987 report of the World Commission on Environment and Development (The Brundtland Report) where development was defined as sustainable:

...if it meets the needs of the present without compromising the ability of future generations to meet their own needs.

The idea is premised on the integration of economic and environmental processes in decision-making. In 1992, the IGAE committed all nine Australian governments to the concept, as well as local government. ESD has since been incorporated into almost all Australian environmental legislation as an appropriate objective for environmental agencies and decision-makers. Often core principles are extracted for particular emphasis and utilisation, especially the precautionary principle...

In essence, ESD is development which aims to conserve and effectively manage the environment for the benefit of future generations. In 1990 the Commonwealth Government suggested the following definition for ESD:

...using, conserving and enhancing the community’s resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased.

Two features are characteristic of an ESD approach. First, decision-makers need to consider the economic, social and environmental implications of actions for the local and international community and biosphere. Second, in reaching decisions, decision-makers must adopt a long-term rather than short-term view. In this sense, the precautionary principle ensures a better integration of environmental considerations in decision-making...

ESD represents a delicate balancing of the often competing interests of development and environmental protection. Application of the precautionary principle is considered appropriate in circumstances where a proposed activity carries with it a risk of potentially serious environmental damage which may threaten the interests of present and future generations. Properly evaluating risks is likely to be aided by the guiding principles and indicators of sustainability.

Legislation Incorporating ESD and the Precautionary Principle

...[A]n astounding number of federal, state and territory statutes have expressly referred to or incorporated ESD principles. However, an analysis of the legislation reveals that much of it adopts ESD in general terms without necessarily assigning a specific role to the principles. The following examples of centrally relevant environmental legislation are indicative of the lack of consistency in the approach to inclusion of ESD principles within Acts of Parliament. It will be readily appreciated that ESD is often included among the objects of an Act without further reference, whereas some legislation requires all decisions or specific decisions to take into consideration core principles or to have regard to principles of ESD. It will be seen that no statute gives any precise guidance as to the weight to be given to the principles, nor their particular role in the balancing of considerations in arriving at a decision...

International Cases

In the Danish Bees case the European Court of Justice indirectly applied the precautionary principle to justify a measure having equivalent effect to a quantitative restriction in EC [European Community] law. The case involved a decision made by the Danish Minister for Agriculture which prohibited the keeping of bees on the island of Laeso and certain neighbouring islands other than those of the sub-species, *Apis Mellifera Mellifera* (the Laeso Brown Bee).

The issue before the Court was whether the keeping on the islands of any species of bee other than the sub-species, *Apis Mellifera Mellifera* constituted a measure having equivalent effect to a quantitative restriction within the meaning of Article 30 of the European Community Treaty (the EC Treaty) and whether, if that were the case, such legislation was justified on the ground of the protection and health and life of animals. The Danish Government maintained that the establishment of pure breeding areas for the sub-species, in a particular area within a Members’ State, did not affect trade between Member States. It was contended that this did not constitute discrimination in respect of bees originating in other Member States and was not intended to regulate trade between Member States. Further, the effects on trade flowing from the Minister’s prohibition were too hypothetical and uncertain to be regarded as a measure likely to obstruct it.

Notwithstanding the lack of conclusive scientific evidence establishing both the nature of the sub-species and its risk of extinction, the Court concluded that the decision made by the Minister constituted a measure having an effect equivalent to a quantitative restriction within the meaning of Article 30 of the EC Treaty and that the prohibition was also justified under Article 36 of the Treaty:

...measures to preserve an indigenous animal population with distinct characteristics contribute to the maintenance of biodiversity by ensuring the survival of the population concerned. By so doing, they are aimed at
The legislation was also justified under the Biodiversity Convention ratified by the EC. In so holding, the Court took a precautionary approach to the preservation of indigenous animal populations and the conservation of biodiversity.

In *AP Pollution Control Board v Nayudu*, the Supreme Court of India was considering a petition claiming that certain hazardous industries proposed to be established by the respondents without the necessary certificate from the State Pollution Control Board could not proceed. M. Jagannadha Rao, J discussed the difficulties faced by environmental courts globally in dealing with scientific data. He cited articles by Lord Woolf and Carnworth on the desirability of a specialist environmental court. In particular, his Honour discussed the status and application of the precautionary principle citing Barton and other articles.

His Honour said,

The ‘uncertainty’ of scientific proof and its changing frontiers from time to time has led to great changes in environment concepts during the period between the Stockholm Conference of 1972 and the Rio Conference of 1992. In *Vellore Citizens’ Welfare Forum v Union of India* and others, 1995 (5) SCC 647, a three Judge Bench of this Court referred to these changes, to the ‘precautionary principle’ and the new concept of ‘burden of proof’ in environmental matters. Kuldeep Singh, J after referring to the principles evolved in various international conferences and to the concept of ‘Sustainable Development’, stated that the Precautionary Principle, the Polluter-Pays Principle and the special concept of Onus of Proof have now emerged and govern the law in our country too, as is clear from Articles 47, 48-A and 51-A(g) of our Constitution and that, in fact, in the various environmental statutes, such as the *Water Act*, 1974 and other statutes, including *The Environment (Protection) Act* 1986, these concepts are already implied. The learned Judge declared that these principles have now become part of our law.

The relevant observations in the Vellore Case in this behalf read as follows:

> In view of the above-mentioned constitutional and statutory provisions we have no hesitation in holding that the Precautionary Principle and the Polluter-Pays Principle are part of the environmental law of this country.

The Supreme Court discussed the development of the precautionary principle in replacing the Assimilative Capacity Principle adopted at an earlier point of time.

Rao J stated

The principle of precaution involves the anticipation of environmental harm and taking measures to avoid it or to choose the least environmentally harmful activity. It is based on scientific uncertainty. Environmental protection should not only aim at protecting health, property and economic interest but also protect the environment for its own sake. Precautionary duties must not only be triggered by the suspicion of concrete danger but also by (justified) concern or risk potential. The precautionary principle was recommended by the UNEP [United Nations Environment Program] Governing Council (1989). The Bonnako Convention also lowered the threshold at which scientific evidence might require action by not referring to ‘serious’ or ‘irreversible’ as adjectives qualifying harm. However, summing up the legal status of the precautionary principle, one commentator characterised the principle as still ‘evolving’ for though it is accepted as part of the international customary law, ‘the consequences of its application in any potential situation will be influenced by the circumstances of each case’.

The Court also discussed the issue of burden of proof in cases involving the application of the precautionary principle:

> ...Therefore, it is necessary that the party attempting to preserve the status quo by maintaining a less-polluted state should not carry the burden of proof and the party who wants to alter it, must bear this burden. (See James M. Olson, *Shifting the Burden of Proof*, 20 Envtl. Law p.891 at 898 (1990)). (Quoted in Vol 22 (1998) Harv. Env. Law Review p. 509 at 519, 550).

The precautionary principle suggested that where there is an identifiable risk of serious or irreversible harm, including, for example, extinction of species, widespread toxic pollution in major threats to essential ecological processes, it may be appropriate to place the burden of proof on the person or entity proposing the activity that is potentially harmful to the environment.

The case of *Ashburton Acclimatisation Society v Federated Farmers of New Zealand Inc* was determined well before *ESS* principles became included in legislation. It is referred to by Burton and picked up by the Supreme Court of India in *Nayudu*. It involved an appeal, referring back to the Planning Tribunal for consideration, its report for a national water conservation order affecting the Raikaia River. The contest was between conservationists, who wished the flow and characteristics of the river to be conserved, and farmers who wished to use the water from the river for irrigation. It was submitted that if implemented the report would unduly prejudice the rights and expectation of the Farmers Federation.

At the heart of the appeal was the ground that the Tribunal had misconstrued the Act by placing undue emphasis upon protection of outstanding features of the river and by failing to pay sufficient regard to the competing need of out of stream users, in particular the needs of primary industry and the community. The Tribunal had regarded the sustainability of the amenity afforded by the waters in their natural state as being the overriding consideration under the *Water and Soil Conservation Act* 1967 (NZ).

The Court of Appeal held that the *Water and Soil Conservation Act*, as amended, placed emphasis on conservation of natural waters. Once it was determined that the amenity afforded by the waters in their natural state should be recognised and sustained, primary was to be accorded to that object and it should not be defeated by striving to achieve a balance for other uses of water. The needs of primary industry were to be given weight in considering an application for a conservation order, but this was to be done bearing in mind that the primary object of the Act was the conservation of waters in their natural state.
The case is a good illustration of a court adopting a precautionary approach given the scope, purpose and subject matter of the legislation.

The New Zealand High Court case of Greenpeace New Zealand Inc v Minister for Fisheries involved a total allowable commercial catch (TACC) for orange roughy set by the Minister of Fisheries. Greenpeace applied for judicial review of the decision on the basis that the orange roughy fishery was depleted and that overfishing had endangered its survival. The New Zealand Fishing Industry Association and others argued that:

...the research into the fishery has not yet been sufficient to establish that the concerns of the applicant or the Ministry scientists are justified and sees 'an excessive reduction as being not only unjustified, but as imposing serious and unnecessary losses on the industry.

Greenpeace argued that, in considering the TACC, the Minister was required to apply the precautionary approach. Counsel drew attention to a statement of the Minister referring to decisions of the kind under consideration, when he had said:

It must be a fundamental starting point that management decisions are based on the best data and science available and, in the absence of adequate data, upon the appropriate application of precautionary approaches to management.

After referring to the decision in Leatch, Gellen J recognised that the precautionary approach would also apply in New Zealand. His Honour noted that in the case under consideration, there was no statutory obligation for the precautionary approach to be adopted under the Fisheries Act 1983, but the statute reflected international obligations accepted by New Zealand and that 'there is that context at least a movement towards the view that in questions of such moment, a degree of caution is appropriate'. His Honour went on to say that:

The fact that a dispute exists as to the basic material upon which the decision must rest, does not mean that necessarily the most conservative approach must be adopted. The obligation is to consider the material and decide upon the weight which can be given it with such care as the situation requires... At the same time I note, as counsel did, that in the end this is a weighing and not a decisive factor.

It was held that the precautionary approach must be applied by the Minister in formulating a TACC

In assessing the information upon which a decision must be based, the precautionary principle ought to be applied so that where uncertainty or ignorance exists, decision-makers should be cautious

As noted by Mascher, the Court's finding signals an important landmark in New Zealand environmental law, with implications for fisheries law worldwide, as well as environmental law in general...

Of particular importance to the development of ESD and the precautionary principle is the Case Concerning the Gabčíkovo-Nagymánszky Project (Hungary v Slovakia) in the International Court of Justice, otherwise known as the Danube Dam case. The Separate Opinion of Judge Weeramantry, Vice President of the [ICJ [International Court of Justice], is of signal importance, if not inspirational. While his Honour espoused the principle in commendable detail, the main Opinion has come under attack by some commentators as not taking the many opportunities presenting themselves (at different points of time) to apply the principle, describing the Opinion as a missed opportunity. The Vice President, however, referred to the duty on States to carry out 'continuing environmental impact assessment' because of the potential for significant impact on the environment and that this was 'a specific application of the larger general principle of caution'...

Some Practical Examples of the Application of the Precautionary Principle

The application of the precautionary principle is becoming a daily occurrence for decision-makers, especially local government, given the requirements of the Local Government Act and an increasing number of local environmental plans incorporating ESD. Central Agencies are also having to consider the relevance of the principle in their decisions and recommendations. Both Commonwealth and NSW Commissioners of Inquiry have considered and applied the precautionary principle in their reports. The NSW Minister for Planning utilised the precautionary principle in refusing the proposed Lake Cowell gold mine in the central west of the state—the application of the precautionary principle means that the unknown risks to this significant environment can only be avoided by refusing this mining proposal'....

The Industry Commission Report of the Inquiry into Ecologically Sustainable Land Management examined ESD and the precautionary principle. Its centrepiece recommendation was the establishment of a statutory duty of care to the environment. The proposed duty would require everyone who influences the management of the risks to the environment to take all reasonable and practical steps to prevent harm to the environment that could have been reasonably foreseen.

Conclusion

[David] Freestone sees the emergence of the precautionary principle as one of the most remarkable developments of the last decade and arguably one of the most significant in the emergence of international environmental law itself. The great preponderance of opinion nowadays is that the principle has become part of international customary law.

How the rhetoric of the principle can be operationalised is one of the challenges for the first decade of the 21st Century. However, what is slowly occurring is that the bones of the principle are starting to be fleshed out. It must be remembered that the precautionary principle is not absolute or extreme. It does not prohibit an activity until the science is clear. It does however change the underlying presumption from freedom of exploitation to one of conservation.
One thing is clear—the precautionary principle will not go away. It is here to stay, with or without legislative prescription. Decision-makers and courts (hearing appeals or challenges) will not be able to dodge it or merely pay lip-service to it. Undeniably the courts will be required to review its application and attempt to apply it. In doing so, we will be called upon to evaluate the principle and its place in environmental decision-making. We must not shirk this responsibility.

Environmental and public health activists have clashed with scholars and risk-analysis professionals for decades over the appropriate regulation of various risks, including those from consumer products and manufacturing processes. Underlying the controversies about various specific issues—such as chlorinated water, pesticides, gene-spliced foods, and hormones in beef—has been a fundamental, almost philosophical question: How should regulators, acting as society’s surrogate, approach risk in the absence of certainty about the likelihood or magnitude of potential harm?

Proponents of a more risk-averse approach have advocated a “precautionary principle” to reduce risks and make our lives safer. There is no widely accepted definition of the principle, but in its most common formulation, governments should implement regulatory measures to prevent or restrict actions that raise even conjectural threats of harm to human health or the environment, even though there may be incomplete scientific evidence as to the potential significance of these dangers. Use of the precautionary principle is sometimes represented as “erring on the side of safety,” or “better safe than sorry”—the idea being that the failure to regulate risky activities sufficiently could result in severe harm to human health or the environment, and that “overregulation” causes little or no harm. Brandishing the precautionary principle, environmental groups have prevailed upon governments in recent decades to assail the chemical industry and, more recently, the food industry.

Potential risks should, of course, be taken into consideration before proceeding with any new activity or product, whether it is the siting of a power plant or the introduction of a new drug into the pharmacy. But the precautionary principle focuses solely on the possibility that technologies could pose unique, extreme, or unmanageable risks, even after considerable testing has already been conducted. What is missing from precautionary calculus is an acknowledgment that even when technologies introduce new risks, most confer net benefits—that is, their use reduces many other, often far more serious, hazards. Examples include blood transfusions, MRI scans, and automobile air bags, all of which offer immense benefits and only minimal risk.

Several subjective factors can cloud thinking about risks and influence how nonexperts view them. Studies of risk perception have shown that people
tend to overestimate risks that are unfamiliar, hard to understand, invisible, involuntary, and/or potentially catastrophic—and vice versa. Thus, they overestimate invisible “threats” such as electromagnetic radiation and trace amounts of pesticides in foods, which inspire uncertainty and fear sometimes verging on superstition. Conversely, they tend to underestimate risks the nature of which they consider to be clear and comprehensible, such as using a chainsaw or riding a motorcycle.

These distorted perceptions complicate the regulation of risk, for if democracy must eventually take public opinion into account, good government must also discount heuristic errors or prejudices. Edmund Burke emphasized government’s pivotal role in making such judgments: “Your Representative owes you, not only his industry, but his judgment; and he betrays, instead of serving you, if he sacrifices it to your opinion.” Government leaders should lead; or putting it another way, government officials should make decisions that are rational and in the public interest even if they are unpopular at the time. This is especially true if, as is the case for most federal and state regulators, they are granted what amounts to lifetime job tenure in order to shield them from political manipulation or retaliation. Yet in too many cases, the precautionary principle has led regulators to abandon the careful balancing of risks and benefits—that is, to make decisions, in the name of precaution, that cost real lives due to forgone benefits.

**The Danger of Precaution**

The danger in the precautionary principle is that it distracts consumers and policymakers from known, significant threats to human health and diverts limited public health resources from those genuine and far greater risks. Consider, for example, the environmental movement’s campaign to rid society of chlorinated compounds.

By the late 1980s, environmental activists were attempting to convince water authorities around the world of the possibility that carcinogenic byproducts from chlorination of drinking water posed a potential cancer risk. Peruvian officials, caught in a budget crisis, used this supposed threat to public health as a justification to stop chlorinating much of the country’s drinking water. That decision contributed to the acceleration and spread of Latin America’s 1991–96 cholera epidemic, which afflicted more than 1.3 million people and killed at least 11,000.

Activists have since extended their antichlorine campaign to so-called “endocrine disrupters,” or modulators, asserting that certain primarily man-made chemicals mimic or interfere with human hormones (especially estrogens) in the body and thereby cause a range of abnormalities and diseases related to the endocrine system.

The American Council on Science and Health has explored the endocrine disrupter hypothesis and found that while high doses of certain environmental contaminants produce toxic effects in laboratory test animals—in some cases involving the endocrine system—humans’ actual exposure to these suspected endocrine modulators is many orders of magnitude lower. It is well documented that while a chemical administered at high doses may cause cancer in certain laboratory animals, it does not necessarily cause cancer in humans—both because of different susceptibilities and because humans are subjected to far lower exposures to synthetic environmental chemicals.

No consistent, convincing association has been demonstrated between real-world exposures to synthetic chemicals in the environment and increased cancer in hormonally sensitive human tissues. Moreover, humans are routinely exposed through their diet to many estrogenic substances (substances having an effect similar to that of the human hormone estrogen) found in many plants. Dietary exposures to these plant estrogens, or phytoestrogens, are far greater than exposures to supposed synthetic endocrine modulators, and no adverse health effects have been associated with the overwhelming majority of these dietary exposures.

Furthermore, there is currently a trend toward lower concentrations of many contaminants in air, water, and soil—including several that are suspected of being endocrine disrupters. Some of the key research findings that stimulated the endocrine disrupter hypothesis originally have been retracted or are not reproducible. The available human epidemiological data do not show any consistent, convincing evidence of negative health effects related to industrial chemicals that are suspected of disrupting the endocrine system. In spite of that, activists and many government regulators continue to invoke the need for precautionary (over-) regulation of various products, and even outright bans.

Antichlorine campaigners more recently have turned their attacks to phthalates, liquid organic compounds added to certain plastics to make them softer. These soft plastics are used for important medical devices, particularly fluid containers, blood bags, tubing, and gloves; children’s toys such as teething rings and rattles; and household and industrial items such as wire coating and flooring. Waving the banner of the precautionary principle, activists claim that phthalates might have numerous adverse health effects—even in the face of significant scientific evidence to the contrary. Governments have taken these unsupported claims seriously, and several formal and informal bans have been implemented around the world. As a result, consumers have been denied product choices, and doctors and their patients deprived of life-saving tools.

In addition to the loss of beneficial products, there are more indirect and subtle perils of government overregulation established in the name of the precautionary principle. Money spent on implementing and complying with regulation (justified or not) exerts an “income effect” that reflects the correlation between wealth and health, an issue popularized by the late political scientist Aaron Wildavsky. It is no coincidence, he argued, that richer societies have lower mortality rates than poorer ones. To deprive communities of wealth, therefore, is to enhance their risks.

Wildavsky’s argument is correct: Wealthier individuals are able to purchase better health care, enjoy more nutritious diets, and lead generally less stressful lives. Conversely, the deprivation of income itself has adverse health effects—for example, an increased incidence of stress-related problems including ulcers, hypertension, heart attacks, depression, and suicides.
It is difficult to quantify precisely the relationship between mortality and the deprivation of income, but academic studies suggest, as a conservative estimate, that every $7.25 million of regulatory costs will induce one additional fatality through this “income effect.” The excess costs in the tens of billions of dollars required annually by precautionary regulation for various classes of consumer products would, therefore, be expected to cause thousands of deaths per year. These are the real costs of “erring on the side of safety.” The expression “regulatory overkill” is not merely a figure of speech.

Rationalizing Precaution

During the past few years, skeptics have begun more actively to question the theory and practice of the precautionary principle. In response to those challenges, the European Commission (EC), a prominent advocate of the precautionary principle, last year published a formal communication to clarify and promote the legitimacy of the concept. The EC resolved that, under its auspices, precautionary restrictions would be “proportional to the chosen level of protection,” “nondiscriminatory in their application,” and “consistent with other similar measures.” The commission also avowed that EC decision makers would carefully weigh “potential benefits and costs.” EC Health Commissioner David Byrne, repeating these points [recently] in an article on food and agriculture regulation in European Affairs, asked rhetorically, “How could a Commissioner for Health and Consumer Protection reject or ignore well-founded, independent scientific advice in relation to food safety?”

Byrne should answer his own question: The ongoing dispute between his European Commission and the United States and Canada over restrictions on hormone-treated beef cattle is exactly such a case of rejecting or ignoring well-founded research. The EC argued that the precautionary principle permits restriction of imports of U.S. and Canadian beef from cattle treated with certain growth hormones.

In their rulings, a WTO [World Trade Organization] dispute resolution panel and its appellate board both acknowledged that the general “look before you leap” sense of the precautionary principle could be found within WTO agreements, but that its presence did not relieve the European Commission of its obligation to base policy on the outcome of a scientific risk assessment. And the risk assessment clearly favored the U.S.-Canadian position. A scientific committee assembled by the WTO dispute resolution panel found that even the scientific studies cited by the EC in its own defense did not indicate a safety risk when the hormones in question were used in accordance with accepted animal husbandry practices. Thus, the WTO ruled in favor of the United States and Canada because the European Commission had failed to demonstrate a real or imminent harm. Nevertheless, the EC continues to enforce restrictions on hormone-treated beef, a blatantly unscientific and protectionist policy that belies the commission’s insistence that the precautionary principle will not be abused.

Precaution Meets Biotech

Perhaps the most egregious application by the European Commission of the precautionary principle is in its regulation of the products of the new biotechnology, or gene-splicing. By the early 1990s, many of the countries in Western Europe, as well as the EC itself, had erected strict rules regarding the testing and commercialization of gene-spliced crop plants. In 1999, the European Commission explicitly invoked the precautionary principle in establishing a moratorium on the approval of all new gene-spliced crop varieties, pending approval of an even more strict EU-wide regulation.

Notwithstanding the EC’s promises that the precautionary principle would not be abused, all of the stipulations enumerated by the commission have been flagrantly ignored or tortured in its regulatory approach to gene-spliced (or in their argot, “genetically modified” or “GM”) foods. Rules for gene-spliced plants and microorganisms are inconsistent, discriminatory, and bear no proportionality to risk. In fact, there is arguably inverse proportionality to risk, in that the more crudely crafted organisms of the old days of mutagenesis and gene transfers are subject to less stringent regulation than those organisms more precisely crafted by biotech. This amounts to a violation of a cardinal principle of regulation: that the degree of regulatory scrutiny should be commensurate with risk.

Dozens of scientific bodies—including the U.S. National Academy of Sciences (NAS), the American Medical Association, the UK’s Royal Society, and the World Health Organization—have analyzed the oversight that is appropriate for gene-spliced organisms and arrived at remarkably congruent conclusions: The newer molecular techniques for genetic improvement are an extension, or refinement, of earlier, far less precise ones; adding genes to plants or microorganisms does not make them less safe either to the environment or to eat; the risks associated with gene-spliced organisms are the same in kind as those associated with conventionally modified organisms and unmodified ones; and regulation should be based upon the risk-related characteristics of individual products, regardless of the techniques used in their development.

An authoritative 1989 analysis of the modern gene-splicing techniques published by the NAS’s research arm, the National Research Council, concluded that “the same physical and biological laws govern the response of organisms modified by modern molecular and cellular methods and those produced by classical methods,” but it went on to observe that gene-splicing is more precise, circumscribed, and predictable than other techniques.

[Gene-splicing] methodology makes it possible to Introduce pieces of DNA, consisting of either single or multiple genes, that can be defined in function and even in nucleotide sequence. With classical techniques of gene transfer, a variable number of genes can be transferred, the number depending on the mechanism of transfer, but predicting the precise number or the traits that have been transferred is difficult, and we cannot always predict the characteristics that will result. With organisms modified by molecular methods, we are in a better, if not perfect, position to predict the characteristics.
In other words, gene-splicing technology is a refinement of older, less precise techniques, and its use generates less uncertainty. But for gene-spliced plants, both the fact and degree of regulation are determined by the production methods—that is, if gene-splicing techniques have been used, the plant is immediately subject to extraordinary pre-market testing requirements for human health and environmental safety, regardless of the level of risk posed. Throughout most of the world, gene-spliced crop plants such as insect-resistant corn and cotton are subject to a lengthy and hugely expensive process of mandatory testing before they can be brought to market, while plants with similar properties but developed with older, less precise genetic techniques are exempt from such requirements...

Another striking example of the disproportionate regulatory burden borne only by gene-spliced plants involves a process called induced-mutation breeding, which has been in common use since the 1950s. This technique involves exposing crop plants to ionizing radiation or toxic chemicals to induce random genetic mutations. These treatments most often kill the plants (or seeds) or cause detrimental genetic changes, but on rare occasions, the result is a desirable mutation—for example, one producing a new trait in the plant that is agronomically useful, such as altered height, more seeds, or larger fruit. In these cases, breeders have no real knowledge of the exact nature of the genetic mutation(s) that produced the useful trait, or of what other mutations might have occurred in the plant. Yet the approximately 1,400 mutation-bred plant varieties from a range of different species that have been marketed over the past half century have been subject to no formal regulation before reaching the market—even though several, including two varieties of squash and one of potato, have contained dangerous levels of endogenous toxins and had to be banned afterward.

What does this regulatory inconsistency mean in practice? If a student doing a school biology project takes a packet of “conventional” tomato or pea seed to be irradiated at the local hospital x-ray suite and plants them in his backyard in order to investigate interesting mutants, he need not seek approval from any local, national, or international authority. However, if the seeds have been modified by the addition of one or a few genes via gene-splicing techniques and even if the genetic change is merely to remove a gene—this would-be Mendel faces a mountain of bureaucratic paperwork and expense (to say nothing of the very real possibility of vandalism, since the site of the experiment must be publicized and some opponents of biotech are believers in “direct action”). The same would apply, of course, to professional agricultural scientists in industry and academia. In the United States, Department of Agriculture requirements for paperwork and field trial design make field trials with gene-spliced organisms 10 to 20 times more expensive than the same experiments with virtually identical organisms that have been modified with conventional genetic techniques.

Why are new genetic constructions crafted with these older techniques exempt from regulation, from the dirt to the dinner plate? Why don’t regulatory regimes require that new genetic variants made with older techniques be evaluated for increased weediness or invasiveness, or for new allergens that could show up in food? The answer is based on millennia of experience with genetically improved crop plants from the era before gene-splicing: Even the use of relatively crude and unpredictable genetic techniques for the improvement of crops and microorganisms poses minimal—but, as noted above, not zero—risk to human health and the environment.

If the proponents of the precautionary principle were applying it rationally and fairly, surely greater precautions would be appropriate not to gene-splicing but to the cruder, less precise, less predictable “conventional” forms of genetic modifications. Furthermore, in spite of the assurance of the European Commission and other advocates of the precautionary principle, regulators of gene-spliced products seldom take into consideration the potential risk-reducing benefits of the technology. For example, some of the most successful of the gene-spliced crops, especially cotton and corn, have been constructed by splicing in a bacterial gene that produces a protein toxic to predatory insects, but not to people or other mammals. Not only do these gene-spliced corn varieties repel pests, but grain obtained from them is less likely to contain *Fusarium*, a toxic fungus often carried into the plants by the insects. That, in turn, significantly reduces the levels of the fungal toxin fumonisin, which is known to cause fatal diseases in horses and swine that eat infected corn, and esophageal cancer in humans. When harvested, these gene-spliced varieties of grain also end up with lower concentrations of insect parts than conventional varieties. Thus, gene-spliced corn is not only cheaper to produce but yields a higher quality product and is a potential boon to public health. Moreover, by reducing the need for spraying chemical pesticides on crops, it is environmentally friendly.

Other products, such as gene-spliced herbicide-resistant crops, have permitted farmers to reduce their herbicide use and to adopt more environmentally friendly no-till farming practices. Crops now in development with improved yields would allow more food to be grown on less acreage, saving more land area for wildlife or other uses. And recently developed plant varieties with enhanced levels of vitamins, minerals, and dietary proteins could dramatically improve the health of hundreds of millions of malnourished people in developing countries. These are the kinds of tangible environmental and health benefits that invariably are given little or no weight in precautionary risk calculations.

In spite of incontrovertible benefits and greater predictability and safety of gene-spliced plants and foods, regulatory agencies have regulated them in a discriminatory, unnecessarily burdensome way. They have imposed requirements that could not possibly be met for conventionally bred crop plants. And, as the European Commission’s moratorium on new product approvals demonstrates, even when that extraordinary burden of proof is met via monumental amounts of testing and evaluation, regulators frequently declare themselves unsatisfied.

### Biased Decision Making

While the European Union is a prominent practitioner of the precautionary principle on issues ranging from toxic substances and the new biotechnology to climate change and gun control, U.S. regulatory agencies also commonly
practice excessively precautionary regulation. The precise term of art “precautionary principle” is not used in U.S. public policy, but the regulation of such products as pharmaceuticals, food additives, gene-spliced plants and microorganisms, synthetic pesticides, and other chemicals is without question “precautionary” in nature. U.S. regulators actually appear to be more precautionary than the Europeans towards several kinds of risks, including the licensing of new medicines, lead in gasoline, nuclear power, and others. They have also been highly precautionary towards gene-splicing, although not to the extremes of their European counterparts. The main difference between precautionary regulation in the United States and the use of the precautionary principle in Europe is largely a matter of degree—with reference to products, technologies, and activities—and of semantics.

In both the United States and Europe, public health and environmental regulations usually require a risk assessment to determine the extent of potential hazards and of exposure to them, followed by judgments about how to regulate. The precautionary principle can distort this process by introducing a systematic bias into decision making. Regulators face an asymmetrical incentive structure in which they are compelled to address the potential harms from new products, but are free to discount the hidden risk-reducing properties of unused or underused ones. The result is a lopsided process that is inherently biased against change and therefore against innovation.

To see why, one must understand that there are two basic kinds of mistakes that a regulator can make: First, a harmful product can be approved for marketing—called a Type I error in the parlance of risk analysis. Second, a useful product can be rejected or delayed, can fail to achieve approval at all, or can be inappropriately withdrawn from the market—a Type II error. In other words, a regulator commits a Type I error by permitting something harmful to happen and a Type II error by preventing something beneficial from becoming available. Both situations have negative consequences for the public, but the outcomes for the regulator are very different.

Examples of this Type I-Type II error dichotomy in both the U.S. and Europe abound, but it is perhaps illustrated most clearly in the FDA’s [Food and Drug Administration] approval process for new drugs. A classic example is the FDA’s approval in 1976 of the swine flu vaccine—generally perceived as a Type I error because while the vaccine was effective at preventing influenza, it had a major side effect that was unknown at the time of approval: A small number of patients suffered temporary paralysis from Guillain-Barré Syndrome. This kind of mistake is highly visible and has immediate consequences: The media pounce on the public and Congress are roused, and Congress takes up the matter. Both the developers of the product and the regulators who allowed it to be marketed are exorciated and punished in such modern-day pillories as congressional hearings, television newsmagazines, and newspaper editorials. Because a regulatory official’s career might be damaged irreparably by his good-faith but mistaken approval of a high-profile product, decisions are often made defensively—in other words, above all to avoid Type I errors.

Former FDA Commissioner Alexander Schmidt aptly summarized the regulator’s dilemma:

In all our FDA history, we are unable to find a single instance where a Congressional committee investigated the failure of FDA to approve a new drug. But, the times when hearings have been held to criticize our approval of a new drug have been so frequent that we have not been able to count them. The message to FDA staff could not be clearer. Whenever a controversy over a new drug is resolved by approval of the drug, the agency and the individuals involved likely will be investigated. Whenever such a drug is disapproved, no inquiry will be made. The Congressional pressure for negative action is, therefore, intense. And it seems to be ever increasing. . .

Although they can dramatically compromise public health, Type II errors caused by a regulator’s bad judgment, timidity, or anxiety seldom gain public attention. It may be only the employees of the company that makes the product and a few stock market analysts and investors who are knowledgeable about unnecessary delays. And if the regulator’s mistake precipitates a corporate decision to abandon the product, cause and effect are seldom connected in the public mind. Naturally, the companies themselves are loath to complain publicly about a mistaken FDA judgment, because the agency has so much discretionary control over their ability to test and market products. As a consequence, there may be no direct evidence of, or publicity about, the lost societal benefits, to say nothing of the culpability of regulatory officials.

Exceptions exist, of course. A few activists, such as the AIDS advocacy groups that closely monitor the FDA, scrutinize agency review of certain products and aggressively publicize Type II errors. In addition, congressional oversight should provide a check on regulators’ performance, but as noted above by former FDA Commissioner Schmidt, only rarely does oversight focus on their Type II errors. Type I errors make for more dramatic hearings, after all, including injured patients and their family members. And even when such mistakes are exposed, regulators frequently defend Type II errors as erring on the side of caution—in effect, invoking the precautionary principle. . . Too often this euhemerism is accepted uncritically by legislators, the media, and the public, and our system of pharmaceutical oversight becomes progressively less responsive to the public interest.

The FDA is not unique in this regard, of course. All regulatory agencies are subject to the same sorts of social and political pressures that a cause them to be castigated when dangerous products accidentally make it to market (even if, as is often the case, those products produce net benefits) but to escape blame when they keep beneficial products out of the hands of consumers. Adding the precautionary principle’s bias against new products into the public policy mix further encourages regulators to commit Type II errors in their frenzy to avoid Type I errors. This is hardly conducive to enhancing overall public safety.

**Extreme Precaution**

For some antitechnology activists who push the precautionary principle, the deeper issue is not really safety at all. Many are more antibusiness and an-
titechnology than they are pro-safety. And in their mission to oppose business interests and disparate technologies they don’t like or that they have decided we just don’t need, they are willing to seize any opportunity that presents itself.

These activists consistently (and intentionally) confuse plausibility with provability. Consider, for example, Our Stolen Future, the bible of the proponents of the endocrine disrupter hypothesis discussed above. The book’s premise—that estrogen-like synthetic chemicals damage health in a number of ways—is not supported by scientific data. Much of the research offered as evidence for its arguments has been discredited. The authors equate in-wildly: “Those exposed prematurely to endocrine-disrupting chemicals may have abnormal hormone levels as adults, and they could also pass on persistent chemicals they themselves have inherited—both factors that could influence the development of their own children [emphasis added].” The authors also assume, in the absence of any actual evidence, that exposures to small amounts of many chemicals create a synergistic effect—that is, that total exposure constitutes a kind of witches’ brew that is far more toxic than the sum of the parts. For these anti-innovation ideologues, the mere fact that such questions have been asked requires that inventors or producers expend time and resources answering them. Meanwhile, the critics move on to yet another frightening plausibility and still more questions. No matter how outlandish the claim, the burden of proof is put on the innovator.

Whether the issue is environmental chemicals, nuclear power, or gene-spliced plants, many activists are motivated by their own parochial vision of what constitutes a “good society” and how to achieve it. One prominent biotechnology critic at the Union of Concerned Scientists rationalizes her organization’s opposition to gene-splicing as follows: “Industrialized countries have few genuine needs for innovative food stuffs, regardless of the method by which they are produced”; therefore, society should not squander resources on developing them. She concludes that although “the malnourished homeless” are, indeed, a problem, the solution lies “in resolving income disparities, and educating ourselves to make better choices from among the abundant foods that are available.”

Greenpeace, one of the principal advocates of the precautionary principle, offered in its 1999 IRS filings the organization’s view of the role in society of safer, more nutritious, higher-yielding, environment-friendly, gene-spliced plants: There isn’t any. By its own admission, Greenpeace’s goal is not the prudent, safe use of gene-spliced foods or even their mandatory labeling, but rather these products’ “complete elimination [from] the food supply and the environment.” Many of the groups, such as Greenpeace, do not stop at demanding illogical and stultifying regulation or outright bans on product testing and commercialization; they advocate and carry out vandalism of the very field trials intended to answer questions about environmental safety.

Such tortured logic and arrogance illustrate that the metastasis of the precautionary principle generally, as well as the pseudocontroversies over the testing and use of gene-spliced organisms in particular, stem from a social vision that is not just strongly antigotechnology, but one that poses serious challenges to academic, commercial, and individual freedom.

The precautionary principle shifts decision making power away from individuals and into the hands of government bureaucrats and environmental activists. Indeed, that is one of its attractions for many NGOs [nongovernmental organizations]. Carolyn Raffensperger, executive director of the Science and Environmental Health Network, a consortium of radical groups, asserts that discretion to apply the precautionary principle “is in the hands of the people.” According to her, this devolution of power is illustrated by violent demonstrations against economic globalization such as those in Seattle at the 1999 meeting of the World Trade Organization. “This is [about] how they want to live their lives,” Raffensperger said.

To be more precise, it is about how small numbers of vocal activists want the rest of us to live our lives. In other words, the issue here is freedom and its infringement by ideologues who disapprove, on principle, of a certain technology, or product, or economic system...

Precaution v. Freedom

History offers compelling reasons to be cautious about societal risks, to be sure. These include the risk of incorrectly assuming the absence of danger (false negatives), overlooking low probability but high impact events in risk assessments, the danger of long latency periods before problems become apparent, and the lack of remediation methods in the event of an adverse event. Conversely, there are compelling reasons to be wary of excessive precaution, including the risk of too eagerly detecting a nonexistent danger (false positives), the financial cost of testing for or remediating low-risk problems, the opportunity costs of forgoing net-beneficial activities, and the availability of a contingency regime in case of an adverse event. The challenge for regulators is to balance these competing risk scenarios in a way that reduces overall harm to public health. This kind of risk balancing is often conspicuously absent from precautionary regulation.

It is also important that regulators take into consideration the degree of restraint generally imposed by society on individuals’ and companies’ freedom to perform legitimate activities (e.g., scientific research). In Western democratic societies, we enjoy long traditions of relatively unfettered scientific research and development, except in the very few cases where bona fide safety issues are raised. Traditionally, we shrink from permitting small, authoritarian minorities to dictate our social agenda, including what kinds of research are permissible and which technologies and products should be available in the marketplace.

Application of the precautionary principle has already elicited unscientific, discriminatory policies that inflate the costs of research, inhibit the development of new products, divert and waste resources, and restrict consumer choice. The excessive and wrongheaded regulation of the new biotechnology is one particularly egregious example. Further encroachment of precautionary regulation into other areas of domestic and international health and safety standards will create a kind of “open sesame” that government officials could
invoke whenever they wish arbitrarily to introduce new barriers to trade, or simply to yield disingenuously to the demands of antitechnology activists. Those of us who both value the freedom to perform legitimate research and believe in the wisdom of market processes must not permit extremists acting in the name of “precaution” to dictate the terms of the debate.

POSTSCRIPT

Is the Precautionary Principle a Sound Basis for International Policy?

In their definition of the precautionary principle, Miller and Conko emphasize supposition: Precautions must be taken whenever there might be a problem. Stein emphasizes uncertainty: Lack of full scientific certainty shall not be used as a reason for postponing cost-effective precautions. The same tension is visible in Kenneth R. Foster, Paolo Vecchia, and Michael H. Repacholi, “Science and the Precautionary Principle,” Science (May 12, 2000).

Other writers who oppose the precautionary principle have approached it in much the same way as Miller and Conko. For instance, Ronald Bailey, in “Precautionary Tale,” Reason (April 1999), defines the precautionary principle as “precaution in the face of any actions that may affect people or the environment, no matter what science is able—or unable—to say about that action.” “No matter what science says” is not quite the same thing as “lack of full scientific certainty.” Indeed, Bailey turns the precautionary principle into a straw man and thereby endangers whatever points he makes that are worth considering. One of those points is that widespread use of the precautionary principle would hamstring the development of the Third World. Bonner R. Cohen, in “The Safety Nazis,” American Spectator (July/August 2001), echoes this point, calling the precautionary principle a massive threat to human health in the less developed countries.

Yet the 1992 Rio Declaration emphasized that the precautionary principle should be “applied by States according to their capabilities” and that it should be applied in a cost-effective way. These provisions would seem to preclude the draconian interpretations that most alarm the critics. Turned around, however, these same provisions are what led to the World Trade Organization’s efforts to keep developed nations from applying their own stringent environmental regulations to Third World trading partners, which alarms those who favor the precautionary principle. Hilary French takes a somewhat broader view in “Coping With Ecological Globalization,” in Lester R. Brown et al., State of the World 2000 (W. W. Norton, 2000). Conflicts of interest can take other forms as well. David Kriebel et al., in “The Precautionary Principle in Environmental Science,” Environmental Health Perspectives (September 2001), state that “environmental scientists should be aware of the policy uses of their work and of their social responsibility to do science that protects human health and the environment.” Businesses are also conflicted, writes Arnold Brown in “Suitable Precautions,” Across the Board (January/February 2002), because the precautionary principle tends to slow decision making, but he maintains that “we will all have to learn and practice anticipation.”