MULTINATIONAL MONITOR

September 2004 - VOLUME 25 - NUMBERS 9

T h e P r e c a u t i o n a r y P r i n c i p l e

The Rise of the Precautionary Principle A Social Movement Gathers Strength

By Nancy Myers

Ed Soph is a jazz musician and professor at the University of North Texas in Denton, a growing town of about 100,000 just outside Dallas, Texas. In 1997, Ed and his wife Carol founded Citizens for Healthy Growth, a Denton group concerned about the environment and future of their town. The Sophs and their colleagues -- the group now numbers about 400 -- are among the innovative pioneers who are implementing the Precautionary Principle in the United States.

The Sophs first came across the Precautionary Principle in 1998, in the early days of the group's campaign to prevent a local copper wire manufacturer, United Copper Industries, from obtaining an air permit that would have allowed lead emissions. Ed remembers the discovery of the Wingspread Statement on the Precautionary Principle -- a 1998 environmental health declaration holding that "When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically" -- as "truly a life-changing experience." Using the Precautionary Principle as a guide, the citizens refused to be drawn into debates on what levels of lead, a known toxicant, might constitute a danger to people's health. Instead, they pointed out that a safer process was available and insisted that the wise course was not to issue the permit. The citizens prevailed.

The principle helped again in 2001, when a citizen learned that the pesticides 2,4-D, simazine, Dicamba and MCPP were being sprayed in the city parks. "The question was, given the 'suspected' dangers of these chemicals, should the city regard those suspicions as a reassurance of the chemicals' safety or as a warning of

their potential dangers?" Ed recalls. "Should the city act out of ignorance or out of common sense and precaution?"

Soph learned that the Greater Los Angeles School District had written the Precautionary Principle into its policy on pesticide use and had turned to Integrated Pest Management (IPM), a system aimed at controlling pests without the use of toxic chemicals. The Denton group decided to advocate for a similar policy. They persuaded the city's park district to form a focus group of park users and organic gardening experts. The city stopped spraying the four problem chemicals and initiated a pilot IPM program.

The campaign brought an unexpected economic bonus to the city. In the course of their research, parks department staff discovered that corn gluten was a good turf builder and natural broadleaf herbicide. But the nearest supplier of corn gluten was in the Midwest, and that meant high shipping costs for the city. Meanwhile, a corn processing facility in Denton was throwing away the corn gluten it produced as a byproduct. The parks department made the link, and everyone was pleased. The local corn company was happy to add a new product line; the city was happy about the expanded local business and the lower price for a local product; and the environmental group chalked up another success.

The citizens of Denton, Texas, did not stop there. They began an effort to improve the community's air pollution standards. They got arsenic-treated wood products removed from school playgrounds and parks and replaced with nontoxic facilities. "The Precautionary Principle helped us define the problems and find the solutions," Ed says.

But, as he wrote in an editorial for the local paper, "The piecemeal approach is slow, costly and often more concerned with mitigation than prevention." Taking a cue from Precautionary Principle pioneers in San Francisco, they also began lobbying for a comprehensive new environmental code for the community, based on the Precautionary Principle.

In June 2003, San Francisco's board of supervisors had become the first government in the United States to embrace the Precautionary Principle. A new environmental code drafted by the city's environment commission put the Precautionary Principle at the top, as Article One. Step one in implementing the code was a new set of guidelines for city purchasing, pointing the way toward "environmentally preferable" purchases by careful analysis and choice of the best alternatives. The White Paper accompanying the ordinance pointed out that most of the city's progressive environmental policies were already in line with the Precautionary Principle, and that the new code provided unity and focus to the

policies rather than a radically new direction.

That focus is important; too often, environmental matters seem like a long, miscellaneous and confusing list of problems and solutions.

Likewise in Denton, the Precautionary Principle has not been a magic wand for transforming policy, but it has put backbone into efforts to enact truly protective and far-sighted environmental policies. Ed Soph points out that, in his community as in others, growth had often been dictated by special interests in the name of economic development, and the environment got short shrift.

"Environmental protection and pollution prevention in our city have been a matter, not of proactive policy, but of reaction to federal and state mandates, to the threat of citizens' lawsuits, and to civic embarrassment. Little thought is given to future environmental impacts," he told the city council when he argued for a new environmental code.

He added, "The toxic chemical pollution emitted by area industries has been ignored or accepted for all the ill-informed or selfish reasons that we are too familiar with. The Precautionary Principle dispels that ignorance and empowers concerned citizens with the means to ensure a healthier future."

The Precautionary Principle has leavened the discussion of environmental and human health policy on many fronts -- in international treaty negotiations and global trade forums, in city resolutions and national policies, among conservationists and toxicologists, and even in corporate decision making.

Two treaties negotiated in 2000 incorporated the principle for the first time as an enforceable measure. The Cartagena Protocol on Biosafety allows countries to invoke the Precautionary Principle in decisions on admitting imports of genetically modified organisms. It became operative in June 2003. The Stockholm Convention on Persistent Organic Pollutants prescribes the Precautionary Principle as a standard for adding chemicals to the original list of 12 that are banned by the treaty. This treaty went into force in February 2004.

Making Sense of Uncertainty

Understanding the need for the Precautionary Principle requires some scientific sophistication. Ecologists say that changes in ecological systems may be incremental and gradual, or surprisingly large and sudden. When change is large enough to cause a system to cross a threshold, it creates a new dynamic equilibrium that has its own stability and does not change back easily. These new interactions become the norm and create new realities.

Something of this new reality is evident in recently observed changes in patterns of human disease:

- Chronic diseases and conditions affect more than 100 million men, women, and children in the United States -- more than a third of the population. Cancer, asthma, Alzheimer's disease, autism, birth defects, developmental disabilities, diabetes, endometriosis, infertility, multiple sclerosis and Parkinson's disease are becoming increasingly common.
- Nearly 12 million children in the United States (17 percent) suffer from one or more developmental disabilities. Learning disabilities alone affect at least 5 to 10 percent of children in public schools, and these numbers are increasing. Attention deficit hyperactivity disorder conservatively affects 3 to 6 percent of all school children. The incidence of autism appears to be increasing.
- Asthma prevalence has doubled in the last 20 years.
- Incidence of certain types of cancer has increased. The age-adjusted incidence of melanoma, non-Hodgkins lymphoma, and cancers of the prostate, liver, testis, thyroid, kidney, breast, brain, esophagus and bladder has risen over the past 25 years. Breast cancer, for example, now strikes more women worldwide than any other type of cancer, with rates increasing 50 percent during the past half century. In the 1940s, the lifetime risk of breast cancer was one in 22. Today's risk is one in eight and rising.
- In the United States, the incidence of some birth defects, including male genital disorders, some forms of congenital heart disease and obstructive disorders of the urinary tract, is increasing. Sperm density is declining in some parts of the United States and elsewhere in the world.

These changes in human health are well documented. But proving direct links with environmental causative factors is more complicated.

Here is how the scientific reasoning might go: Smoking and diet explain few of the health trends listed above. Genetic factors explain up to half the population variance for several of these conditions -- but far less for the majority of them -- and in any case do not explain the changes in disease incidence rates. This suggests that other environmental factors play a role. Emerging science suggests this as well. In laboratory animals, wildlife and humans, considerable evidence documents a link between environmental contamination and malignancies, birth defects, reproductive disorders, impaired behavior and immune system dysfunction. Scientists' growing understanding of how biological systems develop and function leads to similar conclusions.

But serious, evident effects such as these can seldom be linked decisively to a

single cause. Scientific standards of certainty (or "proof") about cause and effect are high. These standards may never be satisfied when many different factors are working together, producing many different results. Sometimes the period of time between particular causes and particular results is so long, with so many intervening factors, that it is impossible to make a definitive link. Sometimes the timing of exposure is crucial -- a trace of the wrong chemical at the wrong time in pregnancy, for example, may trigger problems in the child's brain or endocrine system, but the child's mother might never know she was exposed.

In the real world, there is no way of knowing for sure how much healthier people might be if they did not live in the modern chemical stew, because the chemicals are everywhere -- in babies' first bowel movement, in the blood of U.S. teenagers and in the breastmilk of Inuit mothers. No unexposed "control" population exists. But clearly, significant numbers of birth defects, cancers and learning disabilities are preventable.

Scientific uncertainty is a fact of life even when it comes to the most obvious environmental problems, such as the disappearance of species, and the most potentially devastating trends, such as climate change. Scientists seldom know for sure what will happen until it happens, and seldom have all the answers about causes until well after the fact, if ever. Nevertheless, scientific knowledge, as incomplete as it may be, provides important clues to all of these conditions and what to do about them.

The essence of the Precautionary Principle is that when lives and the future of the planet are at stake, people must act on these clues and prevent as much harm as possible, despite imperfect knowledge and even ignorance.

Environmental Failures

A premise of Precautionary Principle advocates is that environmental policies to date have largely not met this challenge. Part of the explanation for why they have not is that the dimensions of the emerging problems are only now becoming apparent. The limits of the earth's assimilative capacity are much clearer now than they were when the first modern environmental legislation was enacted 30 years ago. Another part of the explanation is that, although some environmental policies are preventive, most have focused on cleaning up messes after the fact -- what environmentalists call "end of pipe" solutions. Scrubbers on power plant stacks, catalytic converters on tailpipes, recycling and super-sized funds dedicated to detoxifying the worst dumps have not been enough. The Precautionary Principle holds that earlier, more comprehensive and preventive approaches are necessary. Nor is it enough to address problems only after they have become so obvious that they cannot be ignored -- often, literally waiting for the dead bodies to appear or for coastlines to disappear under rising tides.

The third factor in the failure of environmental policies is political, say Precautionary Principle proponents. After responding to the initial burst of concern for the environment, the U.S. regulatory system and others like it were subverted by commercial interests, with the encouragement of political leaders and, increasingly, the complicity of the court system. Environmental laws have been subjected to an onslaught of challenges since the 1980s; many have been modified or gutted, and all are enforced by regulators who have been chastened by increasing challenges to their authority by industry and the courts.

The courts, and now increasingly international trade organizations and agreements like the World Trade Organization (WTO) and the North American Free Trade Agreement (NAFTA), have institutionalized an anti-precautionary approach to environmental controls. They have demanded the kinds of proof and certainty of harms and efficacy of regulation that science often cannot provide.

False certainties

Ironically, one tool that has proved highly effective in the battle against environmental regulations was one that was meant to strengthen the enforcement of such laws: quantitative risk assessment. Risk assessment was developed in the 1970s and 1980s as a systematic way to evaluate the degree and likelihood of harmful side effects from products and technologies. With precise, quantitative risk assessments in hand, regulators could more convincingly demonstrate the need for action. Risk assessments would stand up in court. Risk assessments could "prove" that a product was dangerous, would cause a certain number of deaths per million, and should be taken off the market.

Or not. Quantitative risk assessment, which became standard practice in the United States in the mid-1980s and was institutionalized in the global trade agreements of the 1990s, turned out to be most useful in "proving" that a product or technology was not inordinately dangerous. More precisely, risk assessments presented sets of numbers that purported to state definitively how much harm might occur. The next question for policymakers then became: How much harm is acceptable? Quantitative risk assessment not only provided the answers; it dictated the questions.

As quantitative risk assessment became the norm, commercial and industrial interests were increasingly able to insist that harm must be proven "scientifically" -- in the form of a quantitative risk assessment demonstrating harm in excess of acceptable limits -- before action was taken to stop a process or product. These exercises were often linked with cost-benefit assessments that heavily weighted the immediate monetary costs of regulations and gave little, if any, weight to costs to

the environment or future generations.

Although risk assessments tried to account for uncertainties, those projections were necessarily subject to assumptions and simplifications. Quantitative risk assessments usually addressed a limited number of potential harms, often missing social, cultural or broader environmental factors. These risk assessments have consumed enormous resources in strapped regulatory agencies and have slowed the regulatory process. They have diverted attention from questions that could be answered: Do better alternatives exist? Can harm be prevented?

The slow pace of regulation, the insistence on "scientific certainty," and the weighting toward immediate monetary costs often give the benefit of doubt to products and technologies, even when harmful side effects are suspected. One result is that neither international environmental agreements nor national regulatory systems have kept up with the increasing pace and cumulative effects of environmental damage.

A report by the European Environment Agency in 2001 tallied the great costs to society of some of the most egregious failures to heed early warnings of harm. Radiation, ozone depletion, asbestos, Mad Cow disease and other case studies show a familiar pattern: "Misplaced 'certainty' about the absence of harm played a key role in delaying preventive actions," the authors conclude.

They add, "The costs of preventive actions are usually tangible, clearly allocated and often short term, whereas the costs of failing to act are less tangible, less clearly distributed and usually longer term, posing particular problems of governance. Weighing up the overall pros and cons of action, or inaction, is therefore very difficult, involving ethical as well as economic considerations."

The Precautionary Approach

As environmentalists looked at looming problems such as global warming, they were appalled at the inadequacy of policies based on quantitative risk assessment. Although evidence was piling up rapidly that human activities were having an unprecedented effect on global climate, for example, it was difficult to say when the threshold of scientific certainty would be crossed. Good science demanded caution about drawing hard and fast conclusions. Yet, the longer humanity waited to take action, the harder it would be to reverse any effect. Perhaps it was already too late. Moreover, action would have to take the form of widespread changes not only in human behavior but also in technological development. The massive shift away from fossil fuels that might yet mitigate the effects of global warming would require rethinking the way humans produce and use energy. Nothing in the risk-

assessment-based approach to policy prepared society to do that.

The global meetings called to address the coming calamity were not helping much. Politicians fiddled with blame and with protecting national economic interests while the globe heated up. Hard-won and heavily compromised agreements such as the 1997 Kyoto agreement on climate change were quickly mired in national politics, especially in the United States, the heaviest fossil-fuel user of all.

In the United States and around the globe, a different kind of struggle had been going on for decades: the fight for attention to industrial pollution in communities. From childhood lead poisoning in the 1930s to Love Canal in the 1970s, communities had always faced an uphill battle in proving that pollution and toxic products were making them sick. Risk assessments often made the case that particular hazardous waste dumps were safe, or that a single polluting industry could not possibly have caused the rash of illnesses a community claimed. But these risk assessments missed the obvious fact that many communities suffered multiple environmental assaults, compounded by other effects of poverty. A landmark 1987 report by the United Church of Christ coined the term "environmental racism" and confirmed that the worst environmental abuses were visited on communities of color. This growing awareness generated the international environmental justice movement.

In early 1998, a small conference at Wingspread, the Johnson Foundation's conference center in Racine, Wisconsin, addressed these dilemmas head-on. Participants groped for a better approach to protecting the environment and human health. At that time, the Precautionary Principle, which had been named in Germany in the 1970s, was an emerging precept of international law. It had begun to appear in international environmental agreements, gaining reference in a series of protocols, starting in 1984, to reduce pollution in the North Sea; the 1987 Ozone Layer Protocol; and the Second World Climate Conference in 1990.

At the Rio Earth Summit in 1992, precaution was enshrined as Principle 15 in the Rio Declaration on Environment and Development: "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."

In the decade after Rio, the Precautionary Principle began to appear in national constitutions and environmental policies worldwide and was occasionally invoked in legal battles. For example:

- The Maastricht Treaty of 1994, establishing the European Union, named the Precautionary Principle as a guide to EU environment and health policy.
- The Precautionary Principle was the basis for arguments in a 1995 International Court of Justice case on French nuclear testing. Judges cited the "consensus flowing from Rio" and the fact that the Precautionary Principle was "gaining increasing support as part of the international law of the environment."
- At the World Trade Organization in the mid-1990s, the European Union invoked the Precautionary Principle in a case involving a ban on imports of hormone-fed beef.

The Wingspread participants believed the Precautionary Principle was not just another weak and limited fix for environmental problems. They believed it could bring far-reaching changes to the way those policies were formed and implemented. But action to prevent harm in the face of scientific uncertainty alone did not translate into sound policies protective of the environment and human health. Other norms would have to be honored simultaneously and as an integral part of a precautionary decision-making process. Several other principles had often been linked with the Precautionary Principle in various statements of the principle or in connection with precautionary policies operating in Northern European countries. The statement released at the end of the meeting, the Wingspread Statement on the Precautionary Principle, was the first to put four of these primary elements on the same page -- acting upon early evidence of harm, shifting the burden of proof, exercising democracy and transparency, and assessing alternatives. These standards form the basis of what has come to be known as the overarching or comprehensive Precautionary Principle or approach:

> *When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically.*
>
> *In this context the proponent of an activity, rather than the public, should bear the burden of proof.*
>
> *The process of applying the Precautionary Principle must be open, informed and democratic and must include potentially affected parties. It must also involve an examination of the full range of alternatives, including no action.*

The conference generated widespread enthusiasm for the principle among U.S. environmentalists and academics as well as among some policymakers. That was complemented by continuing and growing support for the principle among

Europeans as well as ready adoption of the concept in much of the developing world. And in the years following Wingspread, the Precautionary Principle has gained new international status.

Nancy Myers is communications director for the Science and Environmental Health Network. This article is based on a chapter in a Myers-edited forthcoming book on the Precautionary Principle.

The Precautionary Principle: Answering the Critics

Opponents trot out a series of misleading claims to contest the Precautionary Principle. A careful look shows how these claims misrepresent basic Precautionary Principle precepts:

"If precaution applies to everything, it would stop all technology in its tracks."
Response: Precautionary action usually means adopting safer alternatives. A broad precautionary approach will encourage the development of better technologies. Using this approach, society will say "yes" to some technologies while it says "no" to others. Making uncertainty explicit, considering alternatives, and increasing transparency and the responsibility of proponents and manufacturers to demonstrate safety should lead to cleaner products and production methods. It can also mean imposing a moratorium while further research is conducted, calling for monitoring of technologies and products already in use, and so forth.

"Precaution calls for zero risk, which is impossible to achieve."
Response: Any debate over the possibility of "zero risk" is pointless. Our real goal must be to impose far less risk and harm on the environment and on human health than we have in the past. We must harness human ingenuity to reduce the harmful effects of our activities.

The real question is who or what gets the benefit of the doubt. The Precautionary Principle is based on the assumption that people have the right to know as much as possible about risks they are taking on, in exchange for what benefits, and to make choices accordingly. With food and other products, such choices are often played out in the marketplace. Increasingly, manufacturers are choosing to reduce risk themselves by substituting safer alternatives in response to consumer uneasiness, the threat of liability and market pressures.

A key to making those choices is transparency -- about what products contain, and about the testing and monitoring of those ingredients. Another is support, by government and industry, for the exploration of -- and rigorous research on -- alternatives.

Market and voluntary action is not enough, especially on issues that go beyond individual and corporate choice. It is the responsibility of communities, governments, and international bodies to make far-reaching decisions that greatly reduce the risks we now impose on the earth and all its inhabitants.

"**We don't need the Precautionary Principle; we have risk assessment."**
Response: Risk assessment is the prevalent tool used to justify decisions about technologies and products. Its proponents argue that because conservative assumptions are built into these assessments, they are sufficiently precautionary.

Too often, however, risk assessment has been used to delay precautionary action: decision-makers wait to get enough information and then attempt to "manage" rather than prevent risks. Risk assessment is not necessarily inconsistent with the Precautionary Principle, but because it omits certain basic requirements of the decision-making process, the current type of risk assessment is only helpful at a narrow stage of the process, when the product, technology or activity and alternatives have been well developed and tested and a great deal of information has already been gathered about them. Standard risk assessment, in other words, is only useful in conditions of relatively high certainty, and generally only to help evaluate alternatives to damaging technologies.

Under the Precautionary Principle, uncertainty is also given due weight. The Precautionary Principle calls for the examination of a wider range of harms -- including social and economic ones -- than traditional risk analysis provides. It points to the need to examine not only single, linear risks but also complex interactions among multiple factors, and the broadest possible range of harmful effects.

This broad, probing consideration of harm -- including the identification of uncertainty -- should begin as early as possible in the conception of a technology and should continue through its release and use. That is, a precautionary approach should begin before the regulatory phase of decision-making and should be built into the research agenda.

What is not consistent with the Precautionary Principle is the misleading certainty often implied by quantitative risk assessments -- that precise numbers can be assigned to the possibility of harm or level of safety, that these numbers are usually a sufficient basis for deciding whether the substance or technology is "safe," and that lack of numbers means there is no reason to take action. The assumptions behind risk assessments -- what "risks" are evaluated and how comparisons are made -- are easily manipulated by those with a stake in their outcome.

"Precaution itself is risky: it will prevent us from adopting technologies that are actually safer."
Response: This is not true. Precaution suggests two approaches to new technology:

- Greater vigilance about possible harmful side effects of all innovations. Alternatives to harmful technologies (such as genetic modification to reduce pesticide use) must be scrutinized as carefully as the technologies they replace. It does not make sense to replace one set of harms with another. Brand-new technologies must receive much greater scrutiny than they have in the past.
- Redirection of research and ingenuity toward inherently safer, more harmonious, more sustainable technologies, products, and processes.

"Implementing the Precautionary Principle will be too expensive. We can't afford it."
Response: If a cost-benefit analysis indicates that a precautionary approach is too expensive, that analysis is probably incomplete. Does it consider long-term costs? The costs to society? The costs of harmful side effects -- monetary and nonmonetary? The costs spread over a product's entire lifecycle -- including disposal? The pricetags of most products and developments do not reflect their real costs. Like precautionary science, precautionary economics operates in the real world, in which connections, costs and benefits are complex and surrounded by uncertainty -- but they cannot be ignored. Tallying the "cost" of precaution requires making true value judgments, which can only partially be expressed by money. But in the 21st Century, precaution is essential to a healthy, sustainable economy.

"The Precautionary Principle is anti-science."
Response: On the contrary, the Precautionary Principle calls for more and better science, especially investigations of complex interactions over longer periods of time and development of more harmonious technologies. It calls for scientific monitoring after the approval of products. The assertion that the principle is "anti-science" is based on any or all of the following faulty assumptions:

1) Those who advocate precaution urge action on the basis of vague fears, regardless of whether there is scientific evidence to support their fears.

Most statements of the Precautionary Principle say it applies when there is reason to believe serious or irreversible harm may occur. Those reasons are based on scientific evidence of various kinds: studies, observations, precedents, experience, professional judgment. They are based on what we know about how processes work and might be affected by a technology.

However, precautionary decisions also take into account what we know we do not know. The more we know, scientifically, the greater will be our ability to prevent disasters based on ignorance. But we must be much more cautious than we have been in the past about moving forward in ignorance.

2) Taking action in advance of scientific certainty undermines science.

Scientific standards of certainty are high in experimental science or for accepting or refuting a hypothesis, and well they should be. Waiting to take action before a substance or technology is proven harmful, or even until plausible cause-and-effect relationships can be established, may mean allowing irreversible harm to occur -- deaths, extinctions, poisoning, and the like. Humans and the environment become the unwitting testing grounds for these technologies. This is no longer acceptable. Moreover, science should serve society, not vice versa. Any decision to take action -- before or after scientific proof -- is a decision of society, not science.

3) Quantitative risk assessment is more scientific than other kinds of evaluation.

Risk assessment is only one evaluation method and provides only partial answers. It does not take into account many unknowns and seldom accounts for complex interactions -- nor does it raise our sights to better alternatives.

"The Precautionary Principle is a cover for trade protectionism."
Response: The Precautionary Principle was created to protect public health and the environment, not to restrict valid trade. North American, Argentinean and other representatives in trade talks have leveled this accusation against the European Union in response to EU action on beef containing growth hormones and on genetically modified foods and crops. Recent EU statements on the Precautionary Principle have emphasized that the principle should be applied fairly and without discrimination.

However, the real issue is not protectionism but whether a nation has the sovereign right to impose standards that exceed the standards of international regimes. The 2000 European Commission statement on the Precautionary Principle and Cartagena Biosafety Protocol both assert that right.

-- N.M.