

Rachel's Environment & Health News
#789 -- Answering the Critics of Precaution, Part 1
April 15, 2004

The precautionary principle is a new way of making decisions about environment and health. The purpose of the precautionary approach is to make decisions today that we will not regret in 50 years. As the precautionary approach becomes better known, it is being studied and criticized, which is normal for new ideas. Here we present common criticisms of the precautionary approach, and then offer some responses to the critics. Naturally, ours are not the only possible responses.

Before proceeding, we should distinguish the precautionary approach from the old way of making decisions. (I call it the "old way" because it is being replaced by the newer precautionary approach in many parts of the world -- but in most parts of the U.S. the "old way" is still being used.)

The old way of making decisions assumed that we could do a "risk assessment" on any activity (such as adding the chemical MTBE to gasoline, or burying radioactive waste in the ground, or cutting new logging roads into a forest). The risk assessment would tell us the likelihood and amount of harm from the activity, and we would then enforce limits on the activity to prevent the harm from growing beyond "acceptable" levels. In the case of harms that are rare or unknown, the old way assumes that we will learn about these hidden dangers in ways that may be unpleasant and traumatic but which will not be unacceptably costly or painful.

The old way assumed that people and corporations have the right to do anything they choose (so long as it is legal) until some third party can prove that harm has occurred, at which point a lengthy process of dispute resolution can begin, often requiring decades of effort and millions of dollars. This system requires that harm must occur and must be proven to occur before alternative actions will be considered. The great harms from leaded paint, from leaded gasoline and from asbestos come to mind.

In sum, the old way asked the question, "How much harm is acceptable" or "How much harm can we get away with?" and then tried to limit activities to keep the harm within those boundaries. And the burden of proof of harm was placed on those being harmed -- it was up to them to prove they were being harmed before alternative actions would be considered.

The precautionary principle is a different way of making decisions -- one focused more on preventing harm.

In one form or another, the precautionary principle has been widely adopted in international treaties and agreements[1], and it has even been formally adopted by the U.S. government, which signed the Rio Declaration on Environment and Development in 1992.[2] (Unfortunately, the U.S. has not yet acted on that commitment.)

Criticism #1: There are many ways of stating the precautionary principle, so it is meaningless.

Response #1:

In all formulations of the precautionary principle, we find three common elements:

- 1) If we have reasonable suspicion of harm
- 2) accompanied by scientific uncertainty, then
- 3) we all have a duty to take action to prevent harm.

The precautionary principle does not tell us what kinds of action to take. It does not tell us to ban anything or stop anything or regulate anything. However, it assumes that our aim is to prevent harm, and a consensus is developing that several kinds of action may be helpful[3]:

** set goals;

** examine all reasonable alternatives for achieving those goals with the expectation that the least-harmful approach will be preferred;

** shift the burden of proof to the proponents of new activities or technologies -- they bear the burden of producing information about the expected consequences of their proposed activities, monitoring and reporting as the activity unfolds, agreeing to pay for any harm that ensues, and taking responsibility for remediation as needed; and

** those who will be affected by the decision should help make the decision.

Therefore the precautionary principle is sufficiently well-defined for people to use it in the real world.

Criticism #2: Precaution is not needed. The current regulatory system is working well and there is no need to change it.

Response #2. There are many well-documented cases in which the "old way" has handed us a legacy of very expensive problems that we are now paying for (and struggling to solve), including: depleted fisheries; harm from radioactivity; exposures to benzene, asbestos, and PCBs [polychlorinated biphenyls]; damage to the Earth's ozone shield; exposure to the artificial hormone, diethylstilbestrol (DES); the excessive use of antimicrobials and growth promoters; lead in gasoline, and MTBE as a substitute for lead in gasoline; tributyl tin as an anti-fouling paint on ships and boats; chemical contamination of the Great Lakes; and more. This list could be readily extended -- contamination and depletion of salmon, low levels of many exotic chemicals in typical drinking water supplies; loss of species at 100 to 1000 times historical rates of extinction; water shortages in many parts of the globe including the American west; increasing occurrences of asthma, diabetes, nervous system disorders, childhood cancers, and so on.[4]

Criticism #3: The precautionary approach aims to achieve zero risk, which is impossible.

Response #3: Advocates of the precautionary principle understand that modern technologies will always entail risks,

and that zero risk is not achievable. The goal of precaution is less risk, not zero risk.

However, the precautionary approach responds in a new way to risks. As we saw above, the "old way" asks "How much harm is acceptable?" The precautionary approach asks, "How much harm is avoidable?"

The precautionary principle is needed when something that we value greatly is threatened and requires preventive and protective action, to avoid threats to it, or to prevent threats from materializing into harm.[5]

The precautionary principle is especially needed to avoid harms that could become widespread, serious, or irreversible. Precaution also favors avoiding any harms that are easily avoidable. In sum, "Better safe than sorry" and "A stitch in time saves nine."

Criticism #4: The precautionary principle is anti-science.

Response #4: The precautionary principle embraces and uses all available science. There is nothing anti-science about it.

A key distinction between the "old way" and precaution is their different responses to scientific uncertainty. The old way takes scientific uncertainty as a green light -- until science can prove harm, press ahead.

The precautionary principle takes scientific uncertainty as a yellow light or even in some cases a red light. The precautionary principle assumes that scientific uncertainty is itself a reason to be concerned. When scientific uncertainty is combined with reasonable suspicion of harm, then precautionary action is warranted.

When we see smoke billowing out of a building, do we passively study the situation until we are 100% sure of the cause of the smoke, or do we call the fire department (preventive action) while we simultaneously try to learn more?

Some critics seem to feel that the precautionary approach is anti-science simply because it pays attention to scientific uncertainty. But science always makes a careful distinction between what is known and what is not known -- so paying attention to uncertainty is a normal part of science. As citizens, paying attention to uncertainty is only common sense -- if we're not sure what we're doing, we should proceed cautiously.

Criticism #5: The precautionary principle will stop progress. If we had used precaution as our guide in 1890, we'd never have developed the automobile.

Response #5: In 1890, people needed better means of transportation to replace the horse. If a precautionary approach had been taken in 1890-1900, the alternatives available at that time would have been considered (trains, omnibuses, electric trolleys, cable cars, plus electric automobiles, steam-powered automobiles, and automobiles using the gasoline-powered internal-combustion engine). Unfortunately, a small number of people dominated the decisions in 1900 and they chose to develop the gasoline-powered internal combustion engine, and later to buy up and dismantle competing trolley and train lines. Today, we are all

struggling with the consequences of those decisions (global warming, cities clogged with highways and cars, the deaths of 60,000 people per year from air pollution and another 40,000 killed in accidents, and so on). People needed new forms of transportation in 1900 but the decisions made at that time did not follow a precautionary approach, and they turned out badly. A precautionary approach would at least have forced an open consideration of the risks and benefits of each alternative, and would have given preference to the least harmful. Such a process would not have left us all riding horses, but it might very well have produced a different transportation system than the one we are struggling to replace today because it has proven to be so expensive and so harmful.

Criticism #6: Precaution will stifle innovation and destroy jobs. (This is similar to Criticism #5.)

Response #6: On the contrary, the precautionary principle is already stimulating technical innovation, as we search for new ways to fulfill our needs while minimizing harm to the environment and human health. Much modern technology is incompatible with living things, and it needs to be replaced by newer technologies based on principles learned from nature. Precaution creates incentives for "green chemistry," "green engineering," and "green design." We need transportation -- but the best answer probably isn't gas-guzzling cars. We need energy -- but probably the best answer isn't burning more coal or creating more unmanageable radioactive wastes in nuclear power plants. We need food -- but farms heavily dependent on synthetic fertilizers, chemical pesticides, and genetically engineered crops may not be the best answer because they are so costly.

Human needs have not changed, and they will be fulfilled one way or another. The question is, will we harm the planet and diminish our children's future as we fulfill our needs, or can we find ways to live in harmony with nature? In developing advanced technologies that are compatible with nature, entrepreneurs will find (and create) wonderful opportunities for themselves and others. Transportation, manufacturing, agriculture and energy systems all need to be re-invented, based on cooperating with nature rather than subduing it. The opportunities for job creation are obviously substantial.[6] [To be continued.] --Peter Montague

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[1] The language of precaution has now been adopted in many international treaties and conventions, such as the North Sea Declaration (1987), The Ozone Layer Protocol (1987), the Ministerial Declaration of the 2nd World Climate Conference (1990), the Maastricht Treaty that created the European Union (1994), The United Nations Law of the Sea (2001), and the Cartagena Protocol on Biosafety (2000), among others.

[2] Rio Declaration on Environment and Development (1992); Principle 15 of the Declaration says, "In order to protect the environment, the precautionary approach shall be widely applied by States [nations] 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." Cost-effective means lowest-

cost. Available at

<http://www.rachel.org/library/getfile.cfm?ID=377>

[3] Carolyn Raffensperger and Joel Tickner, eds. *Protecting Public Health and the Environment; Implementing the Precautionary Principle*. Washington, D.C.: Island Press, 1999.

[4] Poul Harremoes and others, *Late lessons from early warnings: the precautionary principle 1896-2000*

[Environmental Issue Report No. 22] (Copenhagen, Denmark: European Environment Agency, 2001). Available at (3-megabyte file):

<http://www.rachel.org/library/getfile.cfm?ID=301>

[5] Carl Cranor, "Some Legal Implications of the Precautionary principle: improving information-generation and legal protections," *European Journal of Oncology* (2003; Supplement 2), pgs. 31-51.

<http://www.rachel.org/library/getfile.cfm?ID=373>

[6] Frank Ackerman and Rachel Massey, *Prospering with Precaution; Employment, Economics, and the Precautionary Principle* (Medford, Mass.: Global Development and Environment Institute, Tufts University, 2002). Available at

<http://www.rachel.org/library/getfile.cfm?ID=218>

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Rachel's Environment & Health News

#790 -- Answering the Critics of Precaution, Part 2

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Last issue we began answering some of the criticisms of the precautionary principle. Of course, ours are not the only possible answers.

The precautionary principle is a new way of making decisions, and it is slowly replacing the "old way." Here is an example of how the "old way" worked: someone develops a new chemical for cleaning refrigerators. They do a "risk assessment" on that chemical and determine that it will only cause "acceptable" harm to humans and the environment. They commercialize the chemical, create a "need" for it by advertising, and rake in the money. They have strong incentives not to study the effects of their chemical, so the first signs of trouble are reported by citizens, and those early reports are ridiculed, denied and labeled "junk science." After a couple of decades, the chemical manufacturer (without ever admitting that the citizens were right) introduces a new refrigerator-cleaning chemical that they say is a big improvement and will only cause "acceptable" harm. Their risk assessment proves it. The merry-go-round continues.

The precautionary principle begins by asking, "What's the goal?" Answer: Clean refrigerators. "What's the least-damaging way to reach the goal?" This leads to an examination of alternative ways of cleaning refrigerators and a search for the least-harmful way (including, probably, vinegar-and-water or perhaps soap-and-water). The overarching goal isn't to inflict "acceptable" damage on humans and the environment -- the main goal is to avoid harm to the extent that we can. Once the least-harmful way has been selected, monitoring continues in case the decision was flawed (always a possibility).

So here are more answers to some of the criticisms of precaution:

Criticism #7: The precautionary principle is based on values and emotions and not on science.

Response #7: Everything we do is based on values. Of course the precautionary principle is based on values, but so is the old way -- the two approaches just emphasize different values.

The precautionary principle makes one set of values explicit - protecting humans and ecosystems -- and puts that out front. Under the "old way" we try to hide our values behind "science," using scientific uncertainty as a cover for valuing short-term, private gain and ignoring the long-term and public/environmental consequences of our actions.

Even science starts with values. Scientific inquiry always begins by asking a question, and the questions that scientists choose to ask arise from particular values, particular assumptions about what is important.[1] So with science and precaution, as with all of life -- values come first.[2] There is nothing wrong with this. Indeed, there is no way to escape it. Making values explicit helps people understand what's really going on, and clarifies our choices as citizens.

Advocates of the precautionary principle definitely don't turn their backs on science, But they also don't turn their backs on other kinds of knowledge. Science is not the only valid way of knowing about the world; other kinds of knowledge can be useful to decision-makers -- historical knowledge, business knowledge, spiritual knowledge, local knowledge, community preferences, cultural values, artistic perceptions, and so on, can all play a valuable role in informing decision-makers.

Science cannot tell us what's best for society. Scientific experts can provide valuable information, but when it comes to setting political goals and making public policies, scientists have no special expertise. As the European Environment Agency has said, "Science should be on tap, not on top." We citizens should decide what we really want (our goals), take all available scientific information into account, take all the other relevant information into account, then do our best to become wise decision-makers.

Who are wise decision-makers?

** Those who are willing to monitor the consequences of their decision, to try to learn from past choices;[3]

** who are willing to revisit past decisions periodically, update their assessments, and modify policies accordingly;

** who favor decisions that can be reversed if things start to go sour;

** who experiment and try to learn before making a full-scale commitment down an unknown path;

** who consider all available alternatives, considering both costs and benefits before proceeding;

** who involve affected parties in decisions from the earliest stages when questions are being asked and goals set;

** who consider intergenerational equity in all decisions, asking whether we are saddling future generations with costs (or diminished opportunities) that we ourselves should be bearing;

** who ask whether justice and fairness are enhanced by the decision;

** who ask whether the decision will increase or decrease inequalities within and between communities;

** who ask what effect the decision will have on the most vulnerable and least capable among us.

Criticism #8: The precautionary principle envisions a new role for government, one without precedent or legitimacy.

Response #8: On the contrary, government has an ancient legal obligation to take precautionary action, to protect the public trust.

The Public Trust Doctrine is a legal doctrine handed down to us from Roman law, through English law, into the law of the 13 original colonies and now the states.[4]

The public trust doctrine asserts that the sovereign (in our case, state government) has an inalienable duty (a duty that cannot be denied or given away) to protect the common wealth --air, water, wildlife, public health, our genetic heritage, and more -- which we all inherit and own together and none of us owns individually.[4]

As trustee, government must protect the trust assets (nature and human health) for the trust beneficiaries (present and future generations). Government even has a duty to protect the trust assets against harmful actions by the beneficiaries themselves, and so from time to time government must limit some of the prerogatives of private property in order to protect the common wealth for present and future generations.

In carrying out its duty to protect the public trust, government has a duty to anticipate harm, to look ahead to protect the trust against impending threats.[5] If government waits until harm can be demonstrated beyond doubt, then it will be too late -- the trust property will be damaged and government will have failed in its duty as trustee.

The precautionary principle provides a way for government to fulfill its responsibility to protect the public trust, to anticipate and avoid harm, to foresee and forestall.

Criticism #9: Risk assessments rely on conservative assumptions and so they embody all the "precaution" we need.

Response #9: Risk assessments typically examine only a single option, not a range of alternatives. Therefore, risk assessments don't ask the basic precautionary question, "How can we minimize harm while achieving our goal?"

Because basic data are often not available about environment and health risks, risk assessors substitute best professional judgments and estimates. Furthermore, risk assessments try to compensate for unknowns and unknowables by applying "uncertainty factors" of 10 or 100 or 1000. As a result, two equally qualified risk assessors working with the same basic data can reach vastly different conclusions about risk.[6] Peer review of risk assessments by all stakeholders can reduce the range of disagreement, but it remains true that the assessment of risks can vary greatly, depending upon who is doing the risk assessment. As the first administrator of U.S. Environmental Protection Agency, William Ruckelshaus, said in 1984: "We should remember that risk assessment data can be like the captured spy: If you torture it long enough, it will tell you anything you want to know." [7]

Therefore, a risk assessment of a single option is not precautionary. Indeed, risk assessments are often used merely to argue that a certain amount of harm is justifiable, not to learn how much harm is avoidable.

Furthermore, instead of accepting that the burden of producing needed information falls on the party who is seeking to impose risks on society, risk assessors often try to make up for the lack of basic data by applying "uncertainty

factors," as if guesswork could adequately substitute for real knowledge. This is not precautionary in any sense of the word.

Risk assessment might play a role in a precautionary decision process by assessing the risks -- and the benefits -- of all available alternatives. The work of risk assessors could then be considered, along with many other factors, in the decision.

Criticism #10: Precaution requires proof of safety, which is impossible.

Response #10: Precaution does not require proof of safety -- it requires that the creator of risks shall make a best effort to acquire the information needed to assess the possible harms from the activity -- an effort that is open and subject to peer review by all affected parties. It requires acceptance of the community's stake in the outcome. It requires a commitment to ongoing monitoring and open reporting as the activity unfolds, and agreeing to pay for any harm that ensues, and taking responsibility for remediation as needed.

But there is still no guarantee that any particular firm will be able to make good on the financial commitment inherent in "agreeing to pay for any harm that ensues, and taking responsibility for remediation as needed." If the Superfund program teaches us anything, it teaches us that even large firms claim that they cannot afford to remediate the problems they have created.

To deter fly-by-night firms, and to institutionalize the principle that "the polluter shall pay," ecological economist Robert Costanza has proposed a "precautionary principle polluter pays" (4P) assurance bond.[8, pgs. 209-215.] Using the "4P" approach, before a new technology, process or chemical could be introduced, the worst-case harm would be estimated in dollar terms. Then the proponent of the new activity would be required to post a bond for the full amount before startup.

Such "assurance bonds" are common in the construction industry today, to assure that a job will be completed on schedule and they are intended to keep "fly by night" firms out of the construction business where they might cut corners and endanger public health.

A "4P" bond effectively shifts the burden of proof onto the proponent -- the burden of producing information to show that the activity is less harmful than was initially assumed (or, if harm becomes evident, to pay restitution by forfeiting a portion of the bond). A "4P" bond would also give the proponent powerful financial incentives to reduce the worst case damages by, for example, adopting intrinsically safer alternatives.

Criticism #11: We don't need this new way of doing things because we're doing better than our predecessors did. We're even doing better than we ourselves did last year. We have new technologies that won't pollute as much as the old technologies polluted.

Response #11: The question isn't whether you are doing better than your predecessors, or better than you did last year. The question is, are you doing the best you can to protect human health and the environment? The precautionary

approach assumes you want to achieve your own goals, and the community's goals, by the least-harmful means available. Precaution provides a way to learn whether you are measuring up to that standard. --Peter Montague

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[1] David Kriebel and others, "The Precautionary Principle in Environmental Science," *Environmental Health Perspectives* Vol. 109, No. 9 (Sept. 2001), pgs. 871-876. Available at <http://www.rachel.org/library/getfile.cfm?ID=170>

[2] Nancy Myers, "The Precautionary Principle Puts Values First," *Bulletin of Science, Technology and Society* Vol. 22, No. 3 (June, 2002), pgs. 210-219. Available at <http://www.rachel.org/library/getfile.cfm?ID=188>

[3] Donald Ludwig, Ray Hilborn and Carl Walters, "Uncertainty, Resource Exploitation, and Conservation: Lessons from History," *Science* Vol. 260 (April 2, 1993), pgs. 17, 36. Available at <http://www.rachel.org/library/getfile.cfm?ID=201>

[4] Peter Manus, "To a Candidate in Search of an Environmental Theme: Promote the Public trust," *Stanford Environmental Law Journal* Vol. 19 (May 2000), pg. 315 and

following pages. Available at <http://www.rachel.org/library/getfile.cfm?ID=234>

[5] James T. Paul, "The Public Trust Doctrine: Who Has the Burden of Proof?" Paper presented July, 1996 in Honolulu, Hawaii, to a meeting of the Western Association of Wildlife and Fisheries Administrators. Available at <http://www.rachel.org/library/getfile.cfm?ID=190>

[6] See Rachel's #420 at http://www.rachel.org/bulletin/index.cfm?issue_ID=705

[7] Ruckelshaus, W. Risk in a Free Society. *Risk Analysis*. 1984; 4(3):157-162. Available at <http://www.rachel.org/library/getfile.cfm?ID=361>

[8] Robert Costanza and others, *An Introduction to Ecological Economics* (Boca Raton, Fla.: St. Lucie Press, 1997). The "4P" bond was described in Rachel's *Environment & Health News* #510, available at http://www.rachel.org/bulletin/index.cfm?issue_ID=613. See also <http://www.rachel.org/library/getfile.cfm?ID=310>

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