

Communicating scientific uncertainty across the science- policy interface

Ensuring Quality and Understanding of Science
and

Accurate and Effective Use of Science
in Forming and Applying Policy

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Using Science in Different Policy Settings

“Rational Policy Makers” vs. “Power Brokers” in:

1. International Negotiations
2. Legislative Hearings and “Mark-Ups”
3. Mass Media, Internet, and Web
4. Executive Agency rulemakings
5. Judicial Review of Agency Decisions
6. Designing new Science-Policy Processes

Legislative, Executive, Judicial Levels

Policy exists in different forms with different Standards or “Burdens” of Proof and Standards of Care:

- International Treaties, Resolutions and Declarations
- Constitutions
- Statutes or Codes
- Regulations Issued by Executive Agencies
- Judicial or Court Decisions –
 - e.g., hazardous substance civil torts (preponderance of evidence & strict, joint liability) vs. criminal convictions (proof beyond a reasonable doubt & guidelines for sentencing and fines).
 - Special Masters for Scientific Questions

Legislative, Executive & Judicial, 2

Ironically, the most powerful policy makers and processes, have the lowest burdens of proof in most cases:

Judicial Review of agency rules vs. legislation vs. treaties

Remedies for poor use of science vary and are elusive -- from requiring super-majorities to ratify to difficult enforcement after ratification.

Being certain about that which we are uncertain

- The Precautionary Principle, has under a different name been a fundamental part of tort law for hundreds of years, but was used at UNCED in 1992 in Agenda 21 and used in the Montreal Protocol. It is a kind of legal standard that also establishes a presumption. The international community chose to use it and recommend it in the face of risk and uncertainty.
- Use the best available scientific data, but don't wait for better in the face of great risk (ESA)
- Require new data when waiting poses less risk (NEPA)

Policy formers' response to scientific uncertainty

The response of the honest and rational policy former is to design a process that will elucidate the best scientifically supported policy prescription for a particular problem, adopt that, and proceed to regularly refine that prescription or regulation over time in as the scientific understanding evolves. One good approach sets standards, delegates the details to expert agencies, provides for judicial review, and revisits the legislation only as needed.

Policy formers' view of what science provides to the policy process

- Science provides policy formers:
 - A basis for exploring a problem through hearings or comments on proposed rules, and
 - Science-based findings on which to base legislation as a rational means to achieve a Constitutionally – agreed public purpose

Applied scientists response on the problem of doing policy-relevant science

Most policy makers would expect scientists to be happy to help provide answers that will help drive the policy process by establishing:

- regulatory thresholds, e.g., pollution or take limits,
- mitigation steps that should work,
- a set of standards (legal and scientific) to prompt and support new regulations in response to new science or technology,
- an understanding of the resources needed.

From empirical experiment to policy evaluation – how many steps?

The greater the number of steps, the greater the need to invoke the precautionary principle – not to stop economic activity, but to channel it into methods, areas and levels at which it will restore and not diminish natural and human capital.

From empirical experiment to policy evaluation – how many steps?

From Proposals to Judicial Review of Agency Decisions

Awarding the costs of participating or litigating to the substantially successful intervener or plaintiff compensates scientists under the more successful American environmental laws. SCB has recommended a proactive approach that would fund unique scientific submissions early in the administrative rulemaking process in order to provide independent science at each step.

When the science is unpalatable – the level of certainty required to drive policy change

- The confirmation of a problem and its correlations, causes and solutions are four very different exercises in many cases especially when negative synergies abound. Again, it is essential that policy makers anticipate and prevent the greatest possible harms and expedite restorative economic actions pending the resolution of uncertainties.
- Thus the level of certainty required decreases in direct proportion to the magnitude of the risks inherent in not acting but increases in direct proportion to the side-effects or risks of risky prescriptions, such as choosing nuclear power as a response to the need to reduce greenhouse gases, without a full life cycle impact assessment of all the alternatives.

When the science is unpalatable – the level of certainty required to drive policy change

- Very often quasi-scientific conclusions are touted repeatedly so as to overwhelm better analysis. For example, most of the world seems to believe that adopting low emissions energy and agriculture will be too expensive to do quickly and certainly for developing countries.
- They also seem to believe that increasing carbon in the atmosphere by another 70 parts per million can still allow us to avoid serious damage. Neither is true by any stretch of rational analysis given the plethora of clean options and dramatic losses and greater risks that attend not using them.
- **450 ppm CO2 vs. 350; full review of pollution sources on a tight schedule vs. waivers and “grandfathering”, current forest tipping points vs. historical assumptions, etc.**

When the science is unpalatable – the level of certainty required to drive policy change

- Fundamental legal principles of tort, contract, international trade, and criminal law are helpful here in addition to elements of wildlife law and other sets of modern environmental law.
- Scientists can help policy makers respond to different levels of risk appropriately -- e.g., risks of direct human physical harm, economic risks, and biological and ecological losses ranging from extinction to ecosystem services to regional and global climate and climate-driven tipping points.

When the science is unpalatable – the level of certainty required to drive policy change

Persons and peoples to have a right in common law tort and in Human Rights Law (not yet always “hard law”), to remedies that will make them whole or prevent a harmful impact upon their persons or property due to the actions of another to which they have not given their “prior informed consent”.

Policy makers will be less likely to waive this principle when science shows that risks are high and that better alternatives are not difficult to adopt.

Designing new Science-Policy Processes

- The challenge is to set national and international norms that require at least a reasonable degree of scientific support for the formulation of the policy question and answers over the period of time in question. Having such norms might also mean having an appeal or review process, for a norm or a right without a remedy is one in name only.
- Legislators could set up a procedural review to ensure the scientific adequacy of the record presented in a committee report before legislation could be brought to the floor for consideration by the full House, for example.
- **In the international treaty writing and implementing processes, an independent body of scientists and policy petition, enforcement, and judicial review processes open to affected persons could be built into new agreements.**