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## Being Clear about the Precautionary Principle

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Kramer *et al* (2017) doubt there can be a single statement of the precautionary principle. They write that there will have to be separate context-dependent versions, and they discuss constraints that these should all respect.

They begin by comparing three well known early formulations: Rio (UNEP, 1992), Wingspread (Science and Environmental Health Network, 1998) and the EU (European Commission, 2000). They claim there are significant differences among them, but when we read the full statements, rather than just the extracts in the target article, we find that they really all say much the same thing but in different words.

For example, Kramer *et al* quote only the first sentence of Wingspread. On its own, this appears to make the principle *require*, rather than only *permit* action, but in the same short paragraph of the declaration we read, "It [the process of applying the precautionary principle] must also involve examination of the full range of alternatives, including no action." They also ignore a key sentence in the European Commission's statement: "In some cases, the right answer may be not to act or at least not to introduce a binding legal measure."

Crucially, all three agree (as some later formulations do not) on the two points that are the core of the precautionary principle. First, the principle can be invoked only if there is scientific evidence of danger or harm. Second, if there is such evidence, the principle does not say that the authorities *must* act, only that they are not obliged to wait for full proof of serious harm before they *may* act.

The decision to act – or not to act – must be taken on a case by case basis, relying on the evidence available at the time. The frequently heard criticism (*e.g.* Sunstein, 2008) which Kramer *et al* repeat, that the precautionary principle is inconsistent because "it simultaneously prescribes and forbids certain safety measures" is therefore completely wrong. The precautionary principle on its own neither prescribes nor forbids anything.

That does not mean, as is also sometimes alleged, that the precautionary principle is too vague to be effective. Imagine it had been in place in the sixteenth century, when tobacco first appeared in Europe. It would not have been relevant at the time because there was no evidence of harm. The authorities might have decided to ban tobacco on the grounds that it was a novel substance being used in an unusual way, but that would have been ordinary caution, not an application of the precautionary principle.

The principle would have become relevant when Doll and Bradford Hill (1950) provided strong epidemiological evidence that smoking is a major cause of lung cancer. Even then, the principle itself would not have obliged governments to take measures to reduce smoking. It would, however, have allowed them to act on the growing evidence for the hazards of smoking, rather than giving in to the tobacco industry's insistence that until the mechanism had been determined, the case against smoking had not been proven and consequently nothing could be done.

We do not know the cost of this failure to apply the precautionary principle. In particular, we do not know how long governments would have waited before they decided that the evidence was strong enough to justify intervention. A back of the envelope calculation, however, suggests a toll of the order of a million early deaths or, for those who insist on seeing everything in terms of money, trillions of US dollars (Saunders, 2010).

The story of asbestos, identified as especially hazardous in 1898 but not banned in the UK until 1998, is another expensive example. For details on this and many others see Harramoës *et al* (2002).

The role of the precautionary principle is analogous to that of the burden of proof in the criminal courts. That can have a significant effect on the outcome of a trial, but it does not determine it.

The burden of proof is placed on the prosecution because we know that courts will sometimes make mistakes and we believe that it is worse to convict a person who is innocent than to acquit one who is guilty. This is a decision of principle that is properly taken by society as a whole. It is also a decision that society is capable of taking because it only has to take it once, not separately for each of the many different offences defined by the law.

Similarly, the decision whether or not to adopt the precautionary principle should be taken at the level of a society. How it is applied in different situations must, however, be delegated. Kramer *et al* describe the detail involved with regard to blood transfusion, and this is only one of a large number of cases that would have to be decided. Society, in the form of the public or legislatures, has neither the time nor the expertise to do this.

Without a clear, agreed formulation, it is impossible for a society to judge whether a decision is in line with what it wants. Indeed, society would be effectively excluded from the

process. We can imagine what sort of precautionary principle would be agreed for tobacco or carbon emissions if the decisions were left to committees of experts – especially if there were, as there so often is in these matters, strong representation on the panels or well-funded lobbying of governments from the relevant industry. Experts have their own agendas.

There can and should be a single statement of the precautionary principle that societies could adopt or not as they chose, and that has the potential to be effective. If it were adopted, history tells us that some very expensive mistakes could be avoided or at least mitigated. At the same time, almost all innovations would go ahead just as they do now. Even with the burden of proof on the prosecution, a large proportion of defendants are found guilty.

The statement should be based on the idea expressed in the Rio, Wingspread and EU versions: where there is a *prima facie* scientific case for harm, it is not necessary to have conclusive proof before measures may be taken.

Expert assistance will be required in drafting the definitive version of a statement that is intended to be a policy of governments and international organisations. This is especially important because trade agreements such as NAFTA and the proposed TTIP include provision for companies to sue governments for the loss of the profits they were denied by an action that a tribunal (not necessarily a court) rules to be unjustified (see, e.g. Freeman, 2015).

Society must be given the right to say what it wants in a way that can actually make a difference. Merely declaring that we are in favour of a precautionary principle of some unspecified sort and leaving expert panels to decide for themselves what, if anything, this amounts to is not enough.

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Short bio:

Peter Saunders is Emeritus Professor of Mathematics at King's College London. He was also for over 15 years co-director of the Institute of Science in Society in London. His major research interests are in evolution theory and the study of complex systems.

