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Communication of scientific uncertainty and the case of the IPCC¹

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Science rarely arrives at certified truth, but as long as it is based on “criteria of justification [that] are indicative of truth” (Haack 2003:25) it presents us with good *candidates* for truth – often more than one. This is to say that science reduces, but seldom eliminates, uncertainty. How are we to communicate the uncertainty that usually lingers on?

We may either (a) be frank about it, i.e. provide our best estimate of uncertainty, or (b) play down uncertainty, or (c) play it up. The first strategy suggests itself as the right one, and the last may seem perverse. But I shall dispute both assumptions.

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Distinguish between (i) pure science, and (ii) science that is undertaken for the sake of political choice, that is, to provide premises for rational choice of policy in some issue area, such as regulation of greenhouse gas emissions.

In the case of pure science, it may be a good idea to play down uncertainty, as it may fuel up scientific debate. This may be called the *Hobbesian* approach, after Thomas Hobbes (1588 – 1679), whose political theory brims with confidence and has been a constant challenge to political scientists. In pure science, one person’s over-confidence in his or her favorite theory may bring out the best in those who disagree.

What if science is undertaken for the sake of policy making? Again, to be frank about uncertainty seems right, but I will put in a word for playing up uncertainty. This is advisable at least if frankness would imply that we put a low estimate on uncertainty. In order to justify this point of view, which may appear paradoxical, I shall first put forth another one, which has no paradox about it.

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In most cases of political choice, we cannot wait for anything near to certified truth before action is taken. Policy will, at best, have to be made on the basis of some theory that is a good candidate for truth. Suppose one such theory – not necessarily the best candidate with respect to the matter at hand – implies that there is danger ahead: Something very bad will happen unless we are very lucky or adopt a certain course of action, C. Then there is good reason to adopt C. This, I take it, is the point of the *precautionary principle*. It has great appeal.

The problem, of course, is that C – what has to be done to avert danger – may have costs, too, which we may be reluctant to incur. Such reluctance is sometimes unwise, but not always. It is unwise only if the costs of C are worth paying. How do we find out? The precautionary principle is no algorithm that allows us to find out in a straightforward, quasi-automatic manner. The question can only be settled through political deliberation and debate. But the precautionary principle provides the proper focus for such debate. (Thus,

¹ A large part of my presentation is based on Malnes 2006 and 2008.

rather than talking about the precautionary *principle*, we should be talking about the *problem* of precaution: It is the one we ought to be concerned about, and cannot be resolved by resort to a simple principle.)

This brings us back to scientific uncertainty: I shall argue that playing up uncertainty can be a way of making sure that political debate has the correct focus.

I shall use the *Intergovernmental Panel on Climate Change* (IPCC) as an illustration. Over a period of 20 years, it has published several reports that portray anthropogenic emissions of greenhouse gases as a major threat to climate stability. It is a clear case of science for the sake of policy making. Bert Bolin, who used to be head of IPCC project, spoke of the need to “bring together available scientific knowledge in as useful a form as possible to provide a factual basis for political decisions” (Bolin 1994:23). He also said that scientists must “inform politicians in a simple manner that can be readily understood, but the message must always be scientifically exact” (ibid.:27). The IPCC has fulfilled this dual obligation by publishing the reports of each working group in two parts, and here is how Bolin describes them:

- i) Supporting material of about 300 pages, which is a careful scientific overview of the available literature ... extensively reviewed by the scientific community to ascertain its credibility.
- ii) A policymakers summary of about 25 pages, which is an extraction from the supporting material of what may be politically important. It is similarly extensively reviewed by the scientific community. (Bolin 1994:27)

The policymakers summary is supposed to be the basis for policy making.

How does the IPCC communicate uncertainty – frankly, by playing it down, or by playing it up? I shall make two observations. In the first report of the IPCC, which came out in 1991, Working Group 1 says this in the summary of its findings:

We are certain of the following: ... emissions resulting from human activities are substantially increasing the atmospheric concentrations of greenhouse gases ... These increases will enhance the greenhouse effect, resulting on average in an additional warming of the Earth's surface. (IPCC 1990: xi)

In the “supporting material”, however, uncertainty is expressed. They who read as far as page 254 get to know that

The inherent variability of the climate system appears to be sufficient to obscure any enhanced greenhouse signal to date. Poor quantitative understanding of low frequency climate variability (particularly on the 10-100 year time scale) leaves open the possibility that the observed warming is largely unrelated to the enhanced greenhouse effect. (IPCC 1990: 254)

This, as far as I can see, is to say that what we observe with respect to temperature and weather developments are *either* an enhanced greenhouse effect *or* an instance of

natural variability. In the scientific proceedings, both hypotheses appear to be equally good candidates for truth, contrary to what the IPCC states in the summary for policy makers.

In the latest IPCC report, which was published in 2007, the summary of the contribution from Working Group 1 is sprinkled with expressions of confidence in the greenhouse theory. We are told that “[m]ost of the observed increase in global average temperature since the mid-20th century is *very likely* due to the observed increase in anthropogenic greenhouse gas concentrations”, whereas it “is *very unlikely* that climate changes of at least the seven centuries prior to 1950 were due to variability generated within the climate system alone” (IPCC 2007: 10 and 12). The IPCC says that there is a chance of 9 in 10 that human activity is the cause of climate change.

But this seems exaggerated in light of qualifications that are made in the scientific proceedings. Here it is pointed out, for example, that it is still not known how clouds and oceans respond to climate change. And it is acknowledged that these processes play no small role in the causal chain between greenhouse gas emissions and climate change (ibid.: 592 – 593).

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As far as I can see, the IPCC isn't entirely frank about uncertainty. I am not suggesting that it is falsifying or distorting empirical findings. But it seems that the IPCC plays down uncertainty when it addresses itself to policy makers. If I'm wrong about that, one thing is beyond doubt: The IPCC does not play up uncertainty. But this, I believe, is what it ought to have done, and here is why.

When proponents of one theory in a field of theoretical controversy express great confidence in their favourite theory, proponents of other theories will hardly remain silent. The scientific debate that follows is likely to be loud and livid. This is apt to be good for science. Remember the Hobbesian argument. But it may not be good for political debate.

As the heat turns up inside the scientific community, people on the outside may come to believe that disagreement runs deeper than it actually does. Scientific uncertainty becomes a major issue. The fact that we have not arrived at certified truth overshadows the fact that we have arrived at some good candidates for truth.

This, it seems, has happened in the debate about climate change. A large part of the public debate revolves around the question whether or not we *know for sure* that harmful climate change will take place unless something drastic is done to reduce greenhouse gas emissions. This has set the stage for endless bickering and postponement of political decisions.

Moreover, scientific discord has not gone unnoticed among those who, for some reason or other, want to dismiss the danger of climate change. They have been able to defend their position simply by pointing out that there is still disagreement among scientists. A telling illustration can be found in a memo from the Republican Party in the United States, aimed at backing up (then) President Bush's resistance to greenhouse gas reductions:

Should the public come to believe that the scientific issues are settled, their views about global warming will change accordingly. Therefore, you need to continue to

make the lack of scientific certainty a primary issue in the debate. (Quoted from Lanchester 2007:5)

Responsibility for this state of affairs lies largely with scientists who have used their position as public experts to argue that the greenhouse theory is the only viable explanation of climate change. Scientists who subscribe to other theories have, quite predictably, raised their voice in protest. As a result, uncertainty has come to be perceived as a major problem and good reason not to do anything before scientists agree – which, of course, is unlikely to happen soon.

The IPCC's profession of firm belief in the greenhouse theory has opened the door to the wrong kind of political debate. Portraying the greenhouse theory as an almost certified truth has played into the hands of opponents of greenhouse gas reductions, allowing them to harp on uncertainty. I do not suggest that opposition to reductions is plainly irrational. It is irrational, however, to oppose reductions on the ground that the greenhouse theory may be false. So it may, but it is a good candidate for truth – good enough to shift focus from theoretical issues to the problem of precaution: Given that danger of man-made climate change exists, is reluctance to cut down greenhouse gas emissions unwise? I think it is, but this is not the point here. The point is that this is the question we should be concerned about for political purposes. The question whether the greenhouse theory is an almost certified truth should be left to pure science.

Uncertainty is resilient in even the best parts of science, and scientists should accommodate people to the idea that most of time, even the best estimate is an uncertain estimate. The fact that we don't know for sure, but only suspect, that greenhouse gas emissions are causing climate change is not, in itself, a good argument for inaction. Uncertainty is not a valid excuse for complacency. No one is better placed than scientists to combat the resort to this excuse. They can do so by playing up and thereby trivializing uncertainty.

Literature

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