

Interactive comment on “Ideas: a simple proposal to improve the contribution of IPCC WG1 to the assessment and communication of climate change risks” by Rowan T. Sutton

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I welcome the call to climate scientists to explore plausible high-impact scenarios, even if the likelihood of these scenarios is considered relatively low. Climate policy is about risk management, and risk management has always had to consider relatively extreme scenarios, with high impacts and low likelihood.

I would suggest however not to define those scenarios by their likelihood. Indeed, estimating the likelihood of non-likely scenario is difficult and controversial, and not necessary to provide useful inputs into risk assessment and the design of risk management policies and measures.

Stress testing in the financial sector, or the decision to insure a house against fire, usually does not involve an estimate of the probability of a given scenario. The idea is that testing a system against an extreme scenario provides useful insights into a system's vulnerability, and help make the system stronger. "Robust decision-making" — a methodology that is becoming increasingly common in infrastructure design; see Lempert et al (2013) — and other methodologies to make decisions under deep uncertainty do not rely on the probabilities of every scenario (even though most approaches can use probabilities when available). (See below for illustrations of how this approach is applied in various sectors, and www.deepuncertainty.org for more information.)

Constraining the proposed scenarios to those with an estimated probability may limit the range of possible futures that can be considered. And for stress testing, being exhaustive (i.e. considering all possible threats) is more important than being precise (i.e. quantifying the likelihood of a scenario and expected impacts).

The approach proposed here could be extremely valuable, and have direct operational implications. To ensure proper risk screening for long-term investments or planning, it is indeed critical to have an idea of the full range of possible futures. A great contribution from climate sciences would be to guide the selection of the most extreme scenarios that should be considered in such analyses, answering questions like "What is the range of plausible change in extreme rainfall in Europe by 2050 or by 2100?".

While the exact definition of these extreme scenarios will depend on the problem at stake (as one wants to be more pessimistic when catastrophic outcomes are possible), any guidance from climate scientists and models would be a great contribution to the design of more resilient infrastructure, and thus to a lower vulnerability to future climate change impacts. I think therefore that this manuscript should be published.

I would like to insist however on the communication challenge that the exploration of "extreme" scenarios creates. It would be useful if the authors — or some of his readers — could provide constructive ideas to ensure that IPCC readers understand the status

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of unlikely scenarios and do not confuse them with forecasts or predictions.

Lempert, R.J., Popper, S.W., Groves, D.G., Kalra, N., Fischbach, J.R., Bankes, S.C., Bryant, B.P., Collins, M.T., Keller, K., Hackbarth, A., Dixon, L., LaTourrette, T., Reville, R.T., Hall, J.W., Mijere, C., McInerney, D.J., 2013. Making Good Decisions Without Predictions. Rand Corp. Res. Brief 9701.

Application of “decision-making under deep uncertainty” in various sectors:

Water: <http://documents.worldbank.org/curated/en/617161468187788705/Robust-decision-making-in-the-water-sector-a-strategy-for-implementing-Lima-s-long-term-water-resources-master-plan>

Energy: <http://documents.worldbank.org/curated/en/465701468330278549/Making-informed-investment-decisions-in-an-uncertain-world-a-short-demonstration>

Transport: <http://documents.worldbank.org/curated/en/691821490628878185/Improving-the-resilience-of-Perus-road-network-to-climate-events>

Hydropower: <http://documents.worldbank.org/curated/en/179901476791918856/South-Asia-Investment-decision-making-in-hydropower-decision-tree-case-study-of-the-upper-Arun-hydropower-project-and-Koshi-basin-hydropower-development-in-Nepal>

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