INGSA CASE STUDIES

THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE:

Transferable Model or Cautionary Tale?

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Transferable Model or Cautionary Tale?

The Intergovernmental Panel on Climate Change (IPCC) is widely regarded as a successful example of global science advice. Its voluminous assessment reports are produced by thousands of volunteer scientists approximately every six years, who work across three Working Groups dealing respectively with the physical science, climate change impacts and adaptation, and mitigation options. Outlines of the reports, and the final content, are approved by government representatives, and are intended to form the main scientific basis for governmental policy-making The IPCC has pioneered new ways of assessing scientific knowledge across a broad range of disciplines and interconnected topics, and has helped to cement climate change within international policy agendas. This success prompted the establishment of the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) in 2012 (Beck et al., 2014) and calls for similar bodies to provide advice for other global policy challenges such as antimicrobial resistance (Woolhouse & Farrar, 2014). Observers from other grand policy challenges may cast an envious eye at the IPCC's undoubted symbolic power (Hughes, 2015). Yet attempts to transfer this model of knowledge production to other issues can be problematic, without detailed analysis of the IPCC's role in both climate science and politics. This case study provides an introductory overview of the IPCC's history and influence and the potential for 'the IPCC model' to be transferred into other policy issues.

Background and context

The IPCC was formed in 1988 under the World Meteorological Organisation (WMO) and the United Nations Environment Program (UNEP). Strong consensus statements had emerged from scientific conferences on climate change in the mid-1980s, but it was perceived by many that the political complexity of climate change was such that more was needed to drive political action. In light of dissatisfaction with the Advisory Group on Greenhouse Gases, a small, underfunded advisory group set up in 1986 by WMO, UNEP and the International Council of Scientific Unions (ICSU) which was arguably too distant from the policy process to be effective, calls were made for a more comprehensive international assessment effort (Agrawala, 1998). Following complex negotiations between the US Government and WMO's Executive Council, the road was paved for the emergence of the IPCC.

The emergence of the IPCC coincided with, and reinforced, a reconceptualization of 'climate' as a complex, global system. This was the outcome of decades of scientific work on the general circulation of the atmosphere, on the data and modelling infrastructures required to study it (Edwards, 2010), and the emergence of new ideas about how environmental problems could or should be managed through cooperation at the global scale (Miller, 2004). It was the novelty of the latter which arguably drove the desire for an *intergovernmental* institution, with various competing actors, not least across different departments of the US Government, keen to ensure governmental oversight of such consequential knowledge-making (see Agrawala 1998).

The focus initially was to be on providing a comprehensive assessment of climate change and its potential impacts, while debating the relative merits of possible response strategies. A number of developing countries expressed unease at this positioning of the IPCC across the science-policy

interface, fearing that the Western dominance of climate science would therefore enable them to dictate the terms of global climate policy, and in 1990 the Intergovernmental Negotiating Committee was formed as a separate setting for the drafting of what would become the UN Framework Convention on Climate Change (UNFCCC). Post-1990, the IPCC reverted more to scientific assessment, promising policy neutrality across its three Working Groups (WGs) dealing with the physical science (WGI), social and ecological impacts and adaptation (WGII), and mitigation options (WGIII). Each WG produces its own report, before working together to produce a more succinct Synthesis Report. Five Assessment Reports have been completed to date, in 1990, 1995, 2001, 2007 and 2014. In 2015, the IPCC decided to begin preparations for a sixth assessment report. These assessments inform parties to the UNFCCC and underpin UN negotiations.[1]

The task of the IPCC is wide-ranging:,to assess all the available science, and come to consensus statements about the present state and the future of anthropogenic climate change. However, it has addressed direct policy questions, such as the potential meanings of 'dangerous' climate change, which the UNFCCC is designed to avoid, and has provided focused assessments of topical questions like extreme weather (IPCC, 2012), renewable energy (IPCC, 2011) and the impacts of 1.5°C of warming in Special Reports (IPCC, 2016). The IPCC's role in setting the scientific and political agenda on climate change saw it awarded the 2007 Nobel Peace Prize, alongside political campaigner and film-maker Al Gore.

The dilemma

The 'headline' findings of the five assessment reports have concerned global mean temperature rises to date and in future, and the ability of scientists to attribute these rises to human activities. This may seem natural to us now, but it wasn't to many in the 1980s. Chris Russill (2016) has argued that this period saw a struggle to 'frame' climate change as either a question of global trend detection and management, or as a question of local climate-society interactions and risk management. Trend detection won out, due in part to the new dominance of global models, but also, Russill suggests, to contemporary US energy politics where the management of global trends was a dominant mode of thought and practice across science and politics. However, in the subsequent evolution of the IPCC over the next two decades, we can trace a shift in framings from climate change as a problem of additional carbon dioxide and temperature, to a problem of risk management. In recent WGII reports in particular, some of the concerns of the dissenting 1980s scientists, who lobbied for risk management rather than trend detection/management approaches, are starting to be addressed.

Implicit in the framing of climate change as a problem of global trend management is the assumption that climate change is a well- structured technical problem, within which scientific advice could act as a trigger for multilateral international agreement on ameliorative policy actions (Hoppe, Wesselink, & Cairns, 2013). However, many social scientists have argued that climate change is actually an unstructured, or 'wicked' problem at the global level, spanning both social and climate systems and containing deep cultural and political differences over values, goals and meanings (Demeritt, 2001; Hoppe et al., 2013; Prins et al., 2010). Framing climate change as a global problem with global solutions has been a natural progression of trends in both science and politics, but the result can be a heavily

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[1] More direct scientific and technical advice, for example on the preparation of emissions inventories, is provided by the UNFCCC's Subsidiary Body of Scientific and Technical Advice.

centralised supply of scientific advice that neglects the need for geographically differentiated and plural policy approaches (Hoppe et al., 2013)

Different framings of a problem have powerful effects on how solutions to the problem are conceptualised. Some have worried that the emphasis on global trend detection in IPCC reports has taken political and public attention away from the IPCC's treatment of adaptation questions, or pushed adaptation to the end of a chain of accumulating impacts where it functions as the social cost of failed mitigation (Beck, 2010; Hulme, 2011). It has been argued that we should be thinking more concertedly about adaptation to climatic extremes already evident, and less about determining their direct cause. Certain framings may also play better in different political cultures – trend and/or risk management may appeal to certain North American modes of thinking about environmental problems, which often place the burden of proof on proponents of regulatory action, but may not sit so well with more precautionary attitudes in Continental Europe, for example (Mahony, 2015). The IPCC has also faced controversy in the way it has framed issues concerning the global South – whether in the presentation of Southern forests as 'empty' spaces standing ready to suck up the carbon pollution of the global North (Fogel, 2005), or in the valuing of Southern lives at lower levels than Northern lives (Masood, 1995). These controversies point to the fact that in the context of an issue like climate change, scientific claims may not be simply 'neutral'. Rather, they shape the contours of how we think – politically, ethically, culturally – about responding to the issue at hand. Institutions like the IPCC exert great political and symbolic power (Hughes, 2015), and therefore face dilemmas about how to frame scientific issues in ways which are credible, legitimate and salient to a wide range of audiences.

Part of the IPCC's response to this dilemma has been a broadening of the disciplinary make-up and forms of knowledge which go into its assessments. However, repeated criticisms have been made of the under-representation of social science and humanities disciplines (with the exception of economics, which is well represented), despite their capacity to provide vital knowledge about the key drivers and potential victims of climate change – human beings and their societies (Bjurström & Polk, 2011). The IPCC has also been dominated by scientists from the global North (Ho-Lem, Zerriffi, & Kandlikar, 2011), leading to worries of bias towards problems and framings which are of greatest concern to Northern scientists and politicians (Orlove, Lazrus, Hovelsrud, & Giannini, 2014). In the case of a country like India, low participation of both scientific and political actors has been attributed to both a lack of interest in the science (as opposed to the politics) of climate change, and a widespread distrust of the IPCC as a potential vehicle of western diplomatic power (Biermann, 2001; Lahsen, 2007). Indeed, it was for this reason that India was among those calling for the IPCC's pre-1990 policy negotiation functioned to be removed (Miller, 2009).

The IPCC's acknowledgement of the social complexities of climate change impacts has grown over time, even if concepts like inequality or justice are yet to become key organising concerns. Debates have ranged over how to bring in the knowledges and experiences of people on the 'frontline' of climate change, for instance in the Arctic. This might mean revision on how expert authors are selected and included (Ford et al., 2016), or on how different types of knowledge are rendered credible and thus proper for inclusion. The public controversy in 2010 over a published mistake about when Himalayan glaciers may melt away brought to the fore questions about the inclusion of so-called 'grey literature' in assessments – literature which may not have been through the vetting procedures of scientific peer review, but which may nonetheless feature important insights from places where accredited scientists may have yet to tread. The tightening of grey literature guidelines to avoid embarrassing mistakes may therefore risk excluding certain forms of knowledge – and thus people and places – from the assessment process.

The role of scientific advice

The IPCC has, since its first assessment report, sought to deliver to policymakers a consensus statement on the state of the science of climate change. Consensus has thus become the hallmark of the IPCC process, achieved through the processes of collective authorship among large groups of scientists, a lengthy expert and government review process, and in lively plenary sessions where government representatives offer their approval (or disapproval) of the headline findings. To many commentators this presentation of a unified scientific voice on a global public stage has been central to the IPCC's authority to set the terms of debate (Pearce, Brown, Nerlich, & Koteyko, 2015). There is a symbolic power to the IPCC'S self-positioning as the voice of a singular scientific community, labouring for many years to offer universal truths unto the altar of politics, where they may either be lauded as sacrosanct, or sacrificed to the higher gods of political ideology and material interest. However, some have argued that despite the symbolic and political power of scientific consensus, it may tarnish the process of producing objective assessments. A famous case concerned the production of estimates of end-of-century sea level rise in the 2007 report, wherein new model results suggested much higher rates of change than previous assessments. However, the unreliability of these results, owing to their comparatively new underlying methodology, meant that consensus could not be reached on them, and they were excluded from the headline statements which were much more conservative (O'Reilly, Oreskes, & Oppenheimer, 2012). Did consensus science serve the best interests of policy makers here? Perhaps the latter would be best served by being informed of not only what everyone can agree on, but of the probabilities – however low, or controversial – of high-magnitude future events, like rapid sea level rise, carrying great implications for things like the planning of coastal cities (Hansen, 2007; Oppenheimer, O'Neill, Webster, & Agrawala, 2007).

Consensus also raises important questions about how best to represent uncertainty. There are many forms and sources of uncertainty – incomplete understandings, observational and model error, expert disagreement, and so on – which are hard to communicate in a single language. The IPCC developed a set of likelihood and confidence statements which have slowly worked their way across the Working Groups, but these have been shown to be incompletely understood, particularly by non-scientific audiences (Barkemeyer, Dessai, Monge-Sanz, Renzi, & Napolitano, 2016; Budescu, Por, Broomell, & Smithson, 2014)

The challenges of consensus and communication also relate to the points above about problem framing, and the frequent inseparability of the epistemic and the normative in climate change science. The IPCC's attempts to produce state of the art, 'policy-neutral' scientific observations of the world are perhaps commonsensical, but they sometimes mean overlooking the societal values and processes that lie underneath the processes the IPCC seeks to describe. Put crudely, the scientific description of 'what is' can often be divorced from the societal 'what ought to be', at the risk of making the issue too distant from the everyday concerns of global publics, and thus undermining the capacities of those publics to make concerted, democratic claims for strong policy action (Jasanoff, 2010).

One example of the inevitable intermingling of facts and values is the recent controversy over so-called 'negative emissions' technologies in IPCC scenarios. These technologies, at this point essentially non-existent, were crucial in generating scenarios in which the world stayed below the commonly agreed upon threshold of dangerous climate change. However, questions of the social and political feasibility of these technologies, which would involve giving huge swathes of land over to bioenergy production, were side-stepped by the IPCC and science advisors, and the centrality of these technologies to the scenarios underplayed (see Geden, 2015). There are important questions here about how scientists should negotiate the links between questions of technical and social feasibility

of new technologies, for example, but also about how transparent they should be about the assumptions and values underpinning descriptions of the world as it is, and predictions of the world as it could – or ought – to be. For many, closer forms of knowledge 'co-production' (or collaboration between knowledge makers and users in assessment processes) is key to tackling these complexities, especially as bodies like the IPCC seek to move to more 'solution-oriented' approaches (see Tollefson, 2015). However, co-production can also challenge conventional means of establishing scientific and political authority and for a body like the IPCC, which values its status as the global scientific authority on climate change, more knowledge co-production could seem like an erosion of its autonomy – even though its autonomy is, by design, already incomplete as an intergovernmental organisation (Hoppe et al., 2013).

Wider lessons and insights

The IPCC is an extraordinary institution – perhaps the largest exercise in scientific cooperation ever embarked upon, and the producer of knowledge claims which have no doubt underpinned the steady push for global policy action. It is therefore not surprising that actors in other domains seek to emulate the IPCC model, for example Woolhouse and Farrar (2014) calling for the creation of an organization similar to the Intergovernmental Panel on Climate Change (IPCC) to marshal evidence and catalyse policy across governments and stakeholders….an intergovernmental panel on antimicrobial resistance (IPAMR)" (Woolhouse & Farrar, 2014). But in the case of climate change, since 1988 global emissions have continued to rise, some still publicly question the reality of climate change, and questions have even been asked about whether the incremental increases in top-line certainty in IPCC reports, concerning global warming trends and their human causation, are worth the years of effort of thousands of volunteer scientists. It is therefore important to reflect on this history and draw lessons from it, both for the IPCC and for science advisory processes with similar ambitions.

The key lessons of the IPCC story are perhaps that there are a number of trade-offs which will need to be considered in designing similar institutions and processes of scientific assessment and advice. Here, we highlight three:

> *i) global vs local*: between scientific knowledge that speaks of abstract global systems, to a global audience, and knowledge that pertains more closely to the local settings where the drivers and impacts of global change are more directly experienced. This dynamic plays out differently across the IPCC's Working Groups, and reflects global distributions of expertise and knowledge which the IPCC cannot itself do much to change. However, regionally-focused assessments have been touted as a means of integrating more sub-global information and local relevance into the IPCC process.

> *ii) scientific disinterestedness vs policy relevance*: between processes which aim to stay firmly on the science side of the science-politics boundary, sticking to the norm of scientific disinterestedness, and processes which engage more directly with value-laden policy questions. The former strategy may help enhance the scientific authority of a process, but perhaps at the cost of direct policy relevance. The IPCC has long guarded the norm of 'policy relevant, never policy prescriptive', but some have argued that steering clear from values-based questions has led to a lack of real-world utility for IPCC reports, particularly when it comes to questions of adaptation and mitigation, where 'is' and 'ought' cannot be so easily separated.

iii) consensus vs conflict: a related trade-off concerns consensus and unitary statements versus the representation of conflicting views. Again, consensus may help enhance scientific authority, and please those policy-makers who value non-ambiguous statements (Mahony, 2013). But as shown above, the pursuit of consensus can lead to important omissions, either of uncertain findings, or of conflict and disagreement. Social science research has shown that the assumption that decision-makers only value unanimity and certainty is wrong (Stirling, 2010). Mediating between conflicting opinions and handling uncertainty is the bread and butter of politics; and scientific advisory processes may benefit from acknowledging points of disagreement

From this it appears that if we are to have an Intergovernmental Panel for Antimicrobial Resistance, or any other global challenges for that matter, the IPCC model cannot be treated as being easily transferable. Global (as opposed to national) science advice involves different design and problem framing choices that should be openly considered by a range of actors, and at the earliest available opportunity. As we have illustrated through the three trade-offs above, there are no perfect solutions when providing policy-relevant science advice on a global level. However, being aware of the underlying and ongoing issues that have surfaced during the IPCC's history provides a sound platform for decision-making and future learning.

QUESTIONS FOR REFLECTION

- Do we need to disaggregate the IPCC's global focus into more regionally-oriented assessment modes? Has the IPCC 'finished the job' when it comes to reporting on the headline global trends, and do policy-maker information needs now lie elsewhere?

- To what extent should the IPCC assessment process be opened up to more diverse forms of knowledge – whether from the social sciences and humanities, or what's commonly referred to as 'local' knowledge, perhaps that of key stakeholders, indigenous groups, or those already suffering the effects of climatic extremes?

- To what extent does the IPCC provide an institutional blueprint for scientific assessment and advisory processes in complex issues domains? What issues might arise when attempting to transfer the IPCC model into other areas of science advice?

- Would assessment reports less focused on finding consensus be of greater public value? Would such reports be well-received by policymakers?

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