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RESEARCH ARTICLE

Actors, activities, and forms of authority in the IPCC

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Abstract

Scholarship on global environmental assessments call for these organisations to become more reflexive to address challenges around participation, inclusivity of perspectives, and responsiveness to the policy domains they inform. However, there has been less call for reflexivity in IPCC scholarship or closer examination of how routine concepts condition scholarly understanding by focusing on science and politics over other social dynamics. In this article, I suggest that scholarly reflexivity could advance new analytical approaches that provide practical insights for changing organisational structures. Through reflecting on my understanding of the IPCC, I develop actors, activities, and forms of authority as a new analytical framework for studying international organisations and knowledge bodies. Through its application, I describe the social order of the IPCC within and between the panel, the bureau, the technical support units, the secretariat and the authors, which is revealing of which actors, on the basis of what authority, have symbolic power over the writing of climate change. The fine-grained analysis of organisations enabled by this analytical framework reveals how dominance can and is being remade through intergovernmental relations and potentially, identifies avenues that managers of these bodies can pursue to challenge it.

Keywords: actors; activities; authority; bourdieu; climate change; developing countries; international organisation; IPCC; knowledge; participation; reflexivity; social order; symbolic power

1. Introduction

Recent studies of the Intergovernmental Panel on Climate Change (IPCC) and the Intergovernmental Policy Platform on Biodiversity and Ecosystem Services (IPBES) call for greater reflexivity in the organisation of these global environmental assessment bodies.¹ As this research indicates, organisational reflexivity is critical for bringing the epistemological and normative frameworks that underpin an organisation and its assessment activities into focus, and creating space to reconsider ‘and evaluate the full range of alternative institutional design options’ that could enable an organisation to change.² Alongside this organisational reflexivity, we also

¹Silke Beck et al., ‘Towards a reflexive turn in the governance of global environmental expertise: The cases of the IPCC and the IPBES’, *GAIA – Ecological Perspectives for Science and Society*, 23:2 (2014), pp. 80–7; Mark Vardy et al., ‘The Intergovernmental Panel on Climate Change: Challenges and opportunities’, *Annual Review of Environment and Resources*, 42:1 (2017), pp. 55–75; Maud H. Devès, Michel Lang, Paul-Henri Bourrelrier, and François Valérian, ‘Why the IPCC should evolve in response to the UNFCCC bottom-up strategy adopted in Paris? An opinion from the French Association for Disaster Risk Reduction’, *Environmental Science & Policy*, 78 (2017), pp. 142–8; Silke Beck and Martin Mahony, ‘The IPCC and the new map of science and politics’, *Wiley Interdisciplinary Reviews: Climate Change*, 9:6 (2018); Maud Borie et al., ‘Institutionalising reflexivity? Transformative learning and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)’, *Environmental Science & Policy*, 110 (2020), pp. 71–6.

²Beck et al., ‘Towards a reflexive turn’, p. 81.

need to turn a reflexive gaze back on ourselves as individual researchers and as a community of scholars analysing these bodies. In much the same way, scholarly reflexivity can bring into focus the analytical frameworks that structure knowledge of the IPCC and IPBES, enabling a closer examination of how shared concepts and models of science in politics shape collective understanding of the nature and characteristics of these bodies.³

Managers of IPCC and IPBES have been receptive and responsive to social science study, particularly criticism around gender, disciplinary, and geographical dominance in the authorship and the inclusion of Indigenous knowledge in assessments,⁴ and used this as the basis to inform incremental change.⁵ Despite the role of IPCC research in identifying the geographical asymmetries in participation, this issue continues to challenge every aspect of the assessment cycle, from appointing authors to the approval of the assessments key findings in the Summary for Policymakers (SPM).⁶ Even in the most recent publication, the Synthesis Report approved in March 2023, the former IPCC vice chair lamented that the session had finished ‘2.5 days later than scheduled, without the participation of many developing countries (who were not funded to stay longer).’⁷ Studies of the IPCC have identified and documented these asymmetries and the historical resistance towards the body and its assessments of climate change this has generated.⁸ The literature indicates that this unevenness is reflected in the climate change knowledge assessed in IPCC reports, creating knowledge gaps for some of the most climate vulnerable countries.⁹ Some studies hold the IPCC responsible for addressing this and others identify resources – such as GDP and investment in research – that are beyond the panel’s capacity to change.¹⁰ In the face of these challenges, the IPCC has attempted – with its limited resources – to undertake capacity building efforts, such as

³See, for example, Matthew Eagleton-Pierce, ‘Advancing a reflexive International Relations’, *Millennium*, 39:3 (2011), pp. 805–23; Anna Leander, ‘Do we really need reflexivity in IPE? Bourdieu’s two reasons for answering affirmatively’, *Review of International Political Economy*, 9:4 (2002), pp. 601–09.

⁴Esteve Corbera, Laura Calvet-Mir, Hannah Hughes, and Matthew Paterson, ‘Patterns of authorship in the IPCC Working Group III Report’, *Nature Climate Change*, 6:1 (2016), pp. 94–9; James D. Ford, Will Vanderbilt, and Lea Berrang-Ford, ‘Authorship in IPCC AR5 and its implications for content: Climate change and Indigenous populations in WGII’, *Climatic Change*, 113:2 (2012), pp. 201–13; James D. Ford et al., ‘Including Indigenous knowledge and experience in IPCC Assessment Reports’, *Nature Climate Change*, 6:4 (2016), pp. 349–53; Diana Liverman et al., ‘Survey of gender bias in the IPCC’, *Nature*, 602:7895 (2022), pp. 30–2; Adam Standring and Rolf Lidskog, ‘(How) does diversity still matter for the IPCC? Instrumental, substantive and co-productive logics of diversity in global environmental assessments’, *Climate*, 9:6 (2021); Adam Standring, ‘Participant diversity’, in De Pryck and Hulme (eds), *A Critical Assessment of the Intergovernmental Panel on Climate Change*, pp. 61–70; Yulia Yamineva, ‘Lessons from the Intergovernmental Panel on Climate Change on inclusiveness across geographies and stakeholders’, *Environmental Science & Policy*, 77 (2017), pp. 244–51.

⁵Vardy et al., ‘The Intergovernmental Panel on Climate Change’.

⁶Kari De Pryck, ‘Intergovernmental expert consensus in the making: The case of the summary for policy makers of the IPCC 2014 Synthesis Report’, *Global Environmental Politics* (2022), pp. 1–22; J. E. Livingston, E. Lövbrand, and J. Alkan Olsson, ‘From climates multiple to climate singular: Maintaining policy-relevance in the IPCC synthesis report’, *Environmental Science & Policy*, 90 (2018), pp. 83–90.

⁷Jean-Pascal Van Ypersele [@JPvanYpersele], Twitter post (19 March 2023), available at: <https://twitter.com/JPvanYpersele/status/1637385241579929603> accessed 21 March 2023.

⁸Frank Biermann, ‘Institutions for scientific advice: Global environmental assessments and their influence in developing countries’, *Global Governance*, 8 (2002), pp. 195–219; Hannah Hughes, ‘Bourdieu and the IPCC’s symbolic power’, *Global Environmental Politics*, 15 (2015), pp. 85–104; Milind Kandlikar and Ambuj Sagar, ‘Climate change research and analysis in India: An integrated assessment of a South-North divide’, *Global Environmental Change*, 9 (1999), pp. 119–38; Myanna Lahsen, ‘Transnational locals: Brazilian experiences of the climate regime’, in Sheila Jasanoff and Marybeth Long Martello (eds), *Earthly Politics: Local and Global in Environmental Governance* (Cambridge, MA: MIT Press, 2004), pp. 151–72; Martin Mahony, ‘The predictive state: Science, territory and the future of the Indian climate’, *Social Studies of Science*, 44:1 (2014), pp. 109–33.

⁹Maya Pasgaard et al., ‘A quantitative analysis of the causes of the global climate change research distribution’, *Global Environmental Change*, 23:6 (2013), pp. 1684–93.

¹⁰Claudia Ho-Lem, Hisham Zerriffi, and Milind Kandlikar, ‘Who participates in the Intergovernmental Panel on Climate Change and why: A quantitative assessment of the national representation of authors in the Intergovernmental Panel on Climate Change’, *Global Environmental Change*, 21 (2011), pp. 1308–317; George Livingston et al., ‘Perspectives on the global disparity in ecological science’, *BioScience*, 66 (2016), pp. 147–55; Maya Pasgaard and Niels Strange, ‘A quantitative analysis of the causes of the global climate change research distribution’, *Global Environmental Change*, 23 (2013), pp. 1684–93.

establishing an IPCC Scholarship Programme with the funds received from the 2007 Nobel Peace Prize award.¹¹

Despite extensive research into developing country participation,¹² there remain few close up analyses of how asymmetries operate in the day-to-day conduct of the organisation and the production of the assessment.¹³ One explanation is that until recently, close up study has been inhibited by limited access to and observation of the everyday practice of putting together an assessment, although forthcoming results of ethnographic study of the AR6 are likely to change that.¹⁴ A second explanation, relates to ‘the epistemological and normative frameworks that underpin’ scholarship of the IPCC. Many of the central concepts that are used to study the establishment and institutionalisation of global environmental assessments have been designed to interrogate the relationship between science and politics. In the following section, I review the influence of the epistemic community model, the concept of a boundary organisation and co-production in IPCC studies.¹⁵ Through this review, I propose that scholarly interest in the relationship between science and politics, which underpins study of knowledge bodies in International Relations (IR) and Science and Technology Studies (STS), obscures other important actors, activities, and social dynamics that structure the IPCC and its work, including the administrative role of Technical Support Units (TSUs). A more systematic approach to the study of different forms of authority operating within the organisation is necessary to identify the social order of relations structuring the daily production of IPCC assessment reports and is critical to connecting these to broader asymmetries in global economic relations.

To situate scientific and political forms of authority within and among competing social dynamics in the study of international organisations, I propose a new analytical framework that organises study according to actors, activities, and forms of authority. By identifying the different forms of authority that constitute the social order within the panel, which include scientific and political forms but are not confined to these, this approach identifies the IPCC as five distinct units and describes the social dynamics that structure relations within the Panel, Bureau, Secretariat, Technical Support Units, and Authorship of IPCC Assessment Reports (Figure 1). This framework is relevant to the study of international organisations more broadly, and contributes to recent attempts to open up the ‘black boxes’ of secretariats and describe the influence of administrative authority.¹⁶ Like the IPCC, all international organisations bring together different sets of actors and authorities that shape and are shaped by the activities that an organisation is mandated to undertake. Distinguishing between organisational actors and forms of authority enables a more thorough analysis of what functions as symbolic power to determine these activities and their products and could further study of the influence of global organisations.

¹¹ IPCC, ‘Scholarship Programme’, available at: <https://www.ipcc.ch/about/scholarship/> accessed 22 November 2022.

¹² I am using the category of ‘developing country’ as used by the IPCC, see: IPCC ‘Participation of Developing Countries in IPCC Activities’ (2018), available at: https://www.ipcc.ch/site/assets/uploads/2018/04/120220180332-Doc-4-Part.DVCs_.pdf accessed 16 November 2022.

¹³ The following study describes the constitution of authority in the authorship of chapters, see Hannah Rachel Hughes and Matthew Paterson, ‘Narrowing the climate field: The symbolic power of authors in the IPCC’s assessment of mitigation’, *Review of Policy Research*, 34:6 (2017), pp. 744–66.

¹⁴ IPCC, ‘Potential Study of the IPCC Process’, IPCC-XXXVII/Doc. 17 (2013), available at: https://www.ipcc.ch/site/assets/uploads/2018/05/130920130704-Doc_17_p37.pdf accessed 20 March 2023.

¹⁵ On ‘IPCC studies’, see; Karin M. Gustafsson, ‘Early career researchers’, in Kari De Pryck and Mike Hulme (eds), *A Critical Assessment of the Intergovernmental Panel on Climate Change* (Cambridge, UK: Cambridge University Press, 2022).

¹⁶ Michael Barnett and Martha Finnemore, *Rules for the World: International Organizations in Global Politics* (Ithaca, NY: Cornell University Press, 2004); Steffer Bauer, ‘Does bureaucracy really matter? The authority of intergovernmental treaty secretariats in global environmental politics’, *Global Environmental Politics*, 6:1 (2006), pp. 23–49; Frank Biermann and Bernd Siebenhüner, *Managers of Global Change: The Influence of International Environmental Bureaucracies* (Cambridge, MA: MIT Press, 2009); Joanna Depledge, ‘A special relationship: Chairpersons and the secretariat in the climate change negotiations’, *Global Environmental Politics*, 7:1 (2007), pp. 45–68; Ole Jacob Sending, *The Politics of Expertise: Competing for Authority in Global Governance, Configurations* (Ann Arbor, MI: University of Michigan Press, 2015); Sikina Jinnah, *Post-Treaty Politics: Secretariat Influence in Global Environmental Governance* (Cambridge, MA: The MIT Press, 2014).

1. Studying the IPCC through science and politics

The IPCC has been a central site for exploring the relationship between science and politics within IR and STS and for studying institutionalised knowledge production on global environmental action. The key concepts that have informed collective scholarly understanding of the IPCC reflect this, including the concepts of epistemic community, boundary organisation and coproduction. Scholarship applying these concepts has advanced scholarly understanding and critique of the intertwinement between science and politics in the organisation, as well as climate politics and international relations more broadly.¹⁷ However, it has also contributed to the privileging of scientific and political relations over other forms of social activity and relational dynamics in the study of collective attempts to organise and assess global environmental knowledge. Below, I review the contributions that these concepts have made to study of the IPCC before unpacking some of the oversights that result.

The epistemic community model is probably the most important concept facilitating scholarly documentation of the early origins of the IPCC. Conceptualised by Peter Haas, the model was designed to elaborate the role played by communities of experts in framing transboundary and scientifically uncertain issues and enabling the identification of shared state interests in a collective response.¹⁸ This model provided a framework for identifying and describing the formation of an international community of climate scientists during the 1980s that generated political interest in climate change and were institutionalised within the IPCC.¹⁹ Despite the epistemic community model's success, scholars have criticised key underlying assumptions, particularly around the theorised potential for science to rationalise politics.²⁰ Thus, empirical accounts have highlighted that the model overlooks struggle and competition within and between epistemic communities,²¹ and assumes that influence is unidirectional from science to politics, overlooking the self-selection of knowledge by scientists for a political audience.²² Since these early accounts, the epistemic community approach has become less popular with IPCC scholars. The model was designed to conceptualise how communities of science inform regime formation and does not have the analytical means to explore the institutionalisation of these communities within an intergovernmental body. Peter Haas himself was critical of the intergovernmental nature of the IPCC, identifying it as preventing the epistemic community from acting as theorised and enabling governments to gain control over climate science.²³

While the epistemic community model has become less analytically significant for studying the institutionalisation of science within the IPCC, the STS concept of a boundary organisation has emerged as the most popular way for characterising the organisation and exploring the

¹⁷Rolf Lidskog and Göran Sundqvist, 'When does science matter? International Relations meets science and technology studies', *Global Environmental Politics*, 15:1 (2014), pp. 1–20.

¹⁸Peter M. Haas, 'Do regimes matter? Epistemic communities and Mediterranean pollution control', *International Organization*, 43 (1989), pp. 377–403; Peter M. Haas, 'Introduction: Epistemic communities and international policy coordination', *International Organization*, 46:1 (1992), pp. 1–35.

¹⁹Steven Bernstein, *The Compromise of Liberal Environmentalism / Steven Bernstein* (New York, NY and Chichester, UK: Columbia University Press, 2001); Sonja Boehmer-Christiansen, 'Global climate protection policy: The limits of scientific advice Part 1', *Global Environmental Change*, 4 (1994), pp. 140–59; Hughes, 'Bourdieu and the IPCC's symbolic power'; Leiv Lunde, *Science or Politics in the Global Greenhouse?: The Development Towards Scientific Consensus on Climate Change* (Lysaker: Fridtjof Nansen Institute, 1991); Peter Newell, *Climate for Change: Non-State Actors and the Global Politics of the Greenhouse* (Cambridge, UK: Cambridge University Press, 2006); Matthew Paterson, *Global Warming and Global Politics*, Environmental Politics (London, UK and New York, NY: Routledge, 1996).

²⁰Karen Litfin, *Ozone Discourse: Science and Politics in Global Environmental Cooperation* (New York, NY and Chichester, UK: Columbia University Press, 2004).

²¹Bernstein, *Liberal Environmentalism*.

²²Newell, *Climate for Change*.

²³Peter Haas, 'When does power listen to truth? A constructivist approach to the policy process', *Journal of European Public Policy*, 11:4 (2004), pp. 569–92.

entanglement between science and politics shaping its products.²⁴ Unlike the proposed separation between science and politics promoted through the epistemic community model, STS scholars start from an acceptance of the intertwining of science and politics and an interest in empirically unpacking its effects in practice.²⁵ In this respect, a boundary organisation is identifiable by being located between the social worlds of politics and science, by the participation of actors from both sides, and by the distinct lines of accountability to each.²⁶ In this approach, relevant knowledge emerges from the productive collaboration between the institutions of science and politics. Empirical studies informed by the boundary organisation concept highlight the distinction or 'boundary' between scientific and political practices during the production of assessments, and illuminate how this is maintained through IPCC activities.²⁷ From this perspective, the IPCC reflects a degree of both the scientisation of politics and the politicisation of science, but it is not tainted by its intergovernmental nature.²⁸

Some STS scholars have questioned the applicability of the boundary organisation concept to the international context because there are more diverse networks, arrangements, and institutionalised forms of science and politics than in the domestic context where it developed.²⁹ However, even within the approaches that seek to accommodate the international context by looking beyond the boundary to the amalgamations or hybrid forms of scientific and political practice that emerge, in describing the work undertaken to maintain a boundary and demarcate these social worlds in knowledge products, the accounts provided continue to privilege the relationship between science and politics.³⁰ Thus, when Clark Miller tells an alternative history on the formation of the IPCC through the idiom of co-production, the narrative remains centred on the meeting of science and politics.³¹

It was the existing research, and the concepts that inform it, that guided my early study of the IPCC. Although I adopted the sociological tools of Pierre Bourdieu, particularly field and interest, to organise my initial study of the organisation, my focus remained centred on the scientific and political dimensions. However, after my first round of interviews with IPCC authors and co-chairs in 2010, I increasingly had the sense that I did not understand the organisation I was studying. Interviewees started to tell me about aspects of participation and organisation that I could not categorise as scientific or political, but were essential to the day-to-day administration of the IPCC and had significant effects on the distribution and imprinting of authority on the organisation and its products. From these interviews, I learned about the intricate detail and daily practice of putting together an assessment, and depending on the actor's role in the organisation, the access and specific forms of authority this gave them in and over the report. As I began to piece together

²⁴Karin M. Gustafsson and Rolf Lidskog, 'Boundary organizations and environmental governance: Performance, institutional design, and conceptual development', *Climate Risk Management*, 19 (2018), pp. 1–11.

²⁵Lidskog and Sundqvist, 'When does science matter?'

²⁶David H. Guston, 'Boundary organizations in environmental policy and science: An introduction', *Science, Technology, & Human Values*, 26:4, Special Issue: Boundary Organizations in Environmental Policy and Science (2001), pp. 399–408.

²⁷Tora Skodvin, *Structure and Agent in the Scientific Diplomacy of Climate Change: An Empirical Case Study of Science-Policy Interaction in the Intergovernmental Panel on Climate Change* (Springer Science & Business Media, 2000); Cathleen Fogel, 'Biotic carbon sequestration and the Kyoto Protocol: The construction of global knowledge by the Intergovernmental Panel on Climate Change', *International Environmental Agreements: Politics, Law and Economics*, 5:2 (2005), pp. 191–210.

²⁸Rob Hoppe, Anna Wesselinck, and Rose Cairns, 'Lost in the problem: The role of boundary organisations in the governance of climate change', *Wiley Interdisciplinary Reviews: Climate Change*, 4:4 (2013), pp. 283–300.

²⁹Ibid.; Clark Miller, 'Hybrid management: Boundary organizations, science policy, and environmental governance in the climate regime', *Science, Technology, & Human Values*, 26:4 (2001), pp. 478–500.

³⁰Lahn Bård and Göran Sundqvist, 'Science as a "fixed point"? Quantification and boundary objects in international climate politics', *Environmental Science & Policy*, 67 (2017), pp. 8–15; Silke Beck and Martin Mahony, 'The IPCC and the new map of science and politics', *Wiley Interdisciplinary Reviews: Climate Change*, 9:6 (2018); Jasmine E. Livingston and Markku Rummukainen, 'Taking science by surprise: The knowledge politics of the IPCC Special Report on 1.5 Degrees', *Environmental Science & Policy*, 112 (2020), pp. 10–16; Miller, 'Hybrid management'.

³¹Clark Miller, 'Climate science and the making of a global political order', in Sheila Jasanoff (ed.), *States of Knowledge: The Co-Production of Science and Social Order* (London, UK: Routledge, 2004), pp. 46–66.

this practice for producing climate change assessments, the uneven distribution of authority for actors to shape its products became apparent.

Through this research, I learned about a group of actors that had barely been mentioned in previous studies – the Technical Support Units (TSUs) – and the unrivalled proximity they had to the assessment as well as those managing and authoring it. When observing these units more closely, it became possible to discern how these administrative bodies, hosted alongside the developed country chairs of the Working Group reports, contributed to some countries dominance in and over the production of the assessments. I was beginning to discern a social order in the IPCC's assessment practice, that is, the particular properties that were recognised and which distinguished actors as authoritative in and over the organisation. This internal social order, which animates relations within the IPCC and its assessment practice, reflects broader global distributions of economic, social, and political resources. In the following section, I describe the analytical framework informed by the sociology of Pierre Bourdieu, which emerged from this study of the IPCC and which makes it possible to contextualise science and politics within and among other social dynamics in intergovernmental expert bodies like the IPCC.

2. The analytical framework: Actors, activities and forms of authority

Bourdieu studied the order of delimited social universes – identifying the distinct features of these and describing the logic or economy that underpin and animate them. He developed analytical tools, including field and habitus, that systematised study of these social realms, and which he fine-tuned and applied through detailed study of, for example, the academic universe and cultural tastes in France.³² Informed through the notion of field and interest, I initially approached the IPCC as an organisation that brought together two distinct fields of practice, the scientific and the political. However, through interviews and observation, I began to discern other ordering forces and economies of practice structuring the assessment and relations within its conduct. Eventually, I came to distinguish and separate out groups of actors – or the units of the organisation – according to the distinct set of activities actors undertake and the related authority these activities enable over the organisation and the assessment of climate knowledge.

This simple framework of *actors, activities, and forms of authority* opens up analysis of organisations to all those with a role in its conduct and products, without privileging or predetermining particular actors and forms of power prior to empirical analysis. The approach is informed by Bourdieu's notions of field and interest because these concepts informed how I distinguished between sets of actors; attuning me to the specific interests and activities actors undertook as a means to group them, as well as ensuring that the study situated the IPCC within the broader field of transnational action on climate change.³³ However, the actors, activities, and forms of authority framework is tailored to the study of international organisations specifically, because it recognises that each body brings together multiple fields of professionals as required to fulfil the organisation's mandate. Alongside the practical necessity of completing the organisation's task, there is struggle for recognition and new forms of authority emerge in the conduct and realisation of organisational products, as identified in other Bourdieu-informed analyses.³⁴ Figure 1 identifies the distinct units within the IPCC as the secretariat, the panel, the bureau, the TSUs, and the authors and also identifies the porosity – connectivity and flow of people and information – between these.

³²Pierre Bourdieu, *Distinction: A Social Critique of the Judgement of Taste* (London, UK: Routledge & Kegan Paul 1986); Pierre Bourdieu, *Homo Academicus*, trans. Peter Collier (Cambridge, UK: Polity Press in association with Basil Blackwell, 1988).

³³Didier Bigo, 'Pierre Bourdieu and International Relations: Power of practices, practices of power', *International Political Sociology*, 5:3 (2011), pp. 225–58; Hughes, 'Bourdieu and the IPCC's symbolic power'.

³⁴Matthew Eagleton-Pierce, *Symbolic Power in the World Trade Organization* (Oxford, UK: Oxford University Press, 2013); Sending, *The Politics of Expertise*.

1. Panel: 195 member governments			4. Secretariat
2. Bureau: IPCC chair (1) + vice chairs (2) WG co-chairs (2-3) + WG vice chairs (6-8)			
3. TSU Working Group I: Scientific Basis	TSU Working Group II: Impacts, Adaptation and Vulnerability	TSU Working Group III: Mitigation	
5. Authors			

Figure 1. The IPCC represented as five distinct units: (1) secretariat; (2) panel; (3) bureau; (4) Technical Support Units (TSUs) and; (5) authors. Units 1–4 come together for the IPCC plenary and have access, share information with one another

In order to identify the properties distinguishing actors within the IPCC, to map the social order and to explore the relationship between the distribution of resources within the organisation and the global distribution of resources, I retained Bourdieu's concept of capital in the analysis. Capital makes it possible to identify and unpack what constitutes authority within each unit of the IPCC – the economic, cultural, and social resources that govern an actor's access to, location within, and influence over the organisation and its assessment practice. Although the properties and their value are relative to the social space, Bourdieu identified three principal types: (1) economic capital – material wealth and financial assets; (2) cultural capital – knowledge, skills, technical qualifications, and titles; (3) social capital – the resources accrued by virtue of membership in a given group.³⁵ Cultural capital is particularly important because it helps to illuminate the specificity of properties and values in an organisation and the 'embodied' form that these takes. Cultural capital is accrued through an actor's life journey – the internalisation (in thought) and embodiment

³⁵Loic Wacquant, 'Pierre Bourdieu', in Rob Stones (ed.), *Key Sociological Thinkers* (London, UK: Macmillan Press, 1998), p. 221. See also Pierre Bourdieu, 'The forms of capital', in John G. Richardson (ed.), *Handbook of Theory and Research for the Sociology of Education* (Westport, CT: Greenwood, 1986).

(through practice) of their sociocultural, educational, and professional background and experiences. The greatest barrier to acquiring this cultural embodiment is access, time and resources, which investment in any social universe requires.³⁶ In the context of the IPCC, embodied forms of cultural capital, such as sounding right or presenting arguments in what is recognised as the *appropriate* language and manner, can be the hardest to acquire and can result in lasting asymmetries.

The ensuing analysis describes the activities of each unit of the IPCC and identifies the forms of authority that have emerged and shape relations within that space, the key elements of which are summarised in accompanying tables (see Tables 1, 2, 4, 6 and 7). The account identifies the most valued forms of authority within the IPCC as: (1) scientific credentials (scientific expertise and contribution to science as measured by institutional affiliations, publications, international networks, etc.); and (2) knowledge of the assessment process in practice (gained through years of experience and proximity to the report's construction). These forms of capital are the basis of symbolic power within the IPCC, which is a power to have an effect on the conduct of the organisation and its products, and ultimately, over how climate change is written.³⁷ The following account describes how these forms of authority have emerged as the most valued properties within the organisation, their distribution and relation to economic capital, and the struggle they engender within and between units to contest or acquire them. Taking this approach allows us to describe the social order of the IPCC, to identify asymmetries in participation and to begin to unpack the basis of these and its effects.

3. The units of the IPCC

The account of the IPCC provided is informed by 12 years of study, including 41 semi-structured interviews between 2010–11 and 2019, during the fifth and sixth assessment cycles respectively, as well as ongoing informal conversations and follow up emails. Wherever possible, I conduct interviews at participant's place of work, to get insight into the fields of professional activity that qualify them to participate in the process. In 2010, I visited the technical support unit for WG II at Stanford University, California and observed the 32nd plenary of the IPCC in Busan, South Korea. I started a second round of interviewing and observation in 2019 during the sixth assessment cycle, including visiting WGIII technical support unit at Imperial College London and observing the approval of the Summary for Policymakers for WGII and WGIII in February and March 2022. Alongside this, I have individually and collaboratively collected extensive data on IPCC authors and bureau members, including documenting their participation in the assessment, institutional, and disciplinary affiliations, and a survey of AR5 WGIII authors in 2016.³⁸ This data informs every aspect of the account provided, which is supported by IPCC information gathering, documentation and reports.

3.1. The Panel

The Panel is the IPCC's member governments that meet once or twice a year in plenary session. Membership to the panel is open to all member countries of WMO and UNEP and there are currently 195 members.³⁹ However, only half regularly send representatives to plenary and for reasons unpacked below, about one quarter could be described as engaged in panel activities.⁴⁰

³⁶ Bourdieu, 'Forms of capital'.

³⁷ Hughes, 'Bourdieu and the IPCC's symbolic power', p. 89; Rebecca Adler-Nissen, 'Symbolic power in European diplomacy: The struggle between national foreign services and the EU's External Action Service', *Review of International Studies*, 40 (2014), pp. 657–81.

³⁸ See, for example, Corbera et al., 'Patterns of authorship'; Hughes and Paterson, 'Narrowing the climate field'.

³⁹ IPCC (n.d.).

⁴⁰ IPCC, 'Improving Participation of Developing/EIT Countries in the IPCC: Summary and Recommendations', IPCC-XXXI/Doc.11 (2009), available at: <https://www.ipcc.ch/site/assets/uploads/2018/03/doc11-8.pdf> accessed 15 March 2022.

Table 1. A summary of the activities and forms of authority of the panel. Main source of authority in bold.

Actor	Activities	Forms of Authority
<p>Panel</p> <p>Member governments represented by delegates</p> <p>Focal point: intermediary between national expert community, national government and the IPCC. Likely to oversee/coordinate government activities</p> <p>Currently 195 members (IPCC, n.d.) Usually reside within Department for Environment/ climate change or national meteorological organisation</p>	<ul style="list-style-type: none"> ● Decision to produce report ● Financial expenditure ● Approve the report outline ● Nominate authors ● Elect the bureau ● Review and submit comments on draft reports ● Accept final report ● Line-by-line approval of assessment's key findings in SPM 	<p><i>Economic capital</i></p> <ul style="list-style-type: none"> ● Government investment <p><i>Cultural capital</i></p> <ul style="list-style-type: none"> ● Political authority ● Historical involvement/length of service ● Knowledge of the assessment process ● Knowledge of IPCC rules and procedures ● Knowledge of scientific content ● Hosting TSU ● Bureau membership ● Authors in the assessment <p><i>Social capital</i></p> <ul style="list-style-type: none"> ● Bureau member ● Hosting TSU ● Relationship with secretariat ● Relationship with/to other member governments

The panel has a role in each stage of the IPCC's assessment practice and as such, governments have considerable influence over the organisation and its work (see Table 1). Although member governments are not directly involved in the authorship, governments approve the report outline, nominate authors, elect the bureau, review draft reports, and accept and approve the final products. Financially, the IPCC is dependent on donations, and all IPCC expenditure is agreed by the panel, which gives governments the final decision over the organisation's continuation, its assessment activities, and the expert meetings and workshops supporting these.

The majority of delegates reside within meteorological offices or environment/climate ministries, and between plenary meetings are engaged intermittently in IPCC work as the national focal point, overseeing the national process for identifying and nominating authors and managing the government review of draft reports.⁴¹ In this role and capacity, they may feed into or be a member of the national delegation to the UNFCCC, particularly on items relating to the Subsidiary Body for Scientific and Technical Advice (SBSTA). To become a meaningful member of the panel, governments must invest the economic and human resources necessary to fulfil this broad range of activities, and through the conduct of these, governments can gain authority in the organisation and influence over the direction and content of the report. This includes, for example, through review comments requiring consideration and revisions by the authors,⁴² and through interventions, textual revisions, and red lines during the approval of the outline and summary for policymakers.⁴³ The symbolic power to shape the organisation, its assessment practice, and the wording of key findings is not equally distributed between member governments.

To unpack the asymmetry in influence, we need to take a closer look at the forms of capital that constitute an authoritative member of the panel. To understand the culture of the panel, and

⁴¹ IPCC, 'Appendix A to Principles Governing IPCC Work: Procedures for the Preparation, Review, Acceptance, Adoption, Approval and Publication of IPCC Reports, Batumi (14–18 October 2013), available at: [<https://www.ipcc.ch/site/assets/uploads/2018/09/ipcc-principles-appendix-a-final.pdf>] accessed 8 March 2022.

⁴² Jean P. Palutikof et al., 'Enhancing the review process in global environmental assessments: The case of the IPCC,' *Environmental Science & Policy*, 139 (2023), pp. 118–29.

⁴³ From observation of plenary and approval sessions.

what is valued within and by its membership, it is necessary to briefly revisit the IPCC's establishment. The IPCC's FAR was originally envisioned as an exercise for a small group of core members and although all WMO and UNEP members were invited to the first plenary, only 28 countries sent delegates.⁴⁴ The current modus operandi and culture of the IPCC was written by early leading members. As documented by John Zillman, the Australian delegate to the IPCC during its first session and a long-standing bureau member, Australian 'emphasis on the importance of objectivity, the involvement of subject matter experts and the use of peer review procedures during its interventions at the First Session, significantly shaped the character of the IPCC in its early years', and it was on US insistence that peer review was incorporated into the assessment practice.⁴⁵

The acceptance of scientific principles without debate⁴⁶ indicates the shared nature of scientific practice and corresponding cultural values within and between the lead countries. This embodied working style was also instilled in panel proceedings, as summarised in the first chairman's address to the panel. In this statement, Bert Bolin urges the panel to ground decision-making in scientific and technical arguments:

He reminded the panel that the IPCC is not a negotiating body ... He hoped there would not be much need for decision-making by voting in the IPCC ... In this process, it was most important that the developing countries were given adequate opportunity to take part because the process then led to mutual learning, benefitting not only the developing countries but also the developed countries ... So orderly conduct of business *in a free and scientific manner* with participation by all or as many as possible should be the IPCC working mode.⁴⁷

This statement designates a style of conduct and appropriate manner that privileges scientific and technical forms of knowledge and argumentation, and thus the panel members that embody these modes of cultural capital, which remain an important dimension of symbolic power today. These forms of cultural capital can be gained over time and through investment in the panel and its activities and through which IPCC processes and procedures are learned. Members' contribution to panel activities and duties enable actors to distinguish themselves – to become recognised as constructive participants. The ability to craft acceptable language, to convene working groups, to co-facilitate contact groups and to broker agreement are some of the valued qualities that distinguish members of the panel and enable them to have their views and interventions on the organisation and its texts heard and accommodated.⁴⁸

Often overlooked in the respect for certain delegates is the time and resources that is required to become recognised, which in turn is dependent on national investment in IPCC participation. Economic capital is the most significant factor in accounting for why less than half of IPCC member governments appear as active participants in plenary proceedings. The IPCC recognised the importance of developing country participation early on in the organisation's establishment and

⁴⁴IPCC, 'Report of the First Session of the WMO/UNEP Intergovernmental Panel on Climate Change (IPCC)', Geneva (9–11 November 1988), available at: <https://www.ipcc.ch/meeting-doc/1st-session-of-the-ipcc-geneva-9-11-november-1988/> accessed 15 March 2022.

⁴⁵John, Zillman, 'Some observations on the IPCC Assessment Process 1988–2007', *Energy and Environment*, 18 (2007), pp. 869–92 (p. 873).

⁴⁶Bert Bolin, *A History of the Science and Politics of Climate Change: The Role of the Intergovernmental Panel on Climate Change* (Cambridge, UK: Cambridge University Press, 2007), pp. 49–52.

⁴⁷Paraphrased from report of session: IPCC, 'Report of the Fifth Session of the WMO/UNEP Intergovernmental Panel on Climate Change (IPCC)', Geneva (13–15 March 1999), pp. 87, 6–7, available at: <https://www.ipcc.ch/site/assets/uploads/2018/05/fifth-session-report.pdf> accessed 15 March 2022, emphasis added.

⁴⁸From interviews and observations of plenary and approval sessions during AR5 and AR6 cycle. See also Kari De Pryck, 'Governmental approval', in De Pryck and Hulme (eds), *A Critical Assessment of the Intergovernmental Panel on Climate Change*, pp. 187–96.

has funded the travel of at least one national delegate from developing and economy in transition countries since 1988 through the trust fund.⁴⁹ However, having a presence at a meeting is not the same as being able to meaningfully participate in that meeting. Thus, while the trust fund offers the potential for some delegates, particularly if there is consistency over time, to become active members of the panel and through this participation accrue cultural capital, vast asymmetries remain in national capacities to invest the necessary time and human resources to realise symbolically powerful membership. This asymmetry in the capacity to become a powerful member becomes even starker when the role of the bureau and hosting TSUs is brought into focus.

3.2. The bureau

The IPCC bureau oversees and manages the production of IPCC Assessment Reports, and in this function is an intermediary between the member governments authorising the assessment and the authors. To increase geographical representation, the bureau has expanded with each assessment round, with 34 members for the AR6. These include the IPCC chair, three vice chairs, two co-chairs and seven or eight vice chairs for each WG.⁵⁰ Bureau members attend annual plenary meetings and meet as a bureau twice a year, including prior to plenary to forge common positions before proceedings. The three WG Bureaux select authors, guide the assessment, ensure consistency across chapters, act as review editors, chair the approval of the outline and final summary for policymakers and disseminate its key findings (see Table 2). The bureau's influence over panel decision-making rests both on recognition of scientific authority, which remains one of the most valuable forms of cultural capital as instilled by the leading members described above, and their management of the assessment. However, this scientific authority can be challenged by the political authority of member governments during plenary and approval proceedings.⁵¹

The developed country WG co-chairs are the most authoritative actors in the assessment's production. Recognised for a combination of scientific contribution and previous IPCC and/or assessment experience (Table 2), the WG co-chairs are responsible for the management of IPCC assessment reports. Officially working 50 per cent on the IPCC process, the host government provides co-chairs with technical and administrative support in the form of a Technical Support Unit (TSU), which are housed in or near the co-chairs institution. This technical support enables the developed country co-chair to lead at every stage of the report's production, from drafting the outline to orchestrating the final government approval and disseminating its key findings. The WG vice chairman assist the co-chairs in this role, and the degree to which developing country co-chairs and vice chairs can imprint on the process depends on the extent they embody organisational culture and are able to invest in IPCC activities, with considerable variation noted between bureau members during interviews.

Bureau members are supported in IPCC activities by their government or the IPCC trust fund and have professional responsibilities outside of the IPCC, the majority working within research institutes, government departments, and/or international organisations. The pressure of time and lack of financial resources significantly constrains developing country bureau members. Although travel expenses are covered by the trust fund, and the IPCC provides developing country co-chairs with additional funding to cover staffing or equipment, this is limited in comparison with the resources and support available to the developed country co-chair. The economic capital structuring developing country capacity to invest in the IPCC process is augmented by the

⁴⁹Shardul Agrawala, 'Structural and process history of the Intergovernmental Panel on Climate Change', *Climatic Change*, 39:4 (1998), pp. 621–42.

⁵⁰IPCC (n.d.).

⁵¹Stephen H. Schneider, *Science as a Contact Sport: Inside the Battle to Save Earth's Climate* (Washington, DC: National Geographic, 2009), p. 288, ch. 6; Robert Stavins, 'Is the IPCC government approval process broken?', *HuffPost* (2014), available at: https://www.huffpost.com/entry/is-the-ipcc-government-ap_b_5223421 accessed 15 March 2022.

Table 2. A summary of the activities and forms of authority of the bureau. Main source of authority in bold.

Actor	Activities	Forms of Authority
<p>Bureau 34 members for the AR6: IPCC chair, three vice chairs, two co-chairs and seven or eight vice chairs for each WG (IPCC, n.d.)</p> <p>Scientific experts nominated and elected by member governments of the panel</p> <p>Usually reside in a university, research institute or relevant government department</p>	<ul style="list-style-type: none"> • Provide scientific and technical advice to the panel to support decision-making • Manage the production of the assessment • Disseminate key findings <p>WG Co-chairs</p> <ul style="list-style-type: none"> • Scope report • Select authors • Oversee and manage the assessment • Chair approval of outline and final SPM <p>WG Vice chairs</p> <ul style="list-style-type: none"> • Support WG co-chairs in above roles • Identify and mobilise regional expertise • May act as review editors or on cross-cutting issues across chapters and WGs 	<p><i>Economic capital</i></p> <ul style="list-style-type: none"> • Government or institutional support <p><i>Cultural capital</i></p> <ul style="list-style-type: none"> • Necessity/centrality to completing assessment, e.g., Co-chair • Scientific authority • Scientific reputation (contribution to science/publications + institutional affiliation) • Historical involvement • Experience of international scientific processes and assessment exercises • Knowledge of the assessment process <p><i>Social capital</i></p> <ul style="list-style-type: none"> • TSU • National focal point • National delegation • Scientific/professional networks

Table 3. Top ten countries by frequency and total time of interventions at the 32nd Plenary Session of the IPCC, hosted in South Korea, October 2010 (data collected by author).^a

Top country by number of interventions	Number of Interventions	Top country by total time of interventions	Total Time (seconds)
1. US* (WG II)	50	1. Switzerland* (WG I)	4849
2. Switzerland* (WG I)	43	2. US* (WG II)	4240
3. Saudi Arabia*	33	3. Saudi Arabia*	3218
4. Australia*	28	4. Australia*	2854
5. UK*	25	5. UK*	1960
6. Belgium*	24	6. Russia*	1532
7. Germany* (WG III)	24	7. Netherlands	1288
8. Netherlands	23	8. Germany* (WG III)	1222
9. Austria	14	9. Austria	1062
10. Sweden	12	10. Brazil*	942
Totals	276/433		23167/33431

Note: * Member countries with a bureau member. Germany, Netherlands, UK, and US co-chaired a WG and hosted the TSU in either or both the AR4 and AR5, for full list refer to Table 4.

^a Only interventions from the floor counted (excl. presentations by delegates or bureau members chairing contact groups). Table first published in Hughes, 'Governments', in De Pryck and Hulme (eds), *A Critical Assessment of the Intergovernmental Panel on Climate Change*, pp. 79–87.

perceptions of some bureau members as being political appointees,⁵² not adequately qualified for the task.⁵³ These judgements can overlook the economic resources necessary for a country to

⁵²Bolin, *Science and Politics of Climate Change*, p. 84.

⁵³IAC, 'Responses to the IAC Questionnaire', pp. 678, 261, 587. Previously available at: <http://reviewipcc.interacademycouncil.net/Comments.pdf> 24 August 2012.

become: (1) interested and invested in IPCC activities; (2) accrue the cultural capital to meaningfully impact the assessment; and (3) have the technical and administrative support to ensure their concerns and representations are incorporated in draft outlines, reports, and summaries.

Government investment in bureau membership does not only benefit the bureau member, host governments gain valuable forms of social and cultural capital in return. Governments with an elected bureau member can attend bureau meetings, which increases their contact with key actors and provides them with greater insight into the assessment's progression. Knowledge of the assessment process is one of the most valued sources of cultural capital in the IPCC. As such, having a bureau member translates into symbolic power during plenaries and report approval sessions, when delegates can draw on this knowledge to make informed interventions and authoritative reasons for altering proposed text.⁵⁴ As Table 3 indicates, those countries intervening most in proceedings at one IPCC plenary meeting all had bureau members. This relationship is strongest where a developed country co-chairs the WG and hosts the TSU, with these governments intervening most frequently during the session.

The significance of bureau membership is also evidenced by the political manoeuvring prior to bureau elections. For example, during the AR5 elections, a researcher observing proceedings suggests that delegates arrived at the plenary with 'guidance from their ministries of foreign affairs on what countries' candidates to support'.⁵⁵ Wikileaks further document this, describing US efforts to ensure that the US candidate (Dr Chris Fields) was elected as WG II co-chair and that the Iranian candidate (Dr Mostafa Jafari) was blocked. According to these accounts, the US contacted the IPCC chair, the Australian, Brazilian, Malian, German, Netherlands, and UK delegations prior to the elections and gave assurances that it would consider their election outcome preferences.⁵⁶

3.3. The Technical Support Units (TSU)

Although WG co-chairs are responsible for overseeing the production and approval of the assessment, they could not fulfil this role without organisational, administrative, and technical support, as housed within the TSU. The TSUs play a significant role at every stage of the assessments production: preparing and administering the timeline for completion; identifying and processing the selection of authors; managing the authors in writing the report; editing, harmonising, and polishing submitted material; and compiling the finished product for panel approval and publication (Table 5). TSU staff are the only IPCC actors that work full time on the report, have the most direct contact with authors and material assessed, and the TSU heads or science leads have intellectual influence over the assessment practice and its content.

The WG TSUs are not homogenous units, and although a newly elected chair and appointed staff seek input and advice from outgoing TSUs, the organisation, style of work, and distribution of authority develop over the course of the assessment as shaped by the WG chair, TSU head and the host country. They are funded by the government of the developed country co-chair and are generally hosted within the co-chair's institution, such as the university, the met office or the environment agency. To date there have been seven countries that have hosted the TSU, with both the

⁵⁴Joanna Depledge ('A special relationship') uses the term intellectual capital to identify the experience and knowledge that UNFCCC Secretariat and Chairpersons have and its value to other actors (also Bauer, 'Does bureaucracy really matter'; Jinnah, *Post-Treaty Politics*). Intellectual capital is identified here as a form of cultural capital (knowledge, skills, technical qualifications, and titles) because its value is specific to the social universe, and social capital, as it is only a source of capital to those that have a connection/relationship and thus a pathway to access it.

⁵⁵Yulia Yamineva, 'The Assessment Process of the Intergovernmental Panel on Climate Change (IPCC)' (PhD thesis, Newnham College, Cambridge, 2010), pp. 242, 85.

⁵⁶Wikileaks Cables: 'US Embassy cables: US lobbied Rajendra Pachauri to help them block appointment of Iranian scientist', *Guardian*, available at: <http://www.guardian.co.uk/world/us-embassy-cables-documents/168194> accessed 15 March 2022; 'US Embassy cables: Norway supports US plan to block election of Iranian climate scientist', *Guardian*, available at: <http://www.guardian.co.uk/world/us-embassy-cables-documents/166258> accessed 15 March 2022; 'US Embassy cables: Brazil considers US plan to block election of Iranian climate scientist', *Guardian*, available at: <http://www.guardian.co.uk/world/us-embassy-cables-documents/166298> accessed 15 March 2022.

Table 4. Countries that have hosted TSUs by WG and assessment round.

Assessment (year published)	FAR(1990)	SAR(1995)	TAR(2001)	AR4(2007)	AR5(2014/15)	AR6(2022/23)
WG I Science	UK	UK	UK	US	Switzerland	France
WG II Impacts	USSR	US	US	UK	US	Germany
WG III Mitigation	US	Canada	Netherlands	Netherlands	Germany	UK

Table 5. A summary of the activities and forms of authority of the TSU. Main source of authority in bold.

Actor	Activities	Forms of Authority
WG TSUs Administrative and technical staff that support the co-chairs in producing the assessment. Located in host country (usually the institution of the WG co-chair).	<ul style="list-style-type: none"> • Prepare and administer assessment timeline • Process author selection • Manage the authors • Edit, harmonise, and polish submitted material • Prepare report, technical summary and SPM for panel acceptance and approval • Finalise for publication 	<p><i>Economic capital</i></p> <ul style="list-style-type: none"> • Host government <p><i>Cultural capital</i></p> <ul style="list-style-type: none"> • Knowledge of the assessment in process • Proximity to the assessment, co-chairs, and authors • Necessity/centrality to completing assessment • Scientific, technical, and administrative expertise <p><i>Social capital</i></p> <ul style="list-style-type: none"> • Co-chairs • National focal point and related government office • Relations with secretariat

US and UK having WG chairmanship for five out of six assessments (Table 4). These units have grown over time to keep pace with increasing author numbers and volumes of knowledge, and today they have between five and fifteen members of staff. Nearly all staff will be new hires, as there are only a few that have served on multiple TSU teams and the demands of TSU head make it difficult to repeat.⁵⁷

While the TSUs are set up to assist the developed and developing country co-chairs, this assistance is uneven. The TSU team regularly update and seek the input of the developing country co-chair, but their main focus is on meeting the requirements of the chair they work alongside.⁵⁸ This means that there are considerable disparities in the distribution of social and cultural capital between WG co-chairs, which impact the extent to which a developing country co-chair can invest in the process and imprint on the final product.

One or two members of the TSU team are hired for their scientific credentials and experience of previous assessment exercises. It is the responsibility of the TSU head or science lead to implement and manage the production of the assessment as envisioned by the WG chair and approved by the panel.⁵⁹ The importance of the task is reflected in the credentials of those hired, many of whom are established within a field of science relevant to the WG and have previously contributed as an

⁵⁷ Interview with TSU, 13 December 2010.

⁵⁸ Interview with TSU, 25 February 2011.

⁵⁹ This role is sometimes split between a science lead and an administrative lead; the exact arrangement depends on the TSU.

IPCC author, bureau member, or as a national delegate.⁶⁰ The combined expertise of the WG co-chair and TSU head is critical for gaining the investment of the authors in this time consuming process. While the scientific credentials of TSU staff distinguish it from the secretariat, it is not the unit's main source of cultural capital.

The WG TSUs make an IPCC assessment report possible, binding the assessment practice – and the actors that constitute it – together through their day-to-day activities. The TSU's symbolic power within the IPCC lies in the organisation's dependence on this unit for achieving its mandated task and its unrivalled access to the WG authors and the assessment under construction. The TSU introduces authors to the IPCC and is their main point of contact throughout the assessment. Through emails and author meetings the TSU staff instil in authors the appropriate procedures and values for conducting the assessment, and have the editorial power to ensure these are adhered to in the compilation of chapters. The TSU's management of the report's construction also gives it unmatched technical knowledge of the process and progress of the report, which makes the TSU an important contact point for secretariat, panel, and bureau members for informed position taking and decision-making prior to and during bureau and plenary proceedings (Table 5). This makes establishing and maintaining links to the TSUs a vital source of social capital and avenue for cultural capital, sources of capital that are most readily available to the member governments hosting these units (see Table 1).

3.4. The Secretariat

The Secretariat is the organisational centre of the IPCC and its only permanent body. Despite its permanence and symbolism as the focal point of the organisation, the secretariat is an enabler rather than a direct contributor to the IPCC's assessment practice. The secretariat plays an active role at the start of the assessment cycle, particularly in assisting the chair and panel in formulating the work programme, as a conduit of institutional memory, and instilling IPCC values and procedures in the incoming bureau members and TSUs. However, the secretariat's direct involvement in the assessment report's production decreases with the formation of the Working Group (WG) TSUs.

The secretariat is an important actor in plenary and bureau meetings: presenting the agenda and reports of previous sessions, providing support to the chair, introducing budgetary matters, responding to government enquiries, and generally ensuring the orderliness of proceedings (Table 6). Between these events the secretariat is regularly in contact with national focal points and bureau members and once the assessment is under way information flows daily between the secretariat and WG TSUs. Outside of the organisation, the secretariat promotes the IPCC's work to relevant UN bodies and seeks regular input from these and other stakeholders to ensure the continued relevance of assessment products as well as organising outreach activities on publication.

Although the secretariat is situated within WMO headquarters in Geneva and its roughly half-dozen staff are employees of the UN, the unit is answerable to member governments of the IPCC panel and it is governments that decide the size and remit of the secretariat.⁶¹ In recent years, the authority of the secretariat has been challenged and different factors and events account for this. The distance between the secretariat and the production of IPCC assessment reports has increased

⁶⁰Interviews with TSU, 25 July 2010; 5 October 2010. For example, Pauline Midgley was head of WG I TSU for the AR5. Pauline has a PhD in atmospheric chemistry and contributed to the science of ozone depletion, publishing articles and participating in international scientific assessments on the effects of CFCs. Prior to her appointment as TSU head, Pauline provided scientific support to the German Federal Ministry of Research, and from 2006 she headed the German IPCC Coordination Office.

⁶¹The staffing of the secretariat has been reviewed and expanded several times, including in 2006, in 2009, and again as a result of criticism in the IAC review. See IAC Review of IPCC processes and procedures. Report by the InterAcademy Council, IPCC-XXXII/Doc. 7 (2010), available at: https://www.ipcc.ch/site/assets/uploads/2018/03/doc07_p32_report_IAC.pdf accessed 8 March 2022; IPCC, 'Decisions Taken with Respect to the Review of IPCC Processes and Procedures' (2011), available at: https://archive.ipcc.ch/meetings/session35/IAC_ExCom.pdf accessed 8 March 2022.

Table 6. A summary of the activities and forms of authority of the secretariat. Main source of authority in bold.

Actor	Activities	Forms of authority
<p>Secretariat Located in the WMO building in Geneva Currently 13 members of staff + 2 interns (IPCC, n.d.)</p>	<ul style="list-style-type: none"> • Oversees, organises, and administers plenary meetings, including all documentation • Manages finances including Trust Fund for developing country participation • Supports IPCC chair • Manages relations between the IPCC and its parent bodies (WMO and UNEP) • Represents IPCC and its products to international stakeholders, most importantly UNFCCC • Manages external communications and media relations 	<p><i>Economic capital</i></p> <ul style="list-style-type: none"> • Voluntary contributions from Member governments • Contributions from UNEP, WMO, UNFCCC, and other international bodies. <p><i>Cultural capital</i></p> <ul style="list-style-type: none"> • Knowledge of IPCC processes and procedures • Knowledge of (relation with) stakeholders' interests/investment in the IPCC • Communications and media representation <p><i>Social Capital</i></p> <ul style="list-style-type: none"> • Member governments • IPCC chair • Bureau • TSUs • Parent organisations: UNEP and WMO • Contact point for UNFCCC secretariat and other stakeholders

with the strengthening of TSUs. As studies of the bureaucratic authority of secretariats indicate, secretariat staff possess a wealth of experience and knowledge, including historical knowledge of the organisation and its policies and procedures.⁶² This intellectual capital – a form of cultural capital – translates into authority in and between plenary and bureau proceedings when focal points and bureau members seek information and advice from the secretariat to inform decision-making. While this knowledge is a valuable form of capital within the IPCC, as has been identified, the most valued form of cultural capital is scientific know-how and knowledge of the assessment process in practice, and the secretariat no longer houses science staff and has minimal direct involvement in the day-to-day construction of the assessment reports compared to the TSUs. Thus, while the secretariat is the principle point of contact for members of the IPCC and observer organisations,⁶³ the secretariat cannot provide participants with the same detailed knowledge on the progression of the report as TSU staff.

Between the AR4 (2007) and AR5 (2014), the secretary sought to stem its loss of authority by increasing the scientific capacity and its proximity to the IPCC's assessment practice. However, this brought the secretariat in conflict with TSU staff and led to further erosion of its authority. In 2008, the panel set up a task group to undertake a review of the secretariat's staffing requirements, as the unit was widely regarded as overstretched.⁶⁴ The secretary at the time, Dr Renate Christ, proposed adding two scientific officers to the staff and identified an expanded role for the secretariat in providing greater technical and administrative support on issues and themes that cut across the three

⁶²Bauer, 'Does bureaucracy really matter?'; Depledge, 'A special relationship'; Jinnah, *Post-Treaty Politics*.

⁶³IPCC, 'Decisions Taken with Respect to the Review of IPCC Processes and Procedures: Governance and Management', IPCC 35th Session, Geneva, Switzerland (6–9 June 2012), available at: {https://www.ipcc.ch/site/assets/uploads/2018/09/IAC_Secretariat_TSU.pdf} accessed 8 March 2022.

⁶⁴IPCC, 'Future IPCC Activities: Reinforcement of the IPCC Secretariat – Report from the Task Group', IPCC-XXX/Doc.19 (2009), available at: {<https://www.ipcc.ch/site/assets/uploads/2018/03/doc19-2.pdf>} accessed 15 March 2022.

working groups and in assessing the grey literature used in reports.⁶⁵ The task group dismissed the secretary's request for additional science staff, indicating that:

the working group and task force TSUs are primarily responsible for the preparation of the assessment reports and methodologies and provide the in-house scientific expertise of the IPCC. IPCC interviewees were strongly of the view that the Secretariat should continue to focus on corporate and administrative issues, concerned with the quality and efficiency of processes rather than with their substance.⁶⁶

The secretariat's position was further undermined by the media attention surrounding errors over the Himalayan glacier in the AR4 and the resulting InterAcademy Review (IAC), which held the secretariat along with the chairman responsible for the IPCC's 'sluggish response'.⁶⁷ However, in responding to this criticism the secretariat has secured an organisational niche for itself in managing external representation of the IPCC through communication and media relations.⁶⁸ This extends to providing bureau members with training and preparation for media appearances. This demonstrates how units can adapt to changing circumstances to ensure their continued relevance. It also highlights that while scientific expertise and proximity to the assessment are the most valued properties, including within the administration of the organisation, they are not the only activities and forms of authority that matter.

3.5. *The authors*

IPCC authors are experts that have nominated themselves or been nominated by their government or an international organisation and selected by the WG bureaux and TSU staff to assess and review the material relevant to their expertise and the government-approved outline. As with panel and bureau members, authoring the assessment is not a full time job and authors are not paid by the IPCC. Most nominees work as knowledge producers and reside within universities, research institutes, government agencies, and international governmental and non-governmental organisations. It is from these sites that they contribute to climate change knowledge production, and it is this contribution that constitutes actors as climate experts and qualifies them to participate in the IPCC's assessment practice.

For most authors, the IPCC is a series of author meetings, email exchanges, and intense periods of reviewing, compiling, assessing, and writing to meet the deadlines of the drafting cycle (Table 7). These activities, authors' experience of the organisation, and the forms of cultural capital ordering relations within the WGs and chapter teams, distinguish authors from other units of the organisation. The panel, bureau, TSUs, and secretariat have a shared experience and practice of the IPCC through plenary and bureau meetings. Running for over thirty years, an organisational culture has developed as described above. Authors do not attend regular IPCC plenary meetings and thus have not internalised this shared history and way of knowing and doing the IPCC. While the author's conduct of the assessment is increasingly governed by the codification of the IPCC's assessment practice, research continues to provide evidence that the order of relations within chapter teams and authors' evaluation of climate change knowledge remain governed by scientific conventions.⁶⁹ Exploring the dynamic between the IPCC's attempts to broaden geographical

⁶⁵ *Ibid.*, p. 14.

⁶⁶ *Ibid.*, p. 8.

⁶⁷ IAC, 'Review of IPCC Processes and Procedures. Report by the InterAcademy Council', IPCC-XXXII/Doc. 7 2010), pp. 115, 47), available at: https://www.ipcc.ch/site/assets/uploads/2018/03/doc07_p32_report_IAC.pdf accessed 15 March 2022.

⁶⁸ IPCC, 'IPCC Communications Strategy' (Adopted by the Panel at the Thirty-Fifth Session, Geneva (6–9 June 2012), amended at the Forty-Fourth Session, Bangkok (17–20 October 2016), available at: https://www.ipcc.ch/site/assets/uploads/2018/09/IPCC_Communications_Strategy.pdf accessed 8 March 2022.

⁶⁹ Hughes and Paterson, 'Narrowing the climate field'.

Table 7. A summary of the activities and forms of authority of the TSU. Main source of authority in bold.

Actor	Activities	Forms of Authority
Authors Knowledge producers/scientific experts on climate change	<ul style="list-style-type: none"> Review, assess, and compile published knowledge of climate change since last assessment 	<p><i>Economic capital</i></p> <ul style="list-style-type: none"> Government and/or institutional support IPCC trust fund (for developing country authors) <p><i>Cultural capital</i></p> <ul style="list-style-type: none"> Scientific authority Scientific reputation: contribution to science (publications) + institutional affiliation IPCC/international assessment experience <p>Social capital</p> <ul style="list-style-type: none"> Bureau Authors TSU Institutional affiliations Collaborators

representation and the attitudes and perceptions of authors towards disciplines of knowledge and developing country members identifies important dynamics that shape the social order of chapter teams.

Scholarship on IPCC authorship identifies the forms of scientific authority ordering relations within chapter teams. IPCC assessments are recognised as central platforms for climate researchers to enhance their scientific credentials and the social and political relevance of their work.⁷⁰ This scholarship reveals perceptions around disciplinary and methodological hierarchies, with some forms of knowledge perceived as more scientific than others, for example, long-standing attitudes of the importance of modelling, the physical sciences over the biological sciences or economics and engineering over broader social science inclusion, attitudes that are mirrored in the authorship and knowledge contained within the assessments.⁷¹ Social Network Analysis and survey data identify scientific credentials (publication record, institutional affiliation, and position within the social network) alongside knowledge of the IPCC assessment through prior experience as the most valuable forms of cultural capital within chapter teams.⁷² The effect of these forms of cultural capital and its distribution shapes which authors have the symbolic power to influence the construction of knowledge in the chapter and its key findings in the SPM.

Over time, the scientific way of conducting the assessment and ordering relations within chapter teams has been confronted and channelled through organisational imperatives to increase geographical and gender representation. Thus, while author selection and scientific assessment in the FAR (1990) and SAR (1996) were largely governed by scientific conventions for recognising authoritative actors and knowledge, these appointment procedures and authorship roles are now codified

⁷⁰Ibid.; Eleftheria Vasileiadou, Gaston Heimeriks, and Arthur C. Petersen, 'Exploring the impact of the IPCC Assessment Reports on Science', *Environmental Science & Policy*, 14:8 (2011), pp. 1052–61.

⁷¹Andreas Bjurström and Merritt Polk, 'Physical and economic bias in climate change research: A scientometric study of IPCC Third Assessment Report', *Climatic Change*, 108 (2011), pp. 1–22; Corbera et al., 'Patterns of authorship'; David Demeritt, 'The construction of global warming and the politics of science', *Annals of the Association of American Geographers*, 91:2 (2001), pp. 307–37; Myanna Lahsen, 'Anatomy of dissent: A cultural analysis of climate skepticism', *American Behavioral Scientist*, 57:6 (2013), pp. 732–53; Simon Shackley and Brian Wynne, 'Global climate change: The mutual construction of an emergent science-policy domain', *Science and Public Policy*, 22:4 (1995), pp. 218–30.

⁷²Hughes and Paterson, 'Narrowing the climate field'.

in the principles governing IPCC work.⁷³ Through this codification, the organisation ensured that leadership of the assessments, both at the WG and chapter level, was shared between developed and developing countries. Despite increased developing country participation with each assessment cycle, barriers remain for the organisation to ensure that this equates with impactful contribution to the assessment. Historically, this has included long-standing misperceptions around developing country authors' scientific authority and contribution to authorship. Developing country contribution to the labour of the assessment was remarked on during interviews and informal conversations. Examples of this perspective were also present in the InterAcademy questionnaire undertaken in 2010 through comments suggesting that not all appointed authors are adequately qualified for the task and/or equally participated in the chapter labour.⁷⁴ Perceptions of the apparent scientific authority of developing country authors, structure the space to contribute, frequently intersecting with gender,⁷⁵ as one participant describes in a survey by Miriam Gay-Antaki and Diana Liverman:

The only reason that I could have felt not required at all in the team could be that I am an African woman. I have very good command of English, I am as qualified as others, I am confident also – but I was never listened to.⁷⁶

Social perceptions around scientific authority also overlook structural inequalities and the way in which economic capital conditions author contributions. Just as the acceptance rate for developing country scientists in international journals is lower due to reduced access to current literature and methodologies; limited access to international journals, slow and costly Internet access and even poor telephone connections impede developing country authors' ability to identify and assess relevant literature.⁷⁷ Those leading the process have become aware of these barriers, and for the first time in the AR4 the WG I TSU reached an agreement with several publishing houses to provide authors with free access to journals. It was intended that this would be extended to all WGs for the AR5. However, WG III was only able to offer a database and encourage sharing between authors, which meant that once again some developing country authors were unable to efficiently search and access relevant literature, and relied upon the support of other chapter team members and even friends to email publications.⁷⁸ In the AR6, when meetings moved online, poor Internet infrastructure meant that some developing country authors were 'cut off from the process altogether'.⁷⁹

The authors that take the lead and whose voices are heard most in decision-making over the content of the assessment are often the most accomplished in their contributions to knowledge and thus it would seem only natural that they have the most to offer in the production of the chapter. However, this natural scientific order is also a culturally specific order, ensuring that

⁷³ IPCC, 'Principles Governing IPCC Work. Amended at the Thirty-Seventh Session, Batumi (14–18 October 2013), available at: <https://www.ipcc.ch/site/assets/uploads/2018/09/ipcc-principles.pdf> accessed 6 April 2022; IPCC, 'Appendix A to Principles Governing IPCC Work' (2013).

⁷⁴ IAC, 'Questionnaire Responses' (2010), pp. 16, 35, 138, 330, 678.

⁷⁵ Miriam Gay-Antaki, 'Stories from the IPCC: An essay on climate science in fourteen questions', *Global Environmental Change*, 71 (2021).

⁷⁶ Miriam Gay-Antaki and Diana Liverman, 'Climate for women in climate science: Women scientists and the Intergovernmental Panel on Climate Change', *Proceedings of the National Academy of Sciences* (2018), p. 2062.

⁷⁷ As one CLA notes, 'I had to send often articles to colleagues, notably African professors' (IAC, 'Questionnaire Responses', p. 618). For accounts of this in the literature, see: Malgorzata Blicharska, Richard J. Smithers, Magdalena Kuchler, Ganesh K. Agrawal, José M. Gutiérrez, Ahmed Hassanali et al., 'Steps to overcome the North–South divide in research relevant to climate change policy and practice', *Nature Climate Change*, 7:1 (2017), pp. 21–7; Andrew Gettelman, 'The "information divide" in the climate sciences', *Bulletin of the American Meteorological Society*, 84:12 (2003), pp. 1703–09; Yamineva, 'Lessons from the Intergovernmental Panel on Climate Change'.

⁷⁸ From email correspondence with AR5 WGIII TSU.

⁷⁹ Julia Steinberger quoted in Christopher Ketcham, 'How Scientists from the "Global South" are Sidelined in the IPCC', available at: <https://theintercept.com/2022/11/17/climate-un-ipcc-inequality/> accessed 21 March 2023.

particular ways of knowing and representing climate change, formed in particular geographic locations through particular, historically constituted, scientific methods and conventions, dominate how climate change is constructed for the international community. This scientific habitus can overlook the economic capital that underpins the making of scientific expertise, including its own, and thus the barriers that developing country authors experience in becoming recognised as authoritative climate knowledge holders.⁸⁰ Examining whether and to what extent these misperceptions continued to impact the authorship of the AR6 will be an important area for forthcoming studies.

II. Conclusion

I started this article by indicating that reflexive scholarship may help to identify how shared interest in the relationship between science and politics overlooks other important actors and social dynamics influencing the daily organisation and resulting products of global environmental assessments. In order to address this, the article outlines and applies a new analytical framework and uses this to provide a detailed description of the IPCC and the order of social relations within and between the different units of the organisation. The aim of this framework is to facilitate a systematic opening up of an intergovernmental body and assessment practice like the IPCC by identifying *all* actors, activities, and forms of authority that constitute its organisation and its products. Incorporating Bourdieu's notion of capital into the framework makes it possible to explore the relationship between activities undertaken and the authority these enable in the organisation and over the assessment, and to connect this symbolic power to write climate change to the global distribution of economic resources.

The description of participation in the panel brings into focus the cultural foundations of the organisation – the privileging of scientific and technical forms of reasoning and its embodied mannerisms. Identifying and understanding these privileged forms of authority matter because they have tangible effects on which co-chair's vision for the next IPCC assessment of climate change is brought to life, which author's views imprint on the report, and which member government's proposed revisions to the summary for policymakers are accepted. However, this explanation is insufficient unless contextualised in all the activities undertaken by the different units of the organisation that constitute the IPCC's assessment practice and in turn, the sustained national economic investment in participation that is required to undertake these. When the activities of each unit of the IPCC are accounted for it becomes possible to discern how bureau membership and hosting a technical support unit – both resource intensive – provide the host country with one of the most valued forms of cultural capital within the IPCC: knowledge of the assessment process in practice. This also reveals the close coupling and reproductive force of cultural dominance and the distribution of global economic resources and how this order of relations is potentially maintained and sustained through the day-to-day organisation, assessment, and writing of climate change. This vast and reproductive challenge means that the IPCC needs all the help from the scholarly community it can get to identify dominance and avenues for countering it.

This approach to the study of intergovernmental organisations – disaggregating them according to the actors, activities, and forms of authority that constitute them – is also relevant to the increased interest and study of international organisations, bureaucracies, and treaty secretariats in recent years. As with the IPCC, these organisations are composed of complex sets of actors with diverse forms of authority over how their mandated tasks are undertaken. This approach ensures that the

⁸⁰ Raewyn Connell, Rebecca Pearse, Fran Collyer, João Marcelo Maia, and Robert Morrell, 'Negotiating with the North: How Southern-tier intellectual workers deal with the global economy of knowledge', *The Sociological Review*, 66:1 (2018), pp. 41–57; Ho-Lem, Zerriffi, and Kandlikar, 'Who participates?'; Sylvia Karlsson, Tanja Srebotnjak, and Patricia Gonzales, 'Understanding the North–South knowledge divide and its implications for policy: A quantitative analysis of the generation of scientific knowledge in the environmental sciences', *Environmental Science & Policy*, 10:7 (2007), pp. 668–84; Maya Pasgaard and Niels Strange, 'A quantitative analysis of the causes of the global climate change research distribution', *Global Environmental Change*, 23:6 (2013), pp. 1684–93.

study of any organisation is situated within the global distribution of resources and that the impact and reproduction of this economic order can be traced on organisational products.

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