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Learning

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Overview

This chapter discusses the performance of the Intergovernmental Panel on Climate Change (IPCC) as a 'learning' organisation. The Panel has responded to novel challenges by adjusting its governance structure and its underlying objectives and principles. Building on a heuristic of organisational learning, we reconstruct and map these past learning processes. We find that most of these challenges resulted in the IPCC adopting an *adaptive mode of learning* by incrementally adjusting procedures. There were only a few moments of *reflexive learning*. Against this backdrop, the chapter discusses future challenges for the IPCC emerging from the Paris Agreement and the call for a 'solution-oriented assessment'. The IPCC has faced demands in the past for greater political relevance, geopolitical representation, scientific integrity, transparency and accountability. In the post-Paris world, the Panel has to cope with its role in the polycentric architecture of the climate regime and its role as 'mapmaker' in the assessment of pathways to achieve the Paris ambition. We conclude by discussing how the IPCC can best use its learning capacities in responding to these challenges.

6.1 Introduction

Since the IPCC's inception in 1988, the magnitude, scale and complexity of climate change research have grown significantly. This is true also of the IPCC's assessment tasks and the public expectations of these assessments. In this chapter, we explore how the IPCC as an organisation learned to tackle the challenges of accommodating advances in scientific understanding and meeting the evolving needs of policymakers. We argue that the performance of the IPCC stands and falls according to its learning capacity. By this we mean its ability to evaluate its governance structures, to apply lessons learned from one assessment to the next,

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and to adjust its processes to address new needs (IAC, 2010). In order to reconstruct forms of organisational learning, we focus on the Panel's governance and institutional arrangements which consist of its decision-making structures, principles, procedures and work programme. The chapter applies the concept of *organisational learning* in order to analyse past learning processes within the organisation. We assess whether the IPCC is fit to address novel challenges and to perform new assessment tasks. Against this historical backdrop, the chapter then discusses the challenges for the IPCC arising after the Paris Agreement, which prompts the question of whether the IPCC is still fit for function.

6.2 Forms of Organisational Learning

In this section we develop a heuristic for reconstructing different forms of organisational learning (Siebenhüner, 2002) in order to distinguish between two forms of learning (see also Table 6.1):

> *Adaptive learning* responds to changes in the environment of an organisation and its externally determined functions. This form of learning leads to incremental adjustments and partial improvements, but it does not transform the organisation's objectives, its conceptual frames and values, or its main practices. It allows for the optimisation and promotion of performance in a given target structure (Fiol & Lyles, 1985; Schön & Argyris, 1996).
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> *Reflexive learning,* by contrast, fundamentally changes the objectives, conceptual frames and value systems of an organisation. Wynne (1993) and Beck et al. (1994) draw upon the notion of 'institutional reflexivity', which they define as the organisation's capacities and processes to continually evaluate the impacts of its objectives and actions in relation to their changing contexts, to critically examine (and thus render open to change) their own basic assumptions, and then to adjust them in the light of this newly acquired knowledge. In these so-called 'constitutional moments' (Jasanoff, 2011a), key design choices of how to govern an assessment are revisited and institutional arrangements reconfigured. These choices refer to questions such as who counts as a credible expert, what counts as relevant expertise and on what ground, and who is entitled to speak for the organisation (Beck, 2012; Pallett & Chilvers, 2013; Borie et al., 2020). Reflexive learning includes responses to both internal and external developments in the socio-political context, reflecting the institution's own role in the wider politics of global environmental change (Beck & Mahony, 2018a).

In order to evaluate the IPCC's learning processes, we need to consider its nature as a hybrid organisation. The Panel performs both scientific and political tasks,

Table 6.1. *Types of organisational learning*

Types of learning	Moments of unsettlement	Ways of learning	Consequences	Criteria / goals
Adaptive	Critical	Loop between expectations and con- sequences	Incremental change/ Adjustment of procedures	Political salience/ authority
Reflexive	Constitutional	Loop between expectations, consequences and objectives	Transformative change: recon- figuration of targets, values and practices	Responsiveness, openness, flexibility, accountability

Source: Authors.

includes rather different communities in science, politics and civil society, and needs to maintain credibility, trust and legitimacy to all. Situated at the interface between international science and politics, the IPCC has to maintain political relevance as well as scientific integrity in the face of intense political pressures (internal and external), tight deadlines and a continually evolving, multi-disciplinary scientific landscape. It has to reconcile political demands – salience, legitimacy, geopolitical representation – with the need for expert decision-making, such as integrity and the relative autonomy of scientific self-organisation. The hybrid nature of the Panel suggests that there is neither a single, exclusive criterion – such as political relevance – nor a single, linear path to evaluate its performance and learning capacity. Different forms of learning serve different functions/purposes and may have trade-offs and unintended consequences. Adaptive learning serves to maintain its political salience and robustness, while reflexive learning can be considered as a means to enact the organisation's responsiveness, openness, innovation, transparency and accountability.

6.3 A Track Record of Adaptive Learning

A prominent site to observe organisational learning in action is the Plenary of the Panel, where governance structures and rules of procedures are adopted by the member states of the IPCC (see **Chapter 3**). There are plenary sessions that take place at the beginning and end of an assessment cycle in order to draw lessons from existing processes and incorporate these lessons into the new phase of assessment (Beck, 2012; see **Chapter 2**). Figure 6.1 depicts the major events and significant changes in the history of the IPCC.
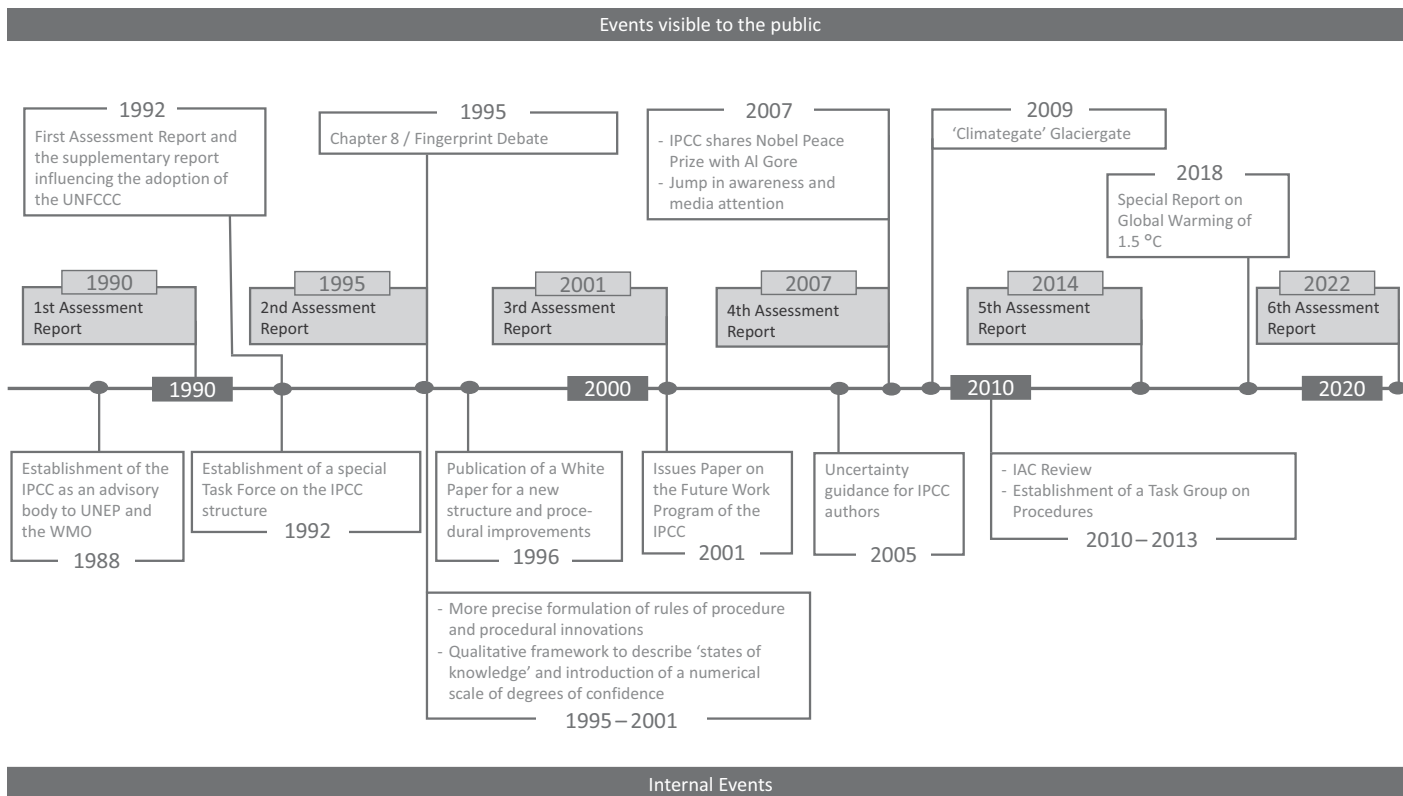
Figure 6.1 Major events and changes in the IPCC structure and processes.
Source: Authors

As several case studies indicate (Siebenhüner, 2002, 2014; Beck, 2012), the IPCC effectively improved its procedures to enhance its political salience and legitimacy, while maintaining its scientific standards. Over the period of its existence, the Panel has substantially revised procedures at least three times – in 1993, 1999 and 2010. Almost all the changes shown in Figure 6.1 qualify as adaptive learning, resulting in incremental changes, adjustments of the conceptual frames, and stepwise improvements of procedures. Examples include the establishment of an iterative review process for the draft assessment reports, embracing uncertainties by a system of levels of confidence, and the inclusion of cross-cutting themes such as costing methodologies and equity.

In response to the so-called 'Chapter-8 debate' in 1995 (see also **Chapter 11**), the Panel introduced radically new ways of addressing external criticisms, which differed remarkably from former forms of adaptive learning. The Chapter-8 debate indicated 'a constitutional moment', which resulted in a form of reflexive learning. In this debate, the IPCC faced a massive attack launched by some U.S. scientists alongside antagonistic media coverage. IPCC authors were accused of deliberately circumventing scientific review procedures and falsifying scientific results for political reasons. In contrast to former criticism, the charges focused on procedural aspects rather than on scientific findings themselves, questioning the legitimacy of the processes by which the report – and in particular the WGI Chapter 8 – had been produced.

In response to such attacks, in 1999 the IPCC began to revise and formalise its scientific quality-control procedures. These revisions indicated a constitutional moment because the IPCC turned, by itself, from a scientific to a legal mode of governance standardising its rules and procedures (Lahsen, 1999; Edwards & Schneider, 2001). Henceforth, the IPCC faced the challenge of reconciling forms of scientific self-organisation with these newly formalised legal modes of coordination. Although the formalising of procedures contributed towards greater coherence of governance structures – and therefore increased the political robustness of the organisation – these efforts constrained the flexibility of scientific processes, which form the backbone of the IPCC (Edwards & Schneider, 2001).

6.4 The Review by the InterAcademy Council (IAC)

The Panel's public recognition increased significantly after it released its Fourth Assessment Report (AR4) in 2007 and in the same it year received a share of the Nobel Peace Prize. But early in 2010, errors were discovered in the AR4 Report. Media coverage focused on the WGII analysis of the potential impacts of global warming, including a controversial statement that Himalayan glaciers might disappear by 2035. The revelation of these errors came shortly after another highly

publicised controversy involving the unauthorised release of email exchanges between prominent climate scientists, many of whom had contributed to IPCC assessments (IAC, 2010: 59; Beck, 2012).

Since its inception, the IPCC has evaluated its own management structure, scope, and the mandate of its Working Groups (WGs). This internal evaluation, conducted during the Panel's plenary sessions, is a key part of its scoping process at the beginning of a new assessment cycle. In response to this vociferous public criticism in the early months of 2010, IPCC procedures were reviewed externally, however, by national and international agencies. In particular, the InterAcademy Council (IAC), an alliance of national scientific academies, published a prominent review in August 2010 focusing on the IPCC's procedures and management structure (IAC, 2010). It identified shortcomings in terms of transparency surrounding the selection of authors, reviewers, and scientific and technical information for assessment reports, a general reluctance to make data publicly available, and the absence of a comprehensive communication strategy. The IAC final report rejected the accusation of deliberate manipulation by authors and highlighted that all of the most prominent statements contained in the IPCC reports were correct. It also noted that there was a mismatch between the growing complexity of the tasks facing the IPCC and its available capacities and management structures. The IAC concluded that the Panel was no longer able to cope adequately with the challenges it faced (IAC, 2010: 6), and fundamental changes to the process and management structure were essential to ensure its continued success (IAC, 2010: 63; Tollefson, 2010).

In October 2010, the IPCC initiated steps to implement the IAC recommendations; however, the organisation remained in an adaptive-learning mode. The negotiations over IPCC reform focused on adjusting specific procedures, from the selection of authors and review procedures to the way errors were dealt with in published assessment reports. The resulting revisions of rules of procedures were adopted by the Plenary of the Panel in 2011 (IPCC, 2011). The IPCC's responses showed that the same mechanisms that served to maintain its political authority (such as its intergovernmental status, the governmental approval mechanism and consensus-based procedures) contributed to closing down the range of reform options. This finally resulted in a 'lowest common denominator' acceptable to all parties involved. This incremental reform solely targeted scientific quality by rendering procedures more transparent for the scientists and nation state representatives already involved (IPCC, 2011). At the same time, the IPCC did not address demands for public transparency and accountability (IAC, 2010), for example by opening up the assessment processes in its WGs to broader audiences, such as the UN, IPCC observer organisations, non-governmental organisations or the wider public, and it did not introduce a public disclosure mechanism. The reform

efforts thus merely focused on incremental revisions and contributed to stabilising its core principles and arrangements and consolidated its fit within the wider climate regime. Even invited by the IAC to rethink its process and management structure and fundamentally change them, the IPCC adapted in an incremental way and missed this opportunity for catalysing reflexive learning.

6.5 The Demand for Solutions: Calls for Reflexive Learning

The Paris Agreement in 2015 represented a major change in the climate regime. Climate politics were no longer about raising awareness about global warming, but about shaping the solutions to achieve politically adopted temperature targets. National governments in countries such as Germany and Sweden were additionally held accountable by social movements such as the Fridays for Future, which drew substantial strength from its reading of IPCC reports. More recently, government initiatives have been launched, such as the European Union Green New Deal and the Biden administration's climate plan. This changing political context raises novel challenges for the IPCC.

First, the IPCC has to adapt to the polycentric political architecture of the Paris Agreement and become more responsive to the needs of state and non-state actors at different levels of decision-making (Beck & Mahony, 2018a). There are broader questions to be asked: Should the 'audience' and 'owners' of IPCC assessments continue to just be nation-state parties? Should the IPCC be more directly accountable to a broader set of actors, such as local and regional authorities, civil-society groups and private companies? It also raises questions about the spatial scale at which a solution-oriented global assessment fits local decision-makers' needs on the ground.

Second, there is a growing political demand for the IPCC to assess solutions for meeting the ambition of the Paris Agreement. The IPCC WGIII responded by developing a 'mapmaker strategy' (Edenhofer & Kowarsch, 2015; IPCC, 2015a). Following the mapmaker metaphor, the WG provided a comprehensive assessment of pathways to achieve politically adopted temperature goals. It is an open and contested question whether a solution-oriented assessment is consistent with the IPCC's mandate to be policy neutral, or whether this mandate needs updating (see **Chapter 21**).

Third, for achieving politically adopted temperature targets the Integrated Assessment Modelling (IAM) community, which provides input to the IPCC, introduced 'negative emissions technologies' (NETs) as a backstop strategy to meet temperature targets. IPCC reports have presented large-scale use of NETs as necessary or inevitable for reaching the goals formulated in the Paris Agreement (IPCC, 2018a). Policy options based on behavioural change and societal

transformations, rather than on technologies, are left out of IPCC assessments because they cannot be easily scaled up and aggregated into the IAMs to the level required to meet the temperature targets (see **Chapter 15**). As a consequence, the IPCC tends to narrow the climate solution space to technological pathways that are deemed feasible by economic models designed to optimise global economic growth. The large-scale deployment of NETs has become a fully-fledged policy option under consideration by powerful actors, even if these technologies are not available in the real world at the scale or scope projected by the IAMs.

The influential role of IAMs with respect to IPCC assessment and policy processes has drawn attention and scrutiny to the practices of this modelling community (Pielke, 2018). As a response to this scrutiny, the modelling community and the IPCC have taken steps to open up the black box of IAMs (Skea et al., 2021), but only in an incremental way. Critics, however, point to the lack of public transparency and accountability, from early energy models in the 1990s through to the most recent generation of IAMs and the pathways assessed by the IPCC (Wynne, 1984; Anderson, 2015). As a consequence, key methodological decisions – addressing issues such as emission pathway characteristics, temperature overshoot, the balance of mitigation action in the near-and long-term, remaining carbon budgets, the role of carbon dioxide removal, and the choice of discount rates applied to future technologies – have not been treated as legitimate objects of political debate or public scrutiny despite having major governance implications (Robertson, 2021).

These novel challenges emerging in the post-Paris context indicate that the relationship between climate science and policy can be seen as undergoing a fundamental transformation (see **Chapter 21**). The challenges call for reflecting on and rethinking the Panel's mandate and its embeddedness in the climate regime if future expectations for the IPCC are to be met. This constitutes an opportunity – and, we would state, a necessity – for reflexive learning leading to substantial changes in the IPCC's governance and procedures.

6.6 Achievements and Challenges

One of the major achievements of the IPCC is that it has already made significant progress in organisational learning. To its credit, the IPCC has shown that it is a flexible and adaptive organisation. Our reconstruction presented in this chapter indicates that the IPCC has mainly learned in an adaptive mode; there are only a few moments where it has chosen reflexive forms of learning. In the past, the Panel responded to novel challenges by incrementally adjusting its internal management structure, as well as its assessment and review processes. Since the IPCC's inception, however, its governance structure has remained remarkably stable.

The IPCC's incremental learning efforts contributed to maintaining and stabilising its institutional arrangements, rather than making it open to change.

External evaluations – such as the IAC report in 2010 – encouraged the IPCC to explore structural transformations in order to address the increasingly multi-disciplinary nature of climate change research and new demands for increased transparency and accountability. The external evaluation by the IAC, for example, can be seen as a constitutional moment where the assessment frameworks, the Panel's mandate, as well as its internal institutional arrangements, were critically evaluated and opened to the possibility of change. The IPCC, however, missed this opportunity. It decided in favour of forms of adaptive learning in order to maintain its political authority. These forms have been, in several cases, counterproductive to other goals of the organisation, by making it more legalistic in its processes. This has made it harder for the IPCC to manoeuvre and be as innovative and responsive as some other large-scale international science assessments.

The NETs example, illustrates one of the consequences of pursuing only adaptive learning, namely the IPCC's lack of public transparency and accountability. The IPCC assessed a set of unproven carbon dioxide removal technologies as technically feasible, based on a narrow set of criteria and linear, techno-optimistic assumptions about technological change and economic growth. Even though these technologies deployed at a large-scale, as recommended by the IPCC, would have major governance implications, they have not been treated as a matter of political choice and public scrutiny.

Our findings give reason to question whether the path of adaptive learning taken in the past will be adequate to cope with future challenges. It is fair to assume that the IPCC's future performance will depend on how the Panel adjusts its management structure to meet demands for relevance, transparency and accountability regarding those peoples most affected by climate policies. This would require forms of reflexive learning. However, reflexive forms of learning challenge – and potentially change – core elements of the Panel's governance, which partly explains why they face resistance and are hard to implement. The response to the IAC review in 2010 illustrates that the decision-making authority of nation states in the Plenary – along with consensus-based procedures – contributed to closing down the range of reform options. It excluded consideration of alternatives to the IPCC's institutionalised governance structure and procedures, alternatives that could have enabled greater public transparency and accountability (IAC, 2010; Robertson, 2021).

The turn towards assessing solutions comes with challenges to cope with a diversity of problem and solution frames and the involvement of a broader range of experts and forms of knowledge (Castree et al., 2021). These novel challenges require rethinking the mandate of the IPCC. But they also call for rethinking the

Panel's role and responsibility in the climate regime and respective broader questions of scale, representation and subsidiarity. This novel situation into which the IPCC is moving represents a stress test for the IPCC's capacities to learn. In order to address these challenges – and to seize new opportunities – modes of reflexive learning will be even more necessary. Yet in the current structure they will be harder to implement.

Three Key Readings

Siebenhüner, B. (2014). Changing demands at the science-policy interface: organisational learning in the IPCC. Chapter 7 in: Ambrus, M., Arts, K., Hey, E. and Raulus, H., (eds.), *The Role of 'Experts' in International and European Decision-Making Processes. Advisors, Decision Makers or Irrelevant Actors?* Cambridge: Cambridge University Press. pp. 126–147. http://doi.org/10.1017/CBO978113987 1365.009

    This book chapter analyses several sequences of the IPCC's learning processes in the first 25 years of its existence.

Beck, S. and Mahony, M. (2018). The IPCC and the new map of science and politics. *Wiley Interdisciplinary Reviews: Climate Change*, 9(6): e547. http://doi.org/10.1002/wcc .547

    This paper analyses the challenges emerging from the post-Paris polycentric governance regime and the new culture of 'post-truth' politics.

Robertson, S. (2021). Transparency, trust, and integrated assessment models: an ethical consideration for the Intergovernmental Panel on Climate Change. *Wiley Interdisciplinary Reviews: Climate Change*, 12(1): e679. http://doi.org/10.1002/wcc .679

    This commentary, written by a former IPCC Lead Author, illustrates how and why transparency and accountability matter when it comes to modelling and assessing future pathways to climate targets.