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From inclusion to epistemic belonging in international environmental expertise: learning from the institutionalisation of scenarios and models in IPBES

Jasper Montana

School of Geography and the Environment, University of Oxford, Oxford, UK

ABSTRACT

The inclusion of diverse perspectives from different disciplines, genders and locations has become a foreground concern in environmental expertise. While inclusion is increasingly accounted for in the design and evaluation of expert organisations, questions remain about the extent to which the pursuit of inclusion equates to effective participation. Building on recent scholarship on expertise in environmental sociology and public participation in environmental governance, this paper puts forward the argument that enabling inclusion in international expert organisations can be supported by facilitating epistemic belonging – a state achieved not only through mutual recognition of skilful practice amongst their expert communities (i.e. group belonging) but also the mobilisation of material resources within and beyond these organisations that enable participating experts to assert their importance, define their specialist skills and to effectively enact their epistemic practices. In this account, I trace the institutionalisation of biodiversity scenarios and models in the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) to show how achieving epistemic belonging requires expert communities to actively reshape the resource environments in which they operate. This account extends current sociological perspectives on environmental expertise and offers insights for environmental expert organisations seeking to broaden their inclusion practices.

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Introduction

The importance of inclusion in environmental expertise is increasingly recognised. Diverse perspectives from different disciplines, genders and locations are thought to contribute to a more thorough understanding of environmental issues, such as climate change and biodiversity loss, but also increase the legitimacy of that knowledge in different policy contexts (Hulme and Mahony 2010; Díaz-Reviriego, Turnhout, and Beck 2019). Inclusion is seen as particularly important at the international level, where expertise must take into account a broad set of scales and stakeholders (Miller 2007; Soberón and Peterson 2015; Arpin et al. 2016). However, for Global Environmental Assessments (GEAs) pursuing global kinds of authority, inclusion is not always an easy bedfellow (Hulme and Mahony 2010; Díaz-Reviriego, Turnhout, and Beck 2019). Indeed, the challenge is finding ways in which to enable meaningful inclusion without triggering a trade-off with the often-fragile epistemic authority for environmental expertise at the global scale (Gustafsson and Lidskog 2018; Montana 2020).

Concern for the inclusion of experts from different perspectives has been prominent in international expert bodies for decades. Since the inception of the

Intergovernmental Panel on Climate Change (IPCC), for example, the need to ensure equitable geographic representation has been recognised as key to the Panel's authority (Hulme and Mahony 2010). The subsequent Millennium Ecosystem Assessment put inclusive organisational arrangements at its core, including representatives from governments, civil society organisations and business communities on its board and striving to include local, traditional, and practitioner's knowledge alongside scientific literature in its assessments (Miller 2007). More recently, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (hereafter IPBES, or 'the Platform') has made explicit efforts to facilitate the inclusion of diverse experts and – despite still falling short of ambition – is now widely recognised as a pioneer in inclusive approaches to environmental expertise (Díaz-Reviriego, Turnhout, and Beck 2019; Arpin et al. 2016). Despite these efforts, there is more to be done before the pursuit of inclusion can be seen to equate to effective participation of diverse experts in international expert bodies.

The long history of inclusion as an ideal of international environmental expertise belies persistent tensions around how inclusion is facilitated in practice. The pursuit of inclusion can run counter to other

institutionalised routines that are linked to the ways in which GEAs produce environmental expertise, notably through consensus-based assessment processes (Díaz-Reviriego, Turnhout, and Beck 2019). It is also the case that GEAs, such as IPBES, carry over particular ways of thinking about environmental problems from existing scientific communities and organisations that they emerge from, which can be off-putting for new entrants (Díaz-Reviriego, Turnhout, and Beck 2019; Vadrot 2014). Securing the benefits of inclusion is therefore a matter that goes beyond the selection of experts for participation.

In this paper, I examine a case of inclusion within IPBES. To do so, I draw upon and further develop recent sociological scholarship on 'environmental expertise as group belonging' (Lidskog and Sundqvist 2018), in which expertise arises from the development of knowledge and skill through socialisation, but also validation and recognition by a community of skilled specialists. This paper extends this perspective by recognising the added importance of materiality in enabling effective participation of experts (drawing on insights on public participation, i.e. Marres and Lezaun 2011). Experts also need access and control of a wider set of socio-material resources through which they can assert their importance, define their specialist skills and enact their own specialised practices – a state I refer to as epistemic belonging.

The paper reports on the process by which a community of scholars working on biodiversity scenarios and models worked within IPBES to institutionalise their knowledge practices both inside and outside the Platform during its first work programme (2013–2019). By tracing how epistemic belonging is achieved in practice, the paper identifies a tentative pathway that other expert communities seeking more effective participation in international environmental expertise might follow to enhance their future involvement.

Understanding inclusion in IPBES

IPBES was formally established as an international expert body for biodiversity under the auspices of the United Nations system in 2012. This followed many years of deliberations amongst international science and policy communities around its structures, functions and processes (Vadrot 2014; Arpin et al. 2016). The result of these negotiations was a Platform with an intergovernmental structure overseen by a membership of over 135 governments that direct and scrutinise the Platform's operations. These government members collectively are termed the Intergovernmental Plenary and represent the formal decision-making body of the Platform.

IPBES completed its first work programme in April 2019, which engaged over 1000 experts from

around the world in its activities, putting it on par with the IPCC in scope and scale. A large proportion of the Platform's work is dedicated to the production of assessment reports, which synthesise the state of knowledge on biodiversity and ecosystem services at different scales and in relation to different topics, such as pollination or land degradation. The majority of experts in IPBES are selected as authors working on a specific assessment report. However, there have also been a number of task forces in the first work programme that focused on capacity building, knowledge and data, and indigenous and local knowledge systems. Task force members are, if invited, allowed to assist author groups with assessment reports and have the resources to generate guidance for other experts within IPBES to assist them in their work. Following other international expert bodies, such as the IPCC, the maintenance of strict rules around expert selection and participation are considered important to the Platform's claim to epistemic authority (Gustafsson and Lidskog 2018). Expert participation in IPBES is largely determined by governments, who are responsible for nominating at least 80% of the experts and have full control over the nomination and selection of experts for the Platform's administrative and technical bodies (Díaz-Reviriego, Turnhout, and Beck 2019).

The Platform's commitment to inclusion is most clearly illustrated by the rules of procedure, which state that expert groups:

should reflect the range of scientific, technical and socio-economic views and expertise; geographical representation, with appropriate representation of experts from developing and developed countries and countries with economies in transition; the diversity of knowledge systems that exist; and gender balance. (IPBES 2013)

This commitment has also been echoed in the IPBES Conceptual Framework, which includes explicit mention of different knowledge systems, from the biophysical sciences to Indigenous knowledge, as underpinning the work of the Platform (Díaz et al. 2015). Since the Platform's inception, particular attention has been directed to the inclusion of experts related to Indigenous and local knowledge (McElwee et al. 2020), and more recently, to wider participation of the social sciences and humanities in the process (Stenseke and Larigauderie 2018). Broadly speaking, IPBES has made marked progress over its first work programme on including diverse disciplines, nationalities, and genders of expertise – at least in numerical terms (Díaz-Reviriego, Turnhout, and Beck 2019). However, analysts note that there is more work to be done.

Thus far, efforts to tackle inclusion have been managed largely through numerical approaches to monitoring the proportion of experts from different

genders, world regions, disciplines and professions during the nomination and selection process (Montana 2017). While this approach has contributed significantly to the diversity of the Platform, there have been notable critiques of an inclusion-by-numbers approach. Hakkarainen et al. (2020) have found that increasing diversity through standalone indicators, such as the disciplinary background of an expert, can fail to account for otherwise desirable diversity in epistemic worldviews. Montana (2019) has noted that selection by defined categories can also pre-determine what experts represent through their participation, and thereby preclude expert communities from defining why and how they might contribute. Morin et al. (2017) have argued that a focus on numerical representativeness also fails to recognise the importance of prior social relations between experts and the role this plays in collaborating across issue-areas, scales, and epistemologies. And, Löfmarck and Lidskog (2017) and Gustafsson et al. (2019) have noted that the categories and boundaries that structure inclusion can also create unnecessary divisions within the assessment process that need to be further mediated. The problems with numerical inclusion in IPBES, therefore, point towards a need to focus on how effective participation of experts is enabled in practice.

For IPBES, institutional design – including the way in which experts are recruited, assessment procedures are enacted, and results are validated – is seen as central to its credibility and policy influence (Gustafsson and Lidskog 2018). Yet, the relationship between firmly institutionalised rules and social norms can cause tension with a desire for more effective participation of diverse expertise. The tradition of consensus-based intergovernmental decision-making, for example, clearly limits the extent to which minority or plural perspectives can be captured in the Platform's outputs (Díaz-Reviriego, Turnhout, and Beck 2019). Creative means of overcoming these constraints are being developed, such as the use of typologies to concurrently represent multiple perspectives (Montana 2017) and the application of multiple evidence-based approaches to weave knowledge systems together within an assessment (Tengö et al. 2017). However, experience suggests that more strategic and explicit efforts to facilitate inclusion through organisational innovation and actively enabling those seeking to be included in defining the terms of their inclusion are likely to be beneficial.

Theoretical framework

In this paper, I examine how understanding and improving the inclusion of experts within international environmental expertise can go beyond numerical approaches to inclusivity. To do so, I draw upon recent sociological perspectives on environmental expertise

as group belonging (Lidskog and Sundqvist 2018). Environmental expertise as group belonging bridges the frictions noted between the substantive view of expertise ('as competence') and the relational view of expertise ('as attribution'), instead suggesting that expertise requires both possession of knowledge and skill developed through socialisation processes, but also validation and recognition by a community of skilled specialists (Lidskog and Sundqvist 2018). In these terms, 'expertise is achieved by carving out and controlling a particular knowledge area, developing real and substantive expertise, and then asserting one's authority as the provider of relevant knowledge for problem-solving within this area' (Lidskog and Sundqvist 2018, 322).

The notion of environmental expertise as group belonging has particular pertinence to the IPBES process. The knowledge and skills of participating experts developed within their expert communities are actively recognised in IPBES through nomination and selection, but also by validation of their findings within the Platform. However, the case of IPBES suggests that understanding the process by which environmental expertise goes from being recognised in participating experts to effectively enacted by them requires an extension to this perspective.

Understanding environmental expertise can learn from insights on public participation in environmental governance, which have emphasised the role of materiality and relationality in enabling participation (notably, Chilvers and Kearnes 2019; Marres 2012). Drawing out just one thread from this scholarship, for example, Marres and Lezaun (2011, 496) call for attention 'to more explicit deployments of objects, settings and devices in the organization of participation', and to recognise that the social and material contexts in which participation plays out are themselves shaped by acts of participation, rather than being predetermined and static. This has implications for an understanding of expert participation in GEAs.

Becoming attuned to a more relational understanding of participation can extend the theorisation of environmental expertise by calling attention to the active engagement and influence that experts might have in relation to the material resource environments in which they operate. The effective participation of experts in IPBES would therefore be determined not only by human choices about who participates but also enabled and constrained by the availability of socio-material resources – including written rules that authorise their actions, financial capital that enables their interactions, and a critical mass of human bodies able to carry epistemic practices into different parts of the organisation.

Drawing these threads together, I suggest that environmental expertise can be understood not only as group belonging but also as epistemic belonging:

the state of having the socio-material resources to assert one's importance define one's specialist skills, and to effectively enact one's epistemic practices. Becoming an effective environmental expert in GEAs requires embedding oneself into the socio-material fabric of these international expert bodies, and generating the objects and relations that directly contribute to a continued sense of belonging and ability to contribute to their work. From this vantage point, what is of interest is not solely how international expert bodies produce knowledge, but rather what Knorr Cetina (2007, 361) refers to in the epistemic cultures approach as 'the construction of the machineries of knowledge construction'. There are insights to be gained from focusing on the structural forms of expert groups and assessment practices, and examining the ways that knowledge practices and systems of categorisation order the conduct of expert action.

Ultimately, understanding the inclusion of experts in GEAs in a way that does not resort to numerical accounting requires a recognition of GEAs as particular institutionalizations of environmental expertise with long histories and significant cross-over of expert participation between them. The establishment of IPBES, for example, saw a substantial transfer of rules and practices from the IPCC, which in turn 'come to shape the ways in which other experts learn how to do assessments and navigate these settings.' (Borie et al. 2020, 23) Yet, while organisational rules and routines stabilise GEA processes, they are also likely to be sources of flexibility and change (following Feldman and Pentland 2003). In IPBES, there is recognised scope for organisational innovation (Montana 2020) and even transformative learning (Borie et al. 2020) within the Platform. Hence, epistemic belonging in practice is likely to centre on the ability of experts within IPBES to engage in a two-way negotiation, by which they fit within existing institutional rules and routines while at the same time embedding novel rules and routines into the process.

Experts on scenarios and models as a case of inclusion in IPBES

Scholarship on inclusion in global environmental assessments, such as the IPCC and IPBES, often focuses on under-represented groups, such as Indigenous knowledge holders, the social sciences and authors from the Global South (i.e. Obermeister 2017; Hollem, Zerriffi, and Kandlikar 2011; Stenseke and Larigauderie 2018). Strengthening the inclusion of these groups reflect ongoing efforts with lessons still being learnt (Díaz-Reviriego, Turnhout, and Beck 2019; Tengö et al. 2017; McElwee et al. 2020). In this paper, I focus on the inclusion of experts related to scenarios and models of biodiversity and ecosystem services. Modelling and scenario analysis are epistemic

practices that offer qualitative or quantitative descriptions of parts and relations within a system, and explore their possible futures (IPBES 2016b). These practices are responsible for some of the most iconic outputs from the IPCC, including the Representative Concentration Pathway and the burning embers diagram of climate-related risks. Given their prominence in international environmental expertise, experts on scenarios and models may appear to be an unlikely example of inclusion in IPBES, but there are a number of reasons why it is valuable to consider this case.

First, prior to the establishment of IPBES, experts on scenarios and models for biodiversity and ecosystem services did not consider themselves to be a coherent and effectively resourced expert community (Pereira et al. 2010; Leadley et al. 2010). In comparison to the climate science community organised around the Coupled Model Inter-comparison Project (CMIP) and the IPCC, experts on scenarios and models for biodiversity and ecosystem services lacked coherence and cohesion (Rosa et al. 2017; Obermeister 2019). IPBES was an opportunity for previously disparate and largely uncoordinated modelling communities 'to work together.' (Leadley et al. 2010, 37) More prominent inclusion in this GEA was seen as an opportunity to use scenarios and models to bring biodiversity and ecosystem change more centrally into government planning and policymaking for the future (Pereira et al. 2010; Leadley et al. 2010).

Second, there are epistemological reasons for understanding how notionally well-represented expert communities, such as those related to scenarios and models, attain inclusion (or even become the norm). Scholarship in science and technology studies has long sought to examine the entanglements of knowledge and power in dominant epistemic practices (Knorr Cetina 2007). Doing so has often relied on methodological attention to moments where dominant epistemic practices are destabilised, be it through controversies or the establishment of new organisations (Jasanoff 2004). The emergence of IPBES (similar but distinct from previous GEA processes) therefore provided the ideal site to observe the institutionalisation of expertise in scenarios and models 'in-the-making'. Such analyses offer insights not only on the entanglements of knowledge and power but also provide insights for how under-represented expert communities may replicate similar actions.

Of course, experts on scenarios and models began from a position of power in IPBES. The Platform borrowed heavily from the organisational arrangements of the IPCC where scenarios and models have been well established for a long time. Proponents of scenarios and models in IPBES were also in positions of leadership throughout its negotiation and first work programme (i.e. Perrings et al. 2011; Larigauderie and Mooney 2010; Leadley et al. 2010). However, the

formality of IPBES required the intergovernmental Plenary to explicitly negotiate and agree the terms of participation. Therefore, strategic and observable organisational work needed to be done in order to institutionalise scenarios and models into the Platform (see, for example, Obermeister 2019; Kok et al. 2017; Rosa et al. 2017).

While this paper treats the expert community in scenarios and models for biodiversity and ecosystem services as a single group, they also constitute a heterogeneous collection of experts from different disciplines, genders and locations with their own patterns of inclusion and exclusion. Previous analyses have considered questions of inclusion amongst this expert community within IPBES, including the challenges they faced with navigating divergent perspectives (Montana 2017) and including Indigenous and local knowledge (Obermeister 2019). Given their prominence in IPBES, the internal diversity of this expert community matters to the future development of environmental expertise. However, this paper limits itself to considering the group as a whole as it sought to assert its importance, define its specialist skills and enact its epistemic practices within IPBES.

Methods

The analysis in this paper is based on empirical research carried out during the first work programme of IPBES. This research adopted a mixed-methods approach and was carried out under ethical approval by the University of Cambridge Department of Geography Ethics Review Group (23–07–2014) and the University of Oxford Central University Research Ethics Committee (SOG1A2020-190).

Qualitative data collection included an extended period of participant observation within the IPBES process. Between December 2013 and February 2016, I attended three intergovernmental Plenary meetings in Antalya, Turkey in 2013; Bonn, Germany in 2015; and Kuala Lumpur, Malaysia in 2016. I undertook a 4-month placement with the IPBES secretariat based in Bonn, Germany, between January and April 2015, which allowed an in-depth understanding of the daily workings of the Platform. I attended three additional meetings: one of the scenarios and models assessment group in Ushuaia, Argentina, in March 2015; one of the IPBES task forces in Bonn, Germany, in April 2015; and one of the subsidiary bodies of IPBES in Bonn, Germany, in April 2015. A field notebook was kept for noting observations regarding events, as well as personal reflections about these experiences. Notably, the research was conducted by a sole researcher and was unable to capture all concurrent activities, which might have been captured by a larger research team doing collaborative event ethnography. However, this was

overcome by the longevity of the research, which has enabled exposure to a wide range of settings.

Participant observation was supplemented with data collection from 15 semi-structured interviews with four administrators and 11 participating experts. The administrators were sampled from the IPBES Secretariat, Bureau and Multidisciplinary Expert Panel and were selected on the basis that they were actively involved in administering the methodological assessment on scenarios and models. The experts were sampled from the authors of the methodological assessment on scenarios and models and were selected on the basis that they were Co-Chairs or Coordinating Lead Authors of chapters within the assessment, or that they made interventions on the strategic institutionalisation of scenarios and models during observed meetings. Interviewees were provided with an information sheet and consent form detailing data collection and analysis procedures prior to electing to be interviewed on a voluntary basis. Selected interviews were skewed towards men (12/15) from Europe (8/15), with others from Australasia (3/15), North America (2/15) and Asia (2/15). Interviews were conducted either face-to-face or online and were audio recorded for later analysis. Interview questions followed an evolving interview schedule focusing on questions, such as: What are the opportunities and challenges for scenarios and models in IPBES? What is the function of the methodological assessment of scenarios and models in the broader context of IPBES? What influence do you think IPBES might have on the theory and practice of scenarios and models of biodiversity and ecosystem services more broadly?

The combined qualitative data was analysed using a grounded theory approach (Charmaz 2006) using an iterative three-pass coding approach in which categories of analysis were allowed to emerge from the collected data in consultation with cited literature. The qualitative data presented here focus on the author group meeting of the methodological assessment on scenarios and models in Ushuaia, Argentina, in 2015, and the intergovernmental Plenary in Kuala Lumpur, Malaysia, in 2016. Included quotes focus exclusively on those interviewees in a leadership position on the methodological assessment on scenarios and models (i.e. Management Committee or Coordinating Lead Authors).

To obtain a broader understanding of the extent to which experts in scenarios and models felt that their importance and skills were recognised and enabled within IPBES, additional quantitative data was collected through an online survey in November 2020. The survey was sent to a wider set of experts than those interviewed, including anyone who had participated in the methodological assessment on scenarios and models, the expert group on scenarios and models (2016–2019), or the task force on scenarios and models

(2019). The total number of potential survey respondents identified was 95 people. Of these, 78 had valid and publicly available email addresses and were invited via email to complete an online survey (see full survey results in Supplemental material). There were 35 responses returned (a response rate of 44.9%). Survey results were quantitatively analysed to determine proportions of responses and formatted into tables for display.

Results

The fourth intergovernmental Plenary meeting (IPBES-4) of IPBES took place in the shadow of the Petronas Towers of Kuala Lumpur in February 2016. The meeting was a pivotal moment for the institutionalisation of scenarios and models within the IPBES process. At this meeting, the 369-pages of a *methodological assessment on scenarios and models for biodiversity and ecosystem services* (hereafter ‘the methodological assessment’) was approved and a continuing expert group on scenarios and models was established that continued until the end of the first work programme in 2019. These were two crucial interventions in the organisation of IPBES that not only signalled group belonging of experts in scenarios and models as valid contributors to the IPBES process but also reflected the attainment of access and control of material resources through which they could assert their importance, define their specialist skills and enact their own specialised practices.

The methodological assessment approved at the meeting had been formally requested by the intergovernmental Plenary in 2013 as one of the first deliverables of the Platform. The methodological assessment was drafted by a group of around 80 experts working at a series of three author meetings and during remote online collaborations. Throughout this time, experts on scenarios and models also had a technical support unit funded in-kind by the Dutch government based at the Netherlands Environmental Assessment Agency (PBL).

The continuing expert group on scenarios and models that was mandated at IPBES-4 was approved to contribute to the continuity of the work of the methodological assessment, and allow for support to ongoing assessments and the forthcoming global assessment (IPBES 2015, 4). The continuing expert group had 23 members selected from the author group of the methodological assessment and was allocated an operational budget of \$100,000 per year to resource its activities (IPBES 2016a).

Scenarios and models subsequently featured prominently in the four regional assessments and the global assessment that was published in 2019. Members of the expert group on scenarios and models also fed into the second phase of work on scenarios and models in the IPBES process, where experts worked on a long-

term research agenda for the development of new scenarios to support the IPBES process. This followed another of the recommendations from the methodological assessment, which stated: ‘The Platform may want to consider encouraging and working closely with the wider scientific community to develop a flexible and adaptable suite of multi-scaled scenarios specifically tailored to its objectives’ (IPBES 2016b, 30). Shortly after the IPBES Plenary approved this recommendation, an international consortium allocated over €28 million to development work on biodiversity scenarios and models in support of the IPBES process over 3 years. Publicity at the time noted that:

the funded projects [...] implement the recommendations made by the IPBES in its methodological assessment on scenarios and models of biodiversity and ecosystem services (notably by developing multiscale and multi-driver scenarios, taking into account uncertainty in the developed scenarios, etc.). (BiodivERsA 2017, 23)

This funding scheme led to a range of academic publications and collaborations, which continue to feed into the IPBES process. A subsequent work programme of up to 2030 has now been provisionally agreed, which includes a dedicated task force of 24 experts on scenarios and models with continuing support from a Technical Support Unit (IPBES 2019).

The findings from this research suggest that the apparent success of experts on scenarios and models in attaining group belonging and epistemic belonging in IPBES was not simply an inevitable outcome, but the product of strategic work by individuals within this group. To illustrate this, it is pertinent to look back to events and thinking at the time of the second author meeting of the methodological assessment in 2015.

Group belonging

The second author meeting of the methodological assessment took place in March 2015 in Ushuaia, Argentina, a town sometimes dubbed ‘the end of the world’. Although this was the second meeting of the author group, the first full draft of the methodological assessment had just been compiled and there was a sense amongst the authors that this was the first time that they were operating as a united whole. The meeting began with an introduction from the management team of the assessment, which explained the potential policy and public impact of scenarios and models for biodiversity, noting that IPBES should not have ‘climate envy’, but they should learn from the excellent international coordination and methodological development of climate modelling in the IPCC. IPBES, they asserted, was an opportunity to ‘bring our community up to a level that is similar’ (Field notes, March 2015). Over the subsequent days, it became

increasingly explicit amongst the authors that the effective development of scenarios and models within IPBES would not take place without their concerted efforts to enact it. Authors developed a collective sense of responsibility to offer guidance to the IPBES process about how to develop scenarios and models going forward, often repeating a mantra that ‘we are the IPBES experts on scenarios and models’ and if they do not offer clear guidance, no one else would (Field notes, March 2015). This phrase not only asserted a level of authority about the methodological assessment but it also acted to unify the authors around the collective identity of being IPBES experts. In effect, the report would speak on behalf of them all in advocating for IPBES to allocate resources, mobilise research agendas and centralise scenarios and models within and beyond its work.

Asserting importance

The methodological assessment was one of the first major products of IPBES. Participating experts saw it as not only an opportunity to assess and synthesise what is available in terms of scenarios and models for biodiversity and ecosystem services but also to communicate the utility of scenarios and models to the rest of the IPBES community. As one of the interviewees reflected during its production:

we have this huge challenge, especially with these regional assessments going on, to make sure that everyone comes up to speed about the usefulness of [scenarios and models] in their assessments. (Interview, February 2015)

The subsequent prominence of scenarios and models in the regional and global assessments attest to the success of these efforts, and experts on scenarios and models surveyed in November 2020 largely concurred. The vast majority (80.00%) of the experts on scenarios and models considered that the perceived importance of scenarios and models in IPBES had increased since its establishment in 2012. Respondents agreed that this increase could be assigned to a range of factors that were considered very important, including the methodological assessment (72.73% very important), the continuing expert group (67.65% very important), the regional and global assessments (45.45% very important), and externally funded research collaborations (42.42% very important).

Defining specialist skills

The methodological assessment was also an opportunity for experts in scenarios and models to define the specialist skills that they could contribute to IPBES assessments. One of the core communication devices for this was the summary for policymakers (SPM):

a summarised version of the full assessment report that sets out key points and is agreed line-by-line by governments in the intergovernmental Plenary. In this case, it was decided that the format of the SPM should include both ‘best practices for using scenarios and models in assessments, policy design and policy implementation’ and a set of recommendations that provided guidance on how IPBES should develop scenarios and models in its work going forward (IPBES 2016b). One of these recommendations included the proposition that IPBES should strengthen the inclusion of scenarios and models in its future work, including the regional and global assessments. As one of the experts explained:

If our assessment is to have any real impact, it can only do that via these other activities: regional assessments, global assessment, and so on. So that was the whole idea of having very explicit recommendations that targeted particular IPBES activities within the work programme. (Interview, June 2015)

Setting out such recommendations in the summary for policymakers was one way in which the guidance from the experts on scenarios and models about how best to develop and apply their specialist skills could be given the authoritative sign-off of the intergovernmental Plenary. Again, this strategic effort was largely perceived as being successful by respondents to the online survey in November 2020. A large proportion (76.47%) suggested that the application of scenarios and models in IPBES had improved since its establishment and most attributed this improvement to the influence of the methodological assessment (63.64% very important). However, the experts on scenarios and models did not see written recommendations alone as enough to ensure the continuity and improvement of their specialist skills in the Platform’s work. Respondents also noted that the continuing expert group (60.61% very important) and externally funded research collaborations (48.48% very important) were also very important to ensuring this.

Enacting specialised practices

Indeed, the experts on scenarios and models deemed early on that there was a need to have experts retained within the process beyond the production of their methodological assessment. Typically, experts are only able to participate in IPBES to work on a specific time-bound task. As such, it is difficult for any expert to work across assessments or to continue contributing to the Platform outside the time window of their specific assessment. The experts on scenarios and models found two solutions. First, they sought to ensure that individuals from their expert community were nominated to participate across the range of IPBES deliverables. As one of the experts described:

We put a fair bit of effort into encouraging individuals who are already involved with our [scenarios and models] deliverable to see if they can get themselves nominated for the various regional assessments. (Interview, June 2015)

Second, they proposed the establishment of an ongoing expert group that could continue to carry out work on scenarios and models in IPBES even though their methodological assessment had been completed. As the same expert explained:

We are also now looking at how we can go beyond that and ensure that there is actually on-going involvement from a small number of scenarios and modelling people with the regional assessments. [...] That is just absolutely crucial. If we can't somehow follow through with that, then all of the work of our assessment will have been wasted. (Interview, June 2015)

As far as the experts of the methodological assessment were concerned, the future of scenarios and models in IPBES depended on a continuing community of experts to bring it to fruition. By the end of the first work programme, the continuing community of experts that responded to the online survey in November 2020 largely felt like they were able to contribute effectively to IPBES assessments (71.88%), while some (12.50%) felt prevented from effective contribution and others (12.50%) did not feel strongly either way.

Discussion

For experts on scenarios and models, the journey from inclusion to epistemic belonging played out through a process of reshaping the resource environment of IPBES in a way that enabled them to assert their importance, define their specialist skills, and effectively enact their epistemic practices. For these experts, the attainment of group belonging whereby they possessed specialist skills and were attributed as experts within the IPBES process was a necessary, but insufficient achievement for effective participation. In addition, experts on scenarios and models used documents, such as the methodological assessment, as a means of asserting both the importance of their epistemic practices and improving their application. Participating experts ensured their own continuity by advocating for the establishment of a continuing expert group, which was no longer constrained by the rigid rules of an assessment author team, and therefore relatively free to self-organise across IPBES activities. Finally, they mobilised capital resources both within IPBES and beyond it to support their work.

While scenarios and models may have been widely anticipated to be an important feature of the Platform before its establishment (Pereira et al. 2010; Leadley et al. 2010), the negotiation of the rules and routines of IPBES required experts on scenarios and models to

actively create space for themselves in the Platform's operations. This case suggests that inclusion in international environmental expertise can be strengthened by providing the authority and resources for expert communities to directly shape the socio-material environments (or epistemic cultures) of the expert organisations that they are working in. This means allowing them to influence the 'objects, settings and devices' of their own participation (Marres and Lezaun 2011) and contribute to establishing 'machineries of knowledge construction' (Knorr Cetina 2007) that support rather than subvert their contributions.

The findings from IPBES echo discussions elsewhere about inclusion and decolonisation in settings of knowledge production. For example, considerations about who has input into the construction of machineries of knowledge construction are significant in moves to decolonise research across disciplines from ecology to geography. In actively undoing systems and ways of thinking that continue to be underpinned by colonialism, Eurocentrism, dispossession and racism, scholars have noted the need for 'those in positions of privilege [to] proactively and authentically engage in positive interventions to decentre themselves and open space for others' (Trisos, Auerbach, and Katti 2021, 5) and thereby contribute to not only decolonising knowledge but also structures, institutions, and praxis (Esson et al. 2017). Creating spaces for effective participation, and even transformation, in academic institutions is also a concern in relation to inter- and trans-disciplinary researchers who frequently must position themselves in largely disciplinary organisations. Felt et al. (2013), for example, examined the way in which early-career researchers developing transdisciplinary approaches were able to carve out what they termed 'epistemic living spaces' in their institutional and disciplinary communities to enable their own desired social and epistemic manoeuvres. In a similar vein, Knaggård, Ness, and Harnesk (2018, 20) have considered how interdisciplinary early-career researchers constitute 'a new generation with the capacity not just to create an academic space for themselves, but the understanding and enthusiasm to change academic structures from within.' As with experts in the IPBES process, these scholars are learning to negotiate between existing institutional rules and norms, and the creation of new ones that enable them to attain longevity and a sense of belonging within their institutions. Developments in the decolonialisation of academic disciplines and the increasing prominence of transdisciplinary approaches to knowledge production illustrate what is at stake when considering the practices of inclusion in knowledge institutions.

While the case of scenarios and models is exemplary, it is by no means the only successful example of inclusion within IPBES. Notable success has also been

achieved in relation to Indigenous and local knowledge, which has been supported by a task force throughout the first work programme that has offered guidance and established processes for working with different knowledge systems (McElwee et al. 2020; Tengö et al. 2017). However, further work is needed in other areas, such as the inclusion of the social sciences and humanities, which are still underrepresented in the Platforms work (Hakkarainen et al. 2020; Stenseke and Larigauderie 2018). For these underrepresented expert communities, the case of scenarios and models offers potential for learning insights that might support them to strengthen their inclusion in the Platform. Yet, it remains unclear whether epistemic belonging is an ideal open to all, or whether the strategic work done by one expert community to embed their epistemic practices will lead to other expert communities being shut out. Tensions related to philosophical and practical challenges of different disciplinary perspectives in expert organisations are likely to persist around distinct forms of communication, criteria for validation, and conflicting ontological positions (Löfmarck and Lidskog 2017). Whether these differences can be navigated will likely depend on where and how institutionalised rules and routines of GEAs enable or constrain transformative learning (Borie et al. 2020). It is certainly important to remember that the success, or otherwise, in attaining epistemic belonging is dependent on buy-in and facilitation by the IPBES leadership and intergovernmental Plenary that control the resources necessary to carve a niche within the official structure of the Platform. Without careful consideration to these issues, the attainment of epistemic belonging by some expert communities may impinge upon the ability of others to do the same.

Finally, it is important to note that the analysis in this paper focuses on the scenarios and models expert group as a whole. Yet, there are also important inclusion concerns within this and any other expert group. For example, the notable prominence of male and European interviewees in this research is both a sampling limitation and an indication of the broader issues of participation that play out in expert organisations such as IPBES. Even when numerical representativeness has been achieved, previous studies have shown that power dynamics within international expert meetings can leave some participants side-lined by frameworks of deliberation that do not facilitate their input (Jasanoff and Martello 2004). There is a need for expert bodies serious about inclusion to listen and learn from the experiences of their own experts from different genders, disciplines, backgrounds and locations. Improving the internal diversity within expert communities, such as those of scenarios and models, may also require further attention to the social and material resources that are needed for inclusion, including access to data sets, state-of-the-art computer systems, and

even differences in access to the IPBES process by virtue of being selected or not selected for participation. Ensuring a wider diversity of experts in scenarios and models will require further attention to the current distribution of these resources and a reflection on the broader implications for biodiversity science and policy.

Conclusion

Developments in the composition of environmental expertise in IPBES matter because like other international expert bodies, IPBES is not an isolated body. It sits within a complex landscape of intergovernmental bodies and agreements, including the United Nations Convention on Biological Diversity and other biodiversity-related conventions. As such, what happens in IPBES matters to the broader international politics around biodiversity. If such organisations are going to support the diversity of expertise needed to respond to environmental issues at national and international scales, they will need to go beyond numerical approaches to inclusion. Focusing on epistemic belonging as an ideal of expert participation may bring about more pluralist and transformative forms of international environmental expertise. This will require expert organisations to enable diverse expert communities to have a hand in defining the terms of their own participation – while also being sensitive and responsive to the needs of others to do the same.

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