

Article

(How) Does Diversity Still Matter for the IPCC? Instrumental, Substantive and Co-Productive Logics of Diversity in Global Environmental Assessments

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Abstract: To what extent has the Intergovernmental Panel on Climate Change (IPCC) succeeded in its ambition to shape a more diverse environmental expertise? In what ways are diversity important to the IPCC? What purposes does diversity serve in the IPCC's production of global environmental assessments and thus environmental knowledge in general? These questions are explored by analyzing quantitative demographic data of the latest two assessment cycles (AR5 and AR6) and qualitative data from a semi-structured interview study with IPCC experts. The analysis shows that there have been improvements in diversity in recent years across measures of gender (women comprising 34% of authors in AR6 compared to 21% in AR5), regional representation and the proportion of authors from developing countries (35% in AR6 compared to 31% in AR5). These improvements have not, however, been distributed evenly when looking at the seniority of authors, nor when comparing across working groups, with WGI (the physical science) remaining much less diverse (28% female authors) than WGII (impacts) (41% female authors) and WGIII (mitigation) (32% female authors). The interviews suggest that rather than viewing diversity as a challenge it should be viewed as an opportunity to build capacity. Distinctions between scientific expertise and 'diversity of voice' need to be reconsidered in terms of both the substantive and instrumental value that a diverse range of knowledge, experience and skills add to the process of the scientific assessment of climate knowledge. In the concluding discussion, three points are raised: (i) the issue of diversity will probably grow in importance due to the fact that the complex task of transforming society has increasingly come into focus; (ii) the issue of diversity will be crucial for IPCC to maintain and develop its capacity to make assessments; (iii) the issue of diversity should not be reduced to simply a means for improving the process of making assessments, but should also improve the outcomes of the assessments.



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1. Introduction

The Intergovernmental Panel on Climate Change (IPCC) was established in 1988 under the auspices of the United Nations and serves as an international expert body that provides regular assessments (assessment reports) on the state-of-the-art in scientific knowledge on climate change [1]. It is currently finalizing its sixth assessment report (AR6) which will be completed in 2022. Besides these general assessment reports, the IPCC also publishes special reports on specific topics, wherein the most well-known is the special report on global warming of 1.5 degrees [2]. The role of the IPCC is not to provide *new* knowledge nor to conduct primary research but functions to analyze and synthesize existing scientific knowledge. It is structured around three Working Groups: WGI—the physical science basis; WGII—impacts, adaptation and vulnerability; and WGIII—mitigation of climate change. The distinct role of the IPCC is to produce 'policy relevant but not policy prescriptive' knowledge to national governments and it is the governments themselves, constituting the 'Panel' who ultimately sign off on the final assessment report.

The IPCC acknowledges that certain groups are underrepresented within the scientific community and, by extension, in the preparation of its own assessment report. It has implemented several measures to improve this situation, including an emphasis on increased diversity—in terms of gender, experience and geographical distribution—within the selection of authors and the formation of Task Forces, such as the Gender Task Force, to report on specific ways in which equality and diversity can be increased within IPCC groups and processes. Despite this clear evidence of a commitment to diversity—including the presence of a published gender policy [3]—there is little published by the IPCC that explicitly justifies or provides a rationale for the desire to improve diversity. One notable exception to this is on the IPCC’s website section on gender, “To continue to produce leading scientific assessments, the IPCC harnesses the best minds, but also utilizes the problem-solving power of diverse perspectives” [4]. This view raises crucial questions about the relation between knowledge and problem-solving as well as the reasons and implications of including diversity in the expert assessment.

This article explores how diversity matters for the IPCC, by exploring three related issues: To what extent has the IPCC succeeded in its ambition to shape a more diverse expertise? In what ways are diversity important to the IPCC? Lastly, as a means of opening up debate on the issue of diversity within the IPCC, what purpose could diversity serve in the IPCC’s production of (global) environmental knowledge? These questions are explored by using two data sets; quantitative demographic data of experts involved in the latest two assessment cycles (AR5 and AR6) are presented and analyzed in the first section. The second section uses qualitative data from a semi-structured interview study with IPCC experts to discuss the various ways the IPCC understands and appreciates diversity. The final section draws conclusions from the analysis of these data sets and suggests a focus on a holistic approach to diversity may be one way to transcend the binary logics of a strategic or substantive approach to diversity. It is ultimately hoped that this article prompts a constructive discussion on the issue of diversity within the IPCC and within environmental research more generally.

2. Literature Review

2.1. Diversity in Science

The IPCC’s quest for diversity is part of a broader trend, in which democratic societies have increasingly embraced the value of acknowledging, articulating, and supporting diversity [5–7]. Diversity has become an important ethos in almost all spheres of society, including public policy, administration, organizations, and science. This trend also has a rather long history in knowledge production, where pleas for a ‘democratized science’ have been voiced for more than two decades, arguing that knowledge production is increasingly diffused in society with the implication that a broader set of expertise—beyond the traditional, formalized and credentialled scientific one—needs to be included in knowledge development and/or knowledge assessments [8–10]. In global environmental assessments, diversity is increasingly adopted as a central value, and policies and task forces are developed to turn this value into practice. In some cases, it has meant opening up assessment work to non-scientific expertise. The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) is the most well-known example of this, assessing knowledge from knowledge systems other than scientific ones but also including non-scientific knowledge holders in its assessment process, what is broadly termed ‘indigenous and local knowledge’ [11]. But for most expert organizations, diversity means that the selected scientific expertise reflects the broadest possible range of social parameters such as gender, disciplines, and regional origin/training.

Previous sociological, social psychological and organizational studies have found a wide array of motivating factors for both individuals and organizations to adopt diversity as a guiding value. Repeatedly an important distinction has been highlighted between the ways in which diversity may serve either a strategic function or a substantial function. Stressing the strategic function centers the issue of legitimacy, either in the form of input

legitimacy (procedural legitimacy) or in the form of output legitimacy (effectiveness) (for an overview, see [12]). Stressing the substantial function centers the epistemic issue, acknowledging that scientific knowledge has a contextual nature, and that by including a more diverse set of expertise, knowledge is improved through increasing the number of perspectives, giving fresh and potentially unknown insights to existing problems [13,14].

Even if it is common to view the functions of diversity in binary terms—as mutually exclusive logics—it is important to see that in practice diversity can have multiple, interrelated, complementary and sometimes contradictory logics. Expertise—a position of epistemic authority—always implies that an organization needs to be competent, in the sense of mastering specialist knowledge or practices, recognized, in the sense of being known outside its own expert community (not least its target groups), and legitimate, in the sense of being considered trustworthy [15]. Diversity may intersect with these different features of expertise in both positive and negative ways. Diversity can be crucial for maintaining and developing the epistemic authority of an expert organization, i.e., it serves both strategic and substantial functions. However, to bring diversity into expert organizations has proven to be a challenge, both in terms of creating a diverse body of expertise (the identification and selection of diverse experts) and of making it matter in practice (the performance of expertise) [16]. At the same time, diversity also provides opportunities for capacity-building; not just as a means to broaden individual expert's competence, experience, and networks but also to help improve the competences and networks of national science infrastructures in developing countries. This article argues that the question of capacity building through diversity can and should be taken one step further—understood not as a 'top-down' process that sees capacity as something passed from the central organization to the individual and the national infrastructure but as a more holistic and inter-relational process that will improve the expert organization's ability to generate knowledge syntheses and understanding of socio-ecological systems as well as to handle different experiences and perspectives within this knowledge field.

2.2. Diversity in the Intergovernmental Panel on Climate Change (IPCC)

The IPCC is not an exception to the general trend of increased inclusivity and an emphasis on diversity. From its earliest days, while the organization was still in a preparatory phase of development, the first chairperson the IPCC Bert Bolin asked in relation to the diversity of participation, "Don't you think credibility demands global representation?", the consideration being here that without an adequate level of participation and representation from a broad number of countries the assessments produced would not be as authoritative or trusted, not least in developing countries (quoted in [17], p. 25). At that time, geographical (and geo-political) diversity was given priority and gender diversity was not granted a similar level of importance—in the first assessment cycle (1990) only 2% of the total scientists involved were women [18].

In the intervening years, the IPCC has developed a much broader vision of diversity but despite continually acknowledging the importance of a diverse author team and enacting positive policies in author selection to improve diversity, a number of studies have remarked upon the slow progress that has been made. Reviewing the authors involved in the four first assessment cycles (1990, 1995, 2001 and 2007), it was found that 45% of the world countries were not represented at all while 75% of the authors were from Europe and North America [19]. The review argues that by not including researchers from the Global South, there is a risk that important scientific and policy issues will be poorly understood and addressed.

A more recent study, of authors in the fifth assessment cycle (AR5) (2014), focusing on WGIII (mitigation), found the uneven distribution of authorship between Global North and Global South persistent and extensive, in particular there was a dominant presence of authors from the US and UK [20]. The implications of this study paint a yet more negative picture for diversity in the IPCC, finding that there are strong institutional pathways, involving shared training and career paths—with many authors having trained at or

worked in the same Global North institutions—which may imply that broader geographical representation of authors will not necessarily lead to wider range of viewpoints (see also [21]).

Another study of AR5, but in this case focused on WGII (adaptation), identified a particular blind-spot in the IPCC's efforts towards increasing diversity, noting that the chapter authors had extremely limited expertise in researching, publishing, and representing indigenous people and their views on climate change [22]. This is argued to be problematic, due principally to the unique climate (as well as interrelated social and economic) vulnerabilities many indigenous groups face, but also, and importantly, because many indigenous peoples have conceptions of the impacts and adaptation possibilities to climate change that depart greatly from those understood by traditional science. A failure to integrate—or even acknowledge—these views and knowledges cannot claim to be exhaustive and stands to miss factors important to producing successful and legitimate adaptation strategies.

When the gender balance of the IPCC has been examined, it has been shown that despite a substantial increase in the proportion of female authors—from less than 5% of the lead authors in 1990 to more than 20% in 2013—there remains a striking imbalance [18]. The same study reported the results of a survey completed by more than 100 female IPCC authors, showing that they face multiple barriers, firstly to joining the IPCC and then having their experience and knowledge given equal consideration to male authors. Many of these barriers intersect with other social identifiers such as race, nationality, language, and discipline.

Broadening the scope of diversity yet further, two other studies on the IPCC and inclusion argue that to fully consider the IPCC representative, both the organization itself and scholars of global environmental expertise must look beyond the representation of countries or gender, but also to include issues of epistemic diversity [1,23,24]. This goes beyond simply the disciplinary—which itself is an issue deserving of more attention—but to look at the range and extent of knowledge plurality, what kinds of knowledge(s) are valorized, and which are rejected and what are the implications of knowledge on policy and the goal of averting climate breakdown.

To summarize, a positive trend has been reported, with the IPCC becoming more inclusive in terms of region and gender but the most recent studies, up to AR5, show this to be unbalanced and still problematic. Studies also suggest that the motivation for increased diversity is not purely instrumental but substantial; by including authors from different countries and regions, and by including female authors, there is a belief that assessments will not just be more trustworthy (legitimate to a greater number of people), but the quality of the assessments will be improved in terms of including more perspectives and more relevant knowledge about climate change. At the same time, there have been warnings that better representation in terms of regions and gender may not necessarily lead to viewpoint diversity if authors are still recruited from a relatively small set of institutions and career pathways.

In the most recent call for nominations of authors, for the AR6, the chair of the IPCC, Hoesung Lee, stated, “We are seeking scientists with expertise across the disciplines assessed by the IPCC. [. . .] We also hope that more scientists from developing countries and more women scientists will be nominated as IPCC authors to give us diverse author teams that can provide a range of relevant perspectives” [25]. To what extent and in what way this call has resulted in more diverse authorship remains to be seen and the following sections analyses the most recent IPCC author data, comparing AR5 and AR6 to give a more up to date perspective on diversity in the IPCC before using the qualitative data taken from a recent interview study to contextualize and deepen the relevance of diversity for the IPCC.

3. Data and Methodology

The study was undertaken in two parts. Firstly, the qualitative data on the IPCC author teams from AR5 and AR6 was obtained from publicly accessible websites including the

IPCC's own author database (<https://archive.ipcc.ch/report/ar5/authors.php>, accessed on 1 February 2021). These author teams were then entered into a spreadsheet and ordered by assessment report, working group and chapter. Data are available as Supplementary Data File with a link at the end of this article. Demographic data, including the gender, country and institution were entered for each author and, where not initially available, were obtained by a research assistant through an internet search and later verified.

This demographic data were then subjected to simple quantitative analysis within the spreadsheet program to assess the percentages of authors corresponding to the relevant criteria of gender, country and global/north south. While recognizing that the distinction, 'global north/global south' is not unproblematic nor uncontroversial within the social sciences [26], not least because it is a blunt tool in unpacking regional and sub-national differences in development, the terms are used synonymously with developed/developing countries to give a rough approximation of national scientific capacities. To make this distinction the United Nation Grouping of 77 (G-77) was used.

The interview study was undertaken with IPCC experts in 2020. In the first instance an interview protocol and draft interview guide was developed in January 2020. The purpose of the interviews was to gain insight into the nature, understanding and practices of expertise in the IPCC, including questions on issues of diversity, interdisciplinarity and knowledge. In February 2020 prospective interviewees were identified and the process of contacting them began. The emerging coronavirus (COVID-19) pandemic severely impacted on the participation rate and the length of time taken to reach relative saturation of interviewees [27]. Between March and November 2020, a total of 17 interviews were conducted, lasting between 60 and 90 min and taking place digitally. Interviewees were asked to complete a consent form before being interviewed and the interviews were recorded and later transcribed.

The contact strategy was to reach a broad range of experience and roles within the IPCC but focusing on those currently working or recently having worked within the IPCC. The information on the range of experience and roles of the interviewees is summarized in Table 1. Most interviewees had experience of working in the IPCC over multiple assessment cycles and across several different roles, explaining why the totals exceed the number of interviews.

Table 1. Roles and experience of interviewees.

| Roles/Positions | Contributions |
|---------------------------|----------------------|
| National Focal Points | 2 |
| Secretariat | 1 |
| Co-Chair | 2 |
| Co-ordinating Lead Author | 9 |
| Lead/Review Author | 20 |
| Technical Support Unit | 3 |
| Working Groups | |
| Working Group I | 12 |
| Working Group II | 17 |
| Working Group III | 5 |
| Assessment Reports | |
| AR6 | 13 |
| AR5 | 7 |
| AR4 | 4 |
| AR3 | 6 |
| AR2 | 5 |
| AR1 | 2 |

Data from the interviews were analyzed thematically, drawing back on the original interview protocol and guide to extract themes. In our analysis (Section 5) we will mainly use data drawn from the interviews with the five interviewees who either currently or previously have some role in the selection of experts for the assessment reports—working group co-chairs or members of the technical support units (TSU).

4. Results: Demographic Data on IPCC Authors

The IPCC routinely publishes data on the diversity of its current and past authors on its website. The IPCC's procedural rules draw particular attention to these aspects in the selection process and the IPCC's Gender Task Force has highlighted that gender, intersecting with other features such as race, ethnicity and nationality, remains a barrier to participation in the production of knowledge [3].

4.1. Author Teams within the IPCC Have Become More Diverse

There have been significant and observable improvements in diversity between the assessment period of AR5 and AR6 in terms of the gender make up of author teams, with women constituting 34% of authors in AR6 compared to 21% in AR5 (Figure 1). Gender diversity has improved more dramatically than the distribution of authors from developing countries in the same period, which rose only four percentage points from 31% to 35% (Figure 2).

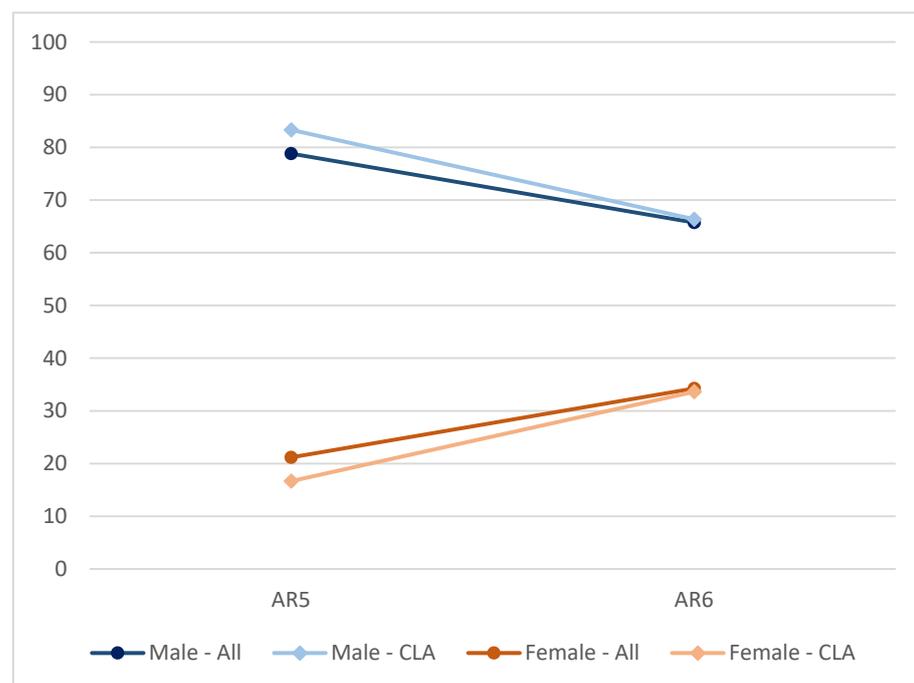


Figure 1. Gender diversity between AR5 and AR6 (%). Source: Authors' own data.

The diversity of the regional origin of authors between AR5 and AR6 presents a much more mixed picture, with a large fall in authors from North America, from 25% to 15% (Figure 3), the reasons for which will be discussed in the following section, and increases in the proportion of authors from Europe, from 34% to 37%, and more dramatically Asia and the Pacific, from 23% to 30%. In this period, authors from Africa and South/Latin America, who were already among the least represented, grew only marginally, in each case by less than a full percentage point (Figure 4).

4.2. Increasingly Diverse Author Teams Are Only Partially Reflected in the Diversity of Senior Authors

While the diversity of author teams has improved between AR5 and AR6, the picture of authors with senior roles, Coordinating Lead Authors (CLA), who have principal responsibility for drafting the chapters as well as coordinating and managing chapter teams, is more mixed. Female CLAs are now on a par with their overall representation in authorship teams (35%) (Figure 1) while those from developing countries remain below their overall presence in author teams (33% compared to 35%) (Figure 2).

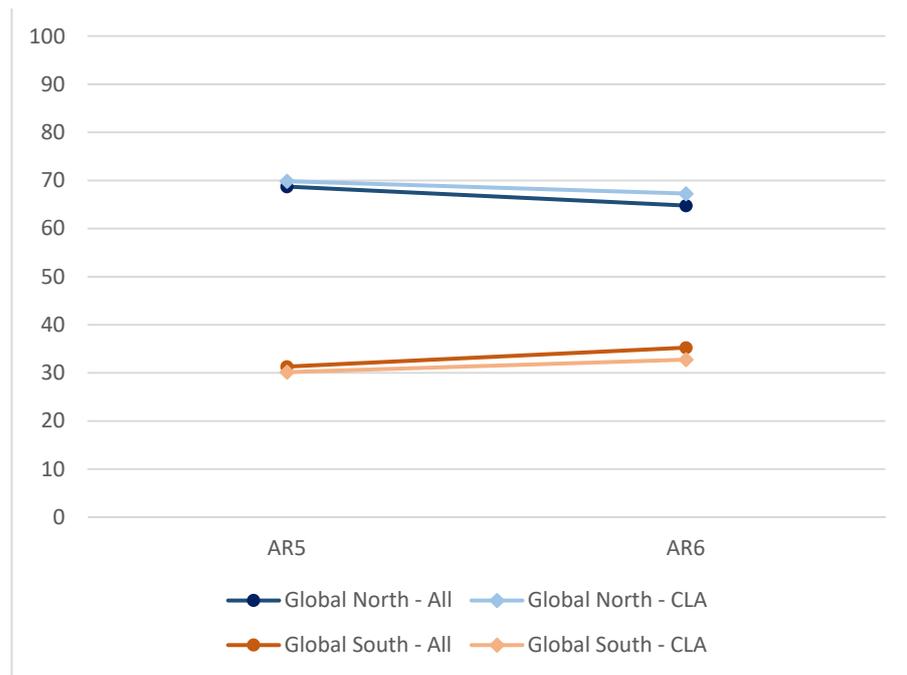


Figure 2. Global North/South diversity between AR5 and AR6 (%). Source: Authors’ own data.

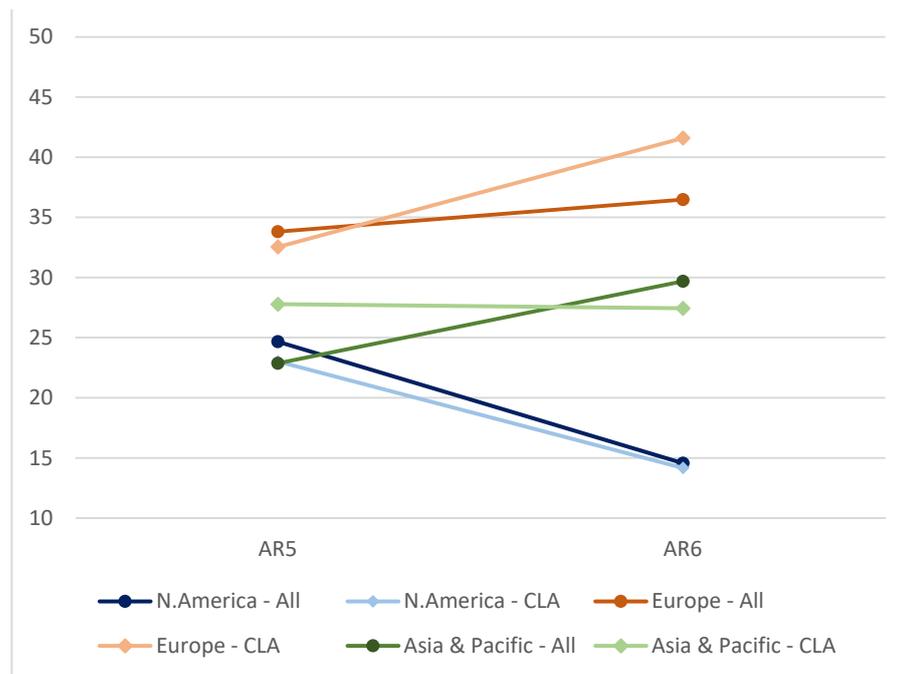


Figure 3. Regional diversity between AR5 and AR6 (%) (Part 1). Source: Authors’ own data.

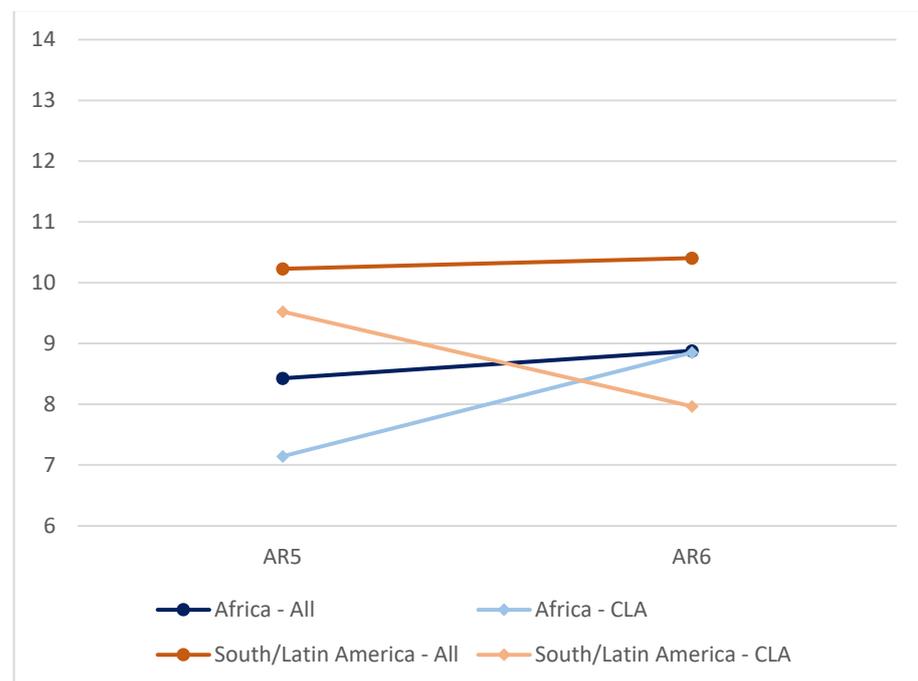


Figure 4. Regional diversity between AR5 and AR6 (%) (Part 2). Source: Authors' own data.

In regional terms, the drop in North American CLAs (25% to 15%), in line with their overall fall in numbers, has corresponded to a large rise in European CLAs (33% to 42%) while the number of CLAs from Asia & Pacific has dropped by half a percentage point (Figure 3). CLAs from Africa and South/Latin America remain a small minority with the rise in African CLAs (7% to 9%) partially compensated by a drop in South/Latin American CLAs (9% to 8%) (Figure 4).

4.3. There Remain Clear Differences in the Levels of Diversity between Working Groups

The differences in the levels of diversity are not spread evenly across the working groups, with WGII (impacts) and particularly WGIII (mitigation) making the most visible improvements in diversity in gender. While overall WGII and WGIII have a more diverse author profile than WGI it is noticeable that in the categories of authors from developing countries and authors from Latin/South America WGIII saw a proportional decline between AR5 and AR6 as the latter category did also for WGII.

When the data for just AR6 are examined—considering the most recent improvements—WGI contains the smallest proportion of women (28%, compared to 41% in WGII and 32% in WGIII) (Figure 5), authors from developing countries (33%, compared to 36% in WGII and 36% in WGIII) (Figure 6) and the lowest proportion of authors from Africa and Latin/South America (16%, compared to 21% in WGII and 20% in WGIII) (Figure 7).

While WGI has seen some of the largest improvements in diversity (the proportion of women in this WG alone rose from just 19% in AR5 to 28% (Figure 5) in AR6 and proportion of authors from developing countries rose from 21% to 33% in the same period) (Figure 6), it remains noticeably behind the other groups in terms of diversity.

Inter-Working Group disparity is exacerbated when senior authorship is analyzed. In the current assessment cycle, AR6, authors from the Global South comprise only 22% of CLAs (compared to 37% of CLAs in WGII and 37% of CLAs in WGIII) while authors from Africa plus Latin/South America comprise 9% of CLAs in WGI (compared to 20% of CLAs in WGII and 20% of CLAs in WGIII). In terms of gender, the picture is slightly improved, with women making up 31% of CLAs in WGI (compared to 39% of CLAs in WGII and just 29% of CLAs in WGIII).

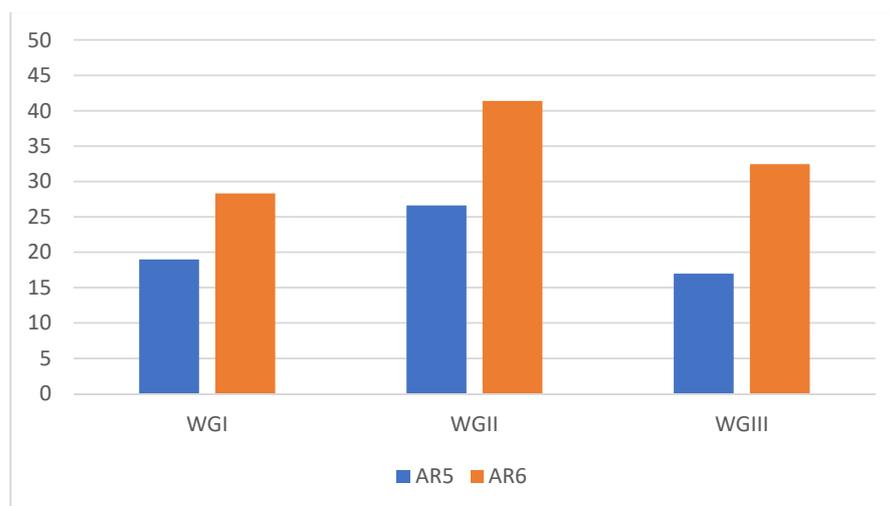


Figure 5. Proportion of female authors (AR5 + AR6). Source: Authors' own data.

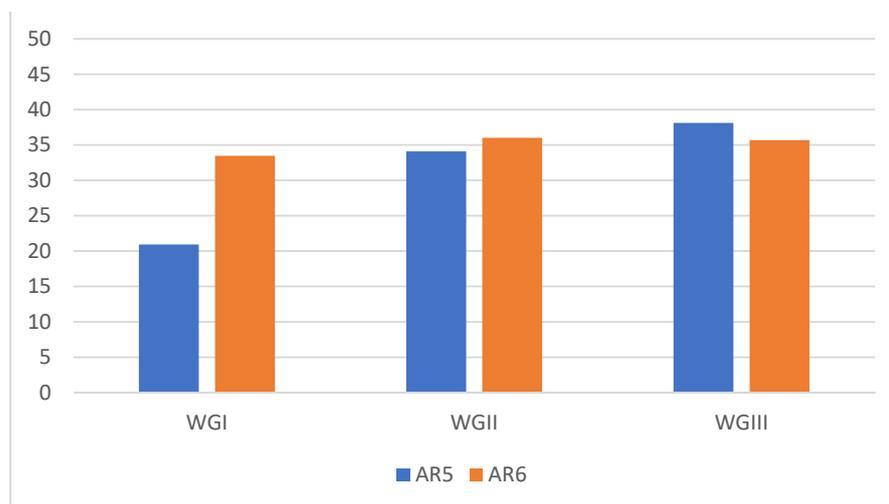


Figure 6. Proportion of authors from Global South (AR5 + AR6). Source: Authors' own data.

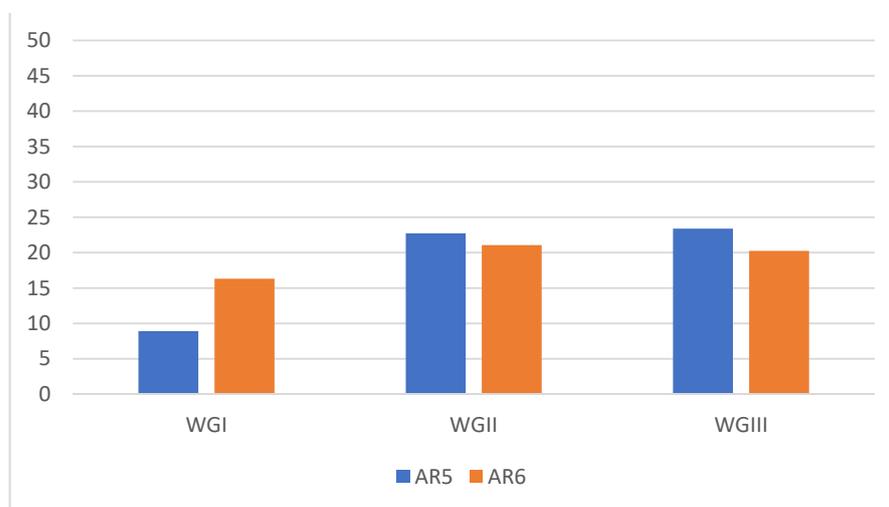


Figure 7. Proportion of authors from Latin/South America+Africa (AR5 + AR6). Source: Authors' own data.

5. How Does Diversity Matter?

To better answer how diversity matters to the IPCC, data were analyzed from the interview study conducted with IPCC experts.

In sitting astride the science–policy interface, the IPCC must fulfil several roles simultaneously: it must produce a rigorous assessment and synthesis of the current state-of-the-art in climate knowledge which itself must be ‘policy-relevant but not policy-prescriptive’ (<https://www.ipcc.ch/>, accessed on 1 February 2021) for the development of national and international climate policy [1]. The legitimacy and authority the IPCC carries into the global policy sphere is mediated by a number of different logics—not simply what is said by the IPCC but who says it and how it is said. The process of producing a global environmental assessment that is acceptable to, and agreed by, all member countries requires not just a rigorous scientific process but also a degree of scientific diplomacy to persuade national governments and their representatives that what is placed before them in the final report is indeed the best available knowledge in the field, which for many entails containing a sufficient number and variety of voices.

There was a broad agreement across most interviewees that the IPCC’s drive for diversity brought with it particular challenges that made the process of writing an environmental assessment more difficult and time consuming. More specifically, issues around language barriers, cultural differences, and the practical difficulties in giving a broad number of people a voice were raised by a number of interviewees. This reflection on the way an instrumental logic is seen to function in tension with diversity is particularly illustrative:

[. . .] they have instituted training, diversity training but I am not sure it is inter-sexual enough. Because like a lot of men who are non-English speakers from the global south, they are silenced as well, so there are multiple silences or silencings [. . .] I have talked to some of the people who are very loud voices [. . .] and they said, we are just in a panic, the issue is so important and the timeline for our report is [short], I just feel I have to push things through.

(Interview 14)

A broad set of views, perspectives and voices is seen by some to work against the imperative to produce high-quality work to a tight deadline. The tension between what constitutes a good environmental assessment from the viewpoint of its scientific rigor and its diverse perspectives was well articulated by one interviewee, who said,

Putting it bluntly, if you want a good well written report on any aspect of climate change you could get half a dozen white European men to write it and if you choose the right six white European men you will get a very good report. It would have a fraction of the impact that an IPCC report does because it just wouldn’t be seen as being representative of the global body scientific or relevant to the body politic. And so bringing that diversity is I think one of the things which is really essential but also one of the things which is very challenging to do.

(Interview 07)

As another TSU member put it, part of their role in the selection process was, “helping Bureau members notice the key players in the regions who don’t necessarily appear at the same level as it were if you just consider objectively academic scores” (Interview 05). The issue of diversity has been increasingly formalized and institutionalized into the selection process, from the criteria for selection laid out in the IPCC’s rules of procedure to the specific practices themselves. But rather than integrating the issue of diversity into the IPCC ethos as an intellectual or epistemic value it remains distinct and ‘othered’ from the traditional notion of scientific competence. This was made explicit in the process of one of the more diverse groups, Working Group III:

[. . .] what we tended to do was take it in three tranches, we would do one tranche where we just voted and that should pick up the best scientifically qualified people. And then we did a second tranche where the TSU proposed

people to fill it out in terms of the regional balance and diversity issues. It took up to maybe 80% of the author time. And then for the last 20% we just went gap hunting and tried to find which are the missing disciplines.

(Interview 07)

The distinction between scientific excellence and diverse voices is made explicit within the very selection process that is committed to diversity. Other interviewees agreed with this point and stressed that it was a distinction made at all levels of the organization, “I think people approach it differently so a lot of developed country people more on the Bureau side would say the most important thing is to get the right scientific expertise in, whereas the developing country members of the Bureau are much more concerned about diversity [...]” (Interview 12).

One of the principal difficulties in developing a diverse set of expertise has been the National Focal Points—the national bodies responsible for recruiting and nominating experts to the IPCC for selection. This is a product of both differences in scientific cultures and the political realities of operating within the science-policy interface. As one interviewee explained:

[. . .] it is pretty clear that in some countries the people who are nominated are senior male scientists who often don’t know anything about climate change and it is not an open process. Somebody in the administrative environment of science agency selects who gets nominated and that means we don’t get the best people.

(Interview 14)

Political sensitivities and considerations about nominations should not be considered solely the preserve of developing countries, however. As the previous section showed, between AR5 and AR6 there was a noticeable drop in the number of authors from North America, principally from USA. One interviewee explained the issue, “quite frankly it was the background of the current [Trump] administration [. . .] we looked at it carefully and the drop off was both from the national laboratories, which was actually quite a big source of nominations for IPCC and for universities which were funded independently” (Interview 12).

The political and structural difficulties in bringing a diverse set of authors into the IPCC are well known and have led to more active, informal practices of broadening diversity, as we were told, “ . . . you can do a lot, if you are around long enough, to bring people into IPCC” (Interview 14). These practices suggest a logic and a motivation for increasing diversity that goes beyond the binary logics of the strategic and the substantive approach and are grounded in a more inter-relational approach best characterized by the concept of capacity building, in which the capabilities, skills, experience and knowledge of all parties benefits from a sharing or pooling on resources. As one interviewee said in relation to a visible underrepresentation:

We actively sought better nominations, as it were, in Africa. I couldn’t say why we need better nominations but essentially informing the community more of the opportunity of what is involved and how to take part in IPCC [. . .] and then helping bureau members notice the key players in the regions who don’t necessarily appear at the same level as it were if you just consider objectively academic scores because the way research is done there is very different.

(Interview 05)

There is a tacit acknowledgment that what constitutes the traditional notion of ‘scientific excellence’, in terms of those markers that can be measured and compared—qualifications, publications, networks etc.—are not fully representative of the diversity of knowledge and experience that is required and that through the very act of participation in the IPCC those capabilities can be improved. This was made explicit by another interviewee involved in the selection process, “for example if I am ranking a woman from, say, a Middle Eastern country, I would rank her a little higher than I would rank the same level

of expertise for say a European country because I know that for her region this seems to be a good curriculum” (Interview 16).

The issue of capacity-building transcends (even subverts) the logics of the strategic approach and the substantive approach—as a means of legitimizing or granting authority to a process and to the quality of the knowledge it produced—because it entails an active process of bringing in otherwise neglected, overlooked, or marginalized people. They have not or would not have been nominated by their national bodies nor would their credentials have been considered sufficient, according to traditional ‘objective’ criteria, for their inclusion without a contextual interpretation of rules for selection. Instead, this is viewed as a means of increasing the current and future capacity of individuals, national science systems, and the IPCC itself:

One of the motivations for developing countries is not so much, well there may be the dignity thing of get your name on it, but there is also the issue that it is also a capacity building thing as well. Because if you become an IPCC author you are introduced to international networks and the best predictor of whether you are getting publications in high-profile journals is whether you are part of a network. So even if people don’t start out with the highest scientific qualifications or publications record it may help them to bring them into the process by doing it. So, I think the capacity building element of it shouldn’t be ignored.

(Interview 12)

The final section that follows brings these results together by suggesting how diversity may matter to the IPCC, and to environmental research more broadly, in the future before suggesting some points of departure for further discussion on the issue of diversity.

6. Discussion

While IPCC authors remain overwhelmingly male and from developed countries—centered in Europe, North America, and Asia—there is strong evidence that diversity does matter to the IPCC. The demographic data presented in this article show improvement in the overall levels of diversity between the assessment periods of AR5 and AR6, even if there is still much work to be done in terms of increasing the diversity within the senior authorship roles and improving the numbers coming from Africa and Latin America.

It was beyond the scope of this article to analyze diversity from the perspective of disciplinary, epistemic or viewpoint diversity—each of which have been highlighted within the literature and by our own interviewees as matters of concern and should be considered areas of particular interest for future researchers. The traditional networks of climate knowledge production, through the Ph.D. programs and career paths of elite universities in the Global North, have often allowed institutions such as the IPCC to effectively ‘game’ the diversity figures, increasing participants ostensibly from the Global South but who are fully integrated into networks outside. In a more positive sign, interviewees here also showed a motivation to build capacity and networks outside of their traditional areas of strength. The recognition that knowledge and expertise are institutionally and socially produced [28]—bringing both constraints but also opportunities—is a step in the right direction.

Beyond the figures, however, lies the question of how diversity matters to the IPCC and therein lies the rub. The interview data presented shows several motivating logics at work when the issue of diversity is raised, seeing it in instrumental and strategic terms but also substantive terms. To transcend these logics, diversity should not be reduced to a ‘box checking’ exercise, not least because experience, knowledge, skills, and identities are themselves irreducible to simplified categories. As was stated above, it was the desire of the current IPCC chair that this assessment cycle be even more representative and diverse than ever before, but the data presented here shows there is still some work to be done, particularly in the area of nominations from National Focal Points. This process of nomination and selection remains something of a black box for the IPCC and could be a point considered for significant policy reforms for capacity building in the future.

In order to generate a broader debate on how issues of diversity could be handled, in the IPCC as well as in other global environmental assessments and institutions of knowledge production, we would like to highlight three specific points of departure for further discussion.

First, the issue of diversity will have growing importance over time. Agenda 2030, the global sustainable development goals, and the Paris agreement all point to the crucial need to develop not only knowledge about problems but also about their solutions—knowledge for action. Focusing on the root causes of problems puts the complex social and cultural task of transforming society at the center [29]. To develop a diverse set of expertise, comprising a diversity of knowledge and experience, is crucial to better understand, assess, and synthesize knowledge about how a problem looks from different social, cultural, and geographical perspectives, and possible ways forward [30].

Secondly, the issue of diversity will be crucial for maintaining and developing the IPCC's capacity to make assessments. Even if methods for assessments are formalized, the application of these methods—as for all scientific methods—presumes training and involves tacit knowledge. Methods are not fully learned through textbooks, manuals, and written procedures, but by training in a community of practice [31]. Thus, the application—and gradual refinement—of methods for assessing and synthesizing knowledge are co-produced in the interaction between involved experts, technical instruments, and applied methods. Thus, assessment should not be seen as a linear model, where established rules are simply applied in a mechanical way, but instead a dynamic activity in which rules are interpreted, and reinterpreted, by experts whose diverse experience and knowledge matters [32].

Thirdly, the issue of diversity should not only be seen as a means to improve the legitimacy of an assessment but will also influence the content of the assessment, not least in the long run. This is a point repeatedly stressed by Science and Technology Studies (STS) and its co-production thesis. The co-production idiom includes not only an interactional aspect—how knowledge conflicts are handled within an already known world—but also a constitutional one [33]. The way we produce knowledge about the world is also part of its constitution. By inventing new concepts and methods, new aspects of reality are discovered, and the extent of its dynamism and contingency is revealed—most recently grasped by the Anthropocene narrative, arguing that human activities now are changing (and constituting) fundamental Earth system processes. Diversity, therefore, cannot be reduced to something that only concerns the processes, but must be reflected up as something that also influences outcomes. When diverse sets of experts take part in assessment practices, these practices will, themselves, change over time and with them the outcomes of those assessments.

To conclude, a broader understanding of diversity, followed by a reflexive way to support and orchestrate it, can serve to strengthen the epistemic authority and capacities of the IPCC and those involved with it [34]. It is not an approach that deals with diversity uncritically—recognizing the tensions and challenges inherent to it—but rather centers the issue by asking necessary questions of processes, participants, and outcomes. It is hoped that this article prompts broader reflection and debate on how diversity can or should matter to the IPCC, to environmental knowledge production and to the wider scientific community—a reflection not only of the challenges that a commitment to increasing diversity brings but also the opportunities that it offers.

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