

Including indigenous knowledge and experience in IPCC assessment reports

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The IPCC is the leading international body for the assessment of climate change, forming the interface between science, policy and global politics. Indigenous issues have been under-represented in previous IPCC assessments. In this Perspective, we analyse how indigenous content is covered and framed in the Working Group II (WGII) portion of the Fifth Assessment Report (AR5). We find that although there is reference to indigenous content in WGII, which increased from the Fourth Assessment Report, the coverage is general in scope and limited in length, there is little critical engagement with indigenous knowledge systems, and the historical and contextual complexities of indigenous experiences are largely overlooked. The development of culturally relevant and appropriate adaptation policies requires more robust, nuanced and appropriate inclusion and framing of indigenous issues in future assessment reports, and we outline how this can be achieved.

The assessment reports of the IPCC play a critical role in producing global knowledge on climate change^{1,2}. This is not a value-neutral role, as the very act of reviewing and assessing the state of knowledge in a given area is influenced by author training, disciplinary background and positionality. Author teams decide what research to include and exclude, how much space to allocate to each topic, a structure for framing knowledge and how to deal with conflicting arguments, as well as writing style and language^{3,4-7}. Before author teams are identified, Working Group Chairs are selected and the broad function and outline of the assessment reports are decided; a process that takes place within an intergovernmental space that is influenced by competing national interests. IPCC chapters are thus framed through specific lenses, which although moderated to some extent by the extensive expert review process of the IPCC, nevertheless affect how climate change is portrayed and what information is included, creating discursive spaces for responding^{8,9-13}. The framing of IPCC chapters in turn influences the development of international climate change policy and decision-making, given the agenda-setting role of the IPCC^{4,6,14-16}.

Studies examining the framing of IPCC assessment reports are relatively recent, and are part of a broader reflexive turn in science and technology research to examine the epistemological and normative framing of the institutional organizations involved in expert-led assessments^{4,8,17-19}. Although this work emphasizes the important contributions of the IPCC and evolution of the scope of the assessment reports over time, it has also been noted that the procedural rules governing how the IPCC operates and the positionality of the author teams (for example, disciplinary background) has resulted in the privileging of positivist science and technocratic perspectives, the marginalization of other ways of knowing (for example, local, traditional and indigenous knowledge) and the prioritization of scenarios and modelling approaches^{3,18,20-23}. Recent papers have also questioned the absence of social science and humanities authors in WGII and WGIII^{3,7,21,24}, the newsworthiness of AR5 reports and outreach materials^{7,25-27} and the extent to which marginalized and vulnerable populations are captured²⁸.

In this Perspective, we document and examine how research reporting on indigenous peoples' experiences with climate change is

framed in AR5 WGII, and the extent to which indigenous-focused content features in the chapters and in the Summary for Policymakers. The work responds to: (1) concern over a neglect of indigenous issues in IPCC assessments, which in part reflects a lack of engagement of indigenous scholars, organizations and knowledge holders in assessment reports, the epistemological framing of the IPCC process and the limited published research on indigenous peoples and climate change^{2,28-32}; (2) the efforts through the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the United Nations University (UNU) to promote coverage of indigenous content in the IPCC assessments, including efforts towards the greater engagement of indigenous peoples²⁹. The treatment of indigenous issues in the IPCC is of particular interest because indigenous peoples have been identified as being uniquely sensitive to climate change impacts^{29,33,34}, and their accumulated knowledge can help to better understand the challenges posed by climate change and how to respond^{28,33,35,36}. The discursive space for considering indigenous issues is also expanding both within the United Nations Framework Convention on Climate Change (UNFCCC) and domestically in some nations^{37,38}, and the extent to which indigenous content is captured in the IPCC (and how) can have an important role in shaping priorities and guiding actions⁴.

The results are based on a content analysis of all 30 chapters in AR5 WGII and the Summary for Policymakers. First, each chapter was read and indigenous-specific keywords were developed. Keyword searches were performed for each chapter and the surrounding text encompassing the relevant content was captured. Second, captured text was coded by content, context, frame and descriptive characteristics (see Supplementary Information for the methods).

Indigenous content in AR5 WGII

Indigenous peoples, knowledge, experiences and livelihoods are commonly referred to in WGII. There are 382 uses of keywords indicating indigenous content, and in a quarter of these cases specific indigenous groups are mentioned. There is considerable variation in the indigenous content among chapters, with 6 of the 30 chapters having no mention of indigenous content (chapters 3, 4, 8, 10, 17 and 30). Notably, when comparing AR5 WGII with AR4 based on keyword

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searches, there is a 60% increase in the occurrence of indigenous relevant keywords in AR5. Indigenous content is more concentrated in the regional chapters of AR4 (57%) than AR5 (46%), and although indigenous keywords are evident in 17 out of the 20 chapters in AR4, overall keyword counts are much lower.

Of the sectoral-focused chapters, indigenous content is most common in the 'Human Security' chapter, with 58 mentions of indigenous keywords, followed by the 'Detection and Attribution of Observed Impacts' ($n = 31$ keyword mentions) and 'Livelihoods and Poverty' ($n = 22$) chapters. Regionally, indigenous content is most common in the 'Polar Regions' chapter ($n = 59$), followed by 'Australasia' ($n = 38$), 'Central and South America' ($n = 21$), 'Africa' ($n = 19$) and 'North America' ($n = 15$). The 'Europe', 'Asia', and 'Small Islands' chapters all have fewer than 10 keyword mentions. Four chapters in the 'Natural and Managed Resources and Systems and Their Uses' section (chapters 3–7), and the 'Human Health', 'Adaptation Needs & Options', 'Adaptation Opportunities' and 'Constraints & Limits' chapters, all had fewer than 10 references to indigenous keywords, despite covering topics that are relevant to indigenous peoples with published research in the literature. There are 14 specific references to indigenous keywords in the Summary for Policymakers.

Two overarching frames of indigenous content are discernible in the WGII report. On the one hand, indigenous peoples are portrayed as victims of the impacts of climate change. This frame is documented in 28 paragraphs coded as having indigenous content, and in the context of the sensitivity of indigenous peoples to climate change given their inhabitation in areas undergoing rapid change, high dependence on resource-based livelihoods and socio-economic disadvantage. On the other hand, the framing of indigenous knowledge systems as important for managing and adapting to climate change and monitoring impacts is evident in 19 paragraphs across chapters. The role and importance of traditional knowledge (TK), or traditional ecological knowledge (TEK), figures prominently in this framing and is one of the most common indigenous-focused keywords in WGII (73 keyword references). TK and TEK are noted in the context of resource management, adaptation, detecting climate change impacts and as a factor that affects vulnerability and adaptive capacity. Both ways in which indigenous content is framed do not typically occur at the same time; paragraphs or sections where the primary focus is on impacts and negative implications for indigenous peoples do not usually document in comparable depth the work characterizing adaptive capacity, and vice versa. Furthermore, there are limited references to indigenous territory or land, or recognition of how land rights, dispossession, colonization or historic inequities affect vulnerability or adaptive capacity to climate change^{33,39–41}. These are important omissions, as the literature indicates how indigenous peoples in multiple geographical contexts have been pushed into marginalized territories that are more sensitive to climate impacts, in turn limiting their access to food, cultural resources, traditional livelihoods and place-based knowledge — all of which support the ability of indigenous peoples to respond to change, and disruptions to these systems undermine aspects of social-cultural resilience^{39,42–45}.

The broad ways in which indigenous content is framed mirror common portrayals of indigenous peoples, their knowledge and their experiences in general scientific and popular discourse, forming part of what Roosvall and Tegelberg⁴⁶ term the 'victim-heroes' frame: victims through the framing that indigenous peoples are highly vulnerable, heroes through the framing that indigenous peoples possess knowledge that can help address the problem. Although both frames are present in the peer-reviewed literature on indigenous peoples and climate change³³, the complexity and diversity of indigenous experiences, understanding and responses to climate change are not captured in many of the cases where indigenous content is documented in WGII. This means that relevant knowledge and opportunities to advance the understanding of climate change through indigenous people's knowledge, experiences and values are

not represented, resulting in a partial understanding of the core issues and limiting the potential for locally and culturally appropriate adaptation responses.

Reviewing the AR5 WGII chapters also reveals what has been termed silencing effects, where inconsistencies and omissions in the text silence certain realities, conditions or experiences^{5,47}. First, the coverage of indigenous issues remains general in scope and limited in length. The majority of cases where indigenous content is documented (70%) are characterized as ambiguous/general, making broad statements without providing detail or specific examples (see Supplementary Information). Indigenous peoples, for example, are commonly referenced in lists alongside marginalized or vulnerable social groups, without a nuanced discussion of different lived experiences or cultural and colonial histories. In 30% of cases, there is a substantive/specific referencing of indigenous content, evident mainly in chapters 18 and 28 ('Detection and Attribution of Observed Impacts' and 'Polar Regions', respectively) (see Supplementary Information). Coding sought to further probe the extent of reference to indigenous content based on the number of sentences in coded paragraphs that are relevant to indigenous peoples. In most cases (68%), only one sentence refers directly to indigenous content, with few (9%) including indigenous content in over five sentences.

Second, although the emphasis on TK in WGII is to be welcomed, there is limited critical engagement with the diversity, range and complexities of indigenous knowledge systems. TK can be broadly defined as a cumulative body of knowledge, practice and values acquired through experience and observations or from spiritual teachings and handed down from generation to generation^{41,48,49}. It has been widely used in climate change research as a source of climate history and baseline data for observed changes, and the majority of the chapters in WGII draw on TK studies as a source of information for expanding scientific understanding on climate change impacts, adaptation and vulnerability. The inclusion of research that documents the TK of the biodiversity impacts of climate change, however, is limited, and rarely considered side-by-side with scientific knowledge in chapters: in the 'Polar Regions' chapter, for instance, the section on polar bears is based on scientific knowledge alone, despite there being alternative perspectives from the Inuit (indigenous peoples of the Arctic)^{50,51}. Moreover, TK is largely documented in chapters in a techno-bureaucratic manner as a source of empirical observations by individuals about specific events or phenomena—what has been termed 'category 1' use of TK⁵²—rather than as a complex knowledge system grounded in generations of place-based observations and experiences. Studies on how the knowledge, experiences, stories, values, ways of knowing and beliefs that underpin how climate change is perceived, understood and responded to^{35,53–59} are largely absent.

Across chapters, TK is commonly treated as a static form of knowledge that is being undermined or made irrelevant by climate change, overlooking the highly dynamic and evolving nature of TK in light of climate impacts^{35,41,55,60,61}. Furthermore, there are frequent examples given in WGII of instances where TK underpins coping mechanisms or is noted to be important for adaptation, yet research that problematizes the appropriation and/or reduction of TK in policy contexts, or examines the power relations embodied in TK systems themselves^{62–65}, is largely absent.

Finally, the historical and contextual complexities that underpin indigenous peoples' experiences with and responses to climate change are largely overlooked. Research consistently identifies the ongoing effects of colonialism, marginalization, power relations, land dispossession and land rights to be central to understanding the human dimensions of climate change for indigenous peoples in diverse contexts^{33,66–71}. In this case, climate change acts as a risk multiplier to these underlying long-term challenges that shape impact pathways and adaptive capacities, and ultimately determine the success of adaptation^{66,68,72}. These topics figure minimally in WGII: histories of colonialism, oppression and/or racism are only documented

in two paragraphs and although marginalization is frequently referred to, the causes are largely absent. Indigenous content primarily focuses on the proximate factors affecting impacts, adaptation and vulnerability (for example, poverty, ill health, changing livelihoods, marginalization and the erosion of TK) without posing the deeper questions around why these conditions exist, and the historic, political, social and economic processes that have led to them.

Implications

There are a number of potential implications of the way indigenous content is framed in the IPCC reports, particularly at a time when interest in the human dimensions of climate change for indigenous peoples is expanding among decision-makers, researchers, indigenous organizations and civil society^{19,37,38,73}. The documented silencing effects in AR5 WGII contribute towards divorcing climate change from its socio-political-historical-cultural context, constructing climate change as a problem for society as opposed to a problem of society^{33,74}. Such depoliticization directs attention away from the root causes of vulnerability and constrains the potential for linking adaptation to broader policy goals or decolonizing processes. Responding to climate change thus becomes a function of techno-managerial planning, in which TK is 'integrated' into risk mitigation programmes but existing power structures, inequalities and histories go unchallenged; as such, TK becomes a tool, rather than a complex, rich and nuanced knowledge system.

Compounding depoliticization, the IPCC (with its global focus and emphasis on consensus) has been critiqued as homogenizing knowledge, cultures and ways of knowing^{32,75}. Such generalization is problematic as the human dimensions of climate change are highly place- and culture-specific⁷⁶. The vulnerabilities of indigenous peoples, for example, often differ considerably from non-indigenous peoples inhabiting the same region, as well as between and within indigenous peoples, and are affected by different factors that necessitate quite different responses^{14,33,34,44,68}. By adding indigenous peoples to lists of vulnerable populations, for example, WGII loses sight of the situated and historical nature of this vulnerability, further diverting attention away from the ideological and political contestation and struggle required to overcome vulnerability in many indigenous settings. Homogenization further overlooks the active and complex role of indigenous communities, organizations and governments in responding to climate change, building on significant adaptive capacities and societal strengths and missing important worldviews and ethical ways of engaging with and understanding the natural world.

The framing of indigenous peoples in WGII mirrors broader critiques on the science of the Anthropocene and climate issues in general, where it has been argued that the diversity of human experience and social-political drivers have been overlooked in the narrative of pending catastrophe, the tropes of cultural loss and the urgent need for pan-global solutions^{14,22,77-79}. Swyngedouw⁷⁷ defines this as 'post politics', where ideological struggle has been replaced by techno-managerial planning dominated by the biophysical and quantitative social sciences. The framing also has parallels with colonial characterizations of indigenous peoples as inherently vulnerable and in need of intervention or, alternatively, in perspectives linking indigeneity only to nature, which neglect the complexity and diversity of indigenous cultures, knowledge systems and ongoing adaptive capacities^{39,74}.

Considerations for AR6

In critically examining AR5, we do not dispute the extent, rigor or importance of the assessment — the size and scope of the endeavour is truly impressive. Yet we agree with others who have argued for strengthening various components of the assessment process (for example, refs 7,80-83). In particular, if indigenous content is to be more meaningfully incorporated, and done so in ways that respect and build on indigenous beliefs, values and practices, there is a need for greater input and leadership from indigenous

scholars and knowledge holders, as well as the social sciences. Such a process needs to be mindful that indigenous knowledge provides an alternative, yet equally valid, way of understanding the human dimensions of climate change to mainstream science, and acknowledge that both knowledge systems may differ and contradict each other in some circumstances. In such cases, both knowledge systems should not be pitted against each other to arrive at a 'correct' understanding, but viewed as providing diverse perspectives. This approach underpins the 'two-eyed seeing' or integrated knowledge framework that has emerged to embrace the contributions of both indigenous and scientific ways of knowing, for example, seeing from both perspectives to better understand the challenges facing indigenous health in Canada⁸⁴. More integration of place-based research is also needed^{14,35,53,85,86}, as the human dimensions of climate change are intimately place-based for indigenous peoples^{35,53}. Specifically, we propose four ways through which indigenous issues can be more comprehensively integrated into the IPCC process:

- (1) A specific indigenous-focused and/or traditional knowledge chapter is needed in WGII, with indigenous scholars, elders and thought-leaders represented at the lead author and contributing author levels. The importance of such a chapter reflects the unique sensitivity, adaptability, resilience and vulnerability of indigenous peoples to climate change, and the alternative conceptions of impacts and adaptation embodied in indigenous knowledge systems. Such a chapter or chapters would confer credibility and rigour to the assessment of indigenous issues in a changing climate and have influence on UNFCCC negotiations and national-level planning, helping define the problem and solution space^{17,28,87,88}.
- (2) The next cycle of the IPCC assessments (AR6) should promote greater involvement of authors with expertise working with indigenous peoples, particularly indigenous scholars, leaders and reviewers. Authorship has an important role in shaping the content of IPCC assessment reports^{28,89,90}; Griggs⁸³ argues that "the selection of lead authors is probably the most crucial step in the [IPCC] process." Chapters in AR5 WGII that had authors (Coordinating Lead Authors, Lead Authors and Review Editors) who worked on indigenous issues ($n = 6$), defined as those that have previously published on indigenous issues and climate change, had greater and more in-depth coverage of indigenous-focused content. A concerted effort to seek out and include indigenous representation in AR6 early in the process will be essential to more robust and representative coverage in the next assessment report^{17,23,28}. The 2014 US National Climate Assessment (NCA), for instance, made significant progress in integrating indigenous issues by having a specific chapter on indigenous peoples, land and resources that was led by a team comprising tribal members, agencies, academics and non-governmental organizations, involving collaboration to solicit, collect and synthesize traditional knowledges¹⁹.
- (3) Recognizing indigenous issues and traditional knowledge as cross-cutting across many chapters of WGII, the IPCC needs to develop specific guidelines for accessing and incorporating indigenous knowledge systems. Such guidelines need to take into account that much valuable information on the human dimensions of climate change occurs outside the peer-reviewed literature in oral histories, traditional practices and grey literature, and be developed in collaboration with indigenous knowledge holders. New procedures are needed to capture this information while also respecting ethical and cultural norms and establishing the credibility of different sources of understanding³¹. This needs to be part of a broader dialogue on incorporating alternative literature and forms of expertise into IPCC assessments⁸¹.

(4) The production of a special report on indigenous peoples and climate change within the IPCC's next work cycle, combining the focuses of both WGII and WGIII, would allow global indigenous issues to be documented and examined in greater depth and would confer greater flexibility to integrate indigenous knowledge and myths, stories, culture and history. This would not only help to enhance our understanding of impacts, adaptation and vulnerability, but also to broaden perspectives on the framing of climate change. Yet caution should be taken: creating a specific special report, or having a specific indigenous chapter, although vital for better capturing indigenous issues in IPCC output, could risk isolating indigenous knowledge/people from the main body of assessment reports. Indigenous issues are cross-cutting across many chapters and need to be incorporated as such, underpinning the importance of recommendations 2 and 3 in any strategy to enhance indigenous content in IPCC output.

In making these recommendations, we also note that the IPCC can learn from other international scientific assessments that have a greater recognition of indigenous issues. The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), for example, has created a task force for strengthening the quality of indigenous peoples' participation in platform deliverables, with the development of procedures for working with indigenous knowledge systems key to its 2014–2018 work programme. Similarly, the Arctic Council's Arctic Climate Impact Assessment had a strong emphasis on the participation of indigenous peoples' representatives throughout, with specific chapters combining indigenous perspectives and science.

Whether the governments that comprise the IPCC would consider having an enhanced indigenous focus along the lines suggested is unclear. Greater engagement with indigenous issues would necessarily involve the consideration of diverse issues such as land rights, dispossession, colonial histories and access to resources that remain highly politicized topics in nations where indigenous rights are contested or not recognized³. The IPCC has acknowledged the need to make special efforts to include indigenous knowledge, and has noted the importance of engaging knowledge holders, regional scientists, local experts and grey literature, but there have been limited high-level indications of the intent for larger-scale changes. There has been negligible discussion of indigenous issues in Sessions of the IPCC, for example, nor have indigenous issues been covered in any decisions adopted by the IPCC concerning the AR6 work cycle or in the proposed potential themes for special reports that were up for consideration at the IPCC's 42nd session in October 2015.

This Perspective seeks to further promote, with evidence, the need for greater consideration of indigenous issues in the IPCC. Indigenous peoples are diverse and face different challenges in dealing with climate change, but there are also similarities in many of the underlying factors affecting sensitivity, adaptive capacity and vulnerability that warrant the consideration of 'special rights' for indigenous peoples in the context of a changing climate in both the IPCC assessments and the UNFCCC. The convening of a taskforce or specific workshop on the engagement of indigenous peoples in the IPCC would be an important first step in moving forwards, and the inclusion of more indigenous-focused and indigenous-led content is essential to creating stronger, more robust and more usable assessments.

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Author contributions

J.D.F. conceptualized and wrote the paper and analysed the data. L.C. performed the content analysis and assisted with writing. J.R., D.N., A.C.W., M.M. and T.P. helped write the paper.

Additional information

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Competing financial interests

The authors declare no competing financial interests.