

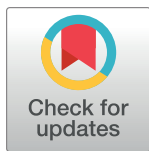
OPINION

Culture change to address climate change: Collaborations with Indigenous and Earth sciences for more just, equitable, and sustainable responses to our climate crisis

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What humankind actually requires is a climate change—a cultural climate change, a change in our thinking and actions—if we are to have any reasonable expectation that we might mitigate what increasingly appears to be dramatic plant and animal extinction [1].

Intercultural collaborations to understand the climate crisis

Engaging both Indigenous and Earth sciences to address climate change challenges is increasingly accepted and promoted within mainstream scientific enterprises [2–4]. Intercultural collaborations are necessary to bring all relevant knowledge to bear on the pressing climate crisis and are opportunities to produce more just, equitable, and sustainable climate science and responses to climate change. Without cultural diversity in science “we pay an opportunity cost, a cost in designs not thought of, in solutions not produced” [5]. Indigenous Knowledges (see [6] for use of plural) represent intergenerational understandings and practices based on lifetimes of observing and interacting with the environment [7]. These rigorous knowledge systems are based on holistic, place- and experience-based observations, long-term monitoring, testing, hypothesizing, and evaluation developed over millennia. Because they focus on relationships within ecosystems that constitute the web of life, Indigenous Knowledges are keenly attuned to local changes in those relationships [1]. Earth sciences can complement Indigenous Knowledges by identifying the underlying and larger-scale causes of change and enabling prediction of future changes. Intercultural collaboration is about interacting—not integrating—between complementary but distinct knowledge systems so that the integrity of each remains intact.

Intercultural collaborations for more just, equitable, and sustainable responses to our climate crisis

Not only do intercultural collaborations have the potential to produce better science, they require more just and equitable research practices. Intercultural collaborations are opportunities to involve collaborators from diverse backgrounds as full partners as opposed to requiring

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that Indigenous collaborators and their knowledges and practices be assimilated into Western scientific processes [8, 9]. Following are several considerations that in our experiences need to be addressed in intercultural collaborations to establish more just and equitable practices and sustainable outcomes in science.

Where is the locus of power in intercultural collaborations?

Science is usually seen as objective and devoid of power differentials. However, the history of science is entangled with processes of colonialism and imperial expansion. Since the 18th century “Age of Enlightenment,” processes of “discovery” and exploitation in the name of science have resulted in the erasure of Indigenous peoples, their cultures, and their knowledge systems [9]. For example, biomedical experiments performed by colonial settlers on Indigenous people purportedly to improve understandings of human bodies and disease in reality served to erode their health, culture, and sovereignty [10]. The historical and ongoing extraction of minerals and plants from Indigenous peoples’ territories is reflected in extraction of Indigenous Knowledges in current collaborations that are not careful to uphold justice. Perpetuated across generations, these erasures, erosions, and extractions have caused intergenerational trauma, a significant reason why few Indigenous students go into Earth or related science disciplines [11]. Working to rectify this legacy, in recent decades mainstream recognition of the rights that Indigenous communities hold over their knowledge has increased and been formalized in institutions such as tribal review boards and in international agreements such as the United Nations Declaration on the Rights of Indigenous Peoples. Such recognition should inform every intercultural collaboration.

What is the purpose of the collaboration and who does the collaboration serve?

All research serves a purpose. For intercultural collaborations, this purpose must be made explicit. For example, is the purpose of the collaboration to advance and enrich scientific understanding, to support Western resource management objectives, or to promote Indigenous sovereignty over traditional lands? Collaborations that exist primarily to advance Western science are likely to lead to extractions of information that further erode Indigenous sovereignty, such as projects where Indigenous Knowledges are used to validate Western scientific theories or observations. Identifying the purpose of the collaboration will reveal who the collaboration serves: Who or what is driving the collaboration? Are the goals of the collaboration aligned with objectives that serve Western scientific institutions, or do they advance priorities of Indigenous communities? Another way to think about this is who initiates the project and the level of inclusion of Indigenous collaborators at the inception of the project. A project that begins with Western-trained scientists wanting to work in a way that serves Indigenous communities can proceed in just and equitable ways if the scientists conduct the work in compliance with the community’s traditional protocol, receive permission from the appropriate people, and commit to not appropriating or sharing sensitive cultural information. Going through the process of identifying the project’s purpose and outcomes can help prevent abuses that can cause harm, even if that harm is unintentional.

What are the responsibilities in intercultural collaborations?

Responsibility and accountability to one’s community, family, culture, language, lands, and lifeways are interwoven with Indigenous Knowledges. Earth scientists carry more bounded responsibilities to their institutions, funders, and disciplines. A key responsibility within both knowledge systems, but differently performed in each, is to intergenerational transfers of

knowledge. While Western scientific education is usually confined to formal education settings, the intergenerational transfer of Indigenous Knowledges is interwoven throughout all aspects of familial and community life. For example, elders mentor youth through familial relationships and different families may have different areas of expertise. In this way, Indigenous Knowledges are inseparable from the wellbeing of the family or the community, and the focus is not solely on the individual student. These different sets of responsibilities are not necessarily mutually exclusive but do mean that non-Indigenous scientists who partner with Indigenous knowledge-holders must understand, support, and be accountable to a broader set of responsibilities than that to which they may be accustomed.

How are relationships developed for intercultural collaboration?

This work can only happen through building relationships and trust, the core foundation of intercultural collaborations, which requires time and continuity. This work is not easy. It is filled with traumas, potential misappropriation or theft of intellectual property, and discomforts. For non-Indigenous collaborators, it is about stepping into a space where one is no longer necessarily the “expert”. This process is usually unfunded and inequitable, particularly considering unequal positions within and outside institutional spaces. When a non-Indigenous Earth scientist and Indigenous knowledge-holder encounter each other for the first time, this is not really the first meeting; it is one in a series of encounters that have been unfolding for hundreds of years. Everything that came before is present and shapes the power dynamics of the present encounter.

Our call for cultural change to address climate change

The urgent threat posed by our climate crisis necessitates innovative actions. Innovation is an opportunity to look beyond Earth sciences to solutions in other knowledge systems and, in doing so, to support the rising voices of those who have been historically marginalized. As Western science institutions increasingly support intercultural collaborations, we aim to further the critical work of decolonizing the scientific process (see, for example, [12–14]). Making room for justice and equity in intercultural collaborations means understanding the direct links between rigorous knowledge building and actions for a sustainable world. Establishing spaces and opportunities within scientific institutions to enable pursuit of intercultural work and the expansion of science is a critical next step for shifting from a time of crisis to one of sustainable, equitable, and just actions.

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