

The determinants of planetary health: an Indigenous consensus perspective

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Indigenous Peoples have resiliently weathered continued assaults on their sovereignty and rights throughout colonialism and its continuing effects. Indigenous Peoples' sovereignty has been strained by the increasing effects of global environmental change within their territories, including climate change and pollution, and by threats and impositions against their land and water rights. This continuing strain against sovereignty has prompted a call to action to conceptualise the determinants of planetary health from a perspective that embodied Indigenous-specific methods of knowledge gathering from around the globe. A group of Indigenous scholars, practitioners, land and water defenders, respected Elders, and knowledge-holders came together to define the determinants of planetary health from an Indigenous perspective. Three overarching levels of interconnected determinants, in addition to ten individual-level determinants, were identified as being integral to the health and sustainability of the planet, Mother Earth.

Introduction

Indigenous Peoples have resiliently weathered continued assaults to their sovereignty and rights throughout colonialism and its continued effects.¹ Human-caused global environmental changes (eg, climate change, biodiversity loss, and pollution) have created new challenges for Indigenous communities due to "habitation in regions undergoing rapid change" platformed on an already "disproportionate burden of morbidity and mortality"² stemming from colonisation.³⁻⁵ The inequitable impacts of these environmental changes are despite Indigenous communities worldwide contributing the least to greenhouse gas emissions⁶ and other global environmental changes.

Historically, Indigenous-focused content and knowledge has mostly been overlooked in climate discourse and in assessment reports such as the UN Intergovernmental Panel on Climate Change (IPCC)⁷ and the Sustainable Development Goals (SDGs).⁸ In the past decade, there has been increasing recognition of the importance of Indigenous Peoples and their traditional knowledges in climate mitigation and adaptation strategies.⁹⁻¹¹ Despite the increasing recognition of traditional knowledges, it has often been more symbolic than practically applied across the globe.¹² Traditional knowledges are not meant to be an assortment of information that can be simply merged with western scientific knowledge systems.¹² Instead, traditional knowledges are collective, holistic, community-based, land-informed ways of knowing that are inherently interconnected with people and the environment.¹³ In other words, traditional knowledges are contextual. As such, they can be a source of knowledge for environmental strategic management in distinct ecosystems. Therefore, attempting to globalise these knowledges can cause them to lose their meaning, purpose, and focus on understanding the relationships between knowledge making and knowledge applications regionally.¹⁴ For example, Indigenous-specific land pedagogies are embedded directly within the respective

lands stewarded by Indigenous Peoples.¹⁵ Stewardship is premised on a deep appreciation for Indigenous Natural or First Law,¹⁶ which warrants recognition and respect for an earth-centred and relational jurisprudence system.¹⁷ These Land-specific and Country-specific Natural or First Laws are rooted in complex notions of reciprocity and responsibility, which view biospheric values as human values.¹⁸

Indigenous Peoples' ontology (ie, way of being) and epistemology (ie, way of knowing) are intricately connected with Land and Country (the term Land is used in some parts of the world and Country in others). Land and Country's innate importance is emphasised by the capitalisation of the words and also encompasses all natural elements no matter whether they are on the ground, in the water, or in the air.¹⁵ Human-centric (ie, anthropocentric) hierarchies are most often absent in Indigenous languages and lifeways with a profound and deep respect given for all human and non-human entities. Indigenous perspectives are therefore in direct contrast to the human-centric worldview that continues to permeate climate discourse and action and from the so-called modern conceptualisations of health and wellbeing. For example, the determinants of health have been an increasingly well understood construct in public health and medical circles. With the goal to promote health equity, increase collaboration, and make the stark power differentials in society more explicit, the evolving determinants of health discourse have bridged social justice movements in a unique way.¹⁹ These health movements are undoubtedly important; however, from an Indigenous perspective, there has been something missing. For example, it is not currently clear where planetary health fits into the existing determinants of health language. In 2021, it was proposed that the world needs to "take a truly ecocentric approach in order to understand and clearly conceptualise the determinants of wellbeing for Mother Earth herself".²⁰ By utilising a new determinant framing (ie, the determinants of

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planetary health) to better elucidate “the combined factors and conditions that affect the health of the planet”,²⁰ we might be able to better inform research, policy, and on-the-ground solutions. This renewed framing is meant to expand the call for the inclusion of equity rights to all of our relations, including Mother Earth and all of her inhabitants.

This call to action conceptualises the determinants of planetary health from an Indigenous perspective, which prioritises Indigenous-specific methods of knowledge sharing from around the globe. A group of Indigenous scholars, practitioners, land and water defenders, respected Elders, and knowledge-holders have led this effort to answer the question: what are the determinants of planetary health?

Methods

Within various Indigenous research methodologies, a focus is often placed on personal preparation, self-location, prayer, and a decolonising lens of benefiting the community.^{21,22} Use of Indigenous research methodologies are crucial to ensure that Indigenous research processes maintain their standing, validity, sophistication, and strength within and across communities.²³ In this Personal View, we therefore used an Indigenous-led approach that was actioned by a broad base of Indigenous Peoples from around the world (Kenya [Ogiek], Canada [Denésuliné, Sahtu’ot’ine, and Haudenosaunee], USA [Blackfeet and Tsimshian], Australia [Gamilaraay, Nyikina Warrwa, and Wangkumara], Mexico [Yaqui, Nahua, and Maya], El Salvador [Nahua], and Nicaragua [Miskita]). Collectively, these group members have a deep breadth of experience across Indigenous health, Mother Earth advocacy, Indigenous rights, spiritual traditions, leadership, governance, and organisational participation at regional, national, and international levels. There was no formalised selection process or eligibility requirements for participation in the consensus process; however, due to established networks among group members working in notable positions at the international level, a form of purposive sampling was used to ensure broad representation across regions. Group members asked to participate were well known for their advocacy, knowledge, and representation of Indigenous communities within the various spaces as noted.

The deep listening method was engaged throughout the process of this work.²⁴ The deep listening method is a way of learning and working in a state of togetherness that is informed by the concepts of community and reciprocity.²⁴ Deep listening was specifically engaged within an adapted consensus development panel that brought regional experts together from various backgrounds and Indigenous communities. Consensus development panels are useful for bringing knowledge-holders together to produce consensus or guiding statements that address the topic at hand in a way that is accessible to lay people and professionals.²⁵ Consensus

development panels also contribute to research by describing the current levels of agreement on important topics.²⁵ Consensus development panels can be adapted to suit the long-standing traditions within many Indigenous communities that utilise some form of consensus method in leadership and governance.^{26,27} In this Personal view, we refer to the adapted consensus development panel as an Indigenous consensus process to differentiate it from other standard definitions and methods.

The Indigenous consensus process was undertaken in three phases from January 6 to April 15, 2021, using a perspective that considers Indigenous “research as ceremony”.²⁸ For these methods to be consistent with an Indigenous research methodology, it was essential to begin from the collective group rather than using consensus method processes (eg, nominal group processes) that start from a place of independent synthesis.²⁹ The first phase of the process was managed virtually in two steps. The first step was an initial online meeting that set the stage for the work, utilising a sharing-circle method³⁰ adapted to the virtual environment. Sharing was done from an interdependent perspective, with the belief in a responsibility for the communal survival and progress of others and their future.³⁰ This method is in contrast to sharing from the more familiar use of the word, which often “begins from a sense of individualized ownership, where one party allows another access to his or her property”.³⁰ In the second step, another online meeting identified shared views on the determinants of planetary health. Phase one resulted in an outline that was circulated to the group for higher-level comments and edits between Jan 22 and Feb 13, 2021.

In the second phase, the feedback was collated into a draft document that was recirculated to the entire group for more specific review and comments over several weeks. A final online meeting occurred to re-engage any remaining areas for consensus and to ensure clarification on any remaining areas of discussion. Two subsequent drafts were produced with a virtual comment period engaged before a final draft was agreed. The research process was reviewed and approved as exempt by the University of North Dakota Office of Research Compliance and Ethics (IRB-202101-096).

Results

The consensus effort was used to reiterate existing knowledges thought to be crucial for the world to understand, regarding how the global community needs to move forward in “a good way”.³¹ The participants also emphasised that despite the many synergies among global Indigenous Peoples’ responsibility and relationships to Land and Country, they were speaking from the heart of their respective communities and with the spirit of their ancestors. The group identified ten main determinants of planetary health in three main interconnected levels that were largely appreciated in

their communities: Mother Earth level, interconnecting level, and Indigenous Peoples' level (see the panel).

Although these distinct determinants of planetary health were identified, the group noted that there were other potential interconnecting determinants that could not be included as formal headings in this Personal View. However, the group felt that the main headings identified effectively encapsulated other potential determinants. Nevertheless, any omission in this regard was not meant to minimise the importance of other community-derived determinants. With this deep appreciation for the complexity of the topic area, the figure visually depicts the main levels of determinants and their deep and fundamental interconnectedness. This interconnected representation ensures communities with unique cultures and land bases can amplify the determinants of planetary health relevant to them. Throughout this work, the group also acknowledged that the identified determinants are vast and complex topics that cannot adequately be categorised in this short Personal view. Nonetheless, we have attempted to categorise these determinants to elevate this crucial conversation.

Mother Earth-level determinants

Ancestral legal personhood designation as a determinant of planetary health

Indigenous Peoples globally have the sacred mandate and right to give voice to rivers and to all of Nature.³² This right is often not respected by common law; however, Indigenous Peoples continue to stand up to protect their human and non-human relatives. Indigenous leadership in the rights of Nature movements have led to global interest in examining and promoting models of Indigenous-led governance that draws on Indigenous-rooted law and practice as a source of legitimacy and authority.³³ Approaches that extend legal pluralism while illuminating the interconnectedness in Nature have recently been exemplified.³⁴ For example, the Whanganui River Claims Settlement³⁵ has granted legal personhood to the Whanganui River and the Protection Act 2017 legally recognises the Yarra River (the traditional name is Willip-gin Birrarung Murrn) as a living entity in Australia.³⁶ Both rivers have been a source of ideas and inspiration for ancestral personhood in coexistence with earth laws, setting the stage for the extension of legal pluralism to ancestral beings.³⁷ Outside of these important examples, current political and economic narratives continue to deprive the land, water, and air of being in the world as equal rights-holders. The denial of being is a deficit discourse that perpetuates negativity, deficiency, and the disempowerment³⁸ of Nature through current legal statutes. This denial of the right of being is a direct product of ongoing capitalist and colonial mandates, which will continue to exacerbate the environmental crisis. Indigenous Peoples share here ancestral legal personhood as a decolonised counter-narrative worthy of voice, protection, and identity.

Panel: The determinants of planetary health identified by the consensus process

Mother Earth-level determinants

- Respect of the feminine
- Ancestral legal personhood designation

Interconnecting determinants

- Human interconnectedness within Nature
- Self and community relationships
- The modern scientific paradigm
- Governance and law

Indigenous Peoples' level determinants

- Indigenous land tenure rights
- Indigenous languages
- Indigenous Peoples' health
- Indigenous Elders and children

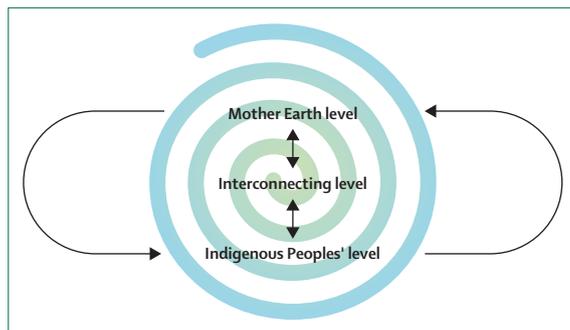


Figure: The interconnectedness of the determinants of planetary health

Respect of the feminine as a determinant of planetary health

In many Indigenous Nations, women are keepers of cultural identity and are caretakers of the natural environment.³⁹ Indigenous worldviews often recognise Mother Earth's creative power as the primordial First Mother. Creation stories bestow on the feminine the principal role of creation, order, and regeneration of the world by bonding people, place, and community. Women are vessels for strong communities and networks. Women foster community, strengthen resilience, and enhance collective vitality and wellbeing. Motherhood also reinforces our relationship to the ecosystem, just as Indigenous Peoples, and the global community, are nourished by Mother Earth. Current global realities are far from acknowledging the cultural, spiritual, and leadership role of women and feminine-embodying gender expressions. Women and feminine genders are continually discriminated against by patriarchal, political, economic, racial, and gender-oppressive systems that do not recognise the feminine regenerative power necessary to keep our planet healthy. We firmly state that violence against Mother Earth is violence against women, and vice versa. Violence against Mother Earth, and therefore the feminine, is a culturally direct product of colonisation,

militarism, racism, social exclusion, and poverty-inducing economic and so-called development policies⁴⁰ that must be overcome to ensure a habitable home for all.

Interconnecting determinants

Human interconnectedness within Nature as a determinant of planetary health

One of the pre-eminent causes of the planet's destruction is the collective loss of awareness of the interconnectedness that exists within Nature. Humans have lost their identity as organisms within a larger system and thus have lost awareness of how to live sustainably with Mother Earth. Ecological demise points to an impaired human relationship with its inner self (ie, humans are Nature and not apart from it). In the broader sense, there is evidence of the loss of an ecologically bound cultural identity. The disconnect from Nature manifests as a fragmented and dissociated identity that cannot recognise itself as part of a system, making it easier to project predatory and abusive impulses onto the environment. Thus, an ideology of independence has resulted in a sense of entitled ownership, a kind of utilitarian perception of the natural world that relates to it through transactional relationships that do not have a sense of responsibility, care, or love. This worldview will only continue to perpetuate planetary harm. Even our conceptualisation of time has been influenced by a system that disconnects people from Nature. Indigenous Peoples around the world traditionally had nature-oriented calendars (solar or lunar), which integrated ecological awareness through synchronicity with the planet's natural cycles. With colonisation came western-based perceptions of time and a consequent disconnect with the sources of life—water, air, earth, and sunlight. People have lost their way as a human species as they have forgotten that they are Nature. Regaining this relationship with ourselves and Mother Earth is crucial for the wellbeing of our planetary home.

Self and community relationships as a determinant of planetary health

Indigenous Nations are predominantly collective by nature.⁴¹ Individuals in collective-based societies learn from a very young age that interdependence with others and place (ie, Land or Country) helps to maintain wellness and balance. Collective societies are more likely to consider the present and future impact their thoughts and actions have on others and place rather than focus on immediate self-gratification or reward (ie, life about service vs life about gain).⁴² This collective focus contrasts with that of individualist societies that many Indigenous Peoples are continually forced to exist in, which results in interruption to their teachings and practice of culture in addition to a confusion of identity. When a sense of reverence for ourselves and our community is lost, so is our sense of belonging. Mother Earth has the potential to

heal and restore when people reclaim their collective identities and relationships while building innate community strengths.

The modern scientific paradigm as a determinant of planetary health

Western science is a paradigm that uses the scientific method to theorise, hypothesise, find variables, measure, and describe a relationship, usually in mathematical, economic, or even political terms. However, the paradigm is limited in explaining complex relationships over time (ie, longitudinal), and can be described as linear, reductionistic, and mechanistic. The overarching interest of western science is to infer phenomena to understand the world; however, there is an underlying implicit interest to find ways to influence, control, and perhaps eventually modify these phenomena for human benefit. With underappreciated connections to Indigenous science, the pendulum in the 21st century is swinging towards the need for a systems-oriented, ecological-based, networking approach. This approach might seem more aligned to the complexity of planetary health and other complex systems with which people inter-relate. The Indigenous scientific method, which is described as contextual, holistic, symbolic, non-linear, and relational, is not limited by time and uses the collective observation of its people to explain natural phenomena through real and metaphoric narratives.⁴³ It has become apparent that society “cannot solve complex problems from the same worldview that created them in the first place, as it will continue to perpetuate a disconnect between us and the planet as ‘relatives’”.²⁰

Governance and law as a determinant of planetary health

Governance and law reflect our explicit or implicit agreements on lifestyles and worldviews. Governance and legal mechanisms are translated into norms and codes that aim to then define our interaction with Mother Earth (eg, an interaction most often premised on development). However, many development measures and indicators are not sustainable. These unsustainable measures and indicators (eg, gross domestic product) are achieved at the expense of Mother Earth's health through a lifestyle of consumption that encourages waste and dismisses relationship. Alternatively, Indigenous Peoples have Natural or First Law that governs lives and embodies complex notions of reciprocity and responsibility.¹⁶ Natural or First Law represents “a comprehensive ethical framework that defines the codes of conduct necessary for maintaining a peaceful, thriving, and co-operative society grounded in love and reciprocity”.¹⁶ The governance practices and embodiment of Natural or First Law by Indigenous Peoples relates directly to the rights of Indigenous Peoples. Maintaining Indigenous governance and Natural or First Law through negotiated instruments—combined with Indigenous Peoples' self-determination—is foundational to the health of the

planet as it will continue to prioritise the rights of all our relatives as well as Mother Earth.

Indigenous Peoples' level determinants

Indigenous land tenure rights as a determinant of planetary health

80% of the world's remaining biodiversity is currently stewarded by Indigenous Peoples.⁴⁴ Yet, Indigenous Peoples inhabit only 22% of the Earth's surface.⁴⁴ Indigenous Peoples manage or have tenure rights to a little more than a quarter of the world's surface in 87 countries or politically distinct areas on all inhabited continents.⁴⁵ It is increasingly being appreciated that recognising Indigenous Peoples' "rights to land, benefit sharing and institutions is important to meeting local and global conservation goals".⁴⁵ The essential roles of Indigenous Peoples are recognised in the Convention on Biological Diversity and the Nagoya Protocol,⁴⁶ a demonstration of the need for their essential leadership within conservation and sustainability spaces. However, Indigenous land tenure rights are under continued threat from governments, multinational corporations, and other interests, with violence against Indigenous environmental activists being strongly related to economic activities with high environmental impacts.⁴⁷ Indigenous land tenure rights guarantees ownership or control of lands and resources, which ensures protection and conservation of the planet's ecosystems. It is integral that more awareness, amplification, and actioned support for Indigenous land tenure rights occurs to better ensure a healthy planet for all.

Indigenous Languages as a determinant of planetary health

Of the world's approximately 6700 languages, Indigenous Peoples speak more than 4000 of them, despite making up only 5% of the world's population.⁴⁸ It is estimated that one Indigenous language dies every 2 weeks due to colonising and structural influences.⁴⁸ With each loss, an extensive and complex system of ecological knowledge developed over millennia is also lost.⁴⁸ For example, when an Indigenous community switches to another language, the deeply embedded ecologically-based "names, oral traditions and taxonomies" can be lost.⁴⁹ This loss matters for planetary health as there is an established recognition of a direct and essential link between Indigenous language preservation and traditional knowledges related to biodiversity preservation.^{50,51} In fact, Indigenous language preservation might be crucial for curbing the loss of biodiversity.⁵¹ Language matters not only for its ecological ties but also in how people frame relationships and for the energies it embodies and carries forward when people speak. For example, when people refer to the planet as an it rather than as a relation, it becomes easier for society to commodify Mother Earth.⁵² Indigenous languages do not refer to Mother Earth and Nature using the pronoun it. Many of the names of Indigenous Peoples come directly from the Land itself

(eg, for the Dene Peoples of northern Canada, *De* means flow, *ne* means land; the Dene's very being therefore flows from the land.⁵³ For the Ogiek of Kenya, their name translates to caretaker of fauna and flora). Nature needs a new pronoun in western cultures to re-establish Mother Earth's place as our relative.⁵²

Indigenous Peoples' health as a determinant of planetary health

The health of the planet is intrinsically tied to the wellbeing of Indigenous Peoples.¹⁷ When Indigenous Peoples have their Land, culture, and sovereignty, they are more likely to have greater wellbeing.^{54,55} Thus, they will continue to sustainably care for more than a third of the world's old-growth forests and the most biodiverse regions on the planet.⁵⁶ As noted, Natural or First Law provides frameworks for understanding relationships to place; therefore, it lays the foundations for the fulfilment of Indigenous Peoples' ecological and relational responsibilities.¹⁶ However, due to ongoing processes of colonisation, many Indigenous Peoples struggle with cultural disconnection, dispossession of land rights, and actioning self-determination.⁴² These processes impact on Indigenous Peoples' health and wellbeing and, therefore, on their abilities to care for Mother Earth.⁴² It is imperative that Indigenous Peoples' health is approached from a holistic lens that acknowledges cultural and Land-based practices as being crucial for human health and for the health of the planet.

Indigenous Elders and children as a determinant of planetary health

Indigenous homes are intergenerational households that extend beyond the physical and social environments in which a person lives.⁵⁷ "Home can be conceived as the relationships that connect a person to all that surrounds them including people, plants, animals, insects, and land as well as ancestors, stories, languages, songs, and traditions."⁵⁷ Indigenous Elders are considered to be the foundation of the home and the physical, mental, emotional, and spiritual wellbeing of the community.⁵⁸ They are the sacred keepers of traditional knowledges and culture, safeguarding Indigenous identity, family bonds, and connectedness. Indigenous Elders are the teachers who transmit traditional values and a relational and ecologically rooted philosophy and worldview through stories, experiential learning, and ceremonies. At the core of their wisdom is how to live in harmony with Mother Earth and all of her beings. Indigenous Elders hold the intergenerational lineage connected to the future of the planet through younger generations. Hence, Elders and children are at the heart of cultural revitalisation and sustainability. Elders guide children on social values, roles, traditions, and ideologies, teaching these narratives to support place, purpose, and social responsibility in the world. Children themselves carry ecological roles as they learn how to nourish relations and take care of the Land through interactions with the

environment, their peers, parents, and Elders. Ensuring this intergenerational household is supported and maintained is crucial for everyone on the planet.

Discussion: steps towards rightful stewardship and balanced relationships

The determinants of planetary health are deeply interconnected. For example, Indigenous Elders cannot pass down traditional ecological knowledge to children if they do not have access to their Lands from which to teach. The planet will benefit when the western scientific paradigm openly and actively respects other knowledge systems, and when government policies and laws reflect an Earth-centred worldview (see the *United Nations Declaration on the Rights of Indigenous Peoples*,³² which provides a roadmap to advance the reconciliation work needed in this space). Humans will also be enriched through an increased sense of belonging, relationship, and purpose by reorienting towards a bold and reciprocal transformative intergenerational change process with and for Mother Earth.

It must be noted that Indigenous Peoples are generally not anti-science. As Indigenous ethnobotanist, Jonathan Ferrier, states, “Indigenous people are very scientific—it’s just that our science includes the heart.”⁵⁹ When Mother Earth becomes our heart, she will be safe, as we cannot live without our heart.

In this Personal view, we sought to embody in practice epistemological pluralism, which is an approach that “recognizes that, in any given research context, there may be several valuable ways of knowing, and that accommodating this plurality can lead to more successful integrated study”.⁶⁰ Epistemological pluralism can be operationalised through a “Two-Eyed Seeing” approach (Etuaptmumk in Mi’kmaw)⁶¹ as described by Elder Albert Marshall. A “Two-Eyed Seeing” approach is described as “learning to see from one eye with the strengths of Indigenous knowledges and ways of knowing, and from the other eye with the strengths of mainstream knowledges and ways of knowing, and to use both these eyes together, for the benefit of all”.⁶¹

Indigenous Peoples offer important lessons through cultivating an intentional, inclusive, and interactive perspective based on observation and relationship with the Land. These observations become direct vessels to understanding and relating with two living and sensing entities (self and Mother Earth). The Ways of Life combines these concepts of relationship and interconnectedness between different beings and how we, as Indigenous Peoples, live together with Mother Earth as expressed through our traditional languages. All peoples need to acknowledge, understand, and implement the Ways of Life, and come to appreciate that our collective networks are ecological networks that involve the planet as a whole. Mother Earth is an interactive, living, sentient organism that depends on the collaborative relationships of its constituents for her overall survival and wellbeing.

Conclusion

It was essential to conceptualise the determinants of planetary health from an Indigenous perspective with Indigenous-specific methods of knowledge sharing from around the globe. Therefore, a group of Indigenous scholars, practitioners, land defenders, respected Elders, and knowledge-holders came together to define the determinants of planetary health. Ten main determinants of planetary health were identified in three main interconnected levels: Mother Earth-level determinants, interconnecting determinants, and Indigenous Peoples’ level determinants. Many of the determinants identified through this consensus process were felt to be already appreciated in many Indigenous communities and integral to the long-term sustainability and health of Mother Earth. In future works, the group looks forward to more clearly examining the implementation and practical application of these determinants of planetary health from an Indigenous lens involving larger networks of communities.

Throughout this consensus process, it became clear that Mother Earth is dependent on the human capacity to understand interconnectedness as a basic and fundamental reality. Universal interconnectedness is a transformational relational process of understanding that can stimulate psychological integration and a sense of responsibility to the larger world. An awakened sense of interdependence between people and planet can be achieved through a gradual process of awareness and action that depends on the inherent human potential for relationality—we are all in and of Nature. Human beings must adapt an all-inclusive consideration for Mother Earth as our relative in all spheres of influence.

As equitable and inclusive societies, institutions, and fields are built, embracing diverse knowledges will get us closer to a well and just planet for all. Indigenous voices are a powerful and beneficial solutions-orientated force for Mother Earth’s wellbeing and for all living beings that inhabit her. We therefore call for an inclusion of wisdom that is not mere knowledge or information but is an insight that comes from the heart—from the heart of Mother Earth.

Contributors

NR, YC, CS, OH, CG, MV, LMP, DK, MCK, AP, JNR, and BB conceptualised the Personal view paper and methodology; NR, YC, CS, OH, CG, MV, DK, and MCK curated data and wrote the original draft; NR, YC, CS, OH, CG, MV, MP, LMP, DK, MCK, AP, JNR, and BB reviewed and edited the paper.

Declaration of interests

We declare no competing interests.

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References

- Kirmayer LJ, Dandeneau S, Marshall E, Phillips MK, Williamson KJ. Rethinking resilience from indigenous perspectives. *Can J Psychiatry* 2011; **56**: 84–91.
- Ford JD. Indigenous health and climate change. *Am J Public Health* 2012; **102**: 1260–66.
- Czyzewski K. Colonialism as a broader social determinant of health. *Int Indig Policy J* 2011; **2**: 1–16.
- Kim PJ. Social determinants of health inequities in indigenous Canadians through a life course approach to colonialism and the residential school system. *Health Equity* 2019; **3**: 378–81.
- Reading C, Wien F. Health inequities and social determinants of Aboriginal Peoples' health. National Collaborating Centre for Aboriginal Health. 2009. <https://www.cnsa-nccah.ca/docs/determinants/RPT-HealthInequalities-Reading-Wien-EN.pdf> (accessed Jan 28, 2021).
- UN. Climate change. <https://www.un.org/development/desa/indigenouspeoples/climate-change.html> (accessed Jan 28, 2021).
- Ford JD, Vanderbilt W, Berrang-Ford L. Authorship in IPCC AR5 and its implications for content: climate change and Indigenous populations in WGII. *Clim Change* 2012; **113**: 201–13.
- Deluca D. What do the Sustainable Development Goals mean for Indigenous Peoples? Cultural Survival. December, 2017. <https://www.culturalsurvival.org/publications/cultural-survival-quarterly/what-do-sustainable-development-goals-mean-indigenous> (accessed Feb 5, 2021).
- Intergovernmental Panel on Climate Change. Climate change 2014: synthesis report. Contribution of working groups I, II and III to the fifth assessment report of the Intergovernmental Panel on Climate Change. Geneva: Intergovernmental Panel on Climate Change, 2014.
- Ratima M, Martin D, Castleden H, Delormier T. Indigenous voices and knowledge systems—promoting planetary health, health equity, and sustainable development now and for future generations. *Glob Health Promot* 2019; **26**: 3–5.
- UNESCO. Indigenous knowledge and climate change. 2019. <https://en.unesco.org/links/climatechange> (accessed Feb 5, 2021).
- Nalau J, Becken S, Schliephack J, Parsons M, Brown C, Mackey B. The role of Indigenous and traditional knowledge in ecosystem-based adaptation: a review of the literature and case studies from the Pacific Islands. *Weather Clim Soc* 2018; **10**: 851–65.
- Redvers N. The value of global indigenous knowledge in planetary health. *Challenges* 2018; **9**: 30.
- Hulme M. Problems with making and governing global kinds of knowledge. *Glob Environ Change* 2010; **20**: 558–64.
- Redvers J. “The land is a healer”: perspectives on land-based healing from Indigenous practitioners in northern Canada. *Int J Indig Health* 2020; **15**: 90–107.
- Redvers N, Poelina A, Schultz C, et al. Indigenous natural and first law in planetary health. *Challenges* 2020; **11**: 29.
- Redvers N, Yellow Bird M, Quinn D, Yunkaporta T, Arabena K. Molecular decolonization: an indigenous microcosm perspective of planetary health. *Int J Environ Res Public Health* 2020; **17**: e4586.
- Gratani M, Sutton SG, Butler JRA, Bohensky EL, Foale S. Indigenous environmental values as human values. *Cogent Soc Sci* 2016; **2**: 1185811.
- WHO. Closing the gap in a generation: health equity through action on the social determinants of health—final report of the Commission on Social Determinants of Health. Aug 27, 2008. <https://www.who.int/publications/i/item/WHO-IER-CSDH-08.1> (accessed Dec 18, 2020).
- Redvers N. The determinants of planetary health. *Lancet Planet Health* 2021; **5**: e111–12.
- Kovach M. Indigenous methodologies: characteristics, conversations, and contexts. Toronto, ON: University of Toronto Press, 2009.
- Weber-Pillwax C. Indigenous researchers and Indigenous research methods: cultural influences or cultural determinants of research methods. *J Indig Wellbeing* 2009; **8**: 21–40.
- Saini M. A systematic review of western and Aboriginal research designs: assessing cross-validation to explore compatibility and convergence. National Collaborating Centre for Aboriginal Health. 2012. <https://www.cnsa-nccah.ca/docs/context/RPT-ReviewResearchDesigns-Saini-EN.pdf> (accessed Jan 28, 2021).
- Brennan F, Ungunmerr-Baumann MR. Reverencing the earth in the Australia dreaming. *Way* 1989; **29**: 38–45.
- Waggoner J, Carline JD, Durning SJ. Is there a consensus on consensus methodology? Descriptions and recommendations for future consensus research. *Acad Med* 2016; **91**: 663–68.
- Chatwood S, Paulette F, Baker R, et al. Approaching Etuaptmuk—introducing a consensus-based mixed method for health services research. *Int J Circumpolar Health* 2015; **74**: 27438.
- Ferrazzi P, Tagalik S, Christie P, Karetak J, Baker K, Angalik L. Aajiqatigiingniq: an Inuit consensus methodology in qualitative health research. *Int J Qual Methods* 2019; **18**: 1–9.
- Wilson S. Research is ceremony: Indigenous research methods. Black Point, NS: Fernwood Publishing, 2008.
- Fink A, Kosecoff J, Chassin M, Brook RH. Consensus methods: characteristics and guidelines for use. *Am J Public Health* 1984; **74**: 979–83.
- Tachine AR, Bird EY, Cabrera NL. Sharing circles: an Indigenous methodological approach for researching with groups of Indigenous Peoples. *Int Rev Qual Res* 2016; **9**: 277–95.
- Flicker S, O'Campo P, Monchalin R, et al. Research done in “a good way”: the importance of Indigenous elder involvement in HIV community-based research. *Am J Public Health* 2015; **105**: 1149–54.
- UN. United Nations declaration on the rights of Indigenous Peoples. Sept 13, 2007. https://www.un.org/development/desa/indigenouspeoples/wp-content/uploads/sites/19/2018/11/UNDRIP_E_web.pdf (accessed March 20, 2021).
- O'Bryan K. Giving a voice to the river and the role of Indigenous People: the Whanganui river settlement and river managements in Victoria. *Aust Indigen Law Rev* 2017; **20**: 48–77.
- O'Bryan K. Indigenous rights and water resource management: not just another stakeholder. Abingdon: Routledge, 2019.
- Waitangi Tribunal. The stage 2 report on the national freshwater and geothermal resources claims. 2019. https://forms.justice.govt.nz/search/Documents/WT/wt_DOC_152208791/Freshwater%20W.pdf (accessed Feb 10, 2021).
- Yarra River Protection Ministerial Advisory Committee. Protecting the Yarra river (Birrarung). Victoria Department of Environment, Land, Water and Planning. 2016. https://www.planning.vic.gov.au/_data/assets/pdf_file/0011/101711/DELWP0032.10_YarraRiverProtection_MACrecommendations_v14_weba.pdf (accessed Feb 10, 2021).
- RiverOfLife M, Pelizzon A, Poelina A, et al. Yoongoorrookoo: emergence of ancestral personhood. *Griffith Law Rev* 2021; published online Nov 8. <https://doi.org/10.1080/10383441.2021.1996882>.
- Fforde C, Bamblett L, Lovett R, Gorrings S, Fogarty B. Discourse, deficit and identity: Aboriginality, the race paradigm and the language of representation in contemporary Australia. *Media Int Aust Inc Cult Policy* 2013; **149**: 162–73.
- Capobianco L, Shaw M, Sagant V, Bodson J. Community safety and Indigenous Peoples: sharing knowledge, insights and action. International Centre for the Prevention of Crime. 2009. <https://www.indigenousjustice.gov.au/resources/community-safety-and-indigenous-peoples-sharing-knowledge-insights-and-action/> (accessed Feb 13, 2021).
- International Indigenous Women's Forum. Mairin Iwanka Raya: Indigenous women stand against violence. 2006. <https://www.un.org/esa/socdev/unpfii/documents/vaiwreport06.pdf> (accessed Feb 16, 2021).
- UN. State of the world's Indigenous Peoples, vol 1. New York, NY: 2009.

- 42 Schultz C. Factors of holistic wellbeing for members of the Aboriginal health and community workforce. PhD thesis, Griffith University, 2020.
- 43 Bartolomé Y. Radical Ecstasy: the passionate compassion of sacred altruism. PhD thesis, Pacifica Graduate Institute, 2020.
- 44 Tauli-Corpus V. United Nations General Assembly: report of the special rapporteur of the Human Rights Council on the Rights of Indigenous Peoples. 2016. <https://www.un.org/development/desa/indigenouspeoples/wp-content/uploads/sites/19/2019/01/N1624109.pdf> (accessed Feb 8, 2021)
- 45 Garnett ST, Burgess ND, Fa JE, et al. A spatial overview of the global importance of Indigenous lands for conservation. *Nat Sustain* 2018; **1**: 369–74.
- 46 Greiber T, Moreno SP, Ahren M, et al. An explanatory guide to the Nagoya Protocol on access and benefit-sharing. 2012. <https://portals.iucn.org/library/sites/library/files/documents/EPLP-083.pdf> (accessed Feb 5, 2021).
- 47 Correa-Salazar C, Marín-Carvajal I, García MA. The role of violence in planetary health. *Lancet Planet Health* 2021; **5**: e113–14.
- 48 UN. The United Nations Permanent Forum on Indigenous Issues: together we achieve. <https://www.un.org/development/desa/indigenouspeoples/wp-content/uploads/sites/19/2018/04/Indigenous-Languages.pdf> (accessed April 4, 2021).
- 49 UNESCO. Endangered languages: biodiversity and linguistic diversity. 2017. <http://www.unesco.org/new/en/culture/themes/endangered-languages/biodiversity-and-linguistic-diversity/> (accessed Feb 6, 2021).
- 50 Salick J, Cellinese N, Knapp S. Indigenous diversity of Cassava: generation, maintenance, use and loss among the Amuesha, Peruvian upper Amazon. *Econ Bot* 1997; **51**: 6–19.
- 51 Wilder BT, O'Meara C, Monti L, Nabhan GP. The importance of Indigenous knowledge in curbing the loss of language and biodiversity. *Bioscience* 2016; **66**: 499–509.
- 52 Kimmerer RW. Nature needs a new pronoun: to stop the age of extinction, let's start by ditching "it". yes! March 30, 2015. <https://www.yesmagazine.org/issue/together-earth/2015/03/30/alternative-grammar-a-new-language-of-kinship> (accessed Feb 7, 2021).
- 53 Redvers JM. Land-based practice for Indigenous health and wellness in Yukon, Nunavut, and the northwest territories. Master of Environmental Design thesis, University of Calgary, 2016.
- 54 Chandler MJ, Lalonde C. Cultural continuity as a hedge against suicide in Canada's First Nations. *Transcult Psychiatry* 1998; **35**: 191–219.
- 55 Colquhoun S, Dockery AM. The link between Indigenous culture and wellbeing: qualitative evidence for Australian Aboriginal peoples. Centre for Labour Market Research and Curtin Business School. January 2012. <https://www.ncsehe.edu.au/publications/indigenous-culture-wellbeing/> (accessed April 4, 2021).
- 56 Fa JE, Watson JEM, Leiper I, et al. Importance of Indigenous Peoples' lands for the conservation of intact forest landscapes. *Front Ecol Environ* 2020; **18**: 135–40.
- 57 Bowra A, Mashford-Pringle A. More than a structure: exploring the relationship between Indigenous homemaking practices and holistic wellbeing. *Wellbeing, Space and Society* 2021; **2**: 100007.
- 58 Mehl-Madrona L. What traditional indigenous elders say about cross-cultural mental health training. *Explore* 2009; **5**: 20–29.
- 59 Funes Y. The land's first caretakers. Nov 22, 2020. <https://atmos.earth/jonathan-ferrier-indigenous-knowledge-public-lands-caretakers-the-frontline/> (accessed Oct 3, 2021).
- 60 Miller TR, Baird TD, Littlefield CM, Kofinas G, Chapin FS 3rd, Redman CL. Epistemological pluralism: reorganizing interdisciplinary research. *Ecol Soc* 2008; **13**: 46.
- 61 Reid AJ, Eckert LE, Lane JF, et al. "Two-eyed seeing": an Indigenous framework to transform fisheries research and management. *Fish Fish* 2020; **22**: 243–61.

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