



La prospettiva One Health- Planetary Health

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THE MANHATTAN PRINCIPLES

In September, 2004, health experts from around the world met for a symposium organized by the Wildlife Conservation Society (WCS) and hosted by The Rockefeller University that focused on the current and potential movements of diseases among human, domestic animal, and wildlife populations. Representatives included specialists from the World Health Organization; the UN Food and Agriculture Organization; the Centers for Disease Control and Prevention; the United States Geological Survey National Wildlife Health Center; the United States Department of Agriculture; the Canadian Cooperative Wildlife Health Centre; the Laboratoire Nationale de Sante Publique of Brazzaville, Republic of Congo; the IUCN Commission on Environmental Law; and the WCS among others.

The product of the symposium—The Manhattan Principles— lists 12 recommendations for establishing a more holistic approach to preventing epidemic / epizootic disease and for maintaining ecosystem integrity for the benefit of humans, their domesticated animals, and the foundational biodiversity that supports us all:

The Manhattan Principles on “One World, One Health”

Recent outbreaks of West Nile Virus, Ebola Hemorrhagic Fever, SARS, Monkeypox, Mad Cow Disease and Avian Influenza remind us that human and animal health are intimately connected. A broader understanding of health and disease demands a unity of approach achievable only through a consilience of human, domestic animal and wildlife health - One Health. Phenomena such as species loss, habitat degradation, pollution, invasive alien species, and global climate change are fundamentally altering life on our planet from terrestrial wilderness and ocean depths to the most densely populated cities. The rise of emerging and resurging infectious diseases threatens not only humans (and their food supplies and economies), but also the fauna and flora comprising the critically needed biodiversity that supports the living infrastructure of our world. The earnestness and effectiveness of humankind’s environmental stewardship and our future health have never been more clearly linked. To win the disease battles of the 21st Century while ensuring the biological integrity of the Earth for future generations requires interdisciplinary and cross-sectoral approaches to disease prevention, surveillance, monitoring, control and mitigation as well as to environmental conservation more broadly.

We urge the world’s leaders, civil society, the global health community and institutions of science to:

1. Recognize the essential link between human, domestic animal and wildlife health and the threat disease poses to people, their food supplies and economies, and the biodiversity essential to maintaining the healthy environments and functioning ecosystems we all require.
2. Recognize that decisions regarding land and water use have real implications for health. Alterations in the resilience of ecosystems and shifts in patterns of disease emergence and spread manifest themselves when we fail to recognize this relationship.
3. Include wildlife health science as an essential component of global disease prevention, surveillance, monitoring, control and mitigation.
4. Recognize that human health programs can greatly contribute to conservation efforts.
5. Devise adaptive, holistic and forward-looking approaches to the prevention, surveillance,

monitoring, control and mitigation of emerging and resurging diseases that take the complex interconnections among species into full account.

6. Seek opportunities to fully integrate biodiversity conservation perspectives and human needs (including those related to domestic animal health) when developing solutions to infectious disease threats.

7. Reduce the demand for and better regulate the international live wildlife and bushmeat trade not only to protect wildlife populations but to lessen the risks of disease movement, cross-species transmission, and the development of novel pathogen-host relationships. The costs of this worldwide trade in terms of impacts on public health, agriculture and conservation are enormous, and the global community must address this trade as the real threat it is to global socioeconomic security.

8. Restrict the mass culling of free-ranging wildlife species for disease control to situations where there is a multidisciplinary, international scientific consensus that a wildlife population poses an urgent, significant threat to human health, food security, or wildlife health more broadly.

9. Increase investment in the global human and animal health infrastructure commensurate with the serious nature of emerging and resurging disease threats to people, domestic animals and wildlife. Enhanced capacity for global human and animal health surveillance and for clear, timely information-sharing (that takes language barriers into account) can only help improve coordination of responses among governmental and nongovernmental agencies, public and animal health institutions, vaccine / pharmaceutical manufacturers, and other stakeholders.

10. Form collaborative relationships among governments, local people, and the private and public (i.e.- non-profit) sectors to meet the challenges of global health and biodiversity conservation.

11. Provide adequate resources and support for global wildlife health surveillance networks that exchange disease information with the public health and agricultural animal health communities as part of early warning systems for the emergence and resurgence of disease threats.

12. Invest in educating and raising awareness among the world's people and in influencing the policy process to increase recognition that we must better understand the relationships between health and ecosystem integrity to succeed in improving prospects for a healthier planet.

It is clear that no one discipline or sector of society has enough knowledge and resources to prevent the emergence or resurgence of diseases in today's globalized world. No one nation can reverse the patterns of habitat loss and extinction that can and do undermine the health of people and animals. Only by breaking down the barriers among agencies, individuals, specialties and sectors can we unleash the innovation and expertise needed to meet the many serious challenges to the health of

people, domestic animals, and wildlife and to the integrity of ecosystems. Solving today's threats and tomorrow's problems cannot be accomplished with yesterday's approaches. We are in an era of "One World, One Health" and we must devise adaptive, forward-looking and multidisciplinary solutions to the challenges that undoubtedly lie ahead.

Read more at:

www.oneworldonehealth.org

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Tripartite and UNEP support OHHLEP's definition of "One Health"

Joint Tripartite (FAO, OIE, WHO) and UNEP Statement

1 December 2021 | Joint News Release | Reading time: 2 min (506 words)

[العربية](#)[中文](#)[Français](#)[Русский](#)[Español](#)

The Food and Agriculture Organization of the United Nations (FAO), the World Organisation for Animal Health (OIE), the United Nations Environment Programme (UNEP) and the World Health Organization (WHO) welcome the newly formed operational definition of One Health from their advisory panel, the One Health High Level Expert Panel (OHHLEP), whose members represent a broad range of disciplines in science and policy-related sectors relevant to One Health from around the world.

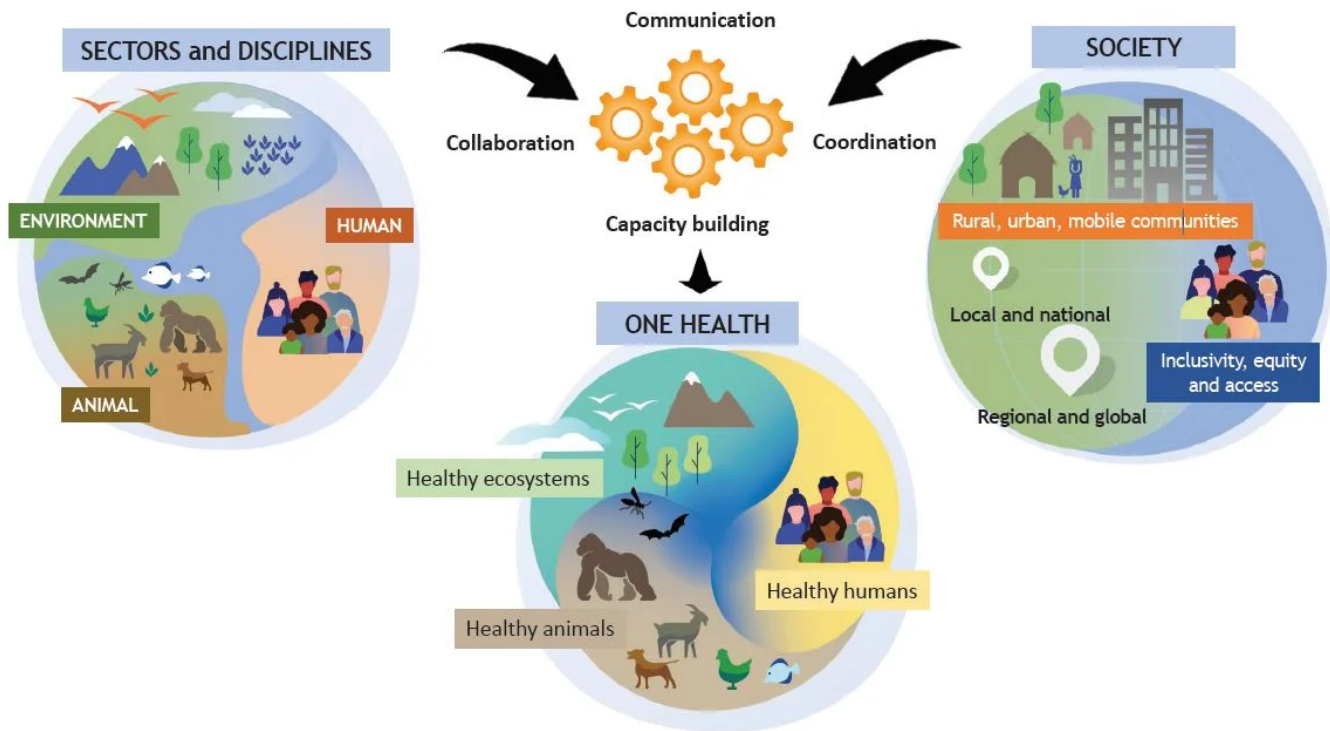
The four organizations are working together to mainstream One Health so that they are better prepared to prevent, predict, detect, and respond to global health threats and promote sustainable development.

The One Health definition developed by the OHHLEP states:

One Health is an integrated, unifying approach that aims to sustainably balance and optimize the health of people, animals and ecosystems.

It recognizes the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and inter-dependent.

The approach mobilizes multiple sectors, disciplines and communities at varying levels of society to work together to foster well-being and tackle threats to health and ecosystems, while addressing the collective need for clean water, energy and air, safe and nutritious food, taking action on climate change, and contributing to sustainable development.



The importance of establishing a One Health definition was first raised by OHHLEP, and later agreed by the four Partners, to develop a common language and understanding around One Health.

The new comprehensive OHHLEP One Health definition aims to promote a clear understanding and translation across sectors and areas of expertise.

While health, food, water, energy, and environment are all wider topics with sector-specific and specialist concerns, the collaboration across sectors and disciplines will contribute to protecting health, addressing health challenges such as the emergence of infectious diseases and antimicrobial resistance and promoting health and integrity of our ecosystems. Moreover, One Health, linking humans, animals and the environment, can help to address the full spectrum of disease control - from disease prevention to detection, preparedness, response, and management - and to improve and promote health and sustainability.

The approach can be applied at community, subnational, national, regional, and global levels, and relies on shared and effective governance, communication, collaboration and coordination. With the One Health approach in place, it will be easier for people to better understand the co-benefits, risks, trade-offs and opportunities to advance equitable and holistic solutions.

Through combined energies of the four organizations, a comprehensive Global Plan of Action for One Health is in development, supported and advised by OHHLEP. This Plan aims to mainstream and operationalize One Health at global, regional, and national levels; support countries in establishing and achieving national targets and priorities for interventions; mobilize investment; promote a whole of society approach and enable collaboration, learning and exchange across regions, countries, and sectors.

As we acknowledge the importance of the One Health approach and welcome the OHHLEP One Health definition, the Tripartite and UNEP will continue to coordinate and implement One Health activities in line with the spirit of the new OHHLEP definition of One Health.

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[One Health High Level Expert Panel \(OHHLEP\)](#).

A manifesto for planetary health

Richard Horton and colleagues' manifesto (March 8, p 847)¹ requires nothing less than a global treaty.

The call for a collective manifesto to transform global public health, while opportune, is destined not to see the light of day without offering a viable and achievable path forward. Political decision makers with the power to first allow, then persuade and implement such a movement have consistently ignored or denied good science in favour of self-serving economics. The strong appeal for a "powerful social movement based on collective action at every level of society"¹ requires uncompromising action equal to the stated task. Nothing short of a treaty-level global authority for prevention and preparedness is required, one that embodies and operationalises the empirical work of the former Intergovernmental Panel on Climate Change and of other scientists who have the technical expertise and institutional basis to devise the treaty content and implementation. Although "international treaties will never be entirely fair...they are nonetheless more impressive than the barrage of platitudes that passes for [current] political discourse."² Treaties are crucial; nations adhere to their contents while craving international respectability.²

Without the power of a treaty, the authors of this manifesto³ will ultimately share collective disappointment.

I declare that I have no competing interests.

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- 1 Horton R, Beaglehole R, Bonita R, Raeburn J, McKee M, Wall S. From public to planetary health: a manifesto. *Lancet* 2014; **383**: 847.
- 2 Editorial. The power of treaties. *Nature* 2013; **501**: 5.

Planetary health¹ needs One Health. One Health is a concept that recognises the links between human, animal, and environmental health. These factors

must be incorporated and integrated before planetary health can be achieved.

The One Health concept promotes multidisciplinary collaborations between physicians, veterinarians, environmental specialists, and other health-related professions. Support for One Health has increased substantially and must be embraced and implemented globally.²

Regrettably, Richard Horton and colleagues' manifesto for planetary health excludes One Health;¹ as such, it is incomplete and ineffectual. It does not adequately address the overwhelming environmental threats to the sustainability of human civilisation. Our planet is rapidly sickening because of anthropogenic causes, but planetary health for humanity is impossible without including animal, environmental, and ecosystem health.³ About 75% of emerging infectious diseases are zoonotic; many emerge because of environmental destruction.⁴

We must recognise that planetary health equals human, animal, environmental, and ecosystem health. Achieving planetary health requires implementation of the One Health concept globally.

We declare that we have no competing interests.

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- 1 Horton R, Beaglehole R, Bonita R, Raeburn J, McKee M, Wall S. From public to planetary health: a manifesto. *Lancet* 2014; **383**: 847.
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Richard Horton and colleagues' manifesto¹ is in the tradition of *The Lancet's* founding Editor Thomas Wakley. It champions social medicine, as does *The Lancet's* current Editor.²

We—as members of the People's Health Movement also aiming to strengthen community and planetary health informed by public health principles—agree with and endorse the general analysis of *The Lancet's* manifesto. However, the manifesto makes no mention of existing social movements, many of which have much the same aims as those being proposed, including: exposing political and economic systems that jeopardise public health, emphasising the provision of universal primary health care, insisting that public health institutions and facilities be protected, empowering the people most immediately affected and defending their rights, calling for renewed social values and a vision that puts the public interest first, and pressing governments to protect public goods.

For more than a decade, the disorder created by reckless capitalism has been authoritatively discredited,³ including by existing social movements. Nevertheless, sustainable development initiatives designed especially for Asia and Africa still almost invariably involve the private sector, as lead partners of UN agencies and governments. But, in reality, the private sector comprises the very transnational corporations whose actions are in conflict with public health. They must be excluded from policy formulations to improve public health.⁴ Instead, partnerships need to include genuinely independent public interest civil society organisations and social movements.

The manifesto calls for the creation of a powerful social movement to deliver planetary health and support sustainable human development.¹ But, there is no reference to the work already being done for example by the World Social Forum, Greenpeace, the International Baby



For more on the **People's Health Movement** see www.phmovement.org

For more on the **One Health Initiative** see <http://www.onehealthinitiative.com>

Submissions should be made via our electronic submission system at <http://ees.elsevier.com/thelancet/>

SCHEDA 2

MANIFESTAZIONI DELL'EMERGENZA CLIMATICA E IMPATTI UMANI NELLA PROSPETTIVA "ONE HEALTH" E "PLANETARY HEALTH"

SOMMARIO: La salute umana come *One Health* e *Planetary Health*; - Le conferme di COP26 e dell'AR6 dell'IPCC 2021-2022

(Tutti i documenti sono linkabili)

LA SALUTE UMANA COME *ONE HEALTH* E *PLANETARY HEALTH*

La considerazione degli impatti dell'emergenza climatica è inquadrata nella prospettiva c.d. "*One Health*" e "*Planetary Health*", comprensiva dei c.d. "determinanti della salute" individuale e dei c.d. "determinanti planetari" della dipendenza della salute umana dalla stabilità del sistema climatico e dagli equilibri ecologici.

I determinanti della salute sono riconosciuti dall'Organizzazione Mondiale della Sanità (OMS), dall'OCSE e dall'ISS, oltre che dal Ministero italiano della Salute, e sono altresì connessi ai 17 SDGs dell'ONU per il 2030 (cfr. Marmot, Bell, *The Sustainable Development Goals and Health Equity*, in 29 *Epidemiology*, 1, 2018, 5-7).

Vengono periodicamente aggiornati in varie sedi, a partire dalla ricognizione della *Commission on Social Determinants of Health* (WHO, *A Conceptual Framework for Action on the Social Determinants of Health*, Discussion Paper-Final Draft, April 2007).

Dopo lo storico *Global assessment report on biodiversity and ecosystem services* dell'IPBES, del 2019, sono stati censiti anche i c.d. "determinanti della salute planetaria" (*Determinants of Planetary Health*), che si aggiungono, integrandoli, a quelli della salute.

I "determinanti planetari" erano stati già discussi dalla comunità scientifica internazionale (cfr. Horton, Beaglehole, Bonita, Raeburn *et al.*, *From public to planetary health: a manifesto*, in 383 *The Lancet*, (9920, 2014, 847, Whitmee, Haines, Beyrer, *et al.*, *Safeguarding human health in the Anthropocene epoch: report of The Rockefeller Foundation-Lancet Commission on planetary health*, in 386 *The Lancet*, 10007, 2015, 1973-2028; ora Redvers, *The determinants of planetary health*, in 5 *The Lancet*, 3, 2021, E11-112).

La prospettiva dei "determinanti planetari" è ora riconosciuta dall'UNFCCC (cfr. *Planetary Health*) e dalla UE (cfr. Comunicazione del 20 maggio 2020, *Strategia dell'UE sulla biodiversità 2030*) come parte integrante della prospettiva appunto *One Health*, nonché dal CMCC (*Strategy for the mitigation of the climate change (CC) effects on human and planetary health, following the Planetary Health Vision*) e, come dall'ISPRA (*UNEP Global Environmental Outlook GEO-6*).

L'analisi *One Health* parte dalla constatazione che la salute umana è strettamente connessa a quella delle altre forme di vita (quindi alla biosfera) e alle componenti del sistema terrestre (quindi all'intero sistema climatico). Nella UE, è studiata dal network europeo delle conoscenze *One Health EJP* e, in Italia, è avallata dall'ISS nonché dal progetto dell'UNEP, che vede coinvolto anche l'ISPRA, *Global Environment Outlook*, fondato sul paradigma "*Pianeta sano, persone sane*".

Al suo interno, i determinanti della salute identificano tutti i fattori di reciproca combinazione, non solo psico-fisica ma anche socio-economico-ambientale, che influenzano la condizione umana individuale.

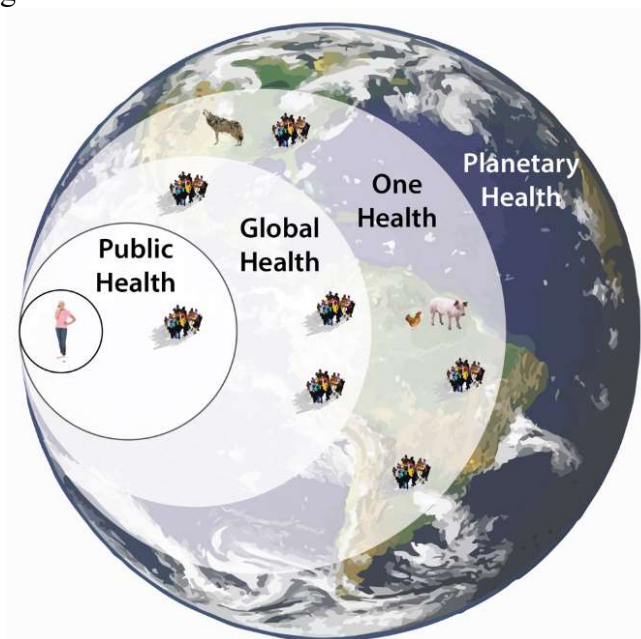
I determinanti planetari, invece, includono i parametri vitali dell'intero pianeta, da cui dipende la vita umana (Demaio, Rockström, *Human and planetary health: towards a common language*, in 386 *The Lancet*, 2015, 10007, 2015, E36-E37).

Inoltre, il rapporto tra salute individuale come *One Health* e *Planetary Health* combina gli obiettivi di sviluppo sostenibile dell'ONU (i 17 *SDGs*), la *New Urban Agenda* dell'ONU, per la vivibilità dell'ecosistema urbano, e l'Accordo di Parigi sui cambiamenti climatici, contraddistinti da una proiezione temporale comune di sostenibilità parametrata al 2030.

Documenti e iniziative che ufficializzano la prospettiva *One Health* e *Planetary Health*, anche per l'Europa e l'Italia, sono:

- la *Parma Declaration on Environment and Health* del 2010;
- la *Doha Declaration on Climate, Health and Wellbeing*, del 2012;
- lo *Statement on Planetary Health and Sustainable Development Goals* dell'Associazione mondiale dei medici di famiglia WONCA, del 2017;
- lo *Statement on Planetary Health & Primary Health Care*, adottato da diverse Associazioni mondiali di professionisti della salute nel 2018;
- la *Declaration Calling for family doctors of the world to act on Planetary Health*, del 2019;
- la *Helsinki Declaration 2020: Europe that protects*.

Infine, la combinazione salute individuale, *One Health* e *Planetary Health* è descritta attraverso il c.d. “diagramma di Venn in pila”, utilizzato per definire una relazione di sovrapposizione e non di semplice interazione. Lo schema, tratto dal progetto *Rockefeller Foundation-Lancet Commission Planetary Health*, è il seguente.



One Health, determinanti della salute e determinanti planetari concretizzano il contenuto del concetto di benessere della persona umana (come riconosciuto dalla “Coalizione globale su salute, ambiente e cambiamenti climatici”, lanciata dagli organismi ONU nel 2018: cfr. *UN Launches New Coalition on Health, Environment and Climate Change*).

A livello di ricognizioni scientifiche dell'ONU, questo intreccio tra intero sistema climatico, comprensivo di tutte le sue sfere, e *One Health* è stato definitivamente consacrato dallo *Scientific Outcome of the IPBES-IPCC co-sponsored workshop on biodiversity and climate change* del 2021.

Per quanto riguarda l'Italia, esso ha trovato esplicitazione ufficiale definitiva, in occasione della COP26 a Glasgow del 2021, con la creazione della High Ambition Coalition for Nature and People, alla quale aderisce appunto anche l'Italia.

In funzione di queste acquisizioni, anche l'Organizzazione Mondiale della Sanità (OMS) ha esplicitamente disciplinato il nesso tra emergenza e impatti umani con il suo protocollo di azione sui "disastri" (WHO, Disasters & Emergencies. Definition and Training Package, Addis Abāba, 2002). Secondo l'OMS, l'emergenza attiva un "periodo patogenetico" produttivo di impatti connessi appunto alle degenerazioni del cambiamento climatico (WHO, Health Topics: Climate Change).

Per tale motivo, l'OMS dichiara l'emergenza climatica la più grande sfida per la salute di tutti i tempi (WHO, Climate change and health, 2021).

LE CONFERME DI COP26 E DELL'AR6 DELL'IPCC 2021-2022

In occasione della COP26 del 2021, lo *Special Report* dell'OMS COP26 Special Report on Climate Change and Health. The Health Argument for Climate Action e la An urgent call for climate action from the health community ahead of COP26 hanno denunciato l'urgenza di azione sull'emergenza climatica in prospettiva di *Planetary Health*, per cinque ragioni:

- il cambiamento climatico è la più grande minaccia per la salute che l'umanità deve affrontare;
- nessuno è al sicuro dagli impatti sulla salute dei cambiamenti climatici;
- l'azione sul clima deve essere urgente;
- la combustione del fossile sta uccidendo l'umanità;
- l'inquinamento atmosferico, principalmente risultante dalla combustione fossile che causa il cambiamento climatico, provoca 13 morti al minuto in tutto il mondo.

Il nuovo Rapporto AR6 Wg2 2022 dell'IPCC, Impacts, Adaptation and Vulnerability, fa propria la prospettiva *Planetary Health*, constatando, in estrema sintesi, che, per garantire il benessere delle persone, si deve garantire la salute del Pianeta, mettendone in sicurezza le sue dinamiche.

The constitutional determinants of planetary health



We need to understand the constitutional determinants of planetary health. A constitution denotes one, or in a minority of countries, several, legal documents that contain basic rules and principles about how political power should be exercised and how public goods should to be provided.¹ Constitutions clarify the rights and duties of individuals, communities, and public authorities, and allocate power horizontally among the executive, legislative, and judicial organs of the state, and vertically between national and local governments.² Different constitutional designs can result in vastly different economic outcomes. Presidential constitutions are consistently associated with greater income inequality than parliamentary constitutions for instance.³ That constitutional design affects population health is increasingly acknowledged, and for reasons that are not difficult to fathom. Constitutions by definition constitute governments, and governments are typically responsible for providing safe drinking water and infectious-disease control. Proportional representation electoral systems have been found to be positively correlated with higher life expectancy and lower infant mortality.⁴ A robust association appears to exist between health and democratic institutions that are accountable to the community at large instead of a small group of autocratic elites who cannot tolerate any dissent, even to policies that are harmful to public, global, or planetary health.⁵

We define the constitutional determinants of planetary health as the constitutional structures within which human impacts on the Earth's natural systems affect human health. Human flourishing has been compromised by drastic environmental changes, organic pollutants, and transborder fire emissions that were by no means inevitable. Global warming is catastrophic not just for global health but also for universally recognised human rights, that are guaranteed either implicitly or expressly by virtually all national constitutions. Climate change and biodiversity loss disproportionately undermine the rights to life and health of vulnerable populations.

In light of these points, we should investigate whether and measure how divergent constitutional structures—presidential or parliamentary, majoritarian or proportional, democratic or autocratic, federal or unitary, judicial independence or the lack thereof—influence and affect planetary health. Preliminary

work has been done by researchers interested in environmental constitutionalism.⁶ Constitutionalising atmospheric integrity and decarbonisation would probably result in sustained policy interest in taking relevant action, constrained short-term opportunism among politicians and policy makers, deadlocks in the legislative process being overcome, and an increase in the potential for judicial review and successful lawsuits against defiant governments and powerful corporations, all in furtherance of planetary health.⁷ Similarly, the enshrinement of rights to environmental health in constitutions would strengthen the ability of rightsholders to hold violators to account, notwithstanding contrary policy considerations.⁸ Indeed, countries with constitutions guaranteeing access to information and the right to participate in environmental governance have been shown to systemically achieve favourable outcomes in environmental justice, relative to countries whose constitutions do not have such features.⁹

The power of constitutions over planetary health must not be exaggerated. In some countries constitutions are more often honoured in the breach than the observance, regardless of their content. But this reality does not excuse us from probing into how constitutions can be drafted or redesigned for the betterment of planetary health at a truly global scale. Empirical constitutional research revealed that constitutional documents are not necessarily unalterable; countries have replaced their national constitutions on average every 19 years during the past two centuries.¹⁰ Supported by more rigorous evidence in relation to the effects of constitutional determinants of planetary health, we might be able to generate concrete advice on how constitutional institutions that are not conducive to planetary health can be suppressed, and how those that are favourable to planetary health can be reinforced. On the basis of this newfound knowledge, courts might consider invoking remedial interpretations of their constitutions to instigate public and corporate actors to act more responsibly and equitably when issues that impinge on the planet arise. We cannot afford to leave untapped the rich potential of constitutions for articulating and upholding a consequential planetary health constitutionalism across nations for this Anthropocene epoch.

We declare no competing interests.

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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

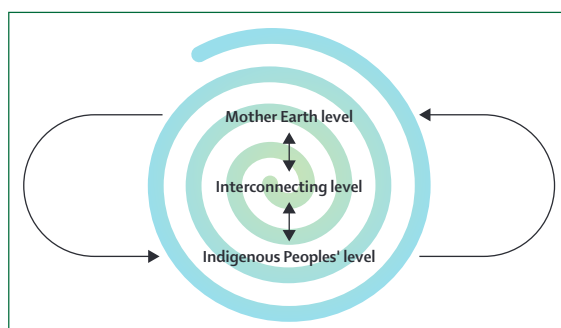


Figure: The interconnectedness of the determinants of planetary health

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.

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We declare no competing interests.

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Perspective

Indigenous Natural and First Law in Planetary Health [†]

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[†] We formally acknowledge Mother Earth as our senior author, with her own presence and voice.

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Abstract: Indigenous Peoples associate their own laws with the laws of the natural world, which are formally known as or translated as Natural or First Law. These laws come from the Creator and the Land through our ancestral stories and therefore, they are sacred. All aspects of life and existence depend on living and following these natural First Laws. Since colonization, Indigenous Peoples' Natural Laws have been forcibly replaced by modern-day laws that do not take into account the sacred relationship between the Earth and all of her inhabitants. The force of societies who live outside of Natural Law has ensured the modern-day consequences of not living in balance with nature. Pandemics and global environmental change, including climate change, are all consequences of not following the Natural Laws that are encapsulated by the interconnected nature of the universe. Here we discuss Natural Law from an Indigenous paradigm and worldview which carries implications for planetary health and wider environmental movements around the globe.

Keywords: Indigenous health; planetary health; environmental health; justice; health equity; Natural Law; First Law

1. Introduction

"The culture's vitality is literally dependent on individuals, in community with the natural world. Indigenous cultures are an extension of the story of the natural community of a place and evolve according to ecological dynamics and natural relationships". [1] (p. 20)

Indigenous Peoples currently host and live in areas that hold eighty percent of the world's biodiversity and yet they inhabit only twenty two percent of the earth's surface [2]. They manage

or have tenure rights over at least ~38 million km² in 87 countries or politically distinct areas on all inhabited continents [3]. Indigenous Peoples have developed knowledge over thousands of years about their natural rootedness, and they have actively maintained their vast ecosystems through reciprocal relationships. Indigenous traditional knowledge has in turn served, often without explicit consent or acknowledgment, entire nations for generations by providing ecosystem and provisioning knowledge and services such as food, medicine, and mineral resources. The extraction of knowledge and resources through forceful colonizing agendas has created a disconnect between the original meaning of this knowledge and how this knowledge is used in current landscapes. This creates a dangerous and precipitous situation where the realities of our existence have been stressed to the breaking point, as evidenced by current global environmental change (e.g., climate change, polluting of watersheds, pandemics).

From an Indigenous land-based worldview, where this original knowledge is rooted, all is considered alive, of living energy, and of spiritual value rather than materialistic or financial value. This is in stark contrast to capitalist systems that largely function on the commodification of nature and are ecocidal [4]. Indigenous Peoples clearly understand that any detrimental interference with the natural world's rhythms and “being” impacts directly on our well-being. For example, for the Dene Peoples of Dakelh, British Columbia, Canada, everything is connected. The land, animals, plants, people, and universe are held together by a power (*Yudughi*) that connects everything. When this important connection is broken or displaced, then other systems get thrown out of line. This is one of the reasons why when we take something (e.g., harvesting ‘medicines’ from the land), we then need to replace it with something (i.e., a spiritual offering to the land). This action demonstrates a deep and intentional reciprocal relationship founded in the knowledge of the power (*Yu*) all around (*Du*) that holds things together (*Ghi*). This interconnectedness is deeply profound and seeds our understanding of the relationships we have with our environment.

Professor Michael McDaniels, the head of Indigenous Knowledge and Pro Vice Chancellor at the University of Technology, Sydney, provided an eloquent narration of this concept in that “interconnectedness of country, of people, of winds, of water, of constellations, of people past and people future, of the web of life ... that to touch one element of the web of life is to affect all” [5]. Caring for Land or Country so Country or Land can care for us is how many Indigenous Peoples will explain this interconnected relationship. Land or Country itself can be explained as the way in which Indigenous Peoples refer to a place that gives and receives life, for and from its peoples [6]. Therefore, Country and Land are explicitly alive and are a life support for all else [7].

With this, we as Indigenous community members, land defenders, water protectors, researchers, providers, and servants to Mother Earth and our people, collectively embrace the need to re-establish dynamic balance to our shared home. We see this done in a way that fits with the natural rhythms of laws that have been storied in our various cultures around the globe for countless generations. We therefore assert that it is vitally important to understand the nested but interconnected levels of existence on which our health depends (see Figure 1). These interconnected levels will form the basis and structure of this discussion.



Figure 1. Nested levels of knowledge and applications that surround healthy communities and ecosystems (adapted from [8]).

Although Mother Earth is a living system that can transform and heal, she will be lonely without the vibrations of her human family. Therefore, in this combined effort, deeply rooted in our collective knowledge traditions and representing the four directions, we seek to humbly offer a way forward through a cultural bridging discourse. Indigenous community conceptions of Natural Law or First Law (both terms are used interchangeably throughout), are an underappreciated window into how Indigenous Peoples around the globe have been able to act as ongoing stewards of their environment in service to Mother Earth, and therefore, as curators of our current existence. Although the term “Natural Law” (*ius naturale, lex naturalis*) has been used in various Euro-Western traditions and contexts, the meaning and application of the concept in these circles are vastly different to those within Indigenous communities. This brief introduction to the Indigenous representation of the topic is meant to be stimulatory, reflective, and actionable, introducing realities and concepts that are missing from current planetary health, environmental, and climate change movements and scholarship, and which are integral to the continuation of existence.

We would also like to formally acknowledge our senior author, Mother Earth, as she is often not given a voice or formal presence despite the millions of articles, research, and work done on, to, and for her. Instead, we are with, by, and as her, as she lives within each of us as the root of our existence.

2. Natural Law or First Law

First Law, Law of the Land Not Law of Man

“Jayida Booroo, yimartuwarra marnins. Welcome to our Country. We, Anne Poelina and Marlikka Perdrisat, are women who belong to the Martuwarra Fitzroy River, in the Kimberley region of Western Australia, Australia.”

We come as Indigenous insiders, mother, and daughter to share our values, ethics, and thoughts regarding Natural Law, First Law, and the Law of the Land in contrast to the colonially imposed Law of Man. First Law is the guiding principle of First Peoples and it has been generated over eons to govern the diverse range of bioregions within the land mass currently known as Australia. It is the body of laws responsible for maintaining respectful and reciprocal relations between and within First Nations and between the human and non-human family.

As traditional custodians of the Martuwarra (Fitzroy River), we derive our identity and existence from this globally significant River. Martuwarra would be best described as an “ancestral being”, a legal subject that possesses legal rights [9]. This is different from the legal subject of “personhood”, for which there is increasing ambivalence among some traditional landowners due to important questions on the actual legal usefulness of this term [10] and whether or not the term dilutes the duty of care needed to protect our ancestor. As the River is already an entity, it should not have to depend on the specific actions of settler law to achieve this status [10].

Our epistemological and ontological lived experience has been informed by tens of thousands of years of memories that are stored in our stories. The meaning of these stories informs our contemporary dreaming. When Aboriginal people are born, we are given a totem. In our Nyikina culture a totem is known as Jadiny. In framing the concept of totemism, Deborah Bird Rose describes totem as “a common property institution for long-term ecological management” [11]. The totem is your kin, and Aboriginal people are given a totem to teach them that they have a kinship relationship with non-human beings.

This relationship creates empathy and a lifelong relationship through practicing the ethics of care. This teaches traditional owners about the ecological balance between humans and nature. Traditional owner groups have sustainably managed discrete estates along the River for countless generations. Shared totems connect people of the past with future generations. Each generation is responsible for respecting and protecting the River from harmful risks.

First Law embodies the concept that is known regionally as Liyan—the feeling of a deep personal relationship with all living and non-living things [9]. This relationship is a logical, personal understanding of how to do the right thing. Our values, ethics and culture support sustaining the environment and

balance of life as the primary intent of law. Liyan is the spirit within us that connects us to the universal spirit of life. First Law is about creating positive energy and being true to ourselves, so that our spirits are at peace.

We are from the oldest continuous society in the world, and for us, as with other First Nations Peoples, it is all about our stories. Our ancient wisdom is maintained and shared through countless generations of storytelling. This ancient cultural wisdom that is transmitted through our stories is greatly needed during this time of global upheaval (i.e., climate change, emerging pandemics, escalating inequities).

First Law itself in Australia differs markedly from its colonial counterpart [9]. First Law principles are not expressed in terms of external rules, policies, and procedures by government to influence individual and societal behavior through fear. First Law is applied through multilayered stories that impart values and ethics; thus they represent 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.

The Warloongarriy songline is the First Law governing the Martuwarra. First Nations along the River share a common songline that sets out community and individual rights, relationships, and responsibilities. Ceremonial songline law is passed to each emerging generation by raising their spirit through singing and dancing. Martuwarra First Law includes Warloongarriy Law (River Law) and Wunan Law (regional governance law) [9]. For example, Wunan Law is a cooperative model based on principles that respect the sovereignty of the Indigenous nations, but ensure the well-being of River, Sea, Ranges (Hill), and Desert Country by viewing it holistically and treating it as an integrated, connected whole. Prior to colonization, the Wunan was the Indigenous regional governance system for an extensive trade exchange based on co-existence and co-management principles across vast estates of land spanning from the Kimberley to the Northern Territory.

Our relationship with the River requires that we act with empathy as it is our fiduciary duty to protect land and living waters, and our non-human family. Invasive or unjust development would constitute a breach of our customary First Law as it impacts on our responsibility to maintain living human and ecological systems.

Colonial laws were imposed over First Law with the intent of extracting private wealth at the expense of the diminished quality of life and well-being of those already living within this Country. First Law recognizes the River as a living entity and therefore it has a right to live and flow. The River generates a positive living spirit that creates and sustains all life in the River Country. Traditional owners of the Martuwarra are seriously challenged by the notion of doing anything that is going to have a negative impact on the River. It defies logic and disheartens individuals and whole communities of people who have a deep relationship with the spirit of our place, our ancestral estate. Due to this, it is important to have legal instruments in place to ensure that First Peoples views and rights are respected. An example of a more constructive approach to recognizing our rights under the common law of Australia is to be found in the recent decision of the Federal Court of Australia regarding Fortescue Metals Group (FMG) vs. Warrie on behalf of the Yindjibarndi People [12]. The determination identified

The very foundation of traditional Aboriginal law and customs is in the spiritual and the intermingling of the spiritual with the physical, with people and with land ... [Furthermore] ... the distinctions between spiritual belief and real property rights, or personal property rights, are not to be imported into an assessment of the existence and content of Aboriginal customary law. To do so would be to destroy the fabric of that customary law [12].

This type of legal judgement is an expression of legal pluralism that demonstrates that First Law can coexist with imposed, anthropocentric laws. The decision legitimizes First Law stories and considers them necessary to uphold the spiritual balance and harmony of life between people and nature.

First Law values honesty, empathy, love, and justice to promote a cooperative spirit, interdependence, and coexistence. In a time of world dis-ease over the COVID-19 pandemic,

rising tensions between political and economic superpowers, and increasing international mistrust of governments, we find meaning in First Law creation stories. Our stories give us the authority to question the legal and moral justification for imposing one law over another. Colonization continues because the intent of colonial-derived laws is to exclusively benefit man and human communities over the needs of the land, water, and all the living spirits that constitute our unique biosphere. The outcomes of many of the new laws diminish Indigenous guardianship, responsibility, and authority.

3. Indigenous Traditional Knowledge

“Working in alliance with nature and her natural laws is the key to ensuring our survival”. [13]

Failure to protect planetary boundaries [14] through the rooted cross-cultural knowledge of Natural or First Law will challenge the ability to protect the planet. Indigenous traditional knowledge (TK) is directly nested within the understanding of Natural or First Law. TK can be defined as “all that is known about the world around us and how to apply that knowledge in relation to those beings that share the world” [15]. TK systems are more species and environmentally inclusive which roots the current broad and increasingly heightened concern about the rate of loss of our ecosystems and the impacts of this on the life and balance of Mother Earth [8]. Indigenous TK has resiliently spanned millennia; however, it is only recently that we have seen a growing recognition of the importance of TK as a foundation for global climate and health solutions [16].

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) has suggested that there is a great risk that Indigenous Peoples will lose their traditional knowledge [16]. This is due to the continued loss of Indigenous Peoples’ land bases and the consequent loss of biodiversity, which directly impacts communities that rely on nature for their traditional medicine, conservation, and cultural rights, among other uses [17]. Two specific international instruments, the Convention on Biological Diversity (CBD) [18] and the Nagoya Protocol (NP) [19], have given Indigenous Peoples the impetus to further conserve the environment in which they live, to protect their traditional knowledge, and to ensure that their knowledge is preserved and passed on from generation to generation. These tools were created with the intent that benefits generated from outside access and utilization of biologic and genetic resources, in addition to TK (i.e., knowledge, innovations, and practices), would be shared equitably. However, large barriers remain in place globally, such as the lack of uptake and actioning of the UN Declaration on the Rights of Indigenous Peoples, which means that the ongoing impacts of colonialism continue to leave many Indigenous communities vulnerable, unrecognized, and without autonomy. However, Indigenous Peoples have diverse notions of resiliency that are grounded in culturally distinct concepts that bridge person, community, and the environment [20], thus, we have seen much strength grown from these hardships, resulting in actionable agendas to ensure the continued preservation of our lands and communities.

Several other specific community-based instruments have been used by Indigenous Peoples to define their values, who they are, and what they expect from external stakeholders when they come onto their lands including such tools defined as Bio-cultural Community Protocols (BCPs). A specific example of this, is the Ogiek Peoples of Kenya Bio-cultural Protocol [21] and the Endorois Peoples of Kenya Bio-cultural Protocol [22]. These instruments are important as they define the culture and heritage of the Ogiek and Endorois Peoples while helping external stakeholders understand how to interact with these groups to avoid undue conflict in the region. Even more critical is the fact that these instruments outline the culture of the community, their relationship with the land in which they live, and the natural environment, including the plants and animals relevant to the community [21,22]. The Endorois and Ogiek Peoples’ BCP are also provided as negotiating tools that allow them to engage with government and other stakeholders about matters that affect them [21,22]. The Ogiek Peoples’ BCP was also developed to enable them to have a tool to engage with the government and other stakeholders when they were faced with eviction from their ancestral homeland, the Mau Forest, by the Government of Kenya [21].

The Mau Forest's bio-capital value is important not only to the Ogiek Peoples of Mau, but is also key for the economy of Kenya and the region. This value is especially important considering that it is one of five water towers in the country of Kenya [23]. The Mau Forest covers approximately 400,000 hectares, a large percentage of which has been destroyed by farmers who have encroached on the forest [23], a factor that has led to the ongoing displacement of the Ogiek Peoples. The Ogiek Peoples believe that they were given the Mau Forest by God, and hence they attach a high spiritual value to their ancestral land. This spiritual attachment to the Mau Forest is the same as the one experienced by the Endorois Peoples. The cultural value of the natural elements to the Ogiek and Endorois Peoples, in addition to their deep attachment to the land and other aspects of their Indigenous life, was examined by the African Commission in the case of the Endorois Peoples [24,25], and by the African Court in the case of the Ogiek Peoples [25,26]. Both of these cases were instituted against the Government of Kenya (the Ogiek case in 2009, and the Endorois case in 2003). In both cases, the Government of Kenya was found to have violated the communities' rights to culture, to religion, and to their rights to land and natural resources [25]. The Ogiek community has pushed the Kenyan government for customary ownership of the Mau Forest, on which their livelihoods depend, but instead they have been evicted from their ancestral lands. As a result of a long-winded litigation that lasted seventeen years in Kenya, the Ogiek Peoples subsequently filed an application with the African Commission, which took up the case and ruled in their favor on the 26th of May, 2017; however, three years later the judgment has yet to be implemented [23]. Due to the direct relationship and entwined nature of the successful inter-generational transfer of traditional ecological knowledge and being in relationship with one's own land or country [27], ensuring that transpolitical tools are in place to protect land rights for Indigenous Peoples globally is the foundation for sustaining TK's important place in this world. Our very survival as a human species will depend on it as current trajectories for achieving sustainability goals will not meet our needs, the needs of our communities or that of the planet [28].

The Ogiek and Endorois Indigenous Peoples' own traditional knowledge has allowed them to thrive as a people through their abiding understanding of their own Natural Laws, which are partly documented in their bio-cultural community protocols. These Natural Laws are implemented through oral TK protocols that include rules on how to interact with nature, such as imposing restrictions that ban communities from cutting trees, or instead lead to the prioritization of the use of only certain parts of trees and roots in a bid to utilize their resources sustainably. They are barred from killing animals, instead, they are bound to protect animals. The people were also not allowed to interfere with water sources and sacred sites except for a few sacred Elders or other groups allowed by custom, among other examples [21,22]. The Ogiek Peoples refer to the Mau ecosystem as their home; it is all they have, and at the same time it is a place where they have direct links with their ancestors. They perform their cultural practices including spiritual ceremonies here [21,23], and the community respectfully and with great care utilizes Mau as their "supermarket", where they get all they need in life for their well-being. As noted, this is not only limited to forest products themselves, but also the important connection to the spirits of their ancestors [21,23]. They have many lessons to teach the world on how to maintain healthy ecosystems and take care of Mother Earth [3,29].

It has been determined that 24% of the global carbon stored above ground in the world's tropical forests, or 54,546 million metric tonnes of carbon, are currently being managed by Indigenous Peoples [29]. This ability to live in harmony with nature has been attributed to Indigenous Peoples' historical stewardship, traditional knowledge, and cultural innovations that are directly rooted in Natural Law. This way of living and being has the potential to be respectfully leveraged through Indigenous *community-led and defined leadership* while providing valuable lessons on how to respectfully and resiliently live sustainably with nature [3,29]. With the needed tools for the adaptation and mitigation from the impacts of climate change and other global environmental changes [3,29], respectful acknowledgment of TK through the recognition of Indigenous land and water rights are however integral for realizing a platform for equitable discourse.

4. Indigenous Applications for Planetary Health

The term, “planetary boundaries” has recently been introduced and defined as the safe “planetary playing field”, or the “safe operating space for humanity” to stay within if we want to be sure to avoid major human-induced environmental change on a global scale [13]. This more modern idea and notion of planetary boundaries has been considered old knowledge by Indigenous Peoples from time immemorial. For example, for the Dene Peoples of Northern Canada,

Elders were in charge of monitoring hunting and fishing in their communities. They [the Elders] were experts in ensuring the sustainability of their food sources. For example, if a certain area was used for hunting or a certain lake for fishing, it would only be allowed for up to ten years in some cases; and then community members were required to halt all harvesting for five years or so to let the populations re-bound while moving to another area for harvesting in the meantime. [30] (p. 113)

The understanding of planetary boundaries as being fixed within Natural or First Law, is reflected globally in the sustainability practices that have ensured Indigenous Peoples’ long survival in some of the harshest and most plentiful environments on the planet. It must be acknowledged that “planetary health” as a field is primarily a Western construct as Indigenous TK systems have no clear separation between the health of the planet and the health of self or that of the community and ecosystem at large [19]. This means that applications for planetary health are directly rooted in community values based on protocols for living in harmony with all.

For the Northern Dene Peoples, Yamoria was a powerful medicine man and a prophet. “He was a true spirit man who taught the Dene how to live a sacred life” [31]. Yamoria taught the people through a set of “environmental laws” (or natural laws) that the Dene were not only to honor and follow but to “prepare the children for a good life by teaching them in this way. It is our responsibility to do this” [31]. The laws are premised on such important teachings as finding a balance in how we give and take from Mother Earth, the need for treating Mother Earth with respect, and staying in harmony with all the Creator’s creations. For the Cree Peoples of Canada, *Wahkohtowin* is a word that means “everything is related.” It is one of the basic principles of Cree Natural Law passed down through language, song, prayer, and storytelling [32]. The Cree Elders explain that individuals, communities, and societies are healthier by following the teachings of *Wahkohtowin* [32].

The return to Indigenous values in our current societal landscapes are an underappreciated and crucially needed element of practice. Elder David Courchene (*Nii Gaani Aki Innini*) of the Anishinaabe Nation states that:

The reason we have climate change is because we have broken Natural Law. What is Natural Law and how can we find our balance again? ... The spirit in each of our beings carries moral and ethical principles of what should be the basis of our human conduct. We understand these moral principles as natural laws. Natural laws are innate to all living beings. They are the invisible laws that govern all life. All living beings, including Mother Earth herself, are governed by natural laws—whether they know it or not. [12]

Natural Law is grounded in a clear set of cultural protocols (or we could say “rules” nested in ceremonial action). We must follow these protocols in our application of daily life as these protocols clearly define a sustainable relationship with Mother Earth and therefore with our communities. Many of these protocols are rooted in relationship, which means they are rooted in love. Love and gratitude are embodied in Natural Law as Mother Earth gives and receives these. This reciprocal and respectful relationship takes great courage and sacrifice as the “Windigo” of greed and gluttony is very persuasive in a world of consumptogenic pressures and expectations. Many Anishinaabeg Peoples of Turtle Island refer to the “Seven Grandfather Teachings” as traditional knowledge that collectively represents what is needed for community survival [33]. The Seven Grandfather Teachings are an example of how to live a good life through the concepts of Respect (*Minwaadendamowin*), Love (*Zaagidiwin*),

Truth (*Debwewin*), Bravery (*Aakodewewin*), Wisdom (*Nibwaakawin*), Generosity (*Miigwe'aadiziwin*), and Humility (*Dibaadendiziwin*). Indigenous knowledge traditions in many contemporary communities located in Turtle Island (North America), are also still founded on and embody what the Haudenosaunee Peoples call, for example, the “Seventh Generation Principle” [34]. The Seventh Generation Principle generally states that any decision taken today should consider the impact of those decisions on the next seven generations that come after us [34].

Ultimately, as Aboriginal Australian Christine F. Black states in her book *The Land Is the Source of the Law* (2010), “the Djang (primordial energy) is out of balance, and the rebalancing of that Djang is up to the individual through their lawful behavior; a behavior which patterns them back to the land” [35]. Therefore, Indigenous applications for planetary health are completely rooted in the values that ground our societies to the Land, and it is through these values that we uphold Natural or First Law that governs the planet and keeps us within sustainable planetary boundaries.

5. Healthy Communities and Ecosystems

Gamilaraay Notions of Lore, Planetary Health and Wellness of Us

Gayrr ngaya Clinton, ngaya Gamilaraay (My name is Clinton Schultz, and I am Gamilaraay). I offer the below as an introduction to the Indigenous country and mindset from which I write.

The Gamilaraay/Gomeri Peoples are the peoples of the land more recently recognized as North West New South Wales in Australia. Gamilaraay country is marked by important river systems that flow south into the greater Murray Darling Basin, the major freshwater resource of much of the “agricultural” lands of Eastern and Southern Australia.

Lore, or what is termed in the Gamilaraay language, *dhiriya gamil* (i.e., First law or Original Law), is the foundation of who we are as Gamilaraay (Aboriginal) Peoples, the original custodians of Gamilaraay country. *Dhiriya gamil* was given to us by the creator, *Buwadjarr*, who is of “before the beginning” [7,36,37]. *Dhiriya gamil* is what gives rise to our culture, our identity, and our spiritual connection with place and allows the Gomeri to know their roles and responsibilities to Gamilaraay country. The old people explained lore to me as the “essence of what ‘is’” and culture as being “how we enact that ‘what is.’” As Gamilaraay, *dhiriya gamil* is therefore the essence of what it is to be Gamilaraay in connection to a Gamilaraay existence [7]. *Dhiriya gamil* always guides me in my intrinsic, reciprocal roles and responsibilities while allowing me to fulfill my part in the continuation of a healthy existence for all. *Dhiriya gamil* or First Law comes from “before the dreaming” (i.e., before human existence in the physical form). In Gamilaraay, we refer to this before the dreaming period as *burruguu*, which simply means “the dream time” but it also equates to the “time of original creation”. This before the dreaming period of *Burruguu* is an ongoing and interconnected part of *burruguu-ngayi-li*, or what people commonly describe in English as simply “dreaming” [37], or what we also may refer to as “my dreaming” (i.e., we are intimately connected through our dream time to our innate existence and the laws on which this depends). *Burruguu-ngayi-li*, is a continuation of creation through the guidance of *dhiriya gamil* for the maintenance of all that we are connected to as Gamilaraay.

Here, I formally story notions of lore, planetary health, and the wellness of Gamilaraay Peoples fortunate enough to share this planet and to be caretakers of Gamilaraay country. “Oneness” through reciprocal roles and responsibilities, in addition to shared place across time are the foundations of *dhiriya gamil* (First Law). This oneness is a concept understood in two ways. Firstly, *bil maal*, literally meaning “all one”, is a concept that speaks to the ways in which we understand the constant interplay between everything we say, think, and do, in addition to all we are connected to [7,36]. Secondly, *gawuban gunigal* speaks to the inherent relationships we share and connections we have with all of nature, the creatures, winds, air, waters, and land [37]. The complexities of our traditional knowledge systems embodied through our language is powerfully demonstrated here.

Gamilaraay clearly understand that detrimental interference with anything within the natural world impacts back on our individual and community well-being. When our well-being is impacted

in a negative way, this in turn plays on our abilities to maintain processes of “caring for Country”. The opportunity to engage in caring for Country (or caring for Land) has been shown to directly and positively influence the well-being of Aboriginal Peoples [38,39]. On the other hand, living in environments that have become “uncared for” due to the processes of colonization can be directly linked to poorer health conditions, not only for Aboriginal Peoples but for settler populations as well.

If we consider the recent bush fire events of the summer of 2019–2020 in Australia, it is clear that there has been little opportunity to care for Country through the cleansing burn-off practices that are rooted in Indigenous fire-keeping practices, and this has enabled out-of-control fires to rage. This has significantly and negatively impacted the lives of all humans, animals, and ecosystems in the area. Thirty-three people unfortunately lost their lives with possibly many more deaths linked to the smoke related to the fires [40]. Many people today are still without shelter or livelihoods and there was a notable and unprecedented loss of wildlife [40]. Nearly three billion animals were killed or displaced by the 2019–2020 bushfires alone [41]. The Mother (Earth) cleansed herself through these fires as she has done time and time again across all of time. She will heal and continue on well after we have all departed, that is a given, but she will be lonely without us.

Returning to our lore is a way to ensure that we have the opportunity to continue to co-exist with the Mother and all that she holds. Having the opportunity to teach those from other interconnected communities for whom these concepts and knowledges may not be so naturally understood or respected will provide a platform for us to move forward in a united and collective way toward a better future for all. *Bil maal gii dhuwi*, “all one heart and spirit”.

6. Conclusions

“Rocks and trees are sentient beings, sacred in their own right and entitled to great respect from human beings”. [42]

Our collective position is summarized here with a recapitulation of the findings from Toledo that the world’s biodiversity will only be preserved by directly and intentionally preserving the diversity of cultures and vice versa [43]. This has direct implications for human health due to the critical connection between biodiversity loss and the increased risk of pandemics such as COVID-19 [44]. In some respects, the lands of Indigenous Peoples are the only ones still left intact and thus, they continually attract interest from governments, the private sector, and other stakeholders, not only for resource extraction but for knowledge and innovation extraction as well. International tools, such as the UN Declaration on the Rights of Indigenous People [45], require “free, prior, and informed consent” [46] to be prioritized for the sharing of appropriate planetary co-benefits. Further creative and peaceful exploration that combines Indigenous traditional knowledge with scientific and technological developments to inform urgently needed solutions to global problems [29] provides an undeniable opportunity to re-establish balance to Mother Earth [47]. This can be juxtaposed with the unfortunate and continued reality of land grabbing, eviction, incarceration, and the death of Indigenous Peoples on the front lines protecting our Mother Earth [29]. Without intentional and actioned global solidarity with our Indigenous brothers and sisters’ efforts to steward and protect their Land and Country from appropriation, extraction and exploitation, efforts and progress toward the maintenance of planetary health and planetary boundaries will be significantly hampered.

Therefore, we collectively affirm the importance of understanding the nested but interconnected levels of existence on which our health depends. In our view, the interconnectedness between Indigenous Natural or First Law and its implications for planetary health through the lens of Indigenous traditional knowledge systems are integral to the realization of healthy communities and ecosystems. Ultimately, individual, community, and planetary health is directly rooted in collective traditional knowledge systems globally that prioritize the need for respect and relationships that are collectively actioned through reciprocity. Indigenous traditional knowledge systems themselves are predicated on a deep understanding of Natural or First Law, whose meaning is uniquely rooted within the respective lands globally.

Irrespective of different geographies, we collectively ‘Dream’ that in the circle of time, our fellow global citizens will one day recognize Indigenous Natural and First Law while actively acknowledging that our laws have standing and merit. Co-existing with common or crown law in an inclusive way to ensure that all global citizens can live in peace and harmony while ensuring balance and care for our shared “common” home is our only way forward.

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