

THE PLANETARY DYSREGULATION

The Physiological Link Between
Planetary Dysregulation and
Human Health



An Urban Health Council report
by Centric Lab



**“ CAPITALISM IS
CONTRARY TO
HUMAN LIFE.**

- The Red Nation



AUTHORS

ELAHI HOSSAIN

Elahi is lead researcher at Centric Lab. Elahi has a keen interest in medical technology and his role at Centric is to research the neurobiological links between people and the external environment. Elahi holds an MSc in Behavioural Science and is a PhD Candidate in Neuroscience at University College London

ARACELI CAMARGO

Araceli is lead scientist at Centric Lab and a cognitive neuroscientist focused on how people interact with urban environments. Araceli is of Turtle Island descent and holds an MSc in Cognitive Neuroscience from King's College London

JAKE ROBINSON

Jake is a microbial and restoration ecologist. Jake's research combines ecology and microbiomics with geospatial analyses and social research. He has a PhD from the University of Sheffield, and currently investigates the relationship between the environment, the microbiome, and human health.

ABOUT

THE URBAN HEALTH COUNCIL IS A RESEARCH, COLLABORATION AND ADVOCACY PLATFORM TO SUPPORT THOSE WORKING TO IMPROVE PUBLIC HEALTH.

THE URBAN HEALTH COUNCIL'S ROLE IS TO ESTABLISH THE APPROPRIATE KNOWLEDGE INFRASTRUCTURE AT THE CITY POLICY, PRACTICE AND ADVOCACY LEVEL THAT IMPROVES URBAN HEALTH. A UNIQUE RESEARCH PROGRAMME IS DELIVERED THROUGH REPORTS, WORKSHOPS AND OTHER LEARNING TOOLS.

URBAN HEALTH IS A TERM USED TO INVESTIGATE THE INTERSECTIONAL LIVED EXPERIENCES OF URBAN DWELLERS. IT FOCUSES ON THE UNIQUE INFLUENCE URBANISATION HAS ON OUR BIOLOGICAL SYSTEMS THROUGH EXPOSURE TO ENVIRONMENTAL AND PSYCHOSOCIAL STRESSORS.

MORE INFO: [URBANHEALTHCOUNCIL.COM](https://urbanhealthcouncil.com)



CONTENTS

PAGE

1. GLOSSARY	1
2. INTRODUCTION	2
3. DEFINING PLANETARY DYSREGULATION	3
4. CONTRIBUTING FACTORS IN PLANETARY DYSREGULATION	4
5. PLANETARY RHYTHMS (PHENOLOGY)	12
6. THE STRESS RESPONSE AS THE PHYSIOLOGICAL LINK BETWEEN PLANET AND HUMAN HEALTH	14
7. INDIGENOUS KNOWLEDGES	22
8. SOLUTION PATHWAYS	24



GLOSSARY

Western Society / the West

In this report when we mention 'western society' or 'the west', we mean the historic white European systems that were implemented by a ruling class to oppress and colonise both Land and Peoples. This is independent from a specific geographical location as we recognise that many Peoples that come from a colonised history are now firmly living in western countries and influencing the culture. Finally, we are speaking about systems and epistemologies rather than specifically a phenotype or a specific person ([source](#)).

Capitalism

The economic system of wealth accumulation through Land and Labour exploitation.

Racialisation

The systemic societal processes and mental framings that discriminate, exclude, and oppress people based on the colour of their skin. It is an artificial concept that is illegitimate and not based on any scientific merit, furthermore it is process and mental framing that is exclusive to a white supremacy culture.

White Supremacy

A systemic structure that was set up since the feudal period to sustain a heteropatriarchal and class rule over resources including Land.

Indigenous

A person that has been othered and identified by a coloniser as being an original Peoples from a specific Land or territory. Indigenous Peoples come from various cultures, part of the world, and all have their distinct Land Knowledges, languages, and wisdoms.

Health Justice

A community led process producing policies that lower the amount of and burden of environmental and psychosocial stressors on people.

Planetary Dysregulation

which is being defined as "the impaired ability of planetary systems to maintain and the processes required for self-regulation, particularly due to unsustainable exploitation of ecosystems and chronic exposure to industrial contamination".



INTRODUCTION




There is now robust evidence from academic science that human health is intrinsically linked to planetary health.

Whether it is through the exposure to the external microbiome, which nourishes and regulates our internal gut environment or the influence natural terrain has on the function and development of our muscular-skeletal systems.

More significantly is Indigenous Peoples have understood this link for thousands of years ([source](#), [source](#)) and continue with this knowledge template to this day. Most recently, the Indigenous led campaign for clean water at the Standing Rock Reservation showed the world that Water is sacred, because Water is Life. In other words, the health of every ecosystem and person on this planet is tied to clean Water.




We cannot talk about what is happening to our planet without speaking about health and environmental justice. Therefore this report will focus on the pathways that are contributing to planetary dysregulation and their impacts on human health. With the purpose of updating policies that will support the work of environmental and health justice practitioners.

This report will focus on three key learnings:

-  **Identify the various cultural and biological pathways that have led to the phenomenon we are currently facing.**
-  **Arrive at an updated understanding of the planetary crisis which includes its effect on human health.**
-  **Introduce Indigenous Knowledges as solutions to the crisis.**

DEFINING PLANETARY DYSREGULATION

The term 'climate change' whilst now firmly established in our lexicon still fails to be mentally accessible due to its ambiguity.

-  Firstly, we do not experience climate on a micro or daily levied abscess, we experience weather.
-  Secondly, change gives no tangible parameters or a comprehensible time frame.
-  Thirdly, climate change is an output or an outcome of the deliberate corruption of the varied and multiple planetary systems by industry ([source](#)).

Only articulating the phenomena based on outputs does little to orientate our attention and cognitive abilities toward the inputs, which contribute to the output or problem.

Identifying and understanding the root factors that contribute to a problem is crucial to establishing long lasting and accurate solutions.

To do this we must start by identifying, naming and defining the problem more accurately. In this report we are using the term “*planetary dysregulation*”, which is being defined as “*the impaired ability of planetary systems to maintain and the processes required for self-regulation, particularly due to unsustainable exploitation of ecosystems and chronic exposure to industrial contamination*”.

We know there are specific ‘top polluters’ and exploitative corporations who constantly contribute to large-scale ecosystem degradation and greenhouse gas emissions that result in Water, Soil, and Air contamination ([source](#)).

It is the activity of these exploiters and industrial polluters that are at the root of our problem, and so the ‘anthropocene’ is an inaccurate label for the current epoch. In other words, humans do not innately drive planetary dysregulation.

Instead, it is particular socio-economic models of practice; namely the deliberate contamination and exploitation of planetary ecosystems driven by capitalism that seeds the phenomenon of planetary dysregulation. Additionally, there are many humans (Indigenous Peoples) that actively live in harmony and in mutualistic symbiosis with Nature, rather than destroying it ([source](#)).

Centric Lab is covering this topic as the phenomenon of planetary dysregulation and its root causes are affecting human health. In short, many of us are sick because our planet is sick.



CONTRIBUTING FACTORS IN PLANETARY DYSREGULATION

It is important to reflect on the various pathways that led down the path of planetary dysregulation, including those that are not within the biological sphere. This has two objectives, the first is that it allows us to understand the mental constructs that led to this phenomenon. The second, is that when we live in a hegemonic society for as long as we have in the west, it can be difficult to see that the way we live is only one way, not the only way.

Additionally, it can also feel like the reality we live, including culture, economics, social organisation, and knowledge pools are unmovable and universal - they are not. This is important to acknowledge so that when it comes to finding solutions, we can start by accepting that reality is movable, new and better ways of living are possible, and more significantly there are other realities, such as those from Indigenous cultures that we should be turning to for guidance through ethical engagement.

Culture, Epistemology, and Structural Supremacy

The first factor to explore is how culture, specifically, epistemology that is rooted in white supremacy has played a role in setting the cognitive pathways for accepting a disconnected relationship with Nature as a universal norm. The world, due to colonialism, has been under its dominance for so long that it feels like an unmovable fact. For example, the idea of humans being the only entities with the capacity for complex thought has been promoted for a long time by western influenced science ([source](#)). This has created an artificial supremacy that places humans above all other beings and it wrongly erases the wisdoms, intellect, and thinking processes of non human beings ([source](#)). It also contributes to the disconnection with Nature as it puts humans above them.

Recently, however, scientists have been acknowledging that beings such as trees have intelligence and they engage in various thought processes ([source/ source](#)). In contrast many Indigenous Peoples who have always perceived the potential of non-human teachers have framed wisdom and intellect as an all being ability ([source](#)). This perception helps build our kindredness, reverence, and connection with Nature. The following three infographics give a brief timeline of how western society moved from a feudal system to industrialisation and how this cultural journey contributed to the planetary dysregulation and disconnection we are currently experiencing. The purpose is to highlight how we got to planetary dysregulation, it was not inevitable, it was orchestrated.



THE PROPAGATION OF WESTERN REALITY
CONTRIBUTING TO PLANETARY DYSREGULATION

FEUDAL SYSTEM

900 AD



DESCRIPTION

The start of land ownership for the purposes of power. Also the start of a labour force

Outcome 1

Structural supremacy to determine "who gets to own the land"/ Artificial creation of poverty, class, inequality and environmental injustice.

Outcome 3

Perceiving Land as a thing
The systemic disconnecting of people from the Land.

Outcome 2

Perceiving Land as a thing to own, rather than a living being with autonomy and wisdom.

Outcome 4

A change of perception from Land being a provider of sustenance, nourishment, and medicine to one where Land is seen as a provider of income and power.

THE PROPAGATION OF WESTERN REALITY
CONTRIBUTING TO PLANETARY DYSREGULATION

LAND PRODUCTIVITY

1600 to present



John Locke's © Godfrey Kneller / National Portrait Gallery, London

DESCRIPTION

John Locke believed Land should be "productive" and that Indigenous Peoples of Turtle Island did not "deserve" the Land because they couldn't make it productive. Productivity meaning the generation of products through labour

Outcome 1

Colonisation, the taking of land through violence, genocide of Indigenous Peoples, and slavery. This is to obtain more land beyond European borders to drive even more power/supremacy

Outcome 3

Destruction of habitats and the start of making the Land sick die to extraction and over-use. Sickness in humans that is rooted in exposure to poor living conditions, acute inequity and racialisation.

Outcome 5

The erase of Indigenous Land Knowledges and interruption of their stewardship.

Outcome 2

The erase of Land's natural productivity, which is to provide living beings with sustenance.

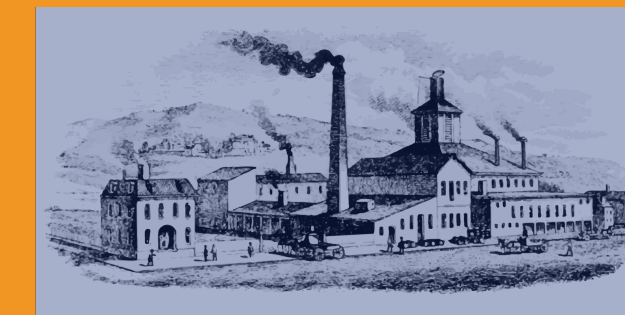
Outcome 4

Start of a global hegemonic society rooted in white supremacy.

THE PROPAGATION OF WESTERN REALITY
CONTRIBUTING TO PLANETARY DYSREGULATION

INDUSTRIALISATION

1850 to present



DESCRIPTION

The acute production of Land and exploitation of natural resources for the purpose of producing capital value.

Outcome 1

A new ear of acute contamination of Land, Water, and Air.

Outcome 3

Continual colonialism and genocide of Indigenous Peoples to violently acquire their territories for the extraction of natural resources.

Outcome 5

The erase of non western epistemology and various Land Knowledges, which can help retract the damage of planetary dysregulation

Outcome 2

The global destruction of ecosystems and biodiversity, which help regulate the climate.

Outcome 4

Poor health due to continual and acute exposure to Air, Land, and Water pollutants. Chronic disease due to exposure to poverty. Harsh working conditions, forced migration, and displacement.

Outcome 6

Am established hegemony that only sees the future in one context, preventing many from seeing any other reality.

The Contamination of The Soil, The Water, and The Air

The second factor to consider is the contamination of our Creators; The Soil, The Water, and The Air. They are our Creators due to the fundamental role in the healing, sustenance, and flourishing of all life on Earth. Before discussing the contamination of our Creators, we first must understand their contributions to our planet.

SOIL	WATER	AIR
<p>Soil is a living ecosystem and community composed of organic matter, minerals, gases, liquids, and organisms that together support, heal, and produce Life. It's the home of myriad microbes that decompose organic matter, fix nitrogen, and facilitate plant communication. It is also home to a plethora of larger critters, each playing an integral role in the ecosystem; soil provides plants with an anchorage to grow, and stores the nutrients and carbon; it filters rainwater and regulates discharges (source), (source).</p>	<p>Water is a living ecosystem that is Sacred as it sustains all Life on Earth. "Water is Life" and "Water is within us". They consist of minerals, microbes, vegetation, insects, chemicals, and various other beings. (source)</p>	<p>Air is an element and complex ecosystem which consists of a planetarily unique mixture of chemicals and microbes. They are within us with every breath, making them essential to all Life on Earth (source). Air protects us from harmful cosmic radiation, and its makeup is essential for the development of complex organisms through supporting respiration and photosynthesis (source).</p>

The contamination pipeline of these three creators, not only contributes to planetary dysregulation, but also to poor human health outcomes.

Contamination to Planetary Dysregulation to Poor Human Health Outcomes

CONTAMINANTS

Human activity producing pollutants to create air, noise, light, heat pollution.



OUR CREATORS

AIR
WATER
SOIL



DYSREGULATION OF ALL PLANEARY SYSTEMS



POOR HUMAN HEALTH OUTCOMES

13% Worldwide are obese
300m asthma suffers
1 in 5 live with mental health issues
17.9M PEOPLE EVERT YEAR DIE FROM AVOIDABLE CARDIOVASCULAR ISSUES

Infographic Notes

- Contamination from Industrial practices (sewage, highway runoff, agricultural run-off, pesticides, toxic chemicals, etc) pollute the Soil, Water, and Air through direct and indirect ways, and in turn it changes their various ecological regulatory mechanisms. For example, healthy soil is essential for maintaining water reserves ([source](#) / [source](#)), biodiversity ([source](#)), and also regulating the climate by acting as a carbon sink ([source](#) / [source](#)). Therefore, one of the key solution pathways for planetary dysregulation is to stop the contamination of our Soil, Air, and Water.
- Our creators (Air, Water, Soil) are constantly and acutely being contaminated by industrial capitalist practices, resulting in air, noise, light, and heat pollution. In turn, this contributes to the dysregulation of planetary systems through changes in microbiomes and other biodiversity, and the regulatory processes they maintain ([source](#)).

- Air pollutants such as heavy metals, sulphur and nitrogen dioxide contaminate the soil, increasing its acidity, which decreases the availability of nutrients to organisms, and increasing exposure to contaminants through leaching- this results in a loss of biodiversity and the overall soil ecosystem services i.e., planetary regulatory mechanisms ([source](#) / [source](#) / [source](#)).
- Artificial light at night has deleterious effects on the balance of insect populations, which negatively impacts their ability to support the conservation of soil structure, fertility and nutrient cycling, and directly negatively influences the development of crops by disrupting circadian regulation, overall negatively impacting biodiversity ([source](#)).
- Heat pollution, whether from the sun or artificially through [urban heat island effect](#) can change ecosystems through evaporation of Water, killing off essential microbes, changing the chemical composition of these various ecosystems which in turn can

exacerbate the change in our climatic systems ([source](#)). Further, rising water temperatures caused by increased absorption of heat trapped in the atmosphere by greenhouse gases, as well as direct thermal pollution from human industrial activities e.g. power plants, results in reduced dissolved oxygen in the waters, increased acidification, and rising levels of water. This increases the risk of extreme weather events e.g. hurricanes, and it devastates marine organisms (hypoxic dead zones) and ecosystems e.g. coral reefs, and mangroves, which in turn puts coastlines at higher risk of erosion and flooding ([source](#) / [source](#) / [source](#))

- The effects on human health are both directly from the contaminants (ex. air pollution) as well as planetary dysregulation (food shortages/destruction of habitats). Through chronic stress, and resultant allostatic load, this can put people at risk of diabetes, mental illness, heart disease, respiratory disease, etc. ([source](#) / [source](#) / [source](#))

The Disruption of Microbial Communities

The next factor to consider is the disruption of microbial communities. Microbes have a fundamental role to play in our ecosystems. This is not to say that it's a purely 'bottom up' affair, whereby less-complex organisms always have an upwards influence on more complex organisms in the ecosystem. Indeed, a mishmash of upward and downward causation is likely at play in our ecosystems. In essence, our actions affect microbial communities and entire environments, and these microbes and environments affect our actions.

It's all connected! However, human activity in recent centuries has led to unprecedented pressure on the fundamental elements of the ecosystems (e.g., the soil and its microbial denizens), leading to ecosystem degradation, which in turn is dysregulating our planetary systems ([source](#)).

We can think about our ecosystems in the context of Earth operating as a single, complex, adaptive system. Earth can be viewed as a system that is influenced by diverse interactions between energy, matter and the organisms that reside in the planet's ecosystems.

This is collectively termed the 'biosphere'. Indigenous Peoples have recognised important aspects of planetary systems for millennia. However, western scientific disciplines have typically examined the components of the planet in isolation, taking a 'reductionist' approach. This has led to a growing disconnection with nature and has inhibited the recognition of the interrelatedness between the constituent parts of the planetary system.

It is all connected

One of the key takeaways from this report is the understanding that every being: every tree, insect, water, human plays an integral role in the regulation of planetary systems. The development of the Earth Systems Science (ESS) discipline in the last century aims to build a unified understanding of planet Earth ([source](#)). The discipline recognises that Industrial activities have increasingly destabilised planetary systems, particularly since the Industrial Revolution in the 1800s.

“With the growing recognition that humans are an integral part of the cycles and systems in the environment, that our actions affect planetary systems and reciprocally, planetary systems affect our health, the field of Planetary Health has emerged: human health and the “health” of the planet are deeply interconnected ([source](#)).”



But how do ecosystems and their constituent parts fit into the 'planetary system' realm and sustain equilibrium and regulation of this system?

Let's use forest ecosystems as an example. Forests can have a significant influence on the hydrological and carbon cycles, and in doing so, influence (and are part of) the planetary system ([source](#)). Forest ecosystems support biodiversity and make up a considerable portion of the biosphere.

Deforestation contributes to global climate change, as does the burning of trees that once lived millions of years ago (i.e., fossil fuels) ([source](#)). Therefore, the influence of trees on the stability of the planetary system cannot be overstated. And ultimately, as the famous saying goes, *"everything is connected to everything else"*.

As we remove forests and other land habitats, we also degrade the soil. The soil provides a foundation to the rest of the ecosystem; the soil and its microbial communities support and nourish the plants, which in turn, support and nourish the animals ([source](#)).

At each of these levels, microbes play an integral role in the health and behaviour of all organisms—they're not simply 'decomposers' as traditional energy pyramids imply.

Going even further, a tree cannot exist without Soil, and topsoil can take around 1,000 years to produce three centimetres ([source](#)). We are currently losing topsoil at an unprecedented pace worldwide due to industrial and capitalist practices degrading the Land. The degradation of soil and its microbial communities is a key driver of planetary dysregulation via the loss of ecosystem integrity ([source](#)).

“Microbes are vital to nutrient cycles and climate regulation, which are two major components of the Earth system”

Back in the 1980s, the evolutionary biologist E.O. Wilson calculated that approximately 27,000 species of animals and plants are going extinct every year ([source](#)). This was based on a species-area relationship and the estimate that roughly ten million species of animals and plants exist on the planet.

Current species extinction rates are estimated to be 1,000 times higher than natural background rates, and without transformative solutions, future rates are likely to increase to 10,000 times higher ([source](#)).

It is also worth noting that E.O. Wilson's original calculations did not include microbes. Current estimates suggest there are an incredible one trillion microbial species on the planet ([source](#)).

Therefore, if the same laws apply, the annual microbial extinction rate (for example, due to mass soil degradation) is likely to be significantly greater than 27,000 species. Whilst more research is required to unravel the implications of this, it could have major implications for ecosystem integrity, and ultimately, the planetary systems.



Mycelia and Vegetation Health

One of the key mechanisms that helps ensure the nourishment, health, and flourishing of trees and other vegetation is the microbes facilitation of tree to tree communication ([source](#)). Mycelial networks in the soil connect the trees in forest ecosystems. That's why it's known as the "Wood Wide Web".

The mycelial web in the soil can be so dense; there can be hundreds of kilometres of mycelium under a single footstep in a healthy forest. Trees use these mycorrhizal networks to take in water and nutrients ([source](#)). Tree tissues act as a special network of highways for water. Water travels up into the tree and is evaporated from the tree canopy in a process called transpiration. In dense forest ecosystems such as the Amazon rainforest and the huge boreal forests in the northern hemisphere, billions of litres of water are released into the sky every single day. This creates "flying rivers" and impacts ecological processes and ultimately the planetary system ([source](#)).

The Amazon's flying river is larger than the Amazon river itself. The "flying rivers" travel to different parts of the planet via atmospheric circulation. Therefore, the ecological processes that occur in one area (say, the Amazon rainforest), affect the weather and ecosystems in other areas ([source](#)).

As such, the degradation of forest ecosystems (most often caused by human activities) can destabilise the planetary system via the hydrological cycle. Deforestation in one area can cause drought in another ([source](#)), thereby leading to further degradation of ecosystems and displacement of human communities- it's a vicious cycle. ([source](#)).

Rising Temperatures and Phytoplankton Productivity

The final point to consider is how the rising temperatures in our oceans are affecting the phytoplankton productivity and how that is also contributing to the dysregulation of our planet. Let's move our discussion from the Land and into the Ocean.

Marine microscopic phytoplankton are responsible for 50% of the global photosynthetic CO₂ fixation and oxygen production, despite only comprising around 1% of global biomass ([source](#)). Marine phytoplankton are distributed over a larger surface area than terrestrial plants and their lifecycle is often days. We can compare this to trees whose lifespan is often many decades and are arguably more "complex" organisms. Because of this fast turnover, phytoplankton can respond more rapidly to climate variations on a global scale. Rising atmospheric CO₂ can increase phytoplankton productivity and thus CO₂ fixation, but only if nutrients are unlimited ([source](#)).

This is an issue because a rise in temperature, for example, due to industry-made climate change, can reduce the transportation of nutrients from the deep water to the surface where phytoplankton reside. This results in a loss of phytoplankton productivity, thereby affecting the climate. There are conflicting studies that show global phytoplankton productivity both increasing and decreasing, which makes this realm challenging to discuss. Still, it is thought that climate change could soon diminish phytoplankton biomass, and thereby reduce global CO₂ uptake ([source](#)). This could potentially exacerbate climate change and further dysregulate our planetary systems.



SIDE NOTE: THE U.S. MILITARY

The U.S. military is responsible for biodiversity loss all which have been protested by the local Indigenous populations. The destruction is due to contamination, the introduction of invasive species, and the destruction of Indigenous caretaking Knowledges through the destruction of Indigenous Peoples.



Hawaii

Polluting water supplies though the Red Hill Fuel Storage Facility, “a massive underground “farm” of 18m litre fuel tanks and pipes just 100 feet above metropolitan O’ahu ([source](#)).”

The Pacific Ocean

“The Pacific islands have been militarised since World War II by the American military and are now the edge of the American Empire,” he said. “They suffered in the past and will inevitably suffer in the future ([source](#)).”

Okinawa

Military pollution and damage from construction works continues to threaten the endangered species and Indigenous Peoples ([source](#)).

Guam

The Chamaro, who are the Indigenous Peoples of Guam are currently protesting against the U.S. Military's mandate to blow up toxic waste on the Island ([source](#)).

PLANETARY RHYTHMS (PHENOLOGY)

A key component of planetary dysregulation is the change in planetary rhythms, which very much contribute to climate change.

Circannual Rhythms

Our planet's biosphere has seasonal processes that drive reproduction, migration, hibernation and other processes ([source](#)). The precise timing of these annual processes is vital for animal, plant, and microbe survival.

Therefore, over evolutionary timescales, the organisms on the planet have adapted to align with predictable, cyclical changes (i.e., phenology) in, for example, climatic conditions, availability of food and suitable breeding habitats ([source](#)).

Many organisms combine internal clocks (circadian rhythms) with external cues in the environment to prepare for cyclical changes that drive reproduction, migration, and hibernation ([source](#)).

Natural selection has favoured mechanisms that allow creatures to anticipate environmental changes by, for example, detecting day

lengths (also known as photoperiodism) ([source](#)). Species vary in their ability to adapt to changing conditions and *"the current, rapid global changes in climate and land-use are likely to impair the functionality of biological time-keeping that has been fine-tuned over evolutionary history"* ([source](#)).

Climate warming as a result of planetary dysregulation, is altering suitable habitats and the phenology of plant and animal species globally ([source](#)). More research is needed, but this may increase the risks of extinction for endangered species with extremely small populations.

Microbial Circadian Clocks

Changes in ecological conditions can affect the 'behaviour and activity' of microbes, e.g., different light, heat, and noise intensities can alter the growth rate, biomass, and intercellular communication (quorum sensing) of microbes ([source](#)).

It may be important in bacterial biofilms too, which plaster the earth. Circadian rhythms in microbes are controlled by intracellular clocks which result in oscillations in gene expression, originally only thought to only occur in photosynthesising microbes (e.g., cyanobacteria) but we now know it occurs in non-photosynthetic bacteria too ([source](#)).

In the human gut, there are daily oscillations in the composition of the microbiome associated with host circadian rhythms (but potentially microbial clocks too), therefore, it is very like that the composition of



environmental microbiomes also oscillates with the changing circadian rhythm processes of the hosts (e.g., plants and animals) in the environment ([source](#)).

This is a nascent field of study, but we can speculate that cyclical changes in the planetary system can significantly change microbiome gene expression and composition, particularly linked to life cycles, behaviour, gravitational effects on plant moisture and effects on both host physiology and microbe biomass/growth/intra and intercellular activity.

Dysregulation of the planetary system could therefore disrupt these dynamics with implications for ecosystem health. The soil is a key source of the aerobiome (microbes in the air) and many microbes from plants and animals end up in the soil ([source](#)).

Vegetation and animals also contribute to the aerobiome directly, therefore, the soil and aerobiome composition likely change in relation to cyclical rhythms, in which case, the exposure and downstream health outcomes of humans and other organisms may be affected by dysregulation of these systems.

“the current, rapid global changes in climate and land-use are likely to impair the functionality of biological time-keeping that has been fine-tuned over evolutionary history”



THE STRESS RESPONSE AS THE PHYSIOLOGICAL LINK BETWEEN PLANET AND HUMAN HEALTH

One of the intentions of this report was to look at the link between planetary dysregulation and human health. This is relevant for two reasons, the first is planetary dysregulation is also a health justice matter. Secondly, if we genuinely want to practise preventative health, then we have to focus on healing planetary practices as well. The better we understand the link between planetary health and human health the faster we can reach *healing futures*.

An Introduction to the Stress Response

The stress-system is a key interface linking the external planetary environment to the internal human environment; it facilitates a key process known as allostasis that can, if exposed to chronic stress, result in disease via allostatic load/overload. With the biological stress-system providing a lens on how the internal and external environment interact to produce disease, we can begin to adopt a more ecological definition of health.

Stress is a lens we can use to understand how planetary dysregulation can impact human health. The word 'stress' has become a common colloquial term to characterise various (often negative) states, or the view that an individual's life is full of it i.e., I'm always 'stressed out' ([source](#)). However, these colloquial definitions focus on outcomes that occur at different points of the phenomena, and it also implies that stress is inherently bad and/or always leads to negative outcomes (distress).

Many organisms combine internal clocks (circadian rhythms) with Instead, we adopt a more comprehensive view of stress in that it is an ongoing process of adaptation. Changes in an individual's psychological and biological state are caused by 'stressors', which are: *"conditions of threat, challenge, demands, or structural constraints that, by the very fact of their occurrence or existence, call into question the operating integrity of the organism"* ([source](#) / [source](#)). Stressors can be categorised in various ways: internal (stressor originates from inside the person) vs external (stressor originates from outside the person);



physical (stressor is a product of physical elements) vs psychosocial (stressor is a product of thought based on experiences in social systems); and event (discrete observable events) vs chronic (no clear startpoint with slow and insidious development) ([source](#) / [source](#)). All of these typologies are relevant when it comes to planetary dysregulation - which will be described in detail shortly.

But how do stressors, and stress negatively impact health?

This is explained by the concepts of 'allostasis' and 'allostatic load/ overload'. Allostasis refers to *"the process of adaptation to acute stress, involving the output of stress hormones . . . to restore homeostasis (equilibrium is a better suited word) in the face of a challenge"* ([source](#)). This process is mediated by the stress response system, particularly the hypothalamic-pituitary-adrenal axis (HPA-Axis), which releases chemical mediators that communicate with various bodily and brain systems e.g., immune, metabolic, to promote adaptation, and thus survival ([source](#)).

Whilst this is a crucial process to maintain life, if an individual is exposed to stressors that are particularly fierce, excessive, and unrelenting, the adaptive process must overcompensate, causing dysregulation of the stress-response.

Overproduction of chemical mediators, and poorer allostatic regulation processes, results in 'allostatic load', that is, *"the price the body pays for being forced to adapt to adverse psychosocial or physical situations"* ([source](#)). Allostatic load accelerates the development of various diseases, such as obesity, diabetes, depression, and dementia ([source](#) / [source](#) / [source](#) / [source](#)).

The stress-response system, through allostatic load, is therefore a useful biological lens to understand how the internal and external environment interact to impact human health. But what exactly is health? There have been multiple perspectives of what 'health' constitutes. One of the most widely held perspectives on health in practice today focuses exclusively on the individual person, and whether they are free from a temporally fixed 'health harming' event i.e., disease. This is grounded in a biomedical, reductionist perspective, that focuses exclusively on the bottom-up biological factors that result in disease.

“allostatic load, the price the body pays for being forced to adapt to adverse psychosocial or physical situations”

This perspective fails to explicitly account for both the wider causal psychological and ecological determinants of health, its temporally continuous nature, and the fact that health is not necessarily the absence of disease, but rather a fluctuating state that tends towards physical, mental, and social flourishing.



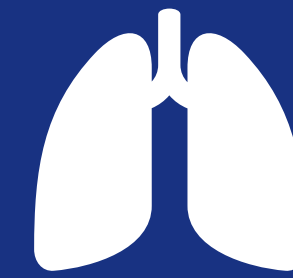
More ecological perspectives of health that account for these points have existed in Indigenous cultures for millennia. In such cultures as of the Aboriginal, Torres Strait-Islanders and the Quechua people, human health has been situated as a continual state at the intersection of one's physical habitat and socio-cultural landscape over their lifetime ([source](#)).

Only now are these concepts beginning to be adopted by western institutions - for example being labelled as 'One Health' which is defined as "an integrated, unifying approach that aims to sustainably balance and optimise 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 interdependent." ([source](#)).

Centric Lab builds upon this Indigenous knowledge, by highlighting the stress-response system as an important interface that mediates the interaction between the internal and external environment. As such, Centric Lab defines health as "*the ability for our biological systems to enter stability after experiencing trauma or stress throughout our entire lifetime, to give us all an equal opportunity to realise our full potential.*" ([source](#)). This definition emphasises health as a structurally-dependent, temporally fluid, and inter-connected phenomena.

Two Pathways of Stress

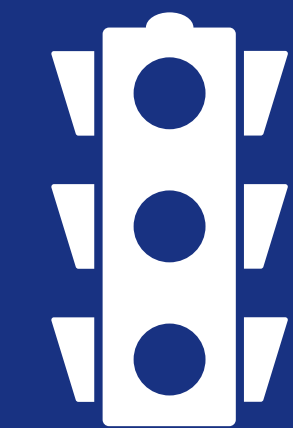
There are two key pathways where the stress response plays a role in physiologically linking planetary health to human health. The first pathway is through *contamination*, which is the pollutants (air, noise, light, heat) that we are exposed to via the places that we live.



Air pollution is a byproduct of our extractive and consumer cultures, with anthropogenic sources originating from the burning of fossil fuels to fuel our transport, energy, manufacturing, construction, and agricultural industries. Air pollution, through allostatic load/overload, has shown to contribute to an increased risk of diseases such as diabetes, cancers, allergic asthma, depression, and susceptibility to viral infectious diseases e.g. Covid-19 ([source](#)).



Noise pollution, similarly, is an anthropogenic stressor, arising as a byproduct mainly from transport and construction industries that contribute to planetary dysregulation. Similarly, chronic exposure to noise stressors can lead to increased risk of disease through allostatic load e.g. disrupted immune functioning ([source](#) / [source](#)).



Light pollution, also an anthropogenic stressor, arises as a byproduct of almost all human urban activities - particularly from street lamps, office/retail buildings, and consumer technologies, all of which contribute to planetary dysregulation through their support of



respective industries (transport, construction, manufacturing). Chronic exposure to light pollution past the natural daytime results in disruption of human circadian rhythms governing our sleep/wake cycle, and other metabolic and endocrine processes. Circadian clock functions are intimately connected to the human stress-response, with chronodisruption and its interaction with the psychosocial stress of sleep disruption, leads to an increased risk of a range of stress-related diseases e.g., cancers, mental disorders, obesity ([source](#)).



Heat pollution is an interaction between steady increases in the global average temperature due to climate dysregulation, and human structures e.g. heat island effect ([source](#)). Thermal pollution through episodes of more intense and frequent acute heat waves, and chronically elevated urban temperatures results in more chronic activation of the stress-response ([source](#)) and heat death ([source](#)).

The second pathway is through *trauma*, which is wide and evolving as planetary dysregulation causes more and more crises. All of these factors put people at risk for depression, anxiety, and PTSD. In turn these mental illnesses can be predictors for high blood pressure, hypertension, obesity, diabetes, and various other non communicable diseases.

- **Forced displacement:** Caused by ecosystems that are too contaminated to grow food or environments that have lost their access to water. Displacement sets a relay of trauma such as migration routes that are harsh and violent, confronting refugee

processes that are dehumanising and legally complex, the risk of incarceration and family separation.

- **Facing an extreme weather event:** Being exposed to climate shocks e.g., hurricane, earthquake, or flooding without the appropriate resources (poor housing, no money, no healthcare or poor healthcare) can cause deep trauma both from witnessing the event and from the aftermath (losing loved ones, home, community etc).
 - **Loss of Place:** There is also the trauma of losing your physical habitat that can be ancestral. For Indigenous Peoples, who perceive their entire habitat as their relatives, this is like losing family. Then there is the extended trauma of losing culture (food, medicinal practices, languages) that play a key role in a sense of being and belonging.
- **Lack of access to food and water:** Malnutrition is a source of acute stress that when faced in childhood can cause long term neurodevelopmental changes. For parents, the stress of not being able to provide for their family is also a source of stress that can lead to depression and anxiety.





CENTRIC LAB BUILDS UPON INDIGENOUS KNOWLEDGE, BY HIGHLIGHTING THE STRESS-RESPONSE SYSTEM AS AN IMPORTANT INTERFACE THAT MEDIATES THE INTERACTION BETWEEN THE INTERNAL AND EXTERNAL ENVIRONMENT. AS SUCH, CENTRIC LAB DEFINES HEALTH AS “THE ABILITY FOR OUR BIOLOGICAL SYSTEMS TO ENTER STABILITY AFTER EXPERIENCING TRAUMA OR

STRESS THROUGHOUT OUR ENTIRE LIFETIME, TO GIVE US ALL AN EQUAL OPPORTUNITY TO REALISE OUR FULL POTENTIAL.” (SOURCE). THIS DEFINITION EMPHASISES HEALTH AS A STRUCTURALLY-DEPENDENT, TEMPORALLY FLUID, AND INTER-CONNECTED PHENOMENA.



The Relationship between Planetary and Human Health Beyond The Stress Response

Like other animals (and plants), we can view the human body as a *holobiont*—a host plus trillions of microbes working symbiotically to form a functioning ecological unit ([source](#)). Indeed, we can think of ourselves as “*walking ecosystems*” within ecosystems.

We can also view the rest of the nature surrounding us as a vast assemblage of holobionts that are interconnected biologically and evolutionarily ([source](#)).

Each human being emits a million biological particles every single hour from their body, sharing the invisible constituents (the microbes) of our human holobiont with all the other holobionts (the plants and animals) whilst they share their invisible constituents with us ([source](#)).

We must recognise this deep interconnectedness. Arguably, the natural step to follow this recognition is to “*promote beneficial relationships between the constituents of the whole. The whole being the planet, and the constituents being our environments, our societies, our ‘selves’, our microbes, and our genes*” ([source](#)).

By doing so, we can foster mutually-advantageous relationships to benefit both the health of our human bodies and our surrounding ecosystems with their bountiful-but-dwindling biodiversity.

This is what planetary health is all about: recognising the deep interconnections between the rest of the ecosystems on the planet and human health and how they affect each other. As mentioned, Indigenous Peoples have long recognised this deep interrelatedness,

knowing not to separate the human body and the health of our “*walking ecosystems*” from the rest of the environment.

“We are protected by two nested layers of biodiversity”

As Finnish Immunologist Tari Haahtela once said, “*we are protected by two nested layers of biodiversity*” ([source](#)). This is in reference to the microbial denizens that live in the plants, air, water, and soil (the first nested layer), and the microbes in and on our bodies (the second nested layer).

The microbes in our bodies are colonised by the microbes from the environment and they keep us healthy by digesting our foods, providing us with health-promoting chemicals, regulating inflammation, and training our immune systems ([source](#)).

Therefore, continuing our detrimental actions towards the external ecosystems and the planetary systems can affect the quality of our habitat (including the microbial communities and our exposure to them), and in turn, the regulation of our health and wellbeing.



Many of us, particularly in western societies, distance ourselves from fostering reciprocal connections with the land or are prevented from doing so via socio-political barriers, e.g., a lack of quality green spaces and being overworked/underpaid. We are also consumed by the notion of convenience at all costs, whilst our ecosystems pay a heavy price. But it's not just our external ecosystems that pay the price. Because our bodies and the environment are in essence inseparable, anything we do to the environment (and the broader planetary system), we do to ourselves ([source](#)).

Indeed, the current global “*megatrend*” of biodiversity loss coincides with the rapid increase in chronic autoimmune diseases and mental health issues ([source](#)). Social isolation is also rising and is a significant risk factor for mortality. Some liken the effects of social isolation on mortality to smoking heavily.

These biological, psychological, and social maladies are now linked to our growing disconnection with natural environments and their biodiverse residents including our microbial “*old friends*” ([source](#)). We've co-evolved with myriad microbes in the environment for millennia (hence being called “*old friends*”) ([source](#)). Some microbial species are paramount to the development of our immune systems.

Moreover, exposure to a diverse assemblage of microbes from a young age is vital for a robust immune system in later life ([source](#)). Growing evidence suggests microbes are also vital to mental health ([source](#)).

Therefore, by destroying the natural world, we're destroying our connection with the environmental microbiome. This could potentially have devastating impacts on our health.

Moreover, as microbes are associated with mental health and even cognition and behaviour (e.g., decision making) ([source](#)), it is possible that by destroying the natural world and reducing our exposure to health-promoting microbes, we may exacerbate psycho-social issues that continue to drive our disconnection with nature. We must recognise and research these feedback loops to promote planetary health.

There are strong links between microbes, the gut microbiome and the stress-response - and thus human health ([source](#) / [source](#) / [source](#) / [source](#)).

Dysbiotic Drift

Microbes are linked to planetary health via social equity issues ([source](#)). For instance, poor quality environments, poor housing quality, environmental toxins, food insecurity, and poor social support could drive inequities in exposure to microbes ([source](#)).

This may include a reduced exposure to health-promoting species and an increased exposure to pathogens. Dr Alan Logan said, “*in western industrial nations, a disparity of microbes might be expected among the socioeconomically disadvantaged, those who face more profound environmental forces*” ([source](#)). Dr Logan termed this disparity of microbes ‘*Dysbiotic Drift*’.



He highlighted the barrage of stressors associated with urbanisation and commercialisation such as heat stress, crowding, pollution, acoustic stress, Westernised dietary patterns, and sedentary behaviours. He then associated these phenomena with significant shifts in the human gut microbiome. Dr Logan said, *“it becomes plain to see that at virtually every theoretical turn in which dysbiosis could arise, those who have been forced into poverty may be at higher risk”* ([source](#)).

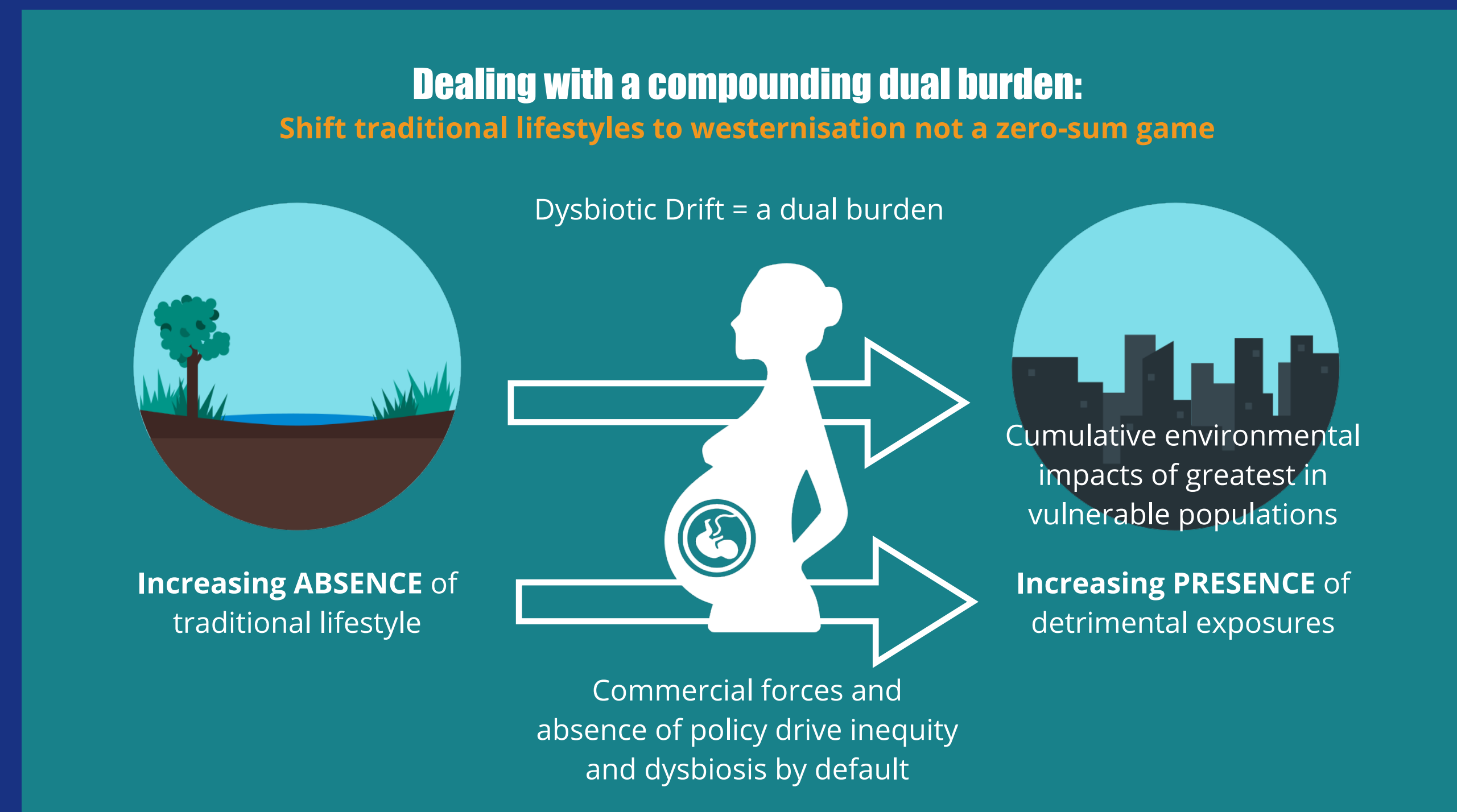
The risk arises from various pathways, the first is capitalist practices create food deserts, which are marginalised neighbourhoods where fresh food is not available, leaving only access to cheap processed foods ([source](#), [source](#)). The second pathway is the constant rise of fresh food prices due to planetary dysregulation, we are seeing this all over the world ([source](#)). The third pathway is that poverty also means the lack of resources to cook fresh food (not affording electricity) ([source](#)).

Many who are Indigenous are being forced out of their Ancestral Land, due to weather events, colonisation, and contamination, which puts them at risk for poverty as they migrate to cities ([source/source](#)). In turn, they no longer have access to their foods, making them dependent on a western diet ([source](#)).

Finally, we also have to consider unique intersectionalities, for example, those racialised as Native American and living on reservations, they cannot access fresh food due to various structural reasons ([source](#)). In short systemic poverty puts people at risk for poor microbial health due to the forced consumption of highly processed foods ([source](#)). Continued ecosystem degradation (in particular the soil) threatens food security, which affects human health and survival. In the absence of effective and scalable interventions, it is expected that

by 2050, 95% of Earth’s land, 90% of coral reefs, and myriad other ecosystems will be degraded ([source](#)).

This includes losses to vital microbially-driven ecological functions. Microbial communities and their interactions play essential roles in carbon and nutrient cycling, climate regulation, animal and plant health, and global food security ([source](#)). Therefore, microbial biodiversity is of vital importance for the ability of ecosystems to simultaneously provide multiple ecosystem services, many of which are essential to human survival. Consequently, ongoing degradation to microbial community structure and functionality poses an existential threat to global biodiversity and to human societies across the planet.






Adapted from image by Professor Susan Prescott ([source](#))



INDIGENOUS KNOWLEDGES

A report about planetary systems without the inclusion of Indigenous Knowledges and Wisdoms would be not only inaccurate but also incomplete. There are some caveats to consider:

-  The first is that being Indigenous is not a monolith, therefore, each community has specific Wisdoms and Knowledges that should be considered and acknowledged.
-  Secondly, each Indigenous Peoples and communities have been affected by colonialism in unique and specific ways, which inform their current Knowledges and approaches.
-  Thirdly, the purpose of this section is to highlight the need of collaborating and consulting Indigenous Knowledges, which should be done ethically and equitably.

As mentioned earlier, despite Earth System Science being developed in the last century, Indigenous Peoples have recognised important aspects of planetary systems for millennia ([source](#)). Although there is no pan-Indigenous science, there are certain broad perspectives that are relatively ubiquitous amongst Indigenous cultures and that are highly relevant from a 'systems thinking' viewpoint. Indigenous Peoples often view Nature as a densely tangled web of interrelated elements

bound together in a "*kindredness*" or "*inter-relatedness*" as opposed to a collection of discrete unrelated objects ([source](#)).

Indeed, various Indigenous cultures cannot separate their bodies, spirit, sense of being or health from the Land and other non human beings. It is important to note that this connection feels seamless, rather than the coming together of two disparate parts. For instance, in the Māori culture there is a saying "*Ko ahau te awa, ko te awa ko ahau*" - which roughly translates to "*I am the River and the River is me*" ([source](#)).

These types of epistemologies set the cognitive space for a more compassionate relationship with Nature, one that is in mutualistic symbiosis, does not extract or does not harm ([source](#)/[source](#), [source](#)). Additionally, it is a perspective of abundance, when we are for all the beings on this planet we have plenty of room for all to flourish.

In practice this means creating land stewardship practices that are in collaboration and solidarity with all ecological systems. For example, the Nahuatl speaking Peoples in what is now Mexico City, created *chinamitls*, which are raised fields on rivers completely biodegradable, do not contaminate, give back to the ecosystem, and are in mutual symbiosis with the wider ecosystem medicinal and food generating gardens ([source](#)).

These structures are still in practice despite Spanish colonisation, which created a cultural, Peoples, and biodiversity genocide.

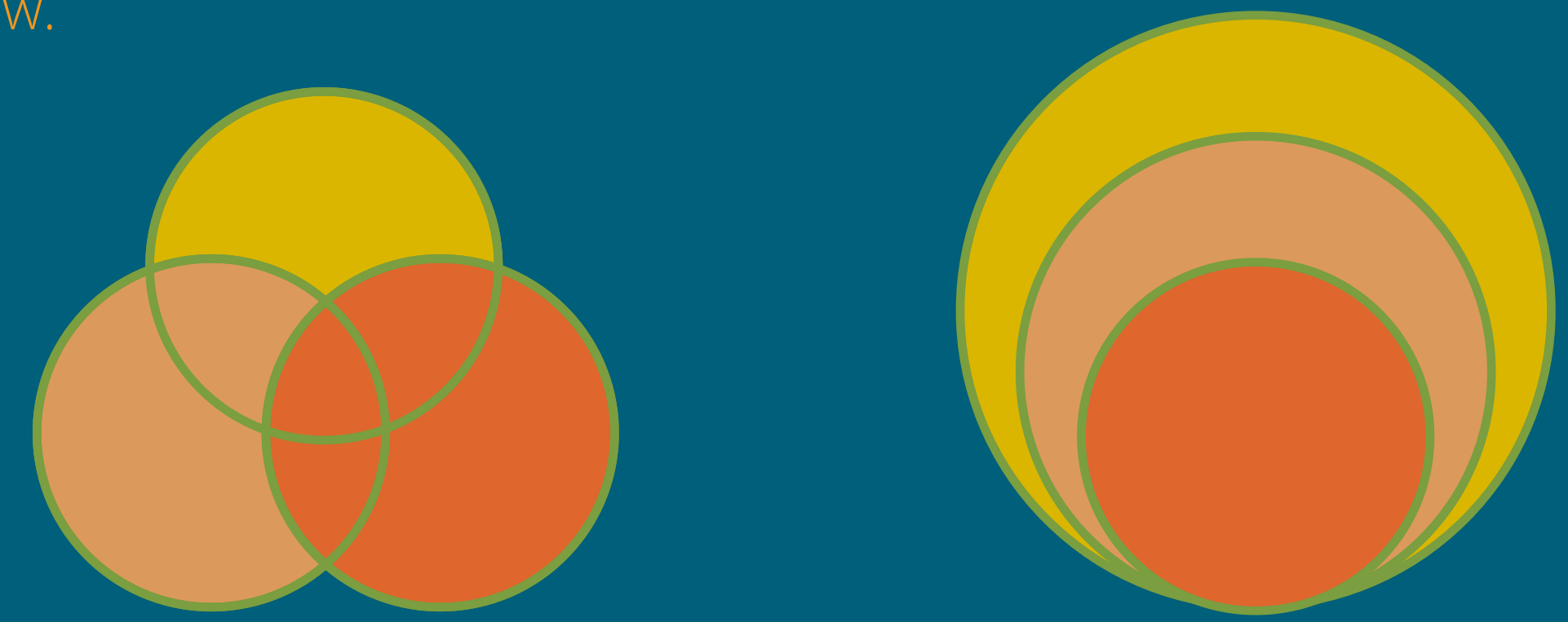


Furthermore, there is clear evidence that Indigenous land stewardship and strategies work and are very much a pathway to restoring habitats. While Indigenous Peoples represent just 5% of the world's population, they inhabit 22% of the Earth's surface and are custodians for 80% of the planet's biodiversity ([source](#)). Evidence suggests that Indigenous Peoples' land management systems ensure sustainability ([source](#)). Their ancient and ongoing farming practices minimise emissions from deforestation and fossil fuel burning (which affects the stability of the planetary system). Moreover, Indigenous Peoples have adaptation strategies to cope with climate variability. Their collective knowledge of the land, sky and sea, means they are excellent observers and interpreters of environmental change ([source](#)).

The current trend of planetary dysregulation, the loss of biodiversity and free access and use of Land, significantly reduces or eliminates the practice and intergenerational transmission of traditional ecological knowledge, which causes further dysregulation of the planet via vicious feedback effects ([source](#)). Indeed, when the rights of Indigenous peoples are prioritised, there will probably be a higher likelihood of meeting global planetary health goals with co-benefits for all living beings on Earth ([source](#)). We are globally surrounded by communities of people that already know how to holistically manage the land, with the restorative and local nuance that still mystifies reductionist science.

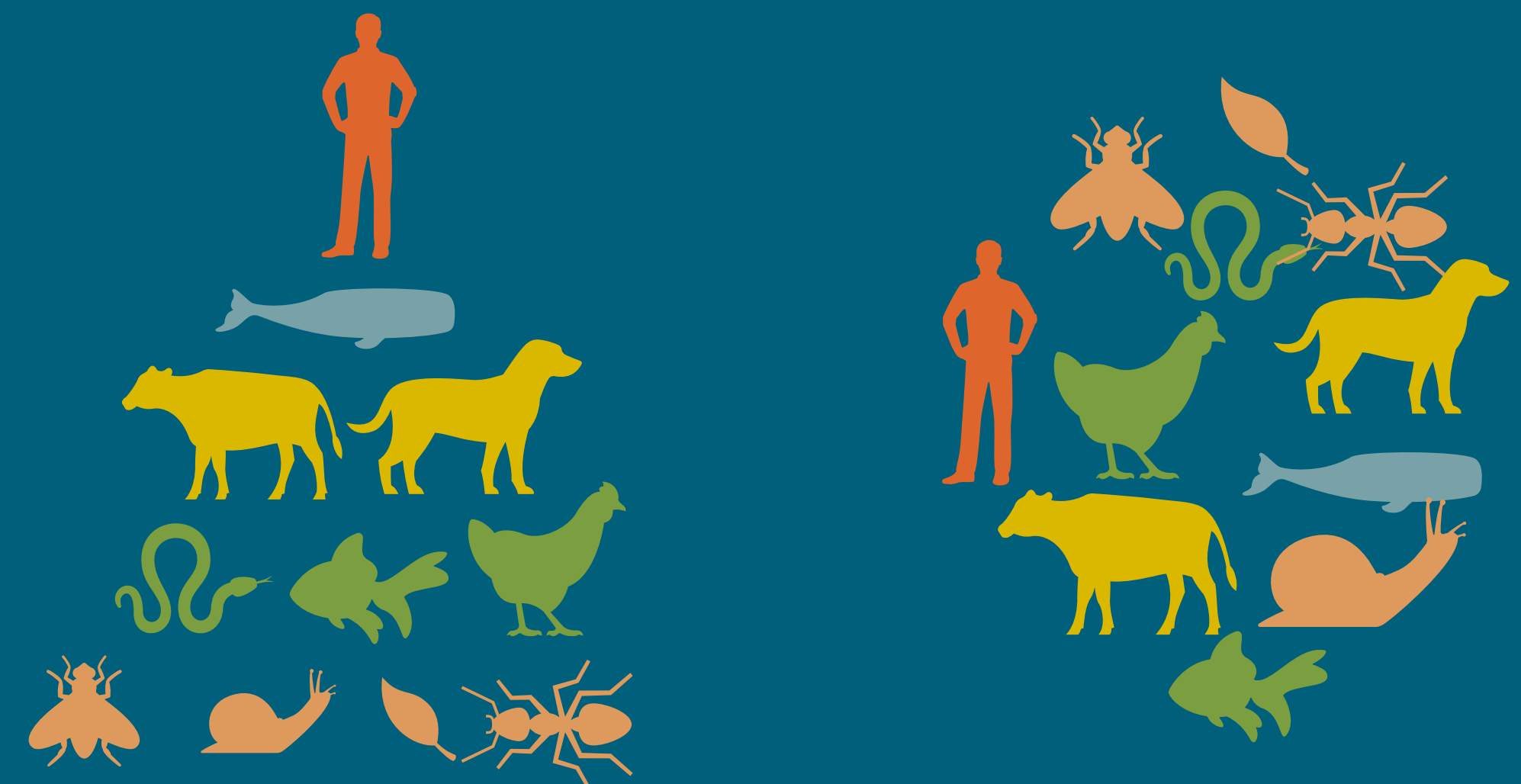
Instead of relying on environmental protection through a constitutional mandate, Indigenous Peoples have applied a “*concept of governance through ancestral connection so that it remains a personal responsibility*” ([source](#)). The growing rights-of-nature approach is both founded and grounded in traditional ecological knowledge systems. Part of the rights-of-nature approach is to shift the legal status of the

environment from an *object* (e.g., a forest or lake) to an independent legal *subject*. Another approach is to shift society's dominant transactional model between humans and the rest of nature, toward a more relational model for planetary health ([source](#)), as per the figure below.



Dominant ego-centric paradigm

Holistic eco-centric paradigm



“the rights-of-nature paradigm versus current model of sustainability; and bottom panel: ego-versus eco-centric views of nature” ([source](#)) (artwork by Indigneous Barkindji, Malyangapa Designer Jasmine Craciun, 2020).

SOLUTION PATHWAYS

1. ECOSYSTEM RESTORATION AND SOCIO-ECOLOGICAL POLICIES

Ecosystem restoration can help address these tremendous environmental challenges. Ecosystem restoration is the practice of renewing and restoring degraded or destroyed ecosystems. You can think of ecosystem restoration as helping the rest of Nature to heal.

To recognise the importance of and the need for ecosystem restoration on a global scale, the United Nations heralded 2021–2030 as the UN Decade on Ecosystem Restoration ([source](#)). Ecologists and social researchers must combine forces to achieve successful restoration objectives.

Many projects fail because local community knowledge (often Indigenous Peoples and multi-ethnic working class communities) are often excluded from the process. Working with local communities, whose livelihoods depend on the local ecosystems is vital. By working together equitably to restore ecosystems and to foster deep

reciprocity with the Land, we can reverse the current degradation, thereby securing the health of people and the planet.

Improved policies that focus on planetary health and ecosystem restoration are required. Policies need to integrate biodiversity and human health co-benefits with explicit considerations to reduce and eventually eliminate social inequity issues. These policies should include tools to catalyse health sector leadership (promoting holistic strategies) and cross-sectoral policy through local and international collaborations.

An emphasis on ecosystem restoration should be central to any long-term holistic policies that aim to support planetary health and enhance the stability of the planetary system. Awareness-raising among politicians and public health practitioners of the importance of ecological principles and driving home the message of *“there is no human wellbeing without planetary wellbeing”* is vital.

Funding for community-led initiatives is needed. Providing communities with the opportunities to create the conditions for health to flourish is essential. This will require a new (for western societies) transformational vision of health for all beings. This may be developed by *ethically* and *respectfully* engaging with Indigenous Peoples' who already hold much of the required knowledge needed for this transformation ([source](#)).

However, it can also not be taken for granted that all Indigenous communities wish to engage.



There are strong socioeconomic drivers on the degree to which communities are affected by the adverse impacts of planetary dysregulation. Communities continue to be reliant upon access to natural areas for health and wellbeing, but the people in greatest need tend not to have sufficient access to nature (i.e., the *“Luxury Effect”*).

Policy interventions should serve to counter these inequities. The twin issues of climate change and rising diseases (both infectious and non-infectious) have greater impacts in regions already impacted by high levels of poverty. These stressors will also have an inordinate impact in areas with heavily degraded ecosystems, which are often in areas of high deprivation ([source](#)). These conditions of poverty and ecosystem degradation are least conducive to favourable health, wellbeing, and resilience. Many people in highly deprived areas have several jobs, are on zero-hour contracts, or work disproportionately high levels of shifts. This inequity can lead to ‘time poverty’, thereby reducing ‘free time’ to engage in nature-based activities.

Therefore, although policies are needed to create equitably distributed biodiverse green spaces, policies are also needed to tackle time poverty. This will likely encourage people to develop environmental stewardship, thereby promoting the types of behaviours that are protective of ecosystems, and thus, planetary system stability.

Part of the solution could involve creating fairly-paid jobs in the field of ecosystem restoration in deprived communities. Ecosystem restoration should be integrated into social policy to restore equity, health, and resilience by repairing degraded ecosystems and creating employment and educational opportunities. These policies should encourage well-supported community-led action. Simultaneously, policies that support nature-based health interventions (also known as

‘green prescriptions’) ([source](#)) can contribute towards improving health and wellbeing, whilst providing training opportunities to enhance education and employment, and fostering Nature connectedness: a vital facet of wellbeing and environmental stewardship. Moreover, scientific research in this space needs to be translated into a language that is understood by non-experts ([source](#)).

As mentioned earlier in this report, nefarious capitalists tactics are rife in racialised and marginalised communities. It is imperative that policy-makers address the tactics, which continue to drive structural poverty and racism whilst contributing to the destabilisation of the planetary system (via destructive commercial ventures) ([source](#)).

These tactics also drive the continuation of disparities in health via the microbiome. In addition to tackling food insecurity (which involves equitable access to healthy foods and their microbes and pre/probiotic compounds), biodiverse environments must be equitably distributed and accessible to all people. Policies must promote equitable exposure to health-promoting microbial communities that train our immune system and play other vital functional roles in our bodies or *“walking ecosystems”*.



The co-benefit of a microbiome approach to urban health is that it also promotes complex and resilient ecosystems that contribute to the stability of the planetary system, and thus, planetary health. Centric Lab and partners have been working on developing a strategy called Microbiome-Inspired Green Infrastructure (MIGI) ([source](#)).

MIGI can be divided into two conceptual arms. The first is *human health*, i.e., through the microbiome lens, how can we restore and design urban environments to enhance human health and wellbeing? The second is ecosystem *functionality and resilience*, i.e., through the microbiome lens, how can we restore and design urban environments to enhance 'ecosystem health'? To operationalise this in practice, we've been working with large urban developers. One project involved creating a Design Guide tool that real estate developers can use to assess the condition of their sites (via a risk assessment-style process) and understand how they can design/change the site with considerations for the environmental microbiome and human health.

We recommend that this dual human and ecosystem health approach be integrated within urban planning policies (e.g., the National Planning Policy Framework) with scope for ongoing development. This strategy must form part of a holistic, ecological and life-long approach to 'health creation'—for ourselves and the rest of nature.

It is also imperative that we advance equity and inclusion in planetary health research and practice. Decision-makers should commit to inclusive and accessible research and practice to ameliorate the inequities imposed by structural socioeconomic disparities involving classism and racialisation.

2. POLICIES INVOLVING INDIGENOUS PEOPLES

Unmitigated climate change and biodiversity loss pose a considerable threat to the survival of Indigenous Peoples. However, Indigenous Peoples continue to be excluded from global processes of decision and policy making, including climate negotiations and ecosystem restoration strategies that define their future ([source](#)). This must change. The international community needs to proactively protect Indigenous Peoples' intellectual property and data sovereignty rights, and promote Indigenous research leadership.

The value of protecting the rights and livelihoods of Indigenous Peoples, manifests as both intrinsic and instrumental. Protecting Indigenous Peoples' rights will help safeguard traditional ecological knowledge systems. It will also contribute to restoring language, biodiversity, and ecological functions. All of these phenomena play a role in the stability of planetary systems ([source](#)).



“ The value of protecting the rights and livelihoods of Indigenous Peoples, manifests as both intrinsic and instrumental. Protecting Indigenous Peoples' rights will help safeguard traditional ecological knowledge systems. It will also contribute to restoring

language, biodiversity, and ecological functions. All of these phenomena play a role in the stability of planetary systems.

The United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) is a legally non-binding resolution passed by the UN and established in 2007 ([source](#)). It was developed to help protect and uphold the rights of Indigenous Peoples with additional consideration for engagement with Indigenous communities on their alignment with the UN Sustainable Development Goals (SDGs).

Moreover, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) Global Assessment is the first global-scale assessment to systematically engage with Indigenous communities in relation to global biodiversity conservation.

However, Indigenous leadership in planetary health and restoration ecology need to be better prioritised to alleviate the threats to Indigenous cultural integrity, and thus, ecological integrity, with vital importance to the stability of planetary systems (and therefore, all human communities) ([source](#)).

3. LAND RIGHTS

Given the success of the Indigenous stewarded territories, it is vital to support their rights to access their Ancestral Lands. We are going to face another stage of extraction due to electrification and other green technologies ([source](#)) ([source](#)), which is already threatening Indigenous Lands.

For example, the coup in Bolivia was driven by lithium access, which would see Indigenous Peoples forcibly and violently removed from their Lands ([source](#)). This has two outcomes, the first is experiencing

the continual trauma faced by Indigenous Peoples since the start of colonialism over 500 years, which creates various poor health outcomes ([source](#)). The second outcome is the erasure and loss of Land Knowledges, which are directly tied to having continual and generational access to the Land ([source](#)).

This loss will only contribute to further biodiversity loss, disconnection from Nature, and the further contamination of planetary ecosystems. *It should also be considered that protecting the Land rights of Indigenous Peoples is a moral imperative, why should there be a need for Peoples to stay in the ancestral Land in peace and in dignity?*

The value of protecting the rights and livelihoods of Indigenous Peoples, manifests as both intrinsic and instrumental. Protecting Indigenous Peoples' rights will help safeguard traditional ecological knowledge systems. It will also contribute to restoring language, biodiversity, and ecological functions. All of these phenomena play a role in the stability of planetary systems ([source](#)).



4. INDIGENOUS LIBERATION

“There is no hope for restoring the planet’s fragile and dying ecosystems without Indigenous Liberation. This is not an exaggeration. It’s a simple truth. Indigenous Peoples understand the choice that confronts us: decolonization or extinction. We have unequivocally renewed our bonds with the Earth, implementing intellectual traditions in the movement for

decolonisation. There is no turning back; these bonds are Sacred and will never be broken. This is why Indigenous Water protectors and Land defenders throughout the world are criminalised and assassinated on a daily basis. We have chosen Life and therefore we have been marked for death”

- Excerpt from The Red Deal by the Red Nation.

5. STOP CONTAMINATION

The most effective, obvious, cheapest, and easiest solution pathway is to simply stop the contamination of our planet's Creators. In the book *Pollution is Colonialism*, lead author Max Liboiron, speaks on the "permission to pollute" policies, which has given corporations the legal power to contaminate communities and ecosystems without consequence. They point out that instead of changing the laws to stop the contamination, they instead use data to identify "allowable" limits before the ecosystem completely collapses. Liboiron also points out how these allowances do not take into the account the journey of injury contamination has on ecosystems, for example, the biodiversity sacrifice, the smell associated with contamination, the interruption of Nature connectedness with the ecosystems as they become dangerous and undesirable to access, or the "low-level" poor health outcomes such as headaches, nausea, or nose bleeds. To move forward we must instil "do no harm" policies that match human and planetary biology.

6. STOP EXTRACTION

Going hand and hand with contamination is extractive practices, they need to stop. Extraction involves practices such as mining and oil drilling. They cause huge amounts of contamination through oil spills and toxin spill-over to Soil, Water, and Air. They also are water intensive, which can put many local communities in danger of dehydration and crop loss.

7. CARETAKING

“Healing the planet is ultimately about creating infrastructures of caretaking that will replace infrastructures of capitalism”

- The Red Deal by the Red Nation.



THE PLANETARY DYSREGULATION

An Urban Health Council report by
Centric Lab

More info: urbanhealthcouncil.com

Donate to support more of this work and
scientific health research led by people
from marginalised backgrounds

DONATE

©Urban Health Council, May 2022

