

A Future for Planetary Health and Human Wellbeing 2050

UNEP Regional Foresight Workshop, North America

Montréal, Québec, Canada, 9-10 November 2023

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Organised by [Future Earth Canada](#), [Sustainability in the Digital Age](#), in collaboration with the [United Nations Environment Programme](#) and the [International Science Council](#)

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A note from the UNEP Chief Scientist: Reflections on the Regional Workshops

We are entering the final phase of UNEP's 2023-2024 Foresight Process. The first phase scoped a wide range of inputs including a Global Delphi survey and construction of four divergent scenarios of possible futures to 2050. Global issues require a global perspective, but also require understanding of the unique contexts of each region. UNEP's Foresight Process incorporates this regional element. The second phase of the foresight process, the regional workshops, brought together over two hundred experts from six regions, to reflect on possible futures and crucially, to "reverse engineer" them: to walk backwards from them to the present, with respect to interventions needed in 2024 to address the underlying causes of the triple planetary crisis and achieve planetary health and human wellbeing. In doing so, key regional disruptive issues have been identified along with, perhaps more importantly, interventions to take account of disruptive issues and improve the environment for future generations.

The North American workshop was hosted on November 9-10, 2023 together with regional partners Future Earth Canada and Sustainability in the Digital Age. In these discussions, vulnerable public institutions and systems, persistent inequities, corporate power, and misinformation loomed large. But there was a sense that many of the solutions lay close to hand. The implementation of UNDRIP, educational and governance reform, and shifts in the way we value resources and knowledge were all recurrent themes. The need to design governance frameworks collaboratively and inclusively for data, AI, and emerging technologies was also highlighted.

What surprised many of us, was how diverse the visions which emerged from each region were. While it would be unscientific to read too much into the issues raised – the groups were not selected to be representative and this was not a polling exercise – it was nonetheless fascinating and instructive to be reminded that visions of the future are, by necessity, extrapolations of the preoccupations and anxieties of the present.

Andrea Hinwood, Chief Scientist, UNEP
January 2024

Introduction

To better navigate current and future uncertainty and disruptive change, the strategic foresight initiative of the United Nations Environment Programme (UNEP) aims to put in place an institutionalised approach to foresight and horizon scanning. As part of this effort, UNEP and the International Science Council convened a Foresight Expert Panel who met in September 2023 to collectively interpret emerging signals of change distilled from a global survey. Four scenarios were developed at the global level, representing four possible visions of the world in 2050. The scenarios are neither “utopian” or “dystopian” visions, but rather, representations of possible futures used to facilitate discussions on issues, pathways and interventions which may affect planetary health and human well-being in the future.

- **Scenario A - Sustainability Paradox:** Science and technology are actively used to successfully solve many environmental problems and resource scarcity. Therefore, society continues to believe that economies can grow exponentially, and people continue to consume without limits.
- **Scenario B - Post-Truth Division:** Trust in science is eroded and social groups choose their own truths, aligning by shared attributes and beliefs. Conflicts exist within and across states and newly forming entities, down to the local level.
- **Scenario C - Fortress Multipolarity:** A future shaped by a ‘polycrisis’ forces humans to reorganise themselves into hybrid fortified enclaves with megacities, in competition and occasional cooperation with other megacities, and with an emphasis on internal security and surveillance.
- **Scenario D - Global Awakening:** New generations recognise the interconnectedness of their actions and their impact on the health of the planet. Supported by Artificial Intelligence (AI) and technology, they unite to create a world of harmony between humans and nature.

Regional workshops were held to contextualise global findings and explore region-specific dynamics, issues, risks, and opportunities. Participants took part in four main exercises, in a process co-designed by UNEP’s Office of the Chief Scientist and the European Commission Joint Research Centre Foresight team: ***Ice Breaker, Reviewing Scenarios, Exploring Changes, and Identifying Policy Interventions*** (see Annex 1 for more detailed methodology).

This report provides an overview of the main insights captured during the **North American Strategic Foresight Workshop, co-organized with Future Earth Canada and Sustainability in the Digital Age**. The workshop was held in Montréal, Canada on November 9-10, 2023, at the offices of the Secretariat of the Convention on Biological Diversity and brought together 29 experts from across the region (see Annex 2 for a complete list of participants). The report is not intended to present the full set of contributions that took place but rather to synthesise discussions with a view towards showcasing key insights for the region. The insights captured in the regional report as well as insights from the global process will be reflected in the 2024 Global Environmental Foresight Report.

Background

Physically, North America is characterised by a vast geography and diverse landscapes and ecosystems, ranging from arctic to desert. Sources of energy vary considerably across the region, which has one of the highest energy consumption rates per capita in the world (IEA, 2023; Our World in Data, 2023). There are also many time zones, with a six-hour time difference between Hawai'i and Canada's Maritime provinces, which has implications for communication and information flows. There are significant differences across North America regarding availability and access to natural resources, which has led to different relationships to and expectations of nature. There is a long history and strong presence of Indigenous Peoples in North America, which has governance, legal, social, and cultural implications for the region. As such, a focus on Indigenous Peoples, Indigenous sovereignty, and traditional ecological knowledge cut across many discussions about regional dynamics, issues, risks, and opportunities. There is also a historical dominance of Western perspectives and a philosophy of 'rugged individualism' (Bazzi et al., 2020) that are important context for the region.

Around the world, human activities are exerting unprecedented pressure on Earth's life support systems, with significant and growing negative impacts on humans and the natural world upon which we depend (Steffen et al., 2015; Richardson et al., 2023). In North America, one priority issue is biodiversity loss, primarily driven by pressures from land use change, habitat fragmentation, and persistent impacts of invasive species, agriculture, and resource extraction (UNEP, 2016). Though some issues show signs of improving, such as acidification of soils and water, others are worsening, such as invasive species and declining pollinator populations (UNEP, 2019). Freshwater and marine ecosystems, highly diverse in North America, are at high risk, with threats from climate change, land-use change, chemical pollution, and resource harvesting (UNEP, 2023). A related issue is water security, which puts additional stress on these ecosystems. Though the region generally has good access to clean water and quality is improving, the cumulative impacts of poor governance frameworks, ageing infrastructure, increasing reliance on groundwater, and the highest water usage per capita worldwide are cause for concern (UNEP, 2016; UNEP, 2019). Another priority issue in North America and globally, compounding many other challenges, is climate change, with the frequency and intensity of extreme events such as extreme warm days and heavy precipitation events increasing (UNEP, 2019). The impacts of climate change are of particular concern in the Arctic, where change is occurring at an unprecedented scale and rate (Hicke et al., 2022). North America is responsible for a large share of the global greenhouse gas emissions driving climate change, with transportation a main contributor. Though transport emissions have been relatively constant over the past decade, in part due to improved fuel efficiency and regulation, transport demand continues to increase (UNEP, 2019). Finally, while policy action, including for example the United States Clean Air Act, have had significant impact on improving air quality in the region, issues remain. While airborne particulate matter concentrations have significantly decreased in the region, ground-level ozone pollution remains a particular concern (UNEP, 2019). Notably, air quality was severely degraded across North America during the 2023 record-breaking wildfire season (NRC, 2023; Government of Canada, 2023).

Underestimated issues

As a starting point, participants engaged in an exercise to openly identify issues that they perceived to be currently underestimated in public discussions but that are impacting planetary health and human well-being. This set the stage for the foresight exercises to follow by providing insight into the mindset of participants at the onset of the workshop and the priority issues held at the top of their minds.

Policy and governance concerns related, for example, to a lack of diversity and representation in particular from youth, multidisciplinary perspectives, and Indigenous Peoples, issues around migration and immigration policy, the need to understand policy signals for regional stability and resilience, and the importance of the mindsets underlying decision-making.

Political will and public demand for climate solutions and public trust in government and institutions, as well as the continued influence of patriarchal culture on decision-making.

Issues around externalities, in particular tracking corporate externalities and better understanding how to internalise these costs, along with risks of radioactive accidents and fusion energy.

Issues related to behaviour, which included self-subsistence, individual car ownership, overconsumption, and the role of individual behaviour change.

Learning and human cognition, referencing human-emotional drivers of change, resistance to change, inability to deal with complexity, and the need for intergenerational relational social learning.

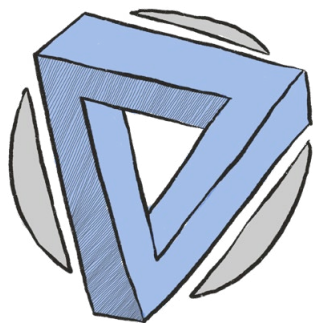
Societal inequalities and uneven vulnerability to extreme impacts, along with issues around negative impacts of misguided climate efforts, loss of biodiversity and in particular keystone species, and continued petrochemical expansion.

Issues related to knowledge diffusion, and in particular the need to elevate Indigenous knowledge, science, and ethics.

North America: Four possible futures

With these opening discussions in mind, participants spent much of the remaining time in the workshop in breakout sessions focusing on the four global scenarios, unpacking the scenarios in the North American context and exploring pathways to change between now and 2050 (Annex 1). These discussions, which incorporate and expand upon many of the key issues raised in the opening session, are summarised for each scenario.

Across all scenarios, the key issues that emerged were the erosion of human and environmental rights, concerns about over-emphasizing decarbonisation and generate new environmental and social concerns, social cohesion or fragmentation, trust in institutions, governance, and the need for new education foci. These are elaborated within the context of each scenario below, where issues particularly relevant to each scenario are discussed, but can also be seen as pointing towards priority areas for intervention that transcend any one scenario.



Scenario A: The Sustainability Paradox

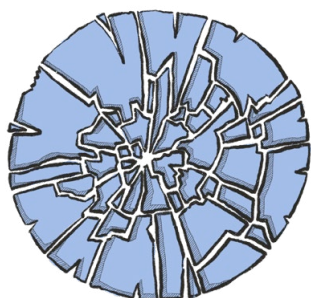
Global Scenario Summary: *Science and technology are actively used to successfully solve many environmental problems and resource scarcity. Therefore, society continues to believe that economies can grow exponentially, and people continue to consume without limits.*

Concerns over planetary health become narrowed into carbon and green economy targets, eventually eclipsing other, more interconnected issues – supporting decarbonization without behaviour change or achieving overall planetary health and well-being.

- ▶ **Human and environmental rights are deprioritised, decoupled from each other, and eroded** over time. This results from a shift away from supporting social movements, shared values, and participatory governance. North American multiculturalism gives way to homogenising global influences that overshadow minority voices, diminishing the diversity of cultural, ethical, and moral perspectives.
- ▶ **The exclusive focus on decarbonisation successfully shifts towards a circular economy and clean energy production but fails to address other environmental and social impacts**, including issues around resource extraction, environmental colonialism, water crises, and high levels of urbanisation and marginalisation. These shifts have dire implications for critical supply chain management.
- ▶ **Intra-national conflict is intensified** between federal governments and the Indigenous Peoples of the North American region.
- ▶ **Sustainability elitism** becomes the new norm, leading to social fragmentation. Advances in social technology blur the lines between individualistic and collectivist tendencies, while society navigates tensions between accelerated polarisation and accelerated connection. Increased digital compassion contrasted with apathy due to information overload is a key part of this connection dichotomy. Increased dependency

on digital technology reinforces the need for security and also creates issues around data slavery and data sovereignty.

- **Mechanisms for corporate oversight that are vulnerable to energy policy lock-in and extreme forms of regulatory capture.** Corporate oversight is eroded, along with regulations and other incentive and disincentive structures that compel transparency and accountability, resulting in unethical practices and negative social and environmental impacts. All the while, the need to scale up open-source AI results in a panoply of AI designs that are not intentional and values-bound. The private sector exerts increasing control over environmental governance through their leadership in technological innovation and deeply entrenched greenwashing, leading to extreme forms of regulatory capture (including capture of nature markets) for profit.
- **The goal of inclusive circularity is left behind.** While goals are set to decarbonise and develop a circular economy with the best intentions, the latter becomes difficult to maintain over time. A slew of resulting changes emerge, including decreased investment in Indigenous-led conservation accompanied by a surge in the commodification of nature and traditional ecological knowledge, a net loss of diversity in knowledge systems and local traditions, lower value attributed to safeguards connected to resource management, and a rapid increase in investment in green technologies over more holistic approaches.



Scenario B: Post-Truth Division

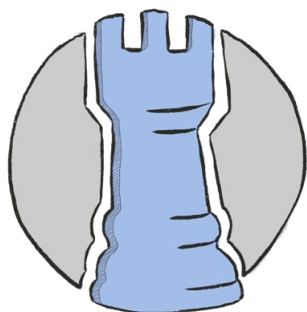
***Global Scenario Summary:** Trust in science is eroded and social groups choose their own truths, aligning by shared attributes and beliefs. Conflicts exist within and across states and newly forming entities, down to the local level.*

Misinformation destroys trust in public institutions as the population increasingly believes that the world created by the current authority is not working for them, feeding a precipitous spiral of social, political, and economic fracturing.

- **Fragmentation of institutions and systems.** Declining trust in public institutions erodes their authority, leading to fragmentation and making it difficult to achieve common goals or abide by collective agreements.
- **Decline in trust.** Trust in groups other than one's own and trust in the source of products and services declines over time, creating conflict and tensions around trade. Over time, multiple critical societal systems break down, including supply chains, education systems, medical systems, and others. Resilience and the capacity of society to respond to changes becomes severely diminished, as evidenced by the complete collapse of the insurance industry and the rise of maladaptation.
- **Media also becomes fragmented and manipulative** as independent journalism and local newspapers become relics of the past, reinforcing echo chambers. Truth is tailored to the values of individuals, and expert opinions are no longer accepted in many circles if they break away from what people want to do or hear. Complex issues that may be difficult to address – such as climate justice, climate action, Indigenous justice, resource

shortages – are completely ignored. Shared ideologies and truths contribute to the formation of small, tight-knit communities, resulting in current political borders becoming meaningless.

- **Flourishing micro-cultures** are established, though there are frequent conflicts between communities over access to increasingly scarce resources, to technologies, and to decentralised energy sources. Remote communities thrive, in particular among Indigenous Peoples with strong knowledge of how to live off the land, but are affected strongly by increasing mass migration due to climate change.
- **The education system is completely splintered and transformed** over time, leading to the loss of critical thinking skills and the ability to make rational decisions. Arguments are rather driven by strong emotions amplified by misinformation or skewed perspectives within echo chambers. Though extreme developments in technology serve to bring this scenario about, further innovation is significantly impeded in this fragmented future characterised by scarcity, with a small number of individuals controlling technology and data, where data slavery becomes the norm. Understanding of AI is low in the general public, with high degrees of anthropomorphizing, making it difficult to distinguish between human and machine.



Scenario C: Fortress Multipolarity

Global Scenario Summary: *A future shaped by a 'polycrisis' forces humans to reorganise themselves into hybrid fortified enclaves with megacities, in competition and occasional cooperation with other megacities, and with an emphasis on internal security and surveillance.*

A series of crises bring in a wave of authoritarianism, with power shifting to smaller, regional enclaves focused on security and resource capture.

- **Large city states emerge** based on natural boundaries and there is a shift towards consolidating and privatising resources. As fortresses emerge, demand for security and actions that prioritise local interests increase, leading to increased militarisation and policing and investment in local infrastructure, particularly in telecommunications as a means to censorship and control over knowledge dissemination. There are broad shifts away from intergovernmental structures and multilateral frameworks as well as from national borders and centralised authority. A very unstable geopolitical landscape emerges, with resource wars and risk of biological warfare. This is linked to an increasing reliance on technology, where the weaponising of AI systems, widespread surveillance, and digital border security all become commonplace.
- **Extreme place-based loyalty and alliances** leads to a general acceptance of enforced behavioural change towards more sustainable practices in response to initial resource shortages and climate shocks. Environmental and natural resource management becomes strictly regulated within fortresses, which eventually leads to humanity largely living within planetary boundaries. Building local resilience becomes a key priority, with investments in renewable energy, local energy grids, and nature protection within the

confines of the fortress. Knowledge diffusion is strongly limited by the privileged few in power, where public communication is very selective to align with government-mandated rules and behaviours.

- **Tokenisation of Indigenous-led governance**, with only selected aspects of Indigenous knowledge taken seriously and others – in particular the importance of recognising and integrating systemic connections across health, well-being, environment, and Indigenous knowledge – are largely ignored. While it is possible that one or a few Indigenous fortresses are established that are truly regenerative and sustainable, a more likely outcome is that Indigenous Peoples as well as minority groups are severely undermined, colonised, and oppressed.
- **Severe social, cultural, and health disruptions** begin to occur as a result of cascading impacts of shifts in governance, creating a breeding ground for cultural genocide, violation of human rights, and extremist views. Values and viewpoints within a fortress are highly alike and eventually become enforced, breeding homophily and leading to human rights violations such as exportation of people with differing views. Religious and other ideologically bound groups gain strength, as do populism, xenophobia, and inequality. There is an increasing epidemic of mental health issues and opioid use.



Scenario D: Global Awakening

Global Scenario Summary: *New generations recognise the interconnectedness of their actions and their impact on the health of the planet. Supported by AI and technology, they unite to create a world of harmony between humans and nature.*

Youth lead large-scale shifts towards social cohesion, supported by a growing sense of togetherness and collectivist thinking as the only way to tackle collective action problems.

- **Equity and resilience become critical cornerstones of political agendas** and there is significant support for a shift away from colonial mentalities towards the development of restorative circles to identify shared values and systems thinking rooted in Indigenous knowledge and a nature stewardship worldview. This creates enabling conditions for the development of forward-looking environmental regulation and infrastructure, and a shift toward an economic system based on shared values, equity, plurality, and circularity as opposed to growth and profit. Governments rely increasingly on scientific knowledge and Indigenous wisdom to guide decision-making across all geographic areas up to the Arctic.
- **Advances in inclusive governance across scales** that prioritise strong, collective leadership. This includes the development of frameworks to support responsible innovation, such as shared agreements, codes of conduct, standards, and rules centred on safety, consideration of digital human rights, and incentivizing innovations that support sustainability. Legal protections for activists, Indigenous knowledge, and nature become normalised and there is a shift towards legal pluralism. Advances in technology accompanied by a shift away from growth as the goal of economic systems frees up a lot of time, which is spent on creative pursuits and on reconnecting with fellow humans and with nature. However, blind trust in technology has also grown, opening the doors

to misuse despite strong governance frameworks. AI is trained to self-regulate, creating possible issues around decreased human oversight.

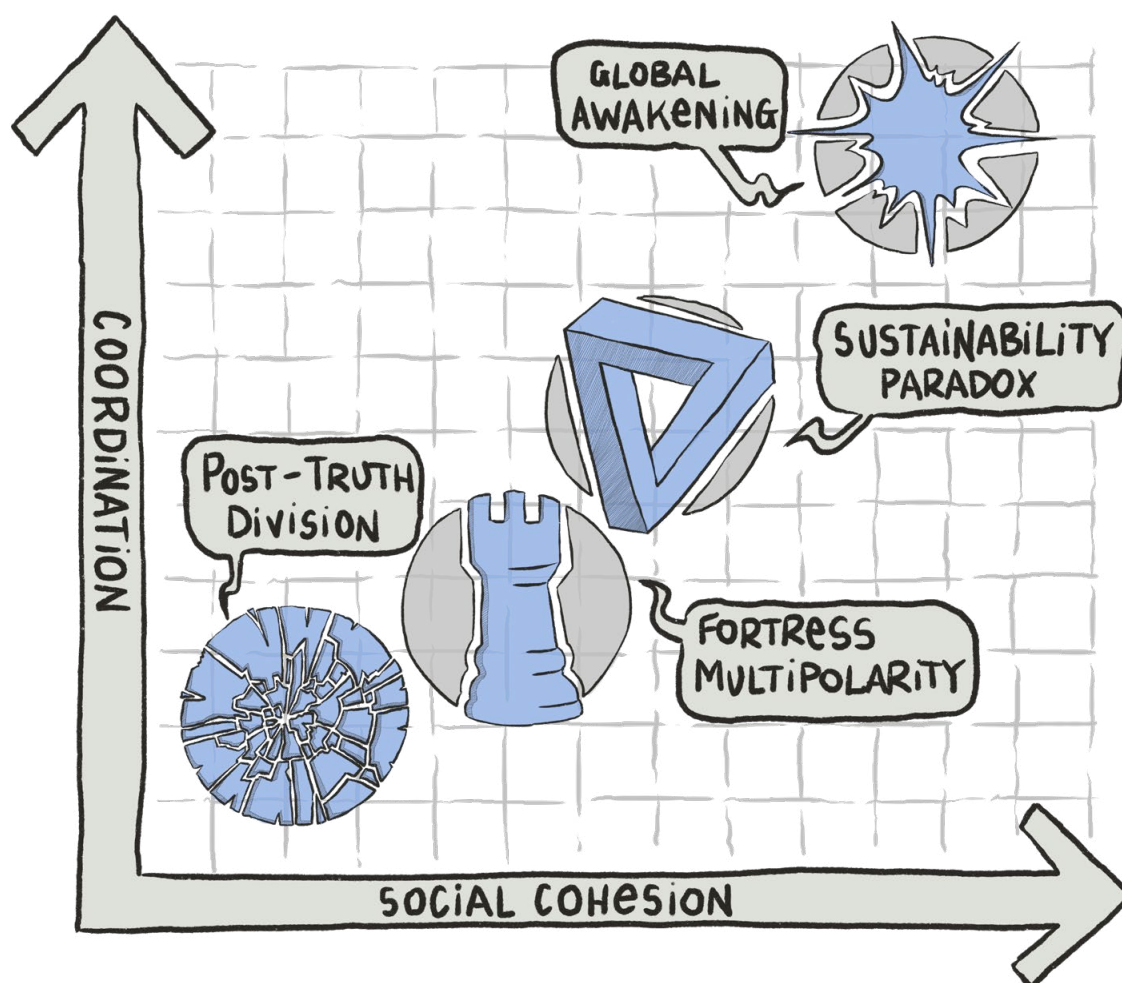
- **Multiculturalism and collectivism are increasingly valued**, shifting away from North American 'rugged individualism'. Ethical spaces, where multiple worldviews co-exist on equal footing, are routinely employed to frame conversations, leading to stronger recognition of Indigenous perspectives and allowing for healing from past traumas. Youth drive significantly lower levels of consumption, and companies respond to new demand signals by focusing on ESG criteria and internalising externalities as a business model.
- **Educational systems are transformed**, learning from positive examples around the world, with emphasis increasingly placed on emotional social education¹, developing identities as global citizens, shifting the prioritisation of values, familial relations to nature, and acceptance of those who think differently.

¹ Traditionally referred to as "*social and emotional learning*" (see Zins and Elias, 2007 for an overview), participants brought forward the need to actually address emotional education first, as a precursor to meaningful progress towards social learning.

The four scenarios

All four scenario descriptions included elements of social cohesion and core beliefs and of coordination and cooperation (see Introduction). These were picked up on and became central to participants' discussions around contextualizing the scenarios and exploring pathways of change, emerging as key inflection points (see discussion synthesis for each scenario in the section above).

Based on the prominence of these discussion themes in the workshop, the four scenarios have been plotted along two axes – coordination and social cohesion – in a scatterplot below. Social cohesion, for example, refers to the degree to which there was a spirit of collectivism and cooperation, the level of agreement on base reality and what constitutes truth, and trust in institutions. Coordination includes the capacity of society to address issues such as climate change from a systemic perspective, accounting for the interrelationship with other goals, to incentivize and regulate technological innovation, and to marshal economic resources for public good, also encompassing issues around governance. The scatterplot demonstrates the relationships identified between the scenarios, as framed by meeting participants, in the proposed shift toward an exploration of potential interventions. Within each scenario, technology and levels of trust (also key elements within scenario descriptions) serve as enabling conditions and underlie the evolution of the four alternative futures over time.



Key areas for interventions

After diving deeply into the four scenarios, participants were asked to take a step back and reflect on what interventions might prevent, improve, or mitigate the outcomes of these 2050 visions. Though the initial workshop structure focused on *how* interventions might actually be implemented and *by whom*, discussions shifted towards identifying priority issues to be addressed and problems to solve. Participants reflected on the fact that many agreements and frameworks were already in place, calling attention, for example, to the Sustainable Development Goals (SDGs), the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), and that the most important need now was to figure out how to deliver on these commitments. With regards to who should be involved in implementation, participants highlighted a diverse array of stakeholders whose engagement is critical to making progress, including government, private sector actors, scientists, non-governmental organisations, Indigenous Peoples, local communities, and others. The main issues to be addressed that were identified cut across scenarios, incorporating multiple elements of coordination and cohesion, and are presented as such below.

Implementation of UNDRIP and legal systems change

In the North American context, but also globally, building trust and stronger relationships with Indigenous Peoples was seen as a critical leverage point. Creating restorative spaces for Indigenous communities to contribute to and drive decision-making was put forward as highly important, elevating Two-Eyed Seeing² and implementing a restorative justice framework. One concrete mechanism brought forward was to support strategic litigation that protects and enshrines the rights of specific groups and provides legal standing to *values or entire communities*. More broad opportunities include advancing legal pluralism, where multiple recognised legal systems can co-exist, supporting recognition of the legal rights of nature and multi-species justice, and advocating for bioregional or watershed scale sovereignty. Effective mechanisms to implement UNDRIP, not only at the national level but also across scales, were noted as necessary for achieving the interventions listed above.

Education reform

Reforming educational systems was seen as an essential intervention, especially given the role of youth in thinking about futures in 2050 and the potential impact of shifting values and mindsets in changing systems. The main idea put forward here was to broaden the scope of current educational programs to also include, for example, developing social emotional awareness, understanding of and respect for Indigenous knowledge, systems science, diverse value systems, and civic education. Making AI ethics mandatory across a range of disciplines was also seen as highly important, given the centrality of technology and in particular AI across scenarios. These features were also seen as important to

2 Two-Eyed Seeing is a concept first brought forward in 2004 by Albert Marshall, an elder from the Mi'kmaw Nation and "refers to 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 Western knowledges and ways of knowing, and to using both these eyes together, for the benefit of all" (Bartlett et al., 2012)

incorporate into education and awareness-building programs for the general public. A non-negotiable commitment to non-violence in education was seen as critical to fostering positive change.

Support for inclusive, polycentric governance

Across a variety of sectors and topics, strengthening engagement across scales of governance was seen as a highly impactful intervention that could potentially push societies towards more desirable outcomes, with an emphasis on prioritising inclusivity and equity for BIPOC (Black, Indigenous, and People of Colour) and youth. Some concrete ideas put forward include: (a) advancing systems of oversight to support the development of rigorous standards, reporting practices, and to strengthen corporate transparency and accountability; (b) creating an AI observatory or a ministry within governments with a focus on ethics that can lead to the development of standards and regulations that include multiple viewpoints, and support commitments to government transparency and accountability through open data; (c) shifting the focus of environmental regulation to coordination across scales and geographies, focusing on regeneration, internalising externalities, and realigning subsidies with public good and public values; (d) advancing decentralised, clean, renewable energy systems with multi-stakeholder public governance that emphasise circularity as a guiding principle; (e) institutionalising the evaluation of policy pathways based on co-benefits and costs across the systems, taking into account human rights and the rights of nature; (f) building infrastructure for city-level policy coordination and direct municipal engagement in UN dialogues, leveraging federal funding to support local governments; (g) advancing universal (or means-based) health care, housing, and eventually basic income; and (h) support citizen-led initiatives by shifting flows of funding and diversifying procurement models to better support cooperatives.

Democratisation and broader societal engagement in policy-making

One of the major challenges to more meaningfully advancing planetary health and well-being was seen as issues with the democratic system. One suggestion to tackle this challenge was to initiate electoral reform through a bottom-up, inclusive process, starting with changes to the electoral cycle and exploring putting age limits on public offices. Regulations to limit the influence of money and special interests in politics was also seen as a critical consideration to strengthen democratic systems. Exploring opportunities to advance legal pluralism and co-governance frameworks with Indigenous Peoples and to engage youth more meaningfully in democratic decision-making were also brought forward as potentially highly impactful interventions.

Economic systems shift

Though certainly not a novel consideration, many of the discussions came back to issues with the dominant economic paradigm. Multiple alternative frameworks were put forward, including doughnut economics (for more information see Raworth, 2017), regenerative and circular economics, Ahupua'a economics based on traditional Hawaiian cultural stewardship of land and sea (see, e.g., Kaneshiro et al., 2005), and others. There was a concrete suggestion to shift the way society measures progress, for example looking at Genuine Progress Indicators in lieu of GDP growth. Implementing boundaries

for capitalism was seen as holding potential, including, for example, limits to corporate accumulation, a cap on wealth, wealth redistribution, more comprehensive mechanisms of capital valuation, and frameworks for liability of corporate actors. Rethinking incentive and evaluation structures was also raised as a means to support investments in innovation and infrastructure that are forward-looking and support human and planetary well-being. Bioregional common asset trusts were brought forward as a mechanism showing particular potential to shift the scale of economic operations to one more in tune with natural systems while also valuing those systems more meaningfully.

Combating misinformation

One of the leverage points identified were issues around misinformation; addressing these could be an important intervention to avoid some of the more undesirable outcomes of the future scenarios discussed. Concrete suggestions were raised including providing information sources for all metadata, supporting the continued growth of open-source resources to create a common sense of truth, to create and support trustworthy public media as a means to rebuild trust, and advancing policy and laws to clearly distinguish between entertainment and news.

Next Steps

The outcomes of the regional workshops will serve to inform the second round of the Global Delphi Survey. This second round aims to prioritise the 259 signals and over 50 issues submitted during the first round of the survey, to the top 18 (three from each region). The original 6000 experts and stakeholders invited to take part in the original Delphi survey, in addition to all those who participated in the regional workshops, will be invited to rank the top 18 issues based on their potential for being most disruptive. Survey respondents will also be invited to give their thoughts on whether and how UNEP should be involved in each issue.

Ultimately all the data gathered during this foresight exercise will contribute to the final Foresight Report, to be released in time for Summit of the Future deliberations in New York in September 2024, and UNEP's strategic long-term outlook.

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Annex 1. Information on the process

UNEP's strategic foresight initiative aims to establish an institutionalised approach to foresight and horizon scanning. The goal is to develop an anticipatory and future-oriented culture, recognising the fact that tackling the global systemic challenges we are collectively facing requires integrating forward-looking knowledge and insights across disciplines, knowledge systems, and sectors of society.

The process comprises two distinct steps. The first was at the global level, bringing together a Foresight Expert Panel to interpret, analyse, and cluster and providing insights to potential for disruption following an analysis of 29 emerging changes and over 1000 signals of change identified from a horizon scan survey. Following this global analysis, a series of regional workshops were held to review the global outputs with the view to providing necessary regional perspectives to validate and adjust the initial identification of emerging signals of change and provide information on regionally specific issues, risks, and opportunities.

The structure for Regional Foresight Workshops was co-designed by UNEP's Office of the Chief Scientist and the European Commission Joint Research Centre (JRC) Foresight team in partnership with the International Science Council. The process included 4 key exercises:

1. **Ice breaker Exercise:** Each participant shared one factor which they believe is affecting planetary health and/or human well-being but is underestimated in public discussion.
2. **Reviewing Scenarios:** Participants were presented with the four UNEP scenarios that are being used as a foresight tool to engage in systemic reflections and the exploration of potential challenges, opportunities, and options for action. Participants were invited to familiarise themselves with the four scenarios and consider how to contextualise each of the thematic areas for the region as well as to refine and validate the scenarios.
3. **Exploring Changes:** Participants were invited to a second discussion on exploring emerging changes under each of the four scenarios with the view to analysing the potential for disruption of the state of the environment, planetary health and human well-being.
4. **Identifying Policy Interventions:** Action-oriented strategic reflection to identify how the main changes impact sustainable development in the region and to propose specific policy interventions that could be implemented to address changes that could negatively impact sustainable development.

The 2-day workshop in North America (November 9-10, 2023) followed Chatham House Rules. It consisted of a series of facilitated breakout sessions during which participants discussed emerging changes in context of the four UNEP scenarios, shared their views on pathways through which those scenarios could possibly materialise and reflected on how this could affect the transition towards a sustainable future of improved planetary health and human wellbeing.

The knowledge and insights produced through the workshop – the collective intelligence generated through the discussions – together with the results of the Delphi survey and Global Sensemaking exercises, will ultimately culminate in a Global Report to be published in 2024 that aims to inform deliberations of the Summit of the Future.

Annex 2. Participants list

Name	Institution	Role
Susan Alzner	Shift7	Participant
Micheline Ayoub	Future Earth Canada and Sustainability in the Digital Age	Participant
Christine Barnard	ArcticNet	Participant
Livia Biznikova	International Institute for Sustainable Development	Participant
Roberto Borrero	Independent	Participant
Breanna Byrd	Future Earth Canada and Sustainability in the Digital Age	Notetaker
Orlando Cabrera	Commission for Environmental Cooperation	Participant
Sylvain Carle	Innovobot	Participant
Celeste Connors	Hawaii Green Growth	Participant
Richard Crompton	Independent	Consultant writer
Apurva Dave	National Academies Climate Security Roundtable	Participant
Nathalie de Marcellis-Warin	Centre Interuniversitaire de Recherche en Analyse des Organisations	Participant
Ursula Eicker	Concordia University	Participant
Scott Findlay	Office of the Chief Science Advisor of Canada	Participant
Mark Fisher	Council of the Great Lakes	Participant
Jennifer Garard	Future Earth Canada and Sustainability in the Digital Age	Facilitator
Henri Hammond-Paul	GovLab	Participant
Jason Jabbour	United Nations Environment Programme	Facilitator
Lekelia (Kiki) Jenkins	Arizona State University	Participant

Odile Joblin	Future Earth Canada and Sustainability in the Digital Age	Logistics support
Sabaa Khan	David Suzuki Foundation	Participant
Anthony Leiserowitz	Yale University	Participant
Sunday Leonard	Secretariat of the Scientific and Technical Advisory Panel to the GEF	Participant
Richard Mallah	Future of Life Institute	Participant
Wadzanayi Mandivenyi	Convention on Biological Diversity	Notetaker
Damon Matthews	Concordia University	Participant
Austein Mcloughlin	Convention on Biological Diversity	Participant
Kim Neale	Natural Assets Initiative	Participant
Rafael Peralta	United Nations Environment Programme North America Regional Office	Participant
Nilufar Sabet-Kassouf	Future Earth Canada and Sustainability in the Digital Age	Notetaker
Jorge Daniel Taillant	Commission for Environmental Cooperation	Participant
Judit Ungvari	Future Earth United States	Participant
Andréa Ventimiglia	Future Earth Canada and Sustainability in the Digital Age	Notetaker
James Waddell	International Science Council	Facilitator
Aaron Williamson	The Value Web	Lead Facilitator
Marisa Zalabak	Open Channel Culture and IEEE AI Ethics Committee	Participant