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Corresponding author:
Clea Edwards; Email: clea.edwards@asu.edu

Accelerating transformations for a just, sustainable future: 10 'Must Haves'

Peter Schlosser[1], Johan Rockström[2], Clea Edwards[1], Paula Mirazo[1], Adrian Heilemann[2], Niklas H. Kitzmann[2,3] and Siri L. Krobjinski[2]

[1]Global Futures Laboratory, Arizona State University, Tempe, AZ, USA; [2]Potsdam Institute for Climate Impact Research – Member of the Leibniz Association, Potsdam, Germany and [3]Institute of Physics and Astronomy, Universität Potsdam, Potsdam, Germany

Non-technical summary. There is increasing evidence of extreme events and irreversible damage occurring faster than expected. Despite inescapable evidence of intersecting crises facing the Earth system and numerous efforts and agreements, global society is not on track to achieve its sustainability objectives. The 10 'Must Haves' initiative aims to identify the pathways of accelerated systemic transformations needed across the globe toward a sustainable and just future where all can thrive on a healthy planet. In this Intelligence Briefing, the authors lay out the rationale for the project, the proposed targets, and set the stage for forthcoming work on action.

Technical summary. This Intelligence Briefing recognizes the urgent need for global-scale transformations to overcome the crises facing humanity. The '10 Must Haves Initiative', conceptualized by The Earth League and the participants of the Global Futures Conference, aims to provide a framework for accelerated transformations to bridge the gap between pledges and action related to global challenges to stay within planetary boundaries and ensure a safe and just future for all. Each 'Must Have' represents targets within which a forthcoming report outlines the specific 'must-do' actions, relevant actors and considerations for successful implementation. The authors put forth that we must have a limit of global warming as close to 1.5°C as possible by 2050; an immediate halt and reversal of the loss of nature's functions and diversity; just economies that operate within planetary boundaries; equitable access to resources needed for human well-being; governance transformations to stay within planetary boundaries; healthy, safe, and secure food for the global population; the reconnection of human well-being to planetary health; an ethical digital world providing for human security and, a resilient global society ready to respond to planetary crises.

Social media summary. 10 'Must Haves' toward thriving future 4 all: global contingency plan toward transformation of unsustainable trajectory.

Compounding crises on local to global scales call for urgent and radical action, a point of virtual consensus among a number of highly credible assessments, analytical frameworks and international agreements. These efforts postulate necessary and scalable transformations across five-to-seven socio-economic sectors, including human well-being; economic system(s); food, land, and health; energy; cities; new commons; and the digital world (Blythe et al., 2018; Feola, 2015; Gillard et al., 2016). For example, *Global Sustainable Development Report 2019: The Future is Now – Science for Achieving Sustainable Development* [2019]; *Six Transformations to achieve the Sustainable Development Goals* [2019]; *International Institute for Applied Systems Analysis Transformations within reach series* [2021]; *Our Common Agenda – Report of the Secretary General* [2021]; *Center for Global Commons Global Commons Stewardship Framework* [2022]; *Stimson Center Road to 2023: Our Common Agenda and Pact for the Future* [2022]. Additional work continues to align evidence-based criteria and metrics with the accelerated transitions needed, including the *Science Based Targets initiative* [2015], *Exponential Roadmap Initiative* [2018], the *1.5°C Business Playbook* [2020], and the UNFCCC's High-Level Champions' *Race to Resilience* and *Race to Zero* [2020] campaigns. Extensive collaboration has gone into international agreements and policies to address intersectional transboundary challenges, not least among them the *Paris Agreement* [2015] and *Sustainable Development Goals* (SDGs) [2015], as well as their respective precedents the *Kyoto Protocol* [1997] and the *Millennium Development Goals* [2000]. These evaluations simultaneously reflect the awareness of the extraordinary challenges humanity faces and outline pathways to deepen, accelerate, and scale transitions toward a sustainable future across sectors and domains (Loorbach et al., 2020). Despite these authoritative and convincing efforts, it is unlikely that many targets society has set for itself, including the Sustainable Development Goals (SDGs), will be met. There is a glaring gap between pledges and action because nations have, despite decades of risk assessments and warning from the scientific community, failed to

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reorient systems away from the risk of irreversible damage of Earth's environmental and societal systems thereby endangering the future of our world (United Nations, 2020a).

Societies and their decision-making bodies have the scientific evidence and scalable solutions in most sectors to substantially accelerate the actions required to reduce the unsustainable pressure on the life-supporting systems of our planet. We must interrogate what keeps us from acting – including, most essentially, the existing power structures across global political and economic systems that impede the development of capacity, will or courage needed to enact significant change. We must understand what options are left if we fail to meet the targets for moving into a future that allows future generations to thrive on a healthy planet.

The science-based calls of urgency are substantiated by rising evidence of extreme events and irreversible changes that occur faster than previously anticipated (IPCC, 2023). The fact that at least half a century has passed since the clear warnings of future planetary crises (e.g. Club of Rome), without adequate action from global society, has left humankind with response times of a few years to a few decades to move off the unsustainable trajectory it is on. We are on track of significantly exceeding the target of keeping global warming below the 1.5°C mark, and we are compromising the resilience of the biosphere. Science and analysts have warned and provided solutions within the realm of mainstream policy and economics for decades, expecting 'orderly' scaled action to solve the problems destabilizing the Earth system. We are rapidly approaching a decisive juncture: either we continue on a failing path, or we fundamentally transform how our societal systems function.

In this context the question emerges, what are the global-scale 'Must Haves' required to disrupt the deleterious trajectory we are on and accelerate global-scale transformations across all planetary boundaries and societal systems?

This query serves as the foundation of the 10 'Must Haves' initiative, a framework led by The Earth League, an alliance focused on global dialogue around anthropogenic change, and the 200 attendees of the first Global Futures Conference, held in September 2022. Our goal is to put forth an accessible and accelerated plan to overcome the gulf between actions and achievements related to global challenges that complement and enhance existing efforts to stay within the boundaries of our planet. The framework for this task is highly dynamic and adaptive, and involves collaboration across multiple sectors and disciplines. It includes perspectives representative of diverse stakeholder groups to reduce and address latent risks in transformation discourses (Blythe et al., 2018). It is grounded in the complexity of our interconnected Earth systems, and the recognition of the structural lock-ins of existing political economic systems that perpetuate unsustainable activity and injustice, and insufficiently inspire, stymie, or even suppress societal will toward broad-scale and rapid transitions. This Briefing sets the stage for forthcoming work that communicates a set of urgent 'must-do' actions to reimagine, restructure, and transform trajectories across all of Earth's systems toward a safe and just future for all (Rockström et al., 2023). (As this Briefing is to relay the thrust of the Initiative in a limited format, we refer to integral and complex concepts, such as justice and equity, in general terms. We acknowledge, however, that the operationalization of such terms is by no means universal. This Initiative is predicated upon a foundational vision of intra- and inter-generational and interspecies justice, where all are not only able to meet their basic needs, but have the opportunity to thrive in a sustainable relationship with Earth's life-supporting systems [e.g. see Gupta et al., 2023].)

The following 10 sections introduce what have been identified as absolute 'Must Haves' to escape the path of increasing crises that would lead to a planetary catastrophe.

1. A limit of global warming as close to 1.5°C as possible by 2050

Despite the availability of relevant knowledge and technologies, the world has yet to make significant progress in slowing down the rate of global emissions. We can curb emissions and alter the trajectory of increasing greenhouse gas (GHG) emissions through systemic transformations, which shall require at times unconventional yet deeply coordinated action (Bataille et al., 2018; Bogdanov et al., 2021; IPCC, 2022; Otto et al., 2020; Roe et al., 2019). Renewable energy technologies and carbon capture enterprises have made significant advancements (Bui et al., 2018; IEA, 2022; Kavlak et al., 2018; Rohrig et al., 2019). Solutions are available and increasingly proven to provide improved health, security, economic development, and well-being (IPCC, 2022; Karlsson et al., 2020; Markkanen & Anger-Kraavi, 2019). Yet, there has been neither significant decrease in fossil-fuel usage nor a reduction in GHG emissions (IPCC, 2021). Wealthier countries must take responsibility and financial leadership for a clean energy transition and a phased, rapid fossil-fuel phase out, based on the pursuit of equity and justice, science-based evidence, and best practices of sustainable policy implementation.

2. An immediate halt and reversal of the loss of nature's functions and diversity

New mechanisms and ways of thinking are needed to advance the conservation of natural systems and species in our interconnected world of 8 billion people expected to increase to ca. 10 billion. Scientists have credited humankind as the leading cause of the Earth's sixth mass extinction (Cowie et al., 2022; Myers, 1990), which, along with the loss of cultural heritage, threatens human well-being (For example, in terms of reduced food, clean air, and water, buffer zones to prevent zoonotic diseases.) and the capacity of the planet's natural systems to sequester carbon, cope with shocks, and provide stabilizing functions and services. To halt and reverse the trend of nature loss requires investments to restore and regenerate natural functions in agriculture and forestry, as well as urgent progress across all targets set by the Kunming–Montreal protocol (Leadley et al., 2022), such as *30X30* and *Nature Positive*. To be successful, sufficient financing and comprehensive mechanisms for monitoring and accountability are required (Leadley et al., 2022; Mace et al., 2018). Up to 80% of the planet's remaining intact biodiversity is reportedly located in the territories of Indigenous peoples and local communities (Obura, 2023), while the main drivers of decline are associated with economic growth and consumption (Obura et al., 2023). Equity and justice are deeply intertwined in action on biodiversity loss. Indigenous cultures have demonstrated effective ways to steward Earth's systems through traditional ecological practices, providing an opportunity for knowledge sharing led by these cultures.

3. Just economies that operate within planetary boundaries

The world's economies must move away from emphasizing profit and short-term outcomes toward systemic transformations that factor in environmental degradation and risk, material cycles,

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and labor protections. Economies that function within environmental and societal planetary boundaries must operate from a new equity-centered paradigm (UNRISD, 2022) that denies unconstrained, profit-driven exploitation of natural capital and instead recognizes the intrinsic value of natural capital and the critical role it plays in sustaining life on Earth (Dasgupta, 2021). The costs and risks of economic development activities must be accounted for in terms of their impacts through time on the coupled human–environment systems. There should be a concomitant reconceptualization of measurements for progress and development, moving beyond GDP and adopting comprehensive frameworks that integrate societal well-being and planetary health (Arrow et al., 2012; Bizikova et al., 2021; Costanza et al., 2009; Stiglitz et al., 2018; van den Bergh, 2022). Achieving the long-term health of the global economy, within a broader set of sustainability and equity goals, also requires authentic and representative stakeholder involvement and consent in decision-making (Bowen et al., 2017; Glass & Newig, 2019; Newig et al., 2018). Effective, inclusive decision-making is empowering – rendering visible and critical diverse knowledge systems embedded across relevant scales and domains – and improves outcomes. In terms of responsibility, a common but differentiated governance approach (Meuleman & Niestroy, 2015) may ensure that those least responsible bear the least costs and that loss and prevention is accounted for.

4. Equitable access to resources needed for human well-being

Achieving responsible consumption and production across scales, domains, institutions, and infrastructures is a prerequisite to ensure equitable access to resources needed for human well-being for current and future generations. Success hinges on a profound transformation undertaken by diverse stakeholders across consumption and production domains, underpinned by an active commitment from the private sector, regulators, and institutional structures (Alfredsson et al., 2018). Overconsumption of elements of life-supporting systems – typically vastly disproportionate, featuring the chasm between the wealthy and poor – is a fixture among systemic challenges negatively impacting communities that are the least responsible and most vulnerable. Examples include clean air and water; excessive waste; deleterious material cycles with extraction, production, and overuse of problematic materials; planned obsolescence and insufficient recycling. Across the world, 34–45% of global consumption-based household GHG emissions can be attributed to just 10% of households (IPCC, 2022). Within the private sector, advances have surfaced regarding guidelines and governance for corporate climate strategies (Day et al., 2023). Reforming the practices of high-consuming elites and households in high-income countries holds significant potential for action (Fuchs et al., 2021; Martin et al., 2021; Sahakian et al., 2021). However, research shows that individualizing responsibility limits the potential for systemic transformation (Stephens, 2021) which current realities demand (Bengtsson et al., 2018).

5. Governance transformations to stay within planetary boundaries

Societies must agree on frameworks that promote collective governance and management of the entire Earth system. Existing governance structures face numerous challenges in regulating the processes that result in the degradation of life-supporting systems on Earth, which undermine the well-being and intergenerational stewardship of all people. It is necessary to strengthen integration across different governance levels and accelerate the uptake of local innovations to improve the distribution of power and create a shared responsibility toward planetary health (Du Toit & Kotzé, 2022; Espinosa, 2023; McDermott et al., 2022). Despite considerable innovations at the local level, few platforms exist to scale local advances (Glennie & Huq, 2023) and adapt global proposals to local contexts. There is a fragmentation and lack of coordination between state and non-state actors (Stranadko, 2022). Decisions are not taken in a participatory and inclusive manner and mainly cater to the interests of those who already bear power, leading to increasing inequalities (Espinosa, 2023). Declining trust in science and government institutions further hinders progress (Kennedy et al., 2022; Philipp-Muller et al., 2022; West & Bergstrom, 2021). Leveling the playing field is an important function of governance institutions for just, sustainable futures, including effectuating ambitious multilateral agreements toward global standards, accompanied by capacity-building, such as through technology transfers and knowledge sharing across issues ranging from GHG emission leakages to occupational health and safety. Ideally, multilateralism should be an avenue for providing and deciding on issues concerning global public goods, guided by the principles of inclusion, co-responsibility, and social ownership (Espinosa, 2023).

6. Healthy, safe, and secure food for the global population

Fixing the food system, including mandating socially responsible practices across land and sea agriculture, is necessary for a trajectory toward human security. Our global food system delivers neither nutritional requirements for all people nor sustainability for the planet. There is insufficient progress to deliver on UN SDG 2 (United Nations, 2015), with 2.3 billion people being moderately or severely food insecure, 828 million affected by hunger, more than 200 million on the verge of starvation, and 10–11 million annually dying prematurely due to unhealthy food (Willett et al., 2019). Despite this underperformance of the global food system, it is one of the primary drivers for transgressing the safe planetary boundaries on loss of biosphere integrity (Dudley & Alexander, 2017), climate change (Tubiello et al., 2022), land-use change, nutrient overloading (nitrogen and phosphorus) (Quinton et al., 2010), freshwater overuse (Rost et al., 2008), and a major contributor to chemical pollution while also highly consuming resources such as energy (Paris et al., 2022) and fertilizers (Ludemann et al., 2022). Perturbations of the food system, driven by environmental degradation, disasters, and socio-political disruptions and conflict exhibit its vulnerabilities. There is an urgent need for a systemic shift toward the adoption of a flexible Planetary Health Diet, so-named for its promotion of healthy people living on a healthy planet while recognizing and evolving with local and seasonal dietary cultures and diversity (FABLE, 2020). We have the tools to scale up efforts that enable equitable access to healthy and sustainable food, in turn enhancing social and environmental resilience.

7. Reconnection of human well-being to planetary health

Compromising the health of our planet through humankind's over- and misuse of the Earth system prevents us from achieving well-being for the global population, particularly the most

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vulnerable populations who contribute the least to Earth's destruction. Pandemics and epidemics are predicted to increase in frequency (UNEP, 2020), as humans continue to invade and overexploit natural ecosystems for agriculture and development, facilitating zoonotic disease outbreaks. Vector-borne diseases (UNEP, 2020); anthropogenic air pollution (WHO, 2021); extreme weather events; and food and water insecurity (Brown et al., 2021) are among the persistent and growing threats. The COVID-19 pandemic simultaneously was a reminder that human well-being reflects the state of nature (and one another), as well as our ability to respond quickly to an immediate stressor (e.g. rapid development and deployment of vaccines and therapies) and to implement mechanisms to mitigate future similar harms (e.g. disease-tracking programs). Addressing the health risks posed by global environmental challenges therefore requires a rapid transformation of planetary health, in which society is seen as part of our biosphere rather than as a separate entity.

8. An ethical digital world providing for human security, equity, and education

The digital realm has become a primary platform for information exchange across the world. Formerly disconnected and hard to reach geographies and populations can now be accessed through digital technologies. Open-source data sharing can strengthen local, regional, and global responses to threats (UNDRR & WMO, 2022). Yet, despite the promising potential – and demonstrated advances in expanding access to high-quality education and credible information – the access and impact of digital tools remains deeply inequitable and insecure, with insufficient oversight mechanisms in place (Gillwald & Partridge, 2023; GMSA, 2022; Mehta & Erickson, 2022; OECD, 2018). At a broader scale, the speed with which disinformation can be spread poses important challenges and concerns for governance and democracy, specifically in terms of power imbalances, and trust and credibility in democratic processes and scientific or governmental authority in general (Colomina et al., 2021; Pew Research Center, 2020). Overall, studies reveal insufficient regulatory frameworks that can anticipate and address current societal and ethical implications in the context of growing use of disruptive technologies (Mantelero, 2018). The fading boundaries between the digital and the physical worlds call for redirecting our trajectories in this space.

9. Stability and security for a global society

Amidst a global panorama of increasing tension and instability, understanding how different sources of inequality and marginalization, including gender, socio-economic status, and race, interact and distinctly increase risks and vulnerabilities is crucial toward thriving, sustainable global futures (DPPA, 2022; OECD, 2022; United Nations, 2020b). Weakening democracies, rising authoritarianism and a geopolitical shift toward heightened risk of armed conflict on account of a 'great powers' model, distract from existential crises such as environmental degradation and increasing inequalities. Establishment of a new security doctrine, where all Earth tipping elements – the large biophysical systems that regulate the stability of the planet and all its life-supporting systems – are governed as part of an international regime, is required to potentiate and protect societal stability and peace across all nations in the world (UNEP et al., 2020; United Nations & World Bank, 2018). This calls for an innovative approach to security and stability and a new agenda for peace – one that moves beyond military solutions and 'ill-suited' forms of risk prevention, management, and resolution and focuses on advancing an inclusive and just peace (The Stimson Center, 2022; United Nations, 2021). At the highest level, we must establish multilateral positive peace alliances, built on complex understandings of planetary health, human security, and a resilient and just global political economic system.

10. A resilient global society ready to respond to planetary crises

We seek a global community that demonstrates resilience: withstanding shocks, and adapting nimbly to changing conditions. This transformation requires developing mutual trust and bolstering social and ecological diversity and human agency. Empathy, meaningful, and respectful inclusion of different knowledge systems and responsibility are paramount – for example, celebrating and learning from Indigenous communities who have historically exhibited advanced resilience-building capabilities, in terms of land use, human life, crisis management, and energy sources (Bohensky & Maru, 2011). Droughts, floods, diseases, and fires – which are becoming more intense and frequent – are amplifying the outbreak of conflict, food scarcity, displacement, and migration (Dai, 2011; Folke et al., 2021). As inequality rises, democratic systems weaken, human rights abuses increase, distrust grows, and polarization widens across the globe (United Nations, 2020a). To deal long-term with shocks, underlying stressors and the systemic risks their interactions generate (Keys et al., 2019), inclusive and contextually specific renderings of the definition and objectives of resilience should be generated (Reyers et al., 2022): outlining the socio-environmental landscape, relevant vulnerabilities, and needed and potential resources. From that foundation, the capacities to detect, prevent, and respond to potential crises must be developed and invested in (Bauch et al., 2016; Bury et al., 2021; Lenton, 2020); protocols to recognize the spillover effects of strife and collapse across scales must be institutionalized; social equity must be strengthened; and opportunities, both financially and logistically, must be enabled for resilient, sustainable development.

11. Action-forward

We must transition from calamity to opportunity by leveraging coordinated political will, private sector innovation, and the demands of an informed civil society. Scaling solutions, trust in science and governance institutions, indigeneity and inclusion of diverse knowledge systems, gender equity, youth participation, and accountability are among the elements that cut across the 10 Must Haves. By identifying the most critical actions needed to respond to each 'must have', the combined '10 Must Haves' provide a global contingency plan that spans disciplines, sectors, and geographies to halt the path toward irreversible and destructive changes to planetary systems and promote the transformations that are urgently needed. Accompanied by multi-stakeholder engagement and an emerging coalition of actors across sectors, knowledge systems, and the world, the '10 Must Haves' Initiative will clarify pathways of action and accountability rooted in evidence, aligned with leaders in different domains to get to work on implementation.

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