

## Reinforcing the SDGs to live within safe and just thresholds

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### Abstract

The concept of safe thresholds is crucial in preventing tipping points, while just thresholds aim to minimize significant harm to people. Strengthening the environmental Sustainable Development Goals (SDGs) can be achieved by integrating these safe and just thresholds into the environmental goals. The SDGs also emphasize the need for minimum access to resources and reduced inequalities. To enhance the effectiveness of the SDGs, it's essential to integrate improved minimum access indicators and targets. However, even without meeting these minimum access requirements, boundaries have already been breached. Achieving the SDGs and staying within Earth System Boundaries (ESBs) will require systemic transformations, resource redistribution, and the development of transferable and accessible sustainable technologies.

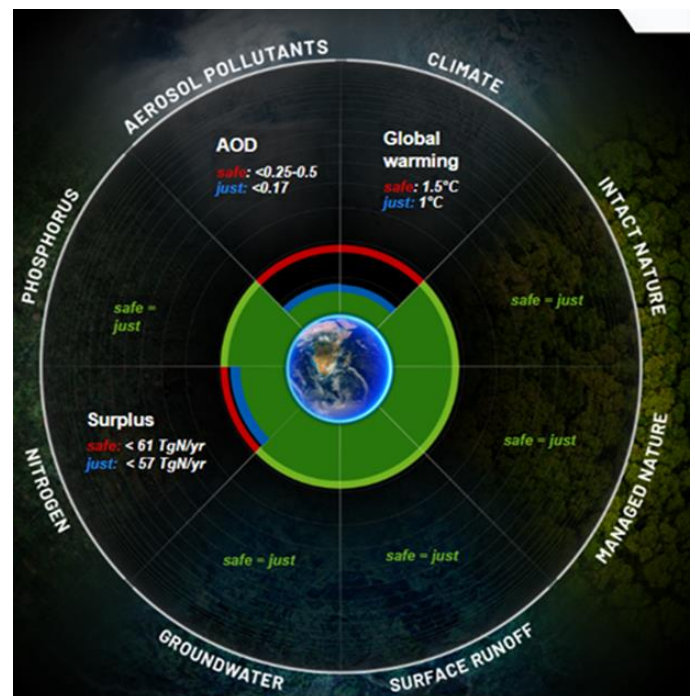
### Safe thresholds protect Earth System Stability and prevent tipping points; just thresholds minimize significant harm to people: The environmental SDGs can be strengthened using the safe and just thresholds

In the Anthropocene, humans and their unsustainable activities are damaging the Earth to the point that we are running the risk of destabilizing the bio-geophysical systems that support life. It is essential therefore to identify the limits beyond which these systems are no longer able to support life, either because they tip over into a new equilibrium or because they can no longer provide ecosystem services. The Earth Commission (EC) has identified the safe thresholds/boundaries for 5 domains, to stabilize the Earth system, such as the protection of biodiversity and the avoidance of climate tipping points (Rockström et al., 2023). Even within safe thresholds, human beings and ecosystems are still exposed to significant harm due to Earth system change. The EC shows that some safe thresholds are not stringent enough to protect humans and other species today, and that we cannot achieve and live within these safe thresholds if inequality is high and resources are unjustly distributed (Rockström et al., 2023; Gupta et al., 2023). Hence, we:

- (a) propose that some thresholds be made more stringent to protect present and future generations and ecosystems,
- (b) complement safe boundaries with local-level standards to protect present generations and ecosystems,
- (c) propose that if the boundary is likely to cause considerable difficulties for present generations, it

should be complemented with policies that account for distributive justice.

**Figure 1.** Safe and Just targets for the five domains and eight boundaries



Data source: Gupta & Rockström plenary presentation at World Economic Forum, Davos. Credit: Globaïa for the Earth Commission (2023, January).

### The SDGs call for minimum access, reduced inequalities and a safe Earth system

The 2030 Agenda calls for action to achieve minimum access (e.g., SDGs 1 and 2, 6), and reduce inequalities (e.g., SDGs 5 and 10) while protecting the environment (e.g., SDGs 13 and 15). We argue that these goals are connected and to understand these connections new indicators must be devised and adopted. We have

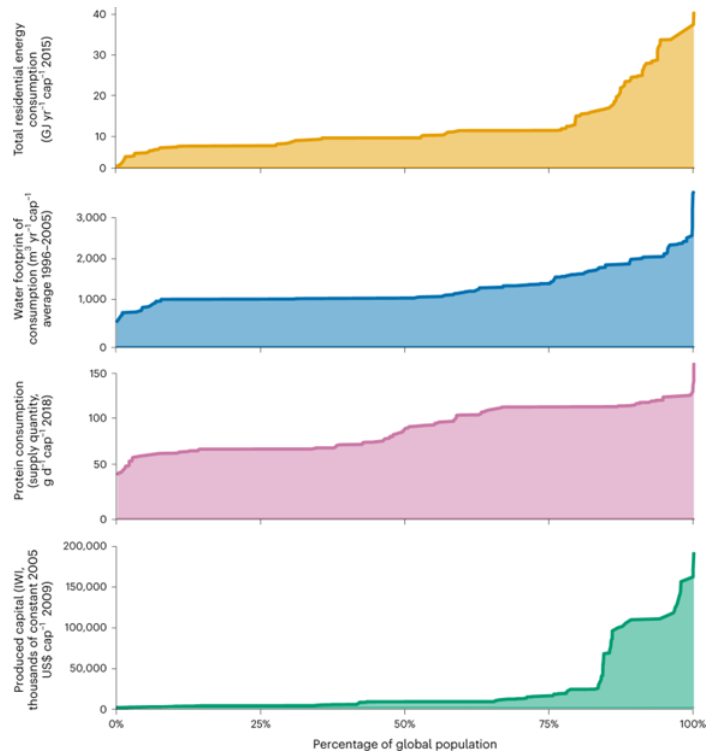
developed a framework to better understand and quantify how these goals interact: solving poverty and meeting access needs while protecting the environment will require addressing the current allocation of resources. An Earth System Justice approach is needed focusing, inter alia, on recognition and epistemic justice, interspecies, intergenerational and intragenerational justice, procedural justice (access to information, decision-making, civic space and courts) and substantive justice (access to minimum and allocation of remaining resources, risks and responsibilities) (ref.).

The term Great Acceleration refers to a speeding up of the growth rates of socioeconomic development that is profoundly impacting the structure and functioning of the Earth system (Steffen et al. 2015). The world's 2,153 billionaires have accumulated more wealth than the bottom 60% of the world's population (Alejo Vázquez Pimentel et al., 2018). The richest 10% in the OECD countries own as much wealth as the poorest 52% (Balestra & Tonkin, 2018). Rammelt et al. (2022) argue that by appropriating the bulk of the Earth's resources, the wealthy drive the Great Acceleration—not the poor. The authors show the recent state of this Great Inequality for selected material needs for energy, water, food and infrastructure. Figure 2 (see on the right) indicates that a relatively small share of the world population places disproportionately larger material claims on the eco-space.

### The SDGs need to be integrated with improved minimum access indicators and targets

Aligning with the SDG targets, justice in access to minimum resources supports human rights, reduces vulnerabilities, and enables people to live healthy and productive lives (Derek et al. 2015). According to Rammelt et al. (2022), minimum access must be conceptualized and operationalized in order to understand how their achievement might impact the Earth system. The authors looked beyond the international poverty line and instead defined 'just access' as minimum per capita requirements that would enable a dignified life beyond survival (level 1—dignity) to those that enable escape from poverty and vulnerability (level 2—capability). As shown in Figure 3 (see on the right), the authors examine 4 key resources for minimum access: food, energy, water, and infrastructure (in terms of access to shelter and transportation). We propose that the SDG indicators can include such minimum access needs preferably prioritizing escape from poverty and contextualize them within specific contexts.

**Figure 2.** Inequalities in resource use for selected material needs.



Data source: Rammelt et al. 2022. Nature Sustainability. <http://creativecommons.org/licenses/by/4.0/>

**Figure 3.** Quantifying minimum levels of access to water, food, energy and infrastructure

| Access domain            | Access level | Value | Unit  |
|--------------------------|--------------|-------|---|
| Energy                   | 1            | 74.5  | Kilowatt-hours per capita per year (kWhcap <sup>-1</sup> yr <sup>-1</sup> )       |
|                          | 2            | 255   |   |
| Water                    | 1            | 50    | Litres per capita per day (lcap <sup>-1</sup> d <sup>-1</sup> )                   |
|                          | 2            | 100   |   |
| Food                     | 1            | 2,100 | Kilocalories per capita per day (kcalcap <sup>-1</sup> d <sup>-1</sup> )          |
|                          | 2            | 2,500 |   |
| Infrastructure—housing   | 1            | 7     | Square metres per capita (m <sup>2</sup> cap <sup>-1</sup> )                      |
|                          | 2            | 15    |   |
| Infrastructure—transport | 1            | 3,500 | Passenger kilometres per capita per year (pkmcap <sup>-1</sup> yr <sup>-1</sup> ) |
|                          | 2            | 4,500 |   |

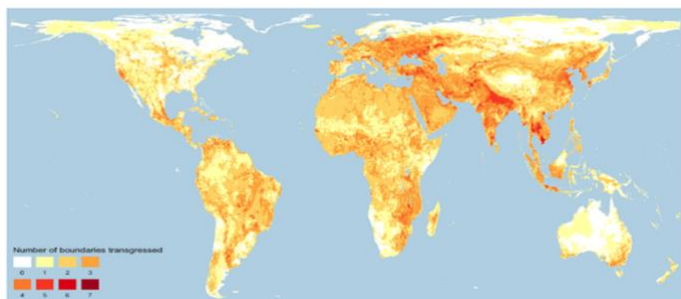
Data source: Rammelt et al. 2022. Nature Sustainability. <http://creativecommons.org/licenses/by/4.0/>

### Even without meeting minimum access the thresholds have already been breached

At the global level, we have breached 7 of the 8 thresholds (Rockström et al., 2023). The global aerosol threshold is the only one that has not been breached yet, however, it has been breached at local level. For climate, we have not breached the safe threshold (currently at 1.2°C), but the just threshold has been breached, causing significant harm to humans and ecosystems.

Worldwide, at least 2 of the proposed thresholds have been breached everywhere, which has affected more than half the land mass where 86% of the world population lives (see Figure 4).

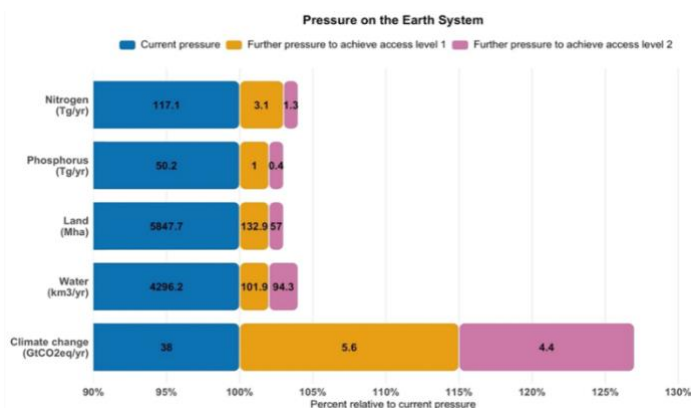
**Figure 4.** Hotspots of current ESB transgressions



Data source: Rockström et al. 2023, Nature. <http://creativecommons.org/licenses/by/4.0/>

The overshooting of such thresholds goes hand in hand with tremendous inequalities in both responsibility and harm (Gupta et al. 2020). Research has shown what the additional pressures on the Earth system would be, in 2018, if adequate minimum access to food, water, energy, and infrastructure was achieved (Rammelt et al. 2022). The year 2018 was chosen because it was a pre-covid year and because it could be assumed that technology and inequalities remained constant. Results showed that meeting such needs would increase pressures on the Earth’s natural systems, raising greenhouse gas emissions by 26% whilst raising water and land use, and nutrient pollution by 2-5% (see Figure 5).

**Figure 5.** Pressure on the Earth System of meeting the basic needs of those below that level in 2018



Data source: Rammelt et al. 2022. Nature Sustainability. <http://creativecommons.org/licenses/by/4.0/>

The study has shown that these pressures, arising from the poorest third of humanity achieving adequate resource access, equalled the pressures caused by the wealthiest 1-4%. This provides scientific evidence for concluding that to achieve societal and environmental

goals, it is the wealthy (who appropriate the bulk of Earth’s resources and ecosystems - not those escaping poverty) who need to undergo transformative change.

### Policy recommendations

Staying within these thresholds requires systemic transformations, resource redistribution, and transferable and accessible sustainable technologies.

Achieving access to minimum resources and services for all whilst safeguarding the stability of the Earth system requires resource redistribution and societal transformations (Rammelt et al., 2022; Rockström et al., 2023). In fact, redistribution is essential, but it must go hand in hand with the development of sustainable technologies that are transferable and accessible to the Global South, and radical reform of the economic system to prioritize justice and sustainability for all. Since the social and environmental goals are connected, the SDGs must be integrated with new and improved minimum access indicators as well as thresholds for the environmental goals. These would then be used to steer the redistribution of resources, risks and responsibilities, and the transformation of water, food, infrastructure and energy provisioning systems. The aching poverty and inequality suffered by people in the Global South – as a consequence of the development of the Global North – must be addressed to provide a meaningful life for all, without transgressing key Earth system thresholds.

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### References

Alejo Vázquez Pimentel, D., Macías Aymar, I. & Lawson, M. Reward Work, Not Wealth: To End the Inequality Crisis, We Must Build an Economy for Ordinary Working People, Not the Rich and Powerful (Oxfam, 2018).

Balestra, C. & Tonkin, R. Inequalities in Household Wealth Across OECD Countries: Evidence From the OECD

Wealth Distribution Database (OECD Publishing, 2018); <https://doi.org/10.1787/7e1bf673-en>

Derek, O., Amy, C. & Farooq, U. Universal Sustainable Development Goals: Understanding the Transformational Challenge for Developed Countries (Stakeholder Forum, 2015)

Gupta, J. et al. "Re-imagining the driver–pressure–state–impact–response framework from an equity and inclusive development perspective." *Sustain. Sci.* (2020) 503–520

Gupta, J. et al. "Earth system justice needed to identify and live within Earth system boundaries." *Nature Sustainability* (2023): 1-9

Rammelt, C. F., & Gupta, J. "Inclusive is not an adjective, it transforms development: A post-growth interpretation of Inclusive Development." *Environmental Science & Policy* (2022): 144–155

Rammelt, Crellis F., et al. "Impacts of meeting minimum access on critical earth systems amidst the Great Inequality." *Nature Sustainability* (2022): 1-10

Rockström, Johan, et al. "Safe and just Earth system boundaries." *Nature* 619.7968 (2023): 102-111.

Steffen, W. et al. "Planetary boundaries: guiding human development on a changing planet." *Science* (2015): 1259855

UN DESA. 2022. The Sustainable Development Goals Report 2022 - July 2022. New York, USA: UN DESA. © UN DESA. <https://unstats.un.org/sdgs/report/2022/>

United Nations. "General Assembly Resolution A/Res/70/1: Transforming Our World: The 2030 Agenda for Sustainable Development." (2015).