

TOWARDS A JUST WORLD ON A SAFE PLANET

Earth System Boundaries,
justice and transformations

futureearth
research for global sustainability



The Earth Commission's findings underscore the urgent need for action across Earth's vital systems, the importance of justice in sustainable development, and the need for just transformations. Safe and Just Earth System Boundaries are designed to be used by actors such as cities and businesses, and provide guidance for action towards a safe and just future for every human and the planetary web of life we all rely on.

FOR THRIVING SOCIETIES WE NEED A THRIVING PLANET

All life on Earth depends on clean air and water, biodiversity, healthy oceans, and a stable climate. These are the global commons: shared resources that ensure a habitable planet. However, overconsumption, pollution and inadequate management of the global commons are causing significant harm to people and the critical life support systems we all depend on.

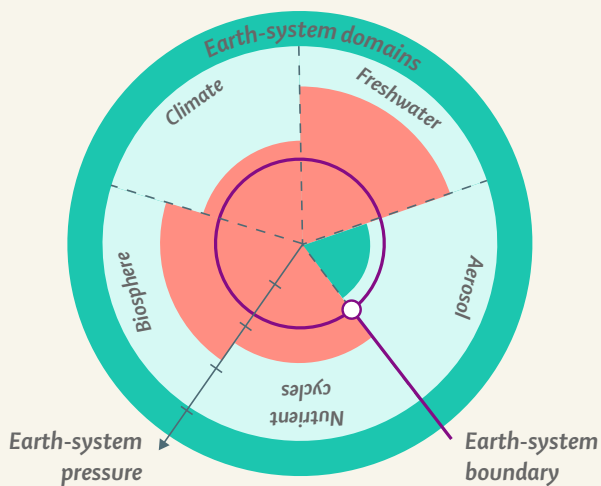
These pressures on the Earth system threaten human health and economies, ecosystems and the services they provide. They put the planet on the brink of irreversible tipping points, such as rapid climate change and loss of critical ecosystems, with the potential to drastically destabilise the societies that depend on them.

Whilst some groups, industries and countries use a disproportionate share of the planet's resources

(such as water, land and energy) billions don't have sufficient resources for wellbeing and to escape from poverty. Many people who do not have access to these basic resources are also the most vulnerable to the impacts of current and future Earth system change.

SAFE AND JUST EARTH SYSTEM BOUNDARIES

Launched in 2023, the Earth Commission's groundbreaking *Safe and Just Earth System Boundaries* brought people and justice to the heart of Earth system science. A paper published in the journal *Nature*¹ showed that most of the boundaries have been breached – with serious implications for humans and Earth system stability. It sent the clear message that the wellbeing of people, societies and businesses are inseparable from the health and stability of the planet.



The safe and just boundaries have already been transgressed for four critical Earth-system domains (biosphere, climate, nutrient cycles and freshwater) at global scales. The boundaries for aerosols are breached in many parts of the world. Excerpt from an infographic from The Lancet Group available at <https://www.thelancet.com/infographics-do/Earth-commission-2024>

In other work the Earth Commission calculated the implications of providing everyone with a minimum amount of resources needed to live a life with basic living standards, and the pressure that this ‘minimum access’ has on the Earth system in terms of resource use and pollution.²

The Earth Commission’s Safe and Just framework complements and builds on previous research, such as the Planetary Boundaries³⁻⁵ (nine biophysical processes that regulate the stability of the Earth system), Doughnut Economics,⁶ and on the United Nations’ Sustainable Development Goals such as the eradication of poverty and hunger and ensuring safe water and energy for all.

The Safe and Just framework is innovative in that it ensures both Earth system stability (safe boundaries), minimises harm to people (just boundaries) and ensures basic living standards for all (minimum access) - all along the same control variables and with the same units. For example, the boundary for freshwater shows how much water can be used within river basins whilst minimising risks to ecosystems and humans, and the minimum access levels is an indicator of how much water is needed to provide basic living standards for everyone.

The Safe and Just Space in between represents the remaining water resources that should be shared in a just manner.

The Safe and Just Boundaries thus provide important insights into Earth’s finite limits and guidance of how to protect people whilst also protecting the planet.

EARTH SYSTEM JUSTICE IN THE ANTHROPOCENE

The work of the Earth Commission is underpinned by Earth System Justice. *This can be defined as an equitable sharing among all people of nature’s benefits, risks, and related responsibilities within safe and just boundaries to provide universal life support and wellbeing.* Earth System Justice includes justice among people today, for future generations and for other living beings.

Earth System Justice applies the concept of justice to the planet and its rich variety of life as an interconnected whole. This includes people and all living things – animals, plants and other species – and the water we drink, the air we breathe and a stable climate. This integrated justice framework incorporates many forms of justice, and prioritises the poorest and most marginalized, who are disproportionately exposed to environmental degradation. It highlights that their involvement and knowledge must be recognised and that all those affected should be included in decision making. It also acknowledges the injustice that responsibilities for the pressures on nature, as well as the harm these pressures cause, are unevenly distributed.⁷

EARTH SYSTEM BOUNDARIES ARE SCIENTIFICALLY QUANTIFIED SAFE AND JUST THRESHOLDS FOR CLIMATE, FRESHWATER, BIOSPHERE, NUTRIENT CYCLES, AND AEROSOL POLLUTANTS.

- The **safe boundaries** ensure a stable and resilient Earth system, safeguarding the biophysical conditions that have enabled humans to flourish.
- The **just boundaries** are set to minimize the exposure of humans and nature to significant harm (existential or irreversible negative impact, for example widespread loss of life and livelihoods, deterioration of health, and displacement).

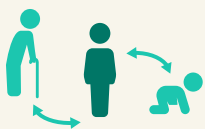
Two important goals of Earth System Justice are to minimise significant harm from exceeding the boundaries, and ensuring that everyone has what they need for a life free from poverty.

JUST BOUNDARIES MINIMISE HARM

Safe boundaries may not be enough to protect people and local ecosystems from harm. Based on a broad review of justice scholarship, the Earth Commission developed “the three ‘I’s of justice” to help identify just boundaries:



Interspecies justice and Earth system stability (a stable Earth system is needed for justice between humans and other species)



Intergenerational justice (between past and present and between present and future generations)



Intragenerational justice (between countries, communities and individuals).

Excerpt from an infographic from The Lancet Group available at <https://www.thelancet.com/infographics-do/Earth-commission-2024>

Using the lense of these three forms of justice the Earth Commission assessed if each safe boundary adequately protects people and other species from significant harm, or if justice considerations require a more stringent boundary. For example, for climate a boundary limit of 1.5°C was deemed safe for planetary processes to retain their stability. However, even at current levels of an average warming of just over 1°C, millions of people are suffering and their health, lives and livelihoods are significantly harmed. Therefore, the just climate boundary was set at 1.0°C to reduce the harm from climate change.

Whilst some boundaries are complemented with local level standards to protect people, for example in the case of air pollution, others, such as biodiversity and freshwater, the safe and just boundaries coincide.

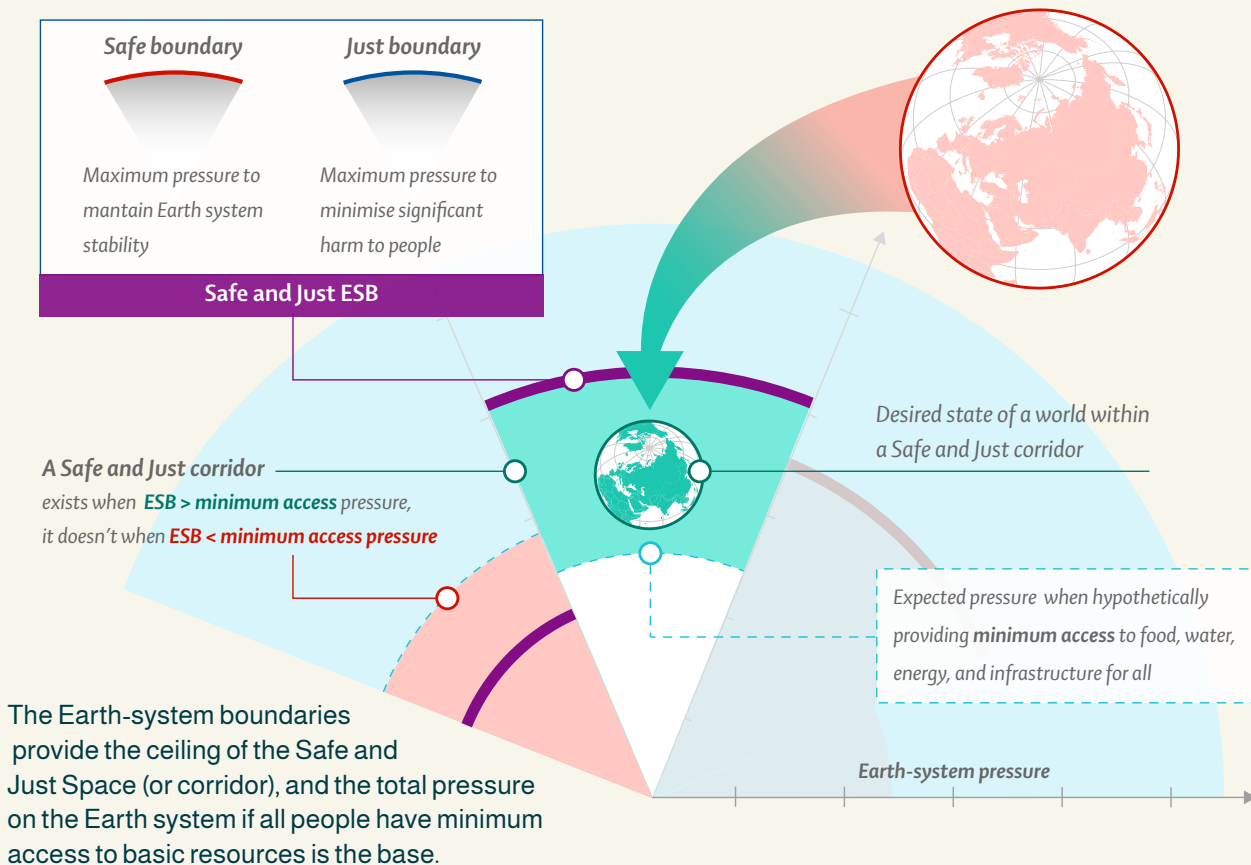
ENSURING ACCESS TO BASIC LIVING STANDARDS

Earth System Justice goes beyond the international poverty line that aims to bring people out of extreme poverty. The Earth Commission provides quantifications of access to food, energy, water, and infrastructure (shelter and transportation) at levels needed to enable a dignified life beyond survival and escape from poverty and vulnerability for all.

Increasing access to resources for the most disadvantaged could increase resource use and pollution, but this pressure on the Earth system would be small compared to the pressure caused by the well-off minority who currently use far greater resources. The Earth Commission has shown that ensuring minimum access in today’s unequal world for those lacking it, would lead to marginally increased pressures on the Earth’s natural systems, except for the climate system where the impact could be significant. However, pressures arising from roughly the poorest third of humanity consuming at the level of ‘minimum access’ equals those caused by the wealthiest 1–4%.²

This implies that in order to achieve societal and environmental goals, transformative change must redistribute a modest amount of resource consumption from ‘overconsumers’ to ‘underconsumers’. This is not an issue of too many people, this is an issue of overconsumption by a minority.





Excerpt from an infographic from The Lancet Group available at <https://www.thelancet.com/infographics-do/Earth-commission-2024>

A SAFE AND JUST SPACE FOR HUMANITY

In its latest major publication, *A just world on a safe planet* in the journal *Lancet Planetary Health*⁴, the Earth Commission identifies where on the planet Earth System Boundaries are currently exceeded and people are exposed to harm, especially where socioeconomic conditions such as poverty have made people more vulnerable and thus experiencing greater impacts. The paper expands the work on ensuring access by projecting the implications of access for all on the Earth system in 2050.⁸

The paper introduces the idea of a ‘Safe and Just Space’ (in the paper called corridor), a dynamic space constrained by efforts to stay within safe boundaries and ensure justice. The ‘ceiling’ of the corridor is defined by the safe and just Earth system boundaries and the ‘foundation’ or floor of the corridor is based on providing equal access to minimum resources for all.

It is in this space that businesses, policy-makers and communities can operate without destabilising the Earth system in a future where everyone can live free from poverty.

A future projection to 2050 shows that the Safe and Just Space will shrink, unless we urgently transform. For example, providing even basic living standards for everyone, without adjusting for high energy consumption by some and decarbonizing technologies, would take climate far outside the safe boundary with rapid warming and high risk of crossing dangerous tipping points.

CITIES AND COMPANIES CAN ACCELERATE TRANSFORMATIONS

For global boundaries to make a difference in reality, they have to be ‘translated’ and down-scaled to allow countries, cities, companies and citizens to take action. The Safe and Just Space shows the available ‘budgets’ of freshwater, nutrients, land and carbon that can be used, when everybody has been granted basic living standards. These resources need to be shared in a just way.

Because of the magnitude of their impacts, and their potential to take swift action and act as agents of change, the Earth Commission has focused on methods to translate boundaries to help steer the operations of companies and cities.

The process of identifying fair shares of resources, but also responsibilities for restoration and emission reduction, includes several steps.

First, the boundaries have to be converted into units that cities and companies can act upon.

The second step is to allocate budgets - to determine how much of a resource a company or city can use, and how much it needs to contribute to restoration. The third step includes adjustment between actors within a sector, to reflect their specific environmental, social and economic contexts.

The Earth Commission proposes ten principles to guide this process of translating science into action; for example the translation has to be scientifically rigorous, transparent and just, and the science-based targets should be enabling, time bound and synergetic. By following these principles, decision-makers can devise pathways towards practices that respect the boundaries, through for example planning, benchmarking, assessing risks and reducing impacts.

JUST TRANSFORMATIONS ARE URGENTLY NEEDED: A CALL TO ACTION

The Earth Commission echoes other studies that suggest there are enough resources on the planet for humanity to live safely and justly whilst ensuring a stable and resilient planet, now and into the future. But, this requires multiple urgent transformations to address inequalities, improve governance and reduce pressures on the Earth system.

Living within the Safe and Just Space is critical for a future safe from destructive planetary change, and protect people from harm and allow basic living standards for all. How can we transform societies so as to achieve this?

The Earth Commission proposes a portfolio of transformations that would reduce pressure on the Earth system while providing resource access for those without. These transformative approaches must be local to global and anchored in the following three major shifts:

1. **A transformation of unsustainable consumption patterns**
2. **A transformation of unsustainable technology**
3. **A transformation of unsustainable economic systems**

All three require transforming governance from local to global scales. The Earth Commission also highlights the need to transform social norms and values to address the root causes of environmental change and vulnerability and the importance of women's rights in reducing overall population pressures.

There are a range of existing policies and practices that already aim to limit excessive and environmentally damaging consumption such as the regulation and taxing of pollution, incentives for energy efficiency and ecosystem protection, certification of more sustainable foods and products, voluntary efforts by individuals and businesses, and education and information programs. More efficient and affordable renewable energy technologies are replacing fossil fuels and new measures of economic progress can focus less on growth and more on sustainable actions. Governance can include policies to provide access to basic resources and reduce poverty, as well as direct efforts to reallocate consumption. But these changes are not fast or extensive enough to keep us within a safe and just corridor and must be accelerated and expanded.

The Safe and Just Boundaries are designed to become a scientific backbone of the next generation of sustainability targets and practices such as Science Based Targets for Nature; to help leaders and policy-makers access the opportunities offered by the Safe and Just Space by better managing the planet's finite resources.

In addition, governing for a safe and just future must include transformative policies that address inequalities as well as reduce the pressures on the planet.

KEY MESSAGES ON JUSTICE

IT REMAINS POSSIBLE for all humans to escape poverty and be safe from harm caused by Earth system change – but the planet’s ability to provide and protect is being stretched past its limits.

THE SAFE AND JUST SPACE is the only space rich in opportunities – but future projections to 2050 show that this Space will shrink over time, driven by inequality, unless urgent transformations take place.

JUSTICE IS NECESSARY for achieving planetary safety. The only way to provide for everyone and ensure societies, businesses and economies thrive without destabilising the planet is to reduce inequalities in how critical Earth system resources, such as freshwater and nutrients, are accessed and used - alongside economic and technological transformation.

ACHIEVING EARTH SYSTEM JUSTICE is not possible with business-as-usual or incremental change. Correcting the course of the multiple planetary and social crises – such as climate change, biodiversity loss, pollution, and poverty – gets harder every year. Transformative, systemic, and rapid change is needed.

JUST TRANSFORMATIONS ARE NECESSARY and includes changes to how we run our economies, through governance policies and activities that address inequality whilst reducing pressure on the planet, better management, sharing and usage of resources, as well as investment in sustainable technologies.

THE OPPORTUNITY OF OUR LIFETIME. If we learn to operate within the ‘Safe and Just Space’, way we can protect and future-proof the economies and natural resources upon which countries, companies, cities and citizens all depend

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ABOUT US

The Earth Commission is an international team of social and natural scientists engaging over 60 researchers around the globe, and is coordinated by its scientific secretariat and hosted by Future Earth – the globe’s largest network of sustainability scientists.

It is the scientific cornerstone of the Global Commons Alliance, a growing coalition of scientists, philanthropists, civil society groups, businesses, and innovators, enabling collective action to safeguard the global commons.

