

# The 9 planetary boundaries

The “**planetary boundaries**” drawn by the *Stockholm Resilience Centre* in 2009 **define the environmental limits within which humanity can safely operate**, not harming the Earth’s ecosystem. Exceeding would turn the Earth into an unwelcoming place.

The picture below depicts how the different control variables for the 9 planetary boundaries **have changed since 1950** (source: Steffen et al. 2015). Green means safe operating space: keeping within the boundaries means a safe place for us and for the Earth as a whole.



(1) It includes the introduction and accumulation of all novel chemical compounds created by humans, such as microplastics, pesticides and nuclear waste. (2) Thinning of the ozone layer. (3) Microscopic particles in the atmosphere that affect climate and living organisms. (4) Phosphorus and nitrogen cycles. (5) Land use. (6) Biodiversity loss and species extinction.

\*Invisible water, retained by the soil and plants. \*\*Visible water in rivers, lakes etc.

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