Global Commons in the Anthropocene: World Development on a Stable and Resilient Planet

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1 Motivation

Three decades of internationally coordinated research on the Earth system has led to the conclusion that Earth has entered a new geological epoch – the Anthropocene. The stability and resilience of the Earth system is now at risk. Yet, a stable Earth system is a prerequisite for human development.

For millennia, communities have effectively managed common-pool resources on a small scale, for example forests, rangeland and fisheries. As industrial impact has grown, and nation-state norms have evolved, the need to manage globally common resources emerged. But now, the reality of full scale of national ecological interdependencies and human impact on the Earth system challenge this traditional thinking on the global commons. How do societies shift world views to accommodate this new thinking? Can knowledge of effective management of common resources be applied at the planetary scale? How are user rights established?

2 Great Acceleration and the Anthropocene

At some point after 1950, the socioeconomic system coupled strongly with the Earth system – the oceans, atmosphere, ice sheets, soils, cycles and waterways and diversity of life that combine to keep Earth habitable. Now, the socioeconomic system is the primary driver of change in the Earth system and this is taking place at an unprecedented magnitude and speed (Figure 1). In a remarkably short space of time, industrial societies have pushed Earth into a new geological epoch, the Anthropocene. As a result of human intervention, the stability of the Earth system is at risk. Indeed, scientists have identified nine Planetary Boundaries that it would be unwise to transgress. However, according to the latest assessment in 2015 (Steffen et al. 2015), four of these boundaries have been breached, namely climate, biodiversity, land-use change and biogeochemical cycles.

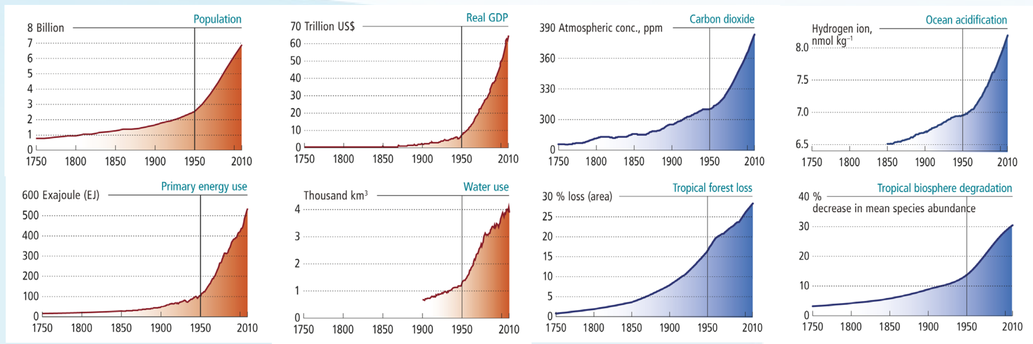

Figure 1: The Great Acceleration – select socioeconomic and Earth-system trends. Source: Steffen et al., 2015.

The Great Acceleration captures the key global megatrends of the 20th century. How will these trends evolve in the 21st century? While future megatrends are inherently unpredictable, six critical trends that are likely to determine the future state of the Earth system are population growth, GDP, urbanization, energy use, GHG emissions and land-use change.

3 Tipping Points Threatening Earth Stability

These future megatrends will further aggravate human pressures on the Earth systems with future responses of the latter being often opaque. The notion that a single stable equilibrium is the natural state of Earth is not supported by observations of past global changes (Steffen et al. 2004). The behavior of the Earth system is typified not by stable equilibria, but by strong nonlinearities, where relatively small changes in a forcing function can push the system across a threshold and lead to abrupt changes in key aspects of system functioning where the internal dynamics of the system kick in and accelerate change – we call these "tipping elements" or "tipping points" (Lenton et al. 2007).

Examples include the rapid ending of ice ages, the exceptionally rapid warming and cooling events in the North Atlantic region, mega-droughts and other extreme events. A recent analysis of tipping elements in the Earth system (Figure 2) indicates that at temperatures of between 2–3°C above pre-industrial temperatures the risk of the subsystems of the Earth system collapsing becomes high, though many uncertainties remain (Schellnhuber et al. 2016).

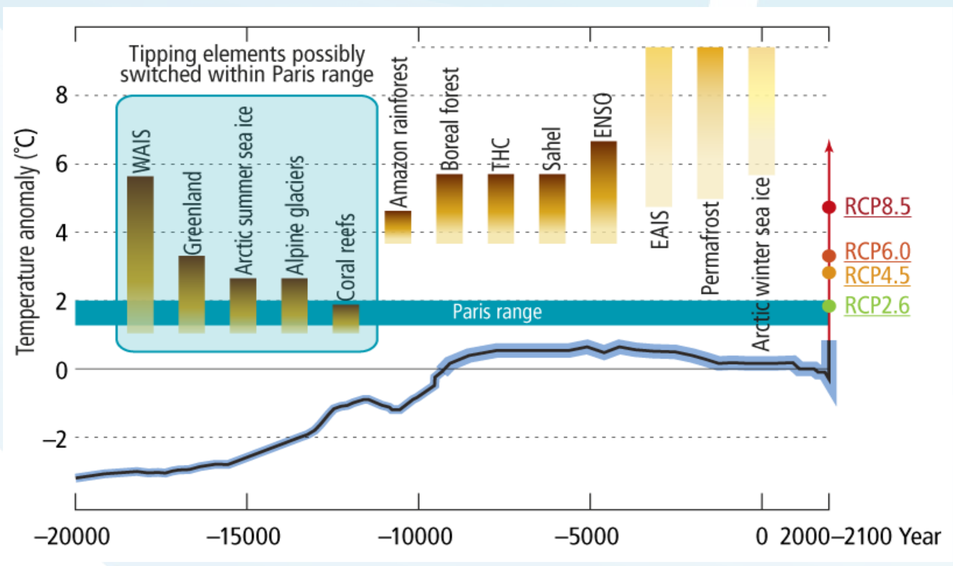

Figure 2: Evolution of global mean surface temperature from the Last Glacial Maximum through the Holocene and future global warming scenarios (RCP, Representative Concentration Pathways) related to tipping elements. WAIS, West Antarctic ice sheet; THC, thermohaline circulation; ENSO, El Niño-Southern oscillation; EAIS, East Antarctic ice sheet. Adapted from Schellnhuber et al., 2016.

4 The New Global Commons in the Anthropocene

The Anthropocene thus changes our relationship with the planet and how societies view the "global commons". One definition of the global commons currently used by international law names: **the high seas; the atmosphere; Antarctica; and outer space** – as the globally common resources that fall outside national jurisdictions.

However, **the stability and resilience of the Earth system is also common to all**. This stability and resilience is dependent upon both the global commons as recognized under international law and also the resources within national jurisdictions, for example rainforests, sea ice, mangroves and biodiversity (see Figure 2).

We argue that humanity must be the steward of the planet's natural resources – the ecosystems, biomes and processes that regulate the stability and resilience of the Earth system, for example the carbon cycle. These are what we term the new "Global Commons in the Anthropocene" (Figure 3).

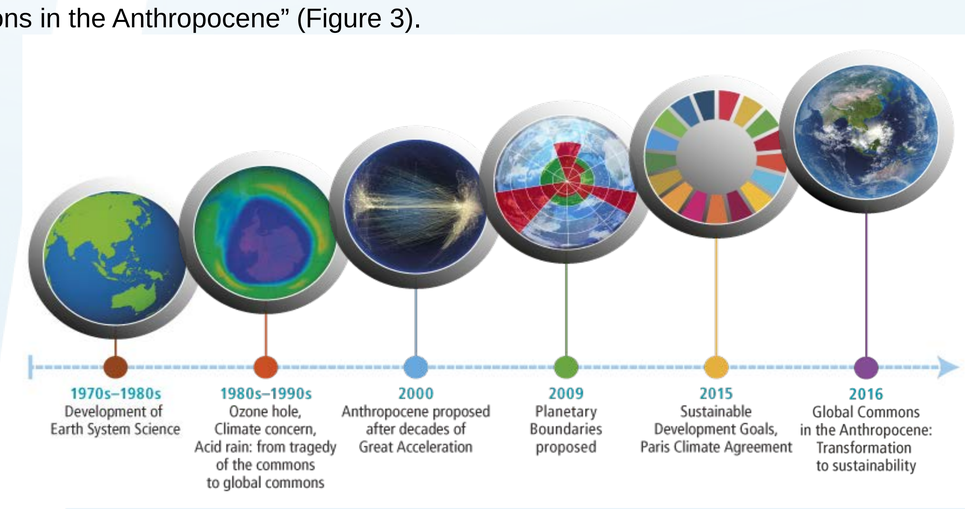

Figure 3: The Global Commons in the Anthropocene builds upon advances in research and in the international environmental and development policy process of the past decades.

The UN Sustainable Development Goals and the Paris Agreement on Climate Change indicate a paradigm shift in the global response to safeguarding the Global Commons in the Anthropocene.

5 Principles for Governing Global Commons in the Anthropocene

The responsibility of the Anthropocene, and the new world view it implies, demands a new set of principles to govern our thinking of the Global Commons. We set out three new overarching principles to inform transformative solutions that cross scales and regions. Together these provide a system-wide perspective to enhance the resilience of Earth and its interlinked subcomponents.

Principle 1: The Inclusivity Principle
The Global Commons in the Anthropocene are not external to human activity; they are internal to development at all scales and need to be treated inclusively.

Principle 2: The Universality Principle
Managing the Global Commons in the Anthropocene requires a paradigm shift in human worldviews toward planetary stewardship.

Principle 3: The Resilience Principle
Planetary stewardship of the Global Commons in the Anthropocene is fundamentally about safeguarding social-ecological resilience, from local communities to Earth stability.

The new principles are designed as foundational principles to inform economic and political decisions at all scales from local to global. For example, criteria for investment decision making would incorporate the fundamental question: how does this investment affect Earth's resilience?

6 Partners

This paper was produced together with colleagues from the Stockholm Resilience Centre as a background document for a science-policy initiative which was launched at a conference on *"Our Global Commons – Assessing the pressures on the global environment and disrupting the systems that drive them"* organized jointly by the Global Environment Facility (GEF) and the International Union for Conservation of Nature (IUCN) in October 2016 in Washington D.C.

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