Unsustainable development goals

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More than halfway between their proposal and the 2030 deadline for their achievement, none of the Sustainable Development Goals (SDGs) is on track to be attained. Meanwhile, we are increasingly crossing planetary boundaries and nearing tipping points of global environmental change. Failure is inevitable because solutions to the crisis cannot come from the same anthropocentric world-view that has created it. The growth of an already supersized consumerist economy and human population is incompatible with long-term functioning ecosystems, but it is precisely this unsustainable perspective that permeates the SDGs. Its rejection in favour of one that has the planetary ecosystem at its heart is urgent and crucial to rebalance life on Earth, prevent further environmental destruction, slow the pace of climate change, and rapidly reduce inequality and injustice within humanity and across the biosphere.

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A series of recent articles in *Science* and *Nature* have emphasized the role of the sustainable development goals (SDGs), acknowledged their merits and limitations, and suggested ways to accelerate their achievement. Yet, as one article notes, "none of the 17 goals to end poverty and protect the environment is on track, and only 15% of the 140 targets for which data are available look likely to be met" (Masood, 2023: 247). In other words, at the midpoint between their initial proposal in 2015 and their planned achievement by 2030, the SDGs are completely failing.

No doubt there is room to improve the SDG framework; however, we are running out of time and might have already crossed almost all the safe Earth system boundaries (Rockström *et al.*, 2023) – and thus the SDGs need more than reform and acceleration. 'Sustainable' means that something can be maintained *indefinitely*, but what this really entails seems largely lost in the confusion created by the abuse of the concept (Engelman, 2013) (Fig. 1). The term 'development' is also misleading: it does not necessarily imply growth

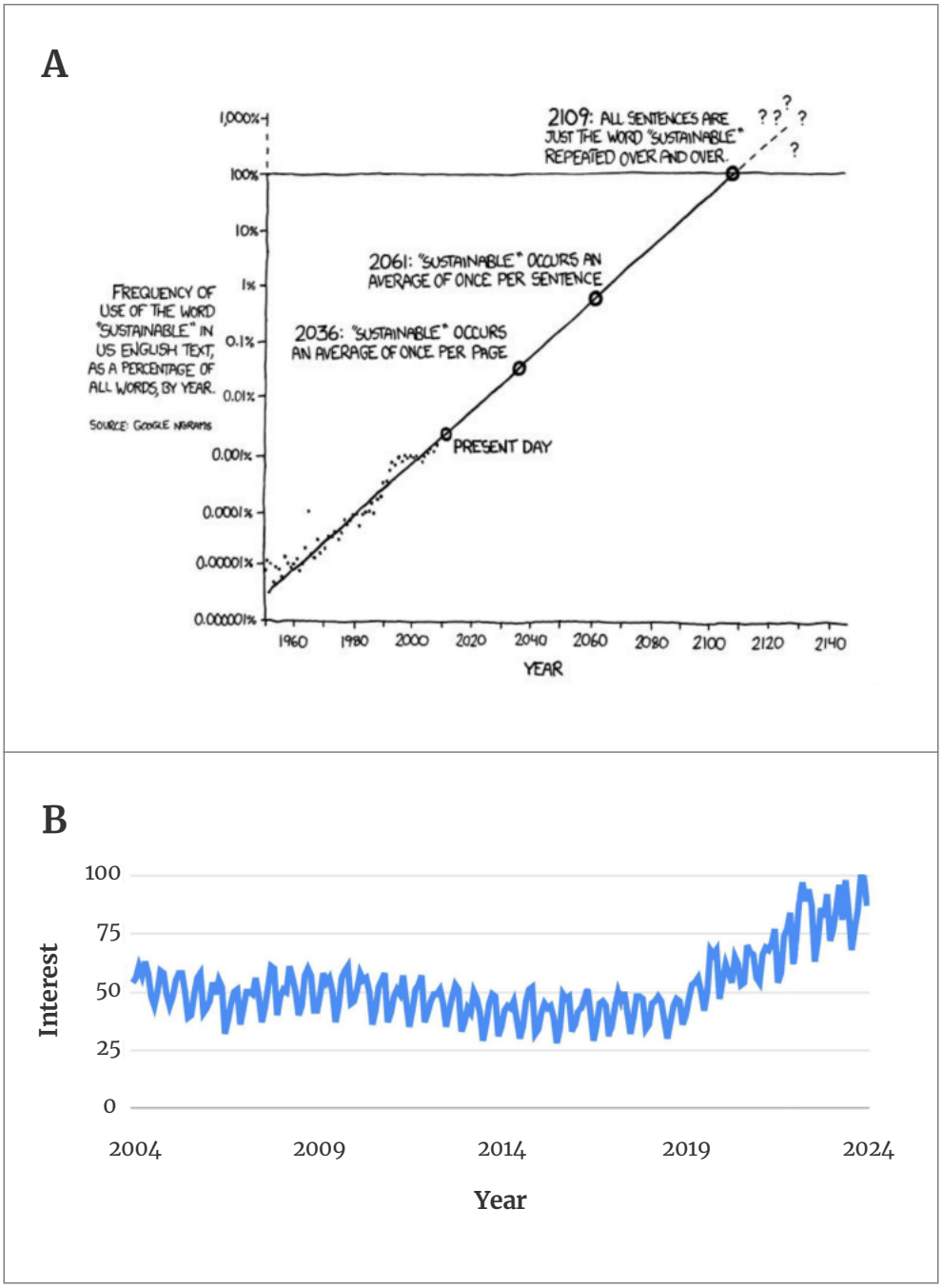

Figure 1. The spread (in words) of sustainability: (A) cartoonist forecast for the use of the term 'sustainability' (https://imgs.xkcd.com/comics/sustainable.png, previously published by Engelman, 2013, under Creative Commons Attribution-2.5 License); (B) worldwide popularity in search interest for 'sustainability' according to https://trends.google.com/ (numbers on the vertical axis represent search interest relative to the highest point on the chart: 100 is peak popularity, 50 means that the term is half as popular, zero indicates lack of data). Notice how in (B) popularity of searches for "sustainability" starts increasing around the year SDG are proposed and climbs to its maximum in the last couple of years, despite the framework having achieved almost no meaningful result (see main text).

and yet this is how, in practice, the word is used (Washington, 2015). Sustainable development is, in fact, an oxymoron when disconnected from the physical and ecological limits of our planet (Brown *et al.*, 2011; Burger *et al.*, 2012). But this disconnection is a crucial component of the dominant free-market capitalist sociopolitical and economic world-view, that chases the mirage of infinite economic (as well as population) growth (Jackson and Victor, 2019). Capitalism might have contributed to 'progress', but that depends on how progress is defined and measured (Sullivan and Hickel, 2023). And, if capitalism has brought improvements, it has done so for just one species (Crist, 2018) and with huge inequalities even within that species (Wilkinson and Pickett, 2019). Meanwhile, it has also massively polluted the environment and caused the decline of tens of thousand of species, with a rate of extinction comparable to the five largest mass extinctions in the entire history of multicellular life (Cowie *et al.*, 2022).

The Earth is home to almost one billion hyper-consumerists whose CO_2 emissions account for almost half of the world total, while the poorest 50 per cent of the global human population is responsible for less than ten per cent of emissions (Capstick *et al.*, 2021). In CO_2 emission terms, a single wealthy consumer is equivalent to 30 of those from the poorest half of humanity. This is, however, just one of many ways to measure the impact of humanity on the planet.

It is, perhaps, easier to grasp the immensity of our ecological footprint if societal consumption is converted into kilo-calories, the same unit we might use to measure the energy content of food when dieting. For an inhabitant of a highly industrialized country, this type of estimate (accounting for all types of resource and energy consumption, not just food but also all direct or indirect energy requirements for any type of goods or services) produces a mean value of per-capita 'sociometabolism' that exceeds 220,000 kcal per day (Schramski *et al.*, 2015). This number corresponds to the energy costs of an entire tribe of dozens of hunter-gatherers and is more than 100 times human basal metabolism (*i.e.* the ~2,000 kcal per day that our body needs to maintain its basic functions). However, owing to global inequality, the current per-capita sociometabolic rate of the entire human population is a little less than 50,000 kcal per day (Schramski *et al.*, 2015). Thus, each living person uses on average as much energy as eight hunter-gatherers. With a global population of approximately eight billion, this means that humanity currently has the energetic requirement of 64 billion Ice Age hunter-gatherers, whose ecological impact was already profound despite a comparatively tiny population.

Indeed, paleolithic nomadic tribes, with their pretty basic needs, might have already been enough to trigger a first world-wide anthropogenic ecological downgrade of the terrestrial ecosystems (Galetti *et al.*, 2018). Starting around 50,000 years ago, humans, numbering less than ten million across the whole planet and mostly living as subsistence hunters, with relatively simple weapons and no large permanent settlements, managed to substantially contribute to the extinction of half of the terrestrial species of megafauna (Barnosky, 2008; Lemoine *et al.*, 2023). Out of more than 350 species of

vertebrates weighing at least ~50 kg, roaming the continents before humans came out of Africa some 100,000 years ago, almost 200 disappeared forever in what is, on an evolutionary time scale, the blink of an eye. Among these extraordinary animals there were: lizards the size of an American alligator; flightless birds twice as big as an ostrich; giant kangaroos weighing almost three times their largest living relative, the red kangaroo; sloths as heavy as a rhino; enormous mammoths and mastodons; sabre-tooth cats, dire-wolves, wild horses, and many other iconic species. The demise of such large, often keystone, species was accompanied by the co-extinction of their closest partners in the ecosystem network, as well as by a cascade of other effects that dramatically changed ecological communities and the environment (Galetti *et al.*, 2018).

Thanks to fossil fuels, we have now greatly surpassed the natural carrying capacity of the planet (Barnosky, 2008), with humans and livestock outweighing by more than 20 times the total biomass of all the remaining 6,000 species of wild mammals put together (Greenspoon *et al.*, 2023). Our exponential growth in number and needs has caused global warming, environmental degradation and loss of biodiversity, and increasingly less resilient and malfunctioning ecosystems (Bradshaw *et al.*, 2021). The ubiquitous discussion, in society and governments, on the transition towards a green and sustainable future leaves no doubt that it is in our own interest to rapidly reduce the size of the gigantic ecological footprint of humanity. But how do we do it?

The SDGs are part of a network of concepts, institutions and practices that maintains humans at centre stage (Folke *et al.*, 2021), and in which non-human species and natural ecosystems are taken to matter only insofar as they provide services to us. Wildlife and the environment are 'resources' to manage for our prosperity and represent 'natural capital' to be exploited for profit. Even if it has been finally acknowledged that we should make an effort to preserve natural resources for future (human) generations, this anthropocentric perspective remains dominant.

Optimists, especially in the West, argue that despite recurrent Malthusian warnings of impending disasters and population crashes, human ingenuity has made us successful – improving living conditions for most people and doubling lifespans in little more than a century. 'Progress' is branded as the child of the Industrial Revolution, which culminated in the great, post-war, technological acceleration. However, we judge this success myopically and over a very short time-frame. In evolutionary biology, a successful lineage is one whose life spans millions of years, during which the ancestral population leaves a large number of species as descendants. *Homo sapiens*, in contrast, is only a few hundred thousands of years old and the sole survivor of a once species-rich taxonomic group, the *Hominini*.

Nonetheless, since we managed to dominate Earth and overcome ecological limits, can't we now become wise planetary managers? In other words, using the same anthropocentric mindset that made us 'conquerors of nature', shouldn't we aim for a "biosphere stewardship for prosperity [and the]

mobilization, innovation, and narratives of societal transformations that connect development to stewardship of human actions as part of our life-supporting biosphere" (Folke *et al.*, 2021: 835)?

The comprehensive failure of the SDGs is one signal among many that we are not moving in the right direction. Likewise, the 2020 Aichi Biodiversity Targets for the preservation of wild species and habitats were not met, and the policy implementation of the Paris Accords to reduce emissions of greenhouse gases has been equally unsuccessful (Bradshaw *et al.*, 2021). The reason for the failure is not just that the goals are often contradictory and the implementation is left in the hand of governments almost inevitably seeking compromise and short-term gains (Hickel, 2019). It is that the entire system that generated the planetary crisis by placing humans at the centre, and everything else at their service, is deeply flawed. The managerial view that wants to make us 'good stewards' of the biosphere is the very same perspective of human domination that has created the problems we face.

Take technology, for instance. Technological innovation might help to mitigate or postpone the worst, but it is technology that has supersized the unsustainable lifestyle of industrialized societies. Especially in the long term, progress can be a trap. Technological breakthroughs might improve efficiency, but tend to have rebound effects such as the Jevons paradox (Herring and Roy, 2007). For example, LED lights are more efficient, but consumers respond by buying more of them and leaving them on longer. Because they are cheaper, more compact and more energy efficient, flat-screen televisions have become bigger and almost ubiquitous in public urban spaces. Technological advancements in transportation have allowed an increasing number of people to travel fast, long-distance and at low-cost, but with a huge environmental footprint. Examples of this and other types of side-effects of innovation are, in fact, countless (Lewis and Maslin, 2018).

Even when useful, 'green' innovations on their own will not suffice (Smil, 2023). As good as it might be, for instance, that Norway "is a global frontrunner in low-carbon electrification in general and in the maritime system" (Andersen *et al.*, 2023: 4) and that its market share of battery electric vehicles has risen to almost 80 per cent (Malekpour *et al.*, 2023), if we all lived like a Norwegian, we would still need resources equivalent to those of more than three and a half Earths (https://is.gd/v8HyLI). One might still argue, however, that there are inventions which have brought change at an extraordinary speed, and this may happen again. Among innovations, in fact, solid-state electronics is probably the only one whose improvement has been truly exponential (Smil, 2023). This may be a unique case, but gives some hope. It is precisely the information-technology revolution that has given us the achievements of the most recent developments of artificial intelligence (AI). Will AI provide the tools for the next leap forward, that must lead humanity and the rest of the biosphere out of the global emergency? Probably not, given the magnitude and complexity of the planetary crisis (Smil, 2023). Besides, as with all innovations, AI has *pros* and *cons* and it is hard to predict who will benefit most from it (Ahmed *et al.*, 2023) .

The SDGs cannot be met unless we reject the socioeconomic system at the root of the crisis – after all, it makes no sense to ask a fundamentally unsustainable system to provide sustainable solutions. To reject that system, however, entails putting the planetary ecosystem – not humans – at the barycentre. The ecological transition cannot have as its aim the construction of a supposedly 'green' consumerism. Even when industrial and infrastructural development go beyond mere green-washing, the multidimensional scale of the challenges we face is such that solving one problem does not address all other issues. For example, electrified forms of transportation can eliminate CO_2 emissions, but

> *that will leave unaddressed other sustainability issues related to transportation such as congestion, accidents, equity, and the livability of cities. And it says nothing about the wider socioeconomy within which [...] mobility is embedded that has implications for land use, natural resource extraction, biodiversity loss, and so on. (Meadowcroft and Rosenbloom, 2023: 9)*

Likewise, hydro-electricity is promoted as renewable green energy by the EU (https://hydropower-europe.eu/), but dams have a multitude of negative consequences: they displace people, and flood habitats with stagnant, muddy waters; they require roads and huge quantities of concrete; they contribute to greenhouse emissions from reservoirs; they cause habitat degradation and fragmentation, hampering fish migration; they change river flow, water temperature and oxygen content, and reduce the transport of sediments and nutrients; they disrupt ecosystem networks and accelerate the loss of biodiversity. With a boom in the construction of power-plants in the Balkans, and thousands more being planned (https://balkanrivers.net/en), citizens of the EU are fed with the dream of reducing their impact on the environment. In reality, that dream is turning into a nightmare, as one of Europe major biodiversity hotspots and some of its last, almost pristine, river networks are being irreversibly devastated (Figs. 2 and 3).

In the illusion of building a green consumerist society we are led towards a future where, we are told, the prosperity of the wealthiest will be kept intact and yet poverty will simultaneously be eradicated, and where smaller carbon emissions will go hand in hand with the mitigation of other environmental impacts, thanks to productivity increases and innovations generated by unstoppable exponential economic growth (Nordhaus, 2021). This scenario is fiction: it is physically and ecologically impossible (Brown *et al.*, 2011; Burger *et al.*, 2012; Jackson and Victor, 2019). Besides, and ironically, as the 'magic' happens, we might even have to pay compensation to "asset owners [for instance, the biggest polluters such as the oil and mining industry] for the premature retirement of their facilities" (Meadowcroft and Rosenbloom, 2023: 6). Though absurd, this is not unrealistic – it is worth remembering that the colonial owners of British sugarcane and cotton plantations were compensated for the loss of income caused by the end of slavery.

That we must live within the physical and ecological boundaries of our planet is bad news for those living in the illusion of never-ending growth. Negative

Figure 2. Nature before 'green and sustainable' renewable hydroelectric plants. Examples of the unique, biodiverse and healthy river networks in the Balkans: (A) the Upper Neretva in Bosnia-Herzegovian, a pristine valley with intact forest and living rivers, threatened by seven hydropower projects; (B) the Tara in Montenegro, one of the most valuable rivers on the Balkans, threatened by a large dam downstream on the Drina river. Photos in this and the next figure were provided courtesy of Ulrich Eichelmann (https://riverwatch.eu/): (A) photo by Vladimir Tadic and (B) by Riverwatch (more photos at: https://is.gd/Tn8FJC).

messages might not belong to the "narratives of hope" that help to promote action (Folke *et al.*, 2021: 848). However, illusions and wishful thinking mislead or lead nowhere and, as Burger and co-workers (2012:6) remark, "the role of science is to understand how the world works, not to tell us what we want to hear".

Figure 3. Nature after 'green and sustainable' renewable hydroelectric plants: (A) the dried, once great, Rapuni River; (B) a small dam on the Drinjaca River, showing huge destruction despite a so-called small scale hydro-power plant. Both photos by Amel Emric.

If sustainability within the current socio-economic system is implausible at best, the alternative, non-human-centred, ecocentric solution is, in principle, simple and sound. To substantially counter anthropic impacts, and their consequences on life on Earth, we need a massive reduction of consumption in

industrialized nations, via carefully planned economic degrowth (Hickel *et al.*, 2022), and a demographic transition, achieved via voluntary non-coercive methods, to stabilize and, in the long term, reduce population size (Wynes and Nicholas, 2017). As Crist (2018: 1244) writes, we will thus contract "humanity's scale and scope by means that will simultaneously strengthen human rights, facilitate the abolition of poverty, elevate our quality of life, counter the dangers of climate change, and preserve Earth's magnificent biodiversity".

This solution is not some impossible utopia; it is far more 'realistic' and 'pragmatic' than our current path towards destruction. However, it is likely to face the strongest opposition precisely where it should be easier to implement: the countries that have already reached the highest standards of living. Regardless of the strategies of corporations and the connected political powers to maintain their wealth and the *status quo*, our own individual disconnection with reality, and most of all with nature (Gaston and Soga, 2020), is probably one of the major obstacles to rapid and impactful change.

We Westerners, together with those who follow our example, take as the norm what is in fact an extraordinarily and unnecessarily opulent standard of living. We live a life beyond the dreams of a pre-industrial era king or emperor: we have homes that, at the touch of a button, are warmed in the winter and cooled in the summer, with clean running water, hot or cold, on tap; the fridge is full of everything we may desire, flown and trucked from all regions of the planet, regardless of the season; almost any good we imagine can be ordered with a few clicks of a mouse and delivered to our doorstep; we have doctors, hospitals and care homes to look after the sick; by car, we can reach in an hour places people, just a century ago, had to walk for days to get to, and, by plane, for a few hundreds euros, we can travel to the opposite side of the world in less than a day.

Yet most of us, in the wealthiest ten per cent of the human population, are unhappy, stressed and unsatisfied. We could live better with less, while minimizing both our pressure on the environment and the exploitation of developing countries, which maintains global inequality and slows up development where really needed (Wilkinson and Pickett, 2019; Hickel *et al.*, 2022). Does this mean we must go back to live in caves, like our hunter-gatherer ancestors? Not in the least. By getting rid of unnecessary opulence and huge inequalities, every human on the planet might be able to work less and live decently in terms of shelter, food, hygiene, clothing, health-care access, communication systems and mobility, while having a per-capita sociometabolism of ~10,000 to 17,000 kcal per day, with that energy almost entirely provided without the need for fossil fuels (Millward-Hopkins *et al.*, 2020). Thus, Millward-Hopkins and colleagues (2020: 8) argue that 'caves' must be redefined as "substantially larger" homes with

> *highly-efficient facilities for cooking, storing food and washing clothes; low-energy lighting [...]; 50 L of clean water [...] per day per person, with 15 L heated to a comfortable bathing temperature; [...] an air temperature of around 20 °C throughout the year, irrespective of geography; [...] a computer with access to*

> *global ICT networks; [...] linked to extensive transport networks providing ~5,000–15,000 km of mobility per person each year.*

There can be no ecological transition with anthropocentrism. Of the seventeen SDGs, only two focus on species other than humans and even those two see other life-forms as resources to use first and foremost for our benefit. An ecological transition must, by definition, make ecology central. And this means making the planetary ecosystem – where *Homo sapiens* is just one of several million species interacting with each other and with its abiotic components (water, soil, temperature, precipitation, the atmosphere and so on) – the centre of sustainability. It is already very late in the day, and the worst consequences of the crisis are being, and will be, paid by those who are less responsible: the poorest half of the global human population, as well as the myriad of nonhuman beings with whom we share this planet. The sooner we abandon the un-Sustainable Development Goals, and the other illusions and delusions of anthropocentrism, the more likely we are to start a change that goes beyond rhetoric and marketing, and brings us back within the planetary boundaries that we, and all other life-forms, cannot escape.

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