Rosling's fallacy: Conservation, biodiversity and the anthropocentrism of Hans Rosling's *Factfulness*

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There have been a spate of recent works arguing that 'despite appearances' things are better now than in the past. A well-known example that I will focus on here is Hans Rosling's posthumously published and best-selling book *Factfulness: Ten reasons we're wrong about the world – and why things are better than you think* (Rosling *et al.*, 2018). Rosling argues that we have an "overdramatic worldview", which is "stressful and misleading" (p. 13). This is because our views on pressing issues – such as population growth, education, disease and the environment – are "not only devastatingly wrong, but systematically wrong" (p. 9).

Is he right? In many instances, he might be and, in some respects, *Factfulness* is indeed a "magnificent book" (O'Neill, 2018). However, it is also an excellent example of something that is all too common: a worldview distorted by anthropocentrism. Rosling, like most of us, tends to see progress from a human-centered perspective – a failing which I will term 'Rosling's fallacy'. Whether there is progress, and the world is truly improving, crucially depends on *who* is asking that question: is it just us, humans, or are we considering also the millions of other species with which we share the planet? Answering this prior question not only provides a deeper ethical perspective, but also adds an evolutionary and ecological dimension that is necessary to avoid inaccurate human-centred assessments of the state of the world.

One of the few places where Rosling's book considers organisms other than humans is its discussion of conservation and biodiversity. I will argue that his account is deeply misleading and unambiguously flawed – precisely because of its myopic anthropocentrism. Early in the book, there is a list of questions which Rosling used to test people's factual knowledge of the world. In this list,

Question 11 is as follows (p. 5): "In 1996, tigers, giant pandas, and black rhinos were all listed as endangered. How many of these three species are more critically endangered today? A: Two of them B: One of them C: None of them." The correct answer to this question is given later in the book: (C) None of them. Rosling writes (p. 190) that,

> *activists who devote themselves to protecting vulnerable animals and their habitats tend to make the same mistake I've just described: desperately trying to make people care, they forget about progress. A serious problem requires a serious database [...] the Red List, where you can access the status of all endangered species in the world, as updated by a global community of high-quality researchers [...] Guess what? If I check the Red List [...] I can see how, despite declines in some local populations and some subspecies, the total wild populations of tigers, giant pandas, and black rhinos have all increased over the past years.*

Had Rosling checked that same list a bit more carefully, he might have discovered that the species where we know something about their conservation status are a minority (with a strong bias towards those closer to us, *i.e.* mammals and vertebrates [Cardoso *et al.*, 2011; Rondinini *et al.*, 2014]). And, even for that minority, things are not really as good as Rosling's three selected examples might suggest. Furthermore, the baselines we use for our comparisons and analyses of trends in biodiversity are shifting and often originate from data produced in an already wildlife-impoverished planet (Pauly, 2019), in which many species have vanished and natural habitats have been strongly impacted by centuries or millennia of human activities (Laurance, 2010). The temporal dimension of the biodiversity crisis is indeed crucial, with its taxonomic biases, extinction lags (Tilman *et al.*, 1994) and non-linear dynamics (Hanski, 2011; Estes, 2020). In "an indispensable guide to thinking clearly about the world", as in Bill Gates' quote on the cover of Rosling's book, 'whether things are better' (for whom, by the way?) cannot be assessed using a short human life time-scale and observations on a few selected species.

Let us see what happens if we expand a little on Rosling's example of the conservation status of large ungulates and carnivores. Given that these are the charismatic animals conservationists and environmentalists typically use as 'flagship' species, after investing so much money and effort in their conservation, we should find reasons for optimism, shouldn't we? Unfortunately, solid reproducible scientific evidence suggests otherwise. A comparison of the IUCN status of these large mammals in the 1970s with their IUCN status in the first decade of this century by Di Marco and co-workers (2014) – the same type of investigation Rosling urges his readers to do – concludes that "23% of all carnivore and ungulate species moved one or more red-list categories closer to extinction over 4 decades" (p. 1117), and that while "the conservation status of some species improved [...] for each species that improved in status 8 deteriorated" (p. 1109).

The black rhino, for instance, has indeed – as Rosling states – improved in terms of numbers since 1996, but it is more the exception than the rule, and we need to put even this fact into a broader context if it is not to be seriously misleading. The current population estimate for this species is about 5,000 individuals from little more than 2,000 at the beginning of the Nineties (as reported by the IUCN rhino specialists at https://is.gd/n9En80). However, the IUCN webpage that provides this good news, also clearly says that this has to be compared with some 65,000 individuals in the 1970s. A quick look at the IUCN map for black rhinos (https://www.iucnredlist.org/species/6557/152728945) also suggests a sharp overall reduction in geographic distribution, with most, if not all, populations in the northern part of the range having gone completely extinct. And, although demographic estimates going back two centuries have huge uncertainties, it is not unreasonable to assume that, until the 1800s, black rhinos populated most of Africa in the hundreds of thousands (Western, 1987). This means that the current black rhino population is likely to be about 1% of what it was just 200 years ago – or, to put this another way, 99% of these magnificent terrestrial mammals have been wiped out by humans in the past two centuries.

To make this point less abstract, I draw an imaginary comparison using the population of Milan, my home-town. Suppose that during a very long war, in fewer than two centuries, its population of about 1.5 million people had been devastated by snipers, until it had become a series of small villages totalling fewer than 10,000 inhabitants. Would we call it progress if, over the last 20 years, a few well-protected neighbourhoods allowed the city to return to 1% (15,000) of its original population size? This is what Rosling does with black rhinos. As shown, most of the other large terrestrial mammals have fared even worse as their decline has accelerated. And most of these species, including the 'lucky' black rhino, are confined to a range which is a fraction of their original distribution and in which they typically occupy isolated fragments with little or no interbreeding among the small populations. In my imaginary scenario of a war-driven collapse of the population of Milan, the fragmented distribution would be the neighbourhoods where the survivors are, and between which they cannot move without being shot by a sniper.

When we are not fooled by a baseline rapidly shifting towards progressively smaller and fragmented populations, we see that things aren't great for black rhinos (or for tigers and giant pandas) despite recent small, and often short-lived, increases in numbers. In the last century, the main trend in terrestrial vertebrates is one of sharp population decline. As Ceballos and co-workers write (2017: E6089),

> *the rate of population loss in terrestrial vertebrates is extremely high – even in 'species of low concern'. In our sample, comprising nearly half of known vertebrate species, 32% (8,851/27,600) are decreasing [...] In the 177 mammals for which we have detailed data, all have lost 30% or more of their geographic ranges and more than 40% of the species have experienced severe population declines (>80% range shrinkage).*

This study, as others before and after, converge on a well supported general conclusion. Beyond extinctions (happening in vertebrates at a rate no less than 100 times faster than expected before the human domination of the planet [Ceballos *et al.*, 2015]), a vast number of populations are in decline and the rate of the human-induced sixth mass extinction is accelerating (Ceballos *et al.*, 2020). Many populations survive only in small numbers and tiny ranges, and might soon disappear (Ceballos *et al.*, 2020). The decline in well-studied species in fact indicates a general environmental degradation, which happens in regions populated by many other, less well known, organisms. As habitat is lost and human impacts continue to increase, these 'data deficient' groups will likely follow the same unfortunate fate of better known species.

By overlooking extensive scientific evidence and by providing a misleading example to support his claims about progress, Rosling's discussion of biodiversity makes precisely the same mistake he condemns in others – where we allow ourselves to be governed by preconceptions (in his case, an anthropocentric optimism), rather than by 'factfulness'. This is a point already raised by other critics of the book, and one that, they argue, applies not just to Rosling's attitude towards biodiversity and conservation, but also, more broadly, to many other aspects where he seems to have misreported the complexity of major world problems that still await a solution (*e.g.* Berggren, 2018; Götmark, 2018).

For all the progress we humans have made in such matters as reductions in infant mortality and global poverty – that Rosling celebrates in his beautiful but narrowly anthropocentric book – somebody has paid and is still paying a huge price: this is hundreds of thousands of other species on Earth. We have overexploited terrestrial (Laurance, 2010; Goulson, 2019; Ceballos *et al.*, 2020) and marine (Roberts, 2007; Cury and Pauly, 2020) habitats, and overcame the limits of the ecosystem carrying capacity only through the profligate use of energy from fossil fuels (Barnosky, 2008). We have become the dominant animal (Ehrlich *et al.*, 2008) with the total human mass being almost ten times (more than 20 times, in fact, if we include livestock) that of all wild mammals together (Bar-On *et al.*, 2018). Even where we have made real progress, we have also created new problems, and whether that progress can be made sustainable in the longer term remains a difficult and open question (Lewis and Maslin, 2018; Sachs, 2020). When we abandon anthropocentrism and embrace an ecocentric view, the damage we have caused and are causing to other species is before our eyes, measurable and undeniable (Tollefson, 2019). Its consequences are beginning to hit us as well (Rockström *et al.*, 2009): the planet is warming and climate is changing; extreme weather events are becoming more common; atmospheric, water and soil pollution is widespread, and ocean acidification increases; the cycle of nutrients like nitrogen and phosphorus is disrupted; aquifers are depleted, river networks disrupted and freshwater resources overused. This 'dark side' of progress cannot be swept under the carpet. 'Rosling's fallacy' is a common mistake in measuring progress, but one we have to correct. Regretfully, Hans Rosling is no longer with us to do it, but I am confident he would have agreed that factfulness

cannot be anthropocentric: biodiversity is in decline and we do face the risk of a sixth mass extinction.

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