Humanity is Tipping the Scales of the World

Eminent scientists throw their weight into the balance

We are approaching a dual tipping point of social and environmental systems that will arguably determine the future of life-support systems on Earth. On the one hand, young people across the world are struggling to tip the social scale towards swift and concerted climate action. On 20 September, they are mobilizing for a global climate protest, days before UN Secretary-General António Guterres in New York aims to cajole heads of state to join a climate 'race to the top'. If this social tipping towards sustainability does not happen quickly, we risk crossing a different kind of tipping points – those in the Earth System that may threaten the stability of life on our planet.

Increasingly, we understand that human pressures are pushing elements of the Earth System ever closer to critical tipping points. This may kick off a cascade of interacting nonlinear processes that force our planet into a fundamentally different climatic state. Tropical coral reef systems and the Arctic summer ice are at risk already at 1.5°C warming and we now know that there is a likely tipping point for the destabilisation of the Greenland Ice sheet, which may be as low as 2°C. [i] We cannot exclude that the West Antarctic Ice Sheet may already have passed certain tipping points towards collapse, which would mean irreversibly committing humanity to 3 meters of long-term sea-level rise across the globe.[ii] The Northern hemisphere jet stream is slowing down and meandering in deeper planetary wave patterns, as the Arctic is warming faster than the rest of the globe.[iii] The resultant lock-ins of high and low pressure weather systems trigger wet spells and heatwaves causing flooding and droughts, progressively threatening livelihoods, food systems, human health and security.[iv] Generally, the increasing number and intensity of extreme weather events caused by climate change can ultimately undermine humanity's ability to cope, particularly in poorer countries and communities. We do not yet know exactly where certain tipping points lie, but we know that warming beyond 1.5°C may put us dangerously close to or beyond those red lines.[i] Limiting warming to 1.5°C, rather than 2°C, could protect several hundred million people from different types of climate-related risks.[v] In contrast, unmitigated greenhouse gas emissions may push the planet onto a 'Hothouse Earth' trajectory, where tipping cascades beyond human control increase global temperature to a devastating 4-5°C.[vi] Humanity may tend to take the benign conditions of the past 10,000 years for granted, but we are already experiencing the highest global mean temperature on Earth since the last Ice Age.[vii]

In light of the mounting scientific evidence, a climate emergency has been declared by several national and local governments and thousands of universities worldwide. As concerned scientists, we want to highlight that calling these declarations 'alarmist' is utterly misplaced. If anything, there is a growing understanding that expert assessments, which are usually conservative in the best sense of the word, have contributed to allow decision-makers to underestimate – not overestimate – the risks of climate impacts. Now it is apparent that impacts are happening much sooner and more severely than expected.[viii] In each report since 2001, the Intergovernmental Panel on Climate Change (IPCC) has corrected its assessments of the so-called 'reasons for concern' upwards, i.e., to higher levels of worry. For instance, while in 2001 the risk to unique and threatened systems, such as coral reefs and indigenous communities, was thought to be 'high' from 3°C warming onwards, we now know that they face a 'very high' risk of irreversible collapse even below 2°C of warming. As science has advanced, the risk of so-called 'large scale discontinuities', i.e., catastrophic shifts, such as irreversibly committing all future generations to inevitable loss of the Greenland Ice sheet ultimately leading to an additional 7 m

sea-level rise, has moved from being a low probability risk in 2001 (a risk only at > 4°C) to a medium to high probability risk in 2019 (a risk already at 2-3°C global warming). All the while, global average temperature continues to rise, as greenhouse gas emissions jumped to an all-time high in 2018.[ix] The world is following a path which even at a conservative assessment will result in > 3°C warming – with definite irreversible tipping points – by the end of this century. Last time we had this level of warming on Earth was 4-5 million years ago.[x]

As young people across the world are inviting adults to join them on September 20th for a global climate action day, we want to echo their call: "This is not a single-generation issue." Humanity is tipping the scales of our planet's future. Only together can we ensure political and economic decision makers do not leave our children to an insecure future full of climate risks. This may be the key counterbalance to triggering the existentially dangerous tipping elements in the Earth system. Let's make 2019 the year of tipping the scales towards sustainability for good. Add your weight to the growing momentum!

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[v] Dan Tong et al. (2019) Committed Emissions from Existing Energy Infrastructure Jeopardize 1.5 °C Climate Target, *Nature*, July 1, no. 1.
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