

Uninhabitable Futures on a Habitable Earth

Luke Kemp
Cambridge University

PERN Cyberseminar on The habitability concept in the field of population-environment studies: relevance and research implications

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Catastrophic Risks and Habitability

Catastrophic climate scenarios are partly questions of habitability.¹ Climate impacts will stress the social habitability of areas. While they may still be physically possible to live in, dense, industrialised, politically stable societies may become increasingly precarious. The knock-on effects, whether they be conflict, financial losses, displacement, or state failure, will cascade across sectors and borders. The Climate Endgame research agenda strands of understanding long-term extreme Earth system states and societal fragility are both key to understanding habitability and catastrophic risks.¹ Yet, thus far, studies of uninhabitability and existential risk have been simplistic. A new approach is needed.

Asking the Wrong Questions

Thus far the majority of the research on climate change and existential risk is guilty of substitution attribution. That is, taking a complex question around risk and replacing it with a simpler one about habitability. Both Toby Ord in *the Precipice*² and Will MacAskill in *What We Owe the Future*.³ Ord asks whether climate change would result in the entire Earth being covered in lethal heat conditions. He concludes that even under the worst-case scenarios some areas will remain habitable. This draws on the growing body of literature on lethal heat conditions. Studies thus far suggest that warming of 7°C could make some areas uninhabitable, while heating of 10-12°C would mean that the majority of human population (assuming the current distribution holds) faces lethal heat conditions.⁴ No study to date has suggested that the entire world would be made uninhabitable due to lethal heat.

MacAskill examines whether climate change will make all agriculture impossible, before suggesting that lethal heat conditions for crops will not be passed in all world regions for even the highest plausible levels of warming. Hence even 7-10°C degrees of warming should not result in societal collapse.

¹ For definitions of terms such as extinction risk, collapse, catastrophic risk, and collapse, please see the vocabulary offered in Table 1 of Climate Endgame.¹

The problem is that such questions of habitability for either crops or people are not the same as questions of catastrophic risk. They are asking related, yet wrong questions. If societies are fragile enough, then catastrophic impacts could be reached at far lower temperatures.

Can the Earth be Made Uninhabitable?

Few have dared to broach the question of whether climate change could make the Earth uninhabitable. Ironically, the book titled *'The Uninhabitable Earth'* by David Wallace-Wells does not attempt to explore this area. Mark Lynas in *Our Final Warning* suggests Lynas has suggested that such a scenario could happen if there was profligate use of fossil fuels, increasing solar radiation, and unseen, extreme Earth system tipping points.⁵

The overarching scientific consensus is that a runaway greenhouse effect which makes the entire Earth uninhabitable is overwhelmingly unlikely. The IPCC in its 31st meeting in 2009 noted that there is almost no chance of a "runaway greenhouse effect" analogous to Venus occurring due to anthropogenic activities.⁶ However, some recent modelling efforts suggest that this is not an entirely implausible outcome. Basic climate modeling has suggested that a runaway greenhouse effect is plausible^{7,8}, a prospect which is buttressed by modelling of cloud feedbacks leading to a moist greenhouse⁹. These are simplistic models with numerous assumptions. For now, a runaway effect seems highly unlikely, but can not be entirely ruled out. If it were to occur it would require vanishingly improbable circumstances including the use of almost all known fossil fuel reserves, high-end Earth system sensitivity, and unforeseen climate tipping points.

The Limits of Habitability

Questions of habitability are useful to studying catastrophic climate change scenarios. Yet, they can be distracting and misleading if interpreted in the most banal sense of 'Will this land area become completely uninhabitable for agriculture and homo sapiens is a scientifically tractable question, but ultimately of limited use. We also need to be aware of the limitations of such studies. Existing studies of lethal heat stress for instance often assume an infinite sweating capacity. They also do not consider adaptive behavioural changes. Hence it is unclear whether we are over- or -underestimating lethal heat conditions.

The most interesting and neglected area is social habitability. Areas may or not be habitable for human groups depending on the infrastructure, subsistence strategy, and population numbers. Year-round lethal conditions will likely not be required to make industrialised high-affluent societies possible in certain areas. Social habitability will be compromised well before physical habitability is. How certain areas becoming socially uninhabitable, or at least uninhabitable for dense population concentrations with stable political states, impacts the rest of the world is underexplored. These are far more

daunting and complex research areas which lies under the second research strand of the Climate Endgame research agenda: societal fragility.

References

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