It Is Not Climate Denial But Adaptation Denial That Holds Us Back

Mathis Wackernagel[1*] and Peter H. Raven[2]

[1] Co-Founder, Global Footprint Network, 1528 Webster Street, Suite 11, Oakland CA, 94612, U.S.A.

[2] President emeritus, Missouri Botanical Garden, 4344 Shaw Blvd, Saint Louis, MO 63110, U.S.A.

* Corresponding author: mathis@footprintnetwork.org

December 17, 2025

Keywords: mitigation, adaptation, climate change, free-rider, strategy

[TEXT: 2611 Words]

Inadequate climate response

Humanity's material metabolism has expanded to such an extent that it has triggered climate disruption, biodiversity loss, and resource depletion, fueling global instability (1). While these threats are well documented, human demand on nature continues to rise (2).

Among all the pressures, climate change is the impact which currently receives the most attention. This may be part of the problem, because this particular problem media, academic, and UN typically frames as a "free-rider problem" in which global needs conflict with countries' incentives, hence requiring "grueling […] hard-fought negotiations" (3) which have largely failed.

Here we make the case that planetary overuse, of which climate change is a part, is largely not a free-rider problem, and hence potentially addressable without needing every country's agreement. Additionally, we argue that the dominant lens of categorizing possible responses as either *mitigation or adaptation* fuels this paralyzing misperception of being stuck in a free-rider trap.

In contrast, we propose that the overarching challenge is humanity's excessive resource metabolism, leading to ecological overshoot (4). Therefore, we propose to position climate change as a threat to "resource security." This shift makes effective responses to climate change more attainable and compelling. It aligns individual and collective incentives. It underscores that preparing oneself for a future shaped by ecological overshoot is not only economically necessary but also strategically advantageous for every single actor.

The climate context

There are good reasons why climate change receives so much attention. Fossil fuels have enabled humanity to grow from one billion to over 8 billion people in just 200 years, whereas it took approximately 11,000 years, from the dawn of agriculture to the start of the fossil fuel era, to grow from 10 million to the first billion. This versatile energy source supercharged population growth, per capita consumption, and technological advancement (5). As a result, 8.2 billion people now inhabit Earth, collectively demanding more than 80% beyond what the planet's ecosystems can regenerate, all powered primarily by fossil fuel use (6, 7).

This global ecological overshoot, composed of all demands on the biosphere including carbon emissions, has resulted in deforestation, ecological depletion, biodiversity loss, and climate

disruption. The extent of some impacts remains unknown, as only 2 million species (excluding bacteria and viruses) of the estimated 20+ million have been cataloged. We know that atmospheric CO_2 equivalent levels have already reached over 534 ppm, far above the 450 ppm threshold, which is likely too high to remain within the globally desired 2°C warming limit (8). The cumulative impacts of these issues are becoming an existential threat to much of humanity (9).

Avoiding runaway global warming requires abandoning fossil fuels, even if the international community has been unable to acknowledge it formally (10). These fuels still account for about 80% of humanity's primary energy use, a share similar to 1965. The main difference is that total fossil fuel use today is 2.5 times higher. When considering all material inputs, not just energy, fossil fuel makes up 60% of humanity's ecological footprint, which is why they are so difficult to replace (11).

None of this is new. Media coverage of climate change is vast, now exceeding that of GDP or economic growth. Yet emissions trends remain largely unchanged. Why are we still failing to meaningfully respond to climate threats, let alone planetary depletion?

Why societies have failed to respond

Humanity's ineffective response may stem from failing to see climate change in its broader context. It is often reduced to a carbon-emission problem, framed as a "**free-rider dynamic**," where actions like reducing emissions primarily benefit the global community rather than the individual actor taking those steps (12). Conversely, activities that increase emissions deliver direct benefits to the emitter, such as cheap, versatile energy, while imposing pollution costs on everyone else. These examples illustrate how individual and collective incentives can clash.

Because of this "free-rider" perspective, policy circles and the environmental movement have leaned heavily on moral arguments, portraying climate action as a humanitarian duty. It becomes a call for all stakeholders to sacrifice some advantages for the common good. This moral framing, rooted in the belief that the climate crisis is a free-rider dilemma, permeates international negotiations, including 30 climate COPs, with mechanisms like "nationally determined contributions." It also shapes policy frameworks promoted by the IPCC and UNFCCC, which categorize climate responses into two seemingly opposing buckets: "**mitigation**" and "**adaptation**." All of this reinforces the perception that humanity is trapped in a profound and largely unsolvable free-rider problem. And chances are, many of you reading this believe that too.

A possible way out

Yet, reality may, in fact, be the opposite of what many assume. While “free-rider” elements exist in the climate domain, we argue they are far from the dominant drivers. The real economic dynamic of the climate threat is this: the less others prepare for the inevitable future of increasing climate disruption, the more you, whether a company, community, city, or country, are at risk. In other words, the less others respond, the stronger your incentive to prepare yourself. Your action does not depend on others’ benevolent collaboration. Collective agreements would likely make responses easier and more effective, but they are not a prerequisite, and may even reduce your incentive to act.

For those who see climate change as a symptom of a larger dynamic, that of planetary overuse or ecological overshoot, the case becomes even clearer. Overshoot implies competition for the services the biosphere provides. This is fundamentally a question of **resource security**, not just for humanity as a whole but for every entity on the planet. In a world of overshoot, any entity that focuses on securing its resources strengthens its own resilience while also contributing to humanity’s overall resource security. Since all entities share this need, incentives in this domain are aligned. This alignment shows that “free-riding” is not the dominant dynamic.

Overshoot and resource security

Resource security is the inverse of exposure to ecological overshoot risks. It means that despite global pressures, an entity, from company to country, maintains secure access to the physical resource flows it needs to operate. The most critical resource is the **regenerative capacity of ecosystems**, or biocapacity: the ability of ecosystems to regenerate and sustain life.

Biocapacity underpins all resources because it determines the availability of food, fiber, and timber. It also constrains fossil fuel use, not because of underground reserves, but because of the biosphere’s limited capacity to absorb resulting emissions. Even mining is largely constrained by biocapacity. The limiting factor is not the remaining mineral deposits underground, but how much of the biosphere’s regenerative capacity societies are willing to dedicate and potentially sacrifice for mining, concentrating, and processing these materials.

In essence, competition for biocapacity is the underlying dynamic of the ecological threat we face. This is not a free-rider problem. The challenge is driven not by opposing incentives but by misperceptions and acceptance of market distortions. These are solvable problems, if recognized as such, and they can be addressed without first securing agreements with others.

Misplaced assumptions in the mainstream climate narrative

Many climate advocates, including natural science-based academic researchers, often assume that opponents resist climate action because they **lack scientific understanding**. A more plausible explanation is that opponents fear they will gain insufficient benefits to justify their own efforts. In this view, climate denial becomes a convenient ruse to avoid being compelled into action.

Climate researchers Mark Maslin and Michael Mann have described this denial as progressing through stages (13), such as:

1. Climate change is not real.
2. It is not caused by humans.
3. It is not that damaging.
4. It is not that urgent.
5. It is uneconomical to fix.
6. It will be solved by imaginary technology.
7. It is too pervasive to fix, we are too late.

If denial is primarily a strategy to avoid the "burden of climate action," then explaining climate science with ever-greater rigor will not work. In fact, stronger evidence can make the claims feel even more threatening to those seeking to avoid action.

Climate advocates could be more effective by helping opponents see how climate action aligns with their self-interest. However, this advantage-focused approach is often unpopular among advocates, who tend to reject self-interest, even though it is a far more powerful and lasting driver of change than moral obligation.

Some activists equate self-interest with corporate greed, which they see as a root cause of the climate crisis. As a result, they resist incorporating self-interest into climate strategy, fearing it would mean fighting fire with fire. Instead, they frame climate action as a moral duty. Yet it is important to distinguish between self-interest aligned with societal well-being and self-interest that undermines the common good. Rejecting self-interest entirely assumes that individual and collective interests cannot align, a view that reinforces the free-rider narrative, which we believe is a core flaw in the mainstream climate narrative.

Additionally, many advocates emphasize mitigation as the primary pathway, partly because they see adaptation as selfish or fear it signals defeat, suggesting mitigation is too late. While

adaptation may be accepted for the most vulnerable, it is often downplayed for others, even derided as “bunker mentality.” Advocates also worry that adaptation conveys the false impression of “solving” the crisis, rather than confronting its root causes, or that adaptation masks the profound threat we face and the radical actions needed to address it. (14)

This mindset may further explain why climate philanthropy overwhelmingly prioritizes mitigation. Those institutions present it as the preferred strategy, even though reducing greenhouse gas emissions is not a strategy in itself but an outcome. Framing mitigation and adaptation as opposites makes mitigation appear strategic. Yet they are a self-limiting, odd couple.

Going beyond adaptation

If adaptation were more centrally embraced, it would implicitly dismantle climate denial. Because adapting means acknowledging the problem. As an added benefit, adaptation may deliver more mitigation than traditional “mitigation strategies,” especially those relying on the benevolence of actors to give up advantages, as core to many efforts to change individual behavior. A major adaptation strategy is reducing resource dependence as the world faces increasing climate disruption and resource constraints. The mitigation benefits of this approach are enormous.

This leads to our proposition: a force more significant than climate denial is holding back climate action. It is **adaptation denial**.

Accepting, rather than vilifying, the need to adapt creates a shared recognition that climate change is an undeniable threat. Still, the term “adaptation” can mislead, suggesting minor adjustments might suffice, when in reality fundamental shifts are required, potentially reducing humanity’s resource metabolism threefold. This reduction is not optional; it is inevitable due to physical planetary limits. Rather the dilemma is how: by design or by disaster? Whether proactive design interventions will win also depends on how fast they are implemented to reduce disaster risks.

Use overshoot as the context

Dwight Eisenhower supposedly advised, “If a problem cannot be solved, enlarge it.” This applies perfectly to the climate change problem, which is merely **a symptom of ecological overshoot**, a deeper and more far-reaching challenge.

Reframing climate change within the broader context of overshoot offers critical insights and more effective strategies. Persistent overshoot, humanity's excessive use of nature's resources, drives biodiversity loss, greenhouse gas buildup, and resource competition. Climate impacts like extreme weather are symptoms of these pressures. Addressing overshoot as the overarching dynamic prevents solving one problem at the expense of another.

While climate mitigation alone traps us in a nearly unsolvable free-rider dilemma, overshoot dynamics are largely free from such concerns. In an overshoot world, everyone faces the risk of losing resource security. Responding to this risk does not require waiting for global consensus. On the contrary, the less others prepare for this inevitable future, the greater your own exposure, and the stronger your incentive to act.

The future is remarkably predictable: people will always need food, shelter, safety, and well-being. Regardless of the scenario, whether rapid decarbonization or delayed action will dominate the day, climate disruptions will intensify, and biological resources will decline. Since overshoot's effects are cumulative, building into an ever-larger ecological debt, they will accelerate faster than expected, while improvements to human infrastructure, from cities to energy systems, come typically with large time lags. The consequences of being underprepared for overshoot will hit the underprepared more directly and severely.

Prepare for the inevitable

The takeaway is simple: if you want to succeed in a future defined by greater climate disruption and fewer resources, **prepare for it**. This means reducing your dependence on resources, especially fossil fuels, which are becoming a dead end. Conversely, for any entity, city, country, or company, failing to prepare for this emerging reality is economically self-destructive.

Proactive preparation reduces risk and builds resilience. For example, discouraging construction in climate-vulnerable areas—such as Florida's coast or wildfire-prone regions of California—is already financially prudent, as properties in these zones face skyrocketing insurance costs, if insurance is available at all. Similarly, avoiding the reconstruction of damaged structures lowers resource demand, delivering both economic and mitigation benefits.

But the argument goes further than merely classical adaptation: the key question is not just how to mitigate or adapt to climate change, but **which assets will retain value in a future shaped by climate and resource constraints**. Assets that actively reduce global overshoot, such as

renewable energy infrastructure, recycling systems, bicycle and pedestrian networks, and biodiversity-rich ecosystems, are likely to hold lasting value. Why? Because business models and urban infrastructure that ease planetary constraints will remain relevant, competitive, and resilient, preserving or even increasing their worth over time.

Consider the case of a German waste recycling company that significantly reduces global overshoot. Global Footprint Network's analysis shows that for every dollar of value added, this company decreases global overshoot **15 times more than the average dollar in the global economy increases it** (15).

Similarly, conserving ecological health and biodiversity in critical ecosystems like oceans (16) or the Mississippi Delta creates long-term carbon sinks and preserves vital habitats, demonstrating how ecological preservation and economic benefit can align (17).

Applying this shift in perspective

We have argued that climate campaigns and policy debates can become far more effective by moving beyond the false dichotomy of mitigation versus adaptation and instead focusing on preparing for the inevitable outcome of persistent overshoot: a future of climate disruption and resource constraints.

We therefore invite climate advocates to embrace adaptation as an entry point and link it to overshoot's larger risk: **resource security**. Effective preparation for this reality is a positive-sum game because the most successful strategies are those that do not exacerbate resource pressures and can be widely replicated. In other words, business models that are both financially viable and reduce planetary stress have the strongest long-term prospects.

Recognizing overshoot as our shared reality, not as an inconvenient burden that obliges us to sacrifice for the sake of society, represents a critical mindset shift that empowers action for any entity. Let's shift the focus from blaming to pursuing effective responses and create "**islands of viability**." Prioritize strategies that align individual and collective incentives.

Admittedly, emphasizing approaches where self-interest aligns with reducing pressure on the biosphere may not be enough to reverse the broader trend. However, it can build confidence that action is not futile and attract interest by demonstrating winnable strategies, ones that could become self-reinforcing, where success breeds further success. It also helps establish broader

acknowledgment that the predictable future is an ever more dominant force shaping everyone's playing field. Ultimately, these efforts forge pathways to more viability and resilience, especially for those who act early, as early adopters secure greater operational stability and adaptability amid growing ecological and climate challenges.

Acknowledgement

We'd like to thank Simone Bastianoni, David Batker, William Brock, Aisha Dasgupta, Simon Levin, David Lin, Walt Reid, Gary Wolff, and Peter Victor for their invaluable comments.

References

[1] Richardson, K., Steffen, W., Lucht, W., Bendtsen, J., Cornell, S.E., Donges, J.F., Drüke, M., Fetzer, I., Bala, G., Von Bloh, W. and Feulner, G., 2023. Earth beyond six of nine planetary boundaries. *Science advances*, **9**(37), p.eadh2458. (2023).

[2] Lo, K., Miller, E., Dworatzek, P., Basnet, N., Silva, J., Van Berkum, J. L., Halldórsdóttir, R. B., & Dyck, M. D. R. 2025. National Ecological Footprint and Biocapacity Accounts, 2025 Edition. Data and metadata version 1.0. Produced for Footprint Data Foundation by researchers at York University and University of Iceland. https://footprint.info.yorku.ca .

[3] Nature briefing, Climate action clings to life at COP30, November 24 2025. https://mailchi.mp/nature/daily-briefing-13894928.

[4] Wackernagel, M., Schulz, N.B., Deumling, D., Linares, A.C., Jenkins, M., Kapos, V., Monfreda, C., Loh, J., Myers, N., Norgaard, R., Randers, J. 2002. Tracking the ecological overshoot of the human economy. Proceedings of the National Academy of Science, 99, 9266-9271. https://doi.org/10.1073/pnas.142033699.

[5] N.J. Hagens, Economics for the future–Beyond the superorganism. *Ecological Economics **169** e*106520 *(2020):*

[6] Lo, K., Miller, E., Dworatzek, P., Basnet, N., Silva, J., Van Berkum, J. L., Halldórsdóttir, R. B., & Dyck, M. D. R. 2025. National Ecological Footprint and Biocapacity Accounts, 2025 Edition. Data and metadata version 1.0. Produced for Footprint Data Foundation by researchers at York University and University of Iceland. https://footprint.info.yorku.ca/data/

[7] M. Wackernagel, L. Hanscom, P. Jayasinghe, D. Lin, A. Murthy, E. Neill, P. Raven, The importance of resource security for poverty eradication. *Nature Sustainability* **4**(8), 731-738 (2021).

[8] NOAA (2025), The NOAA Annual Greenhouse Gas Index (AGGI), Earth System Research Laboratories, NOAA, https://gml.noaa.gov/aggi/aggi.html

[9] C.J.A. Bradshaw, P. R. Ehrlich, A. Beattie, G. Ceballos, E. Crist, J. Diamond, R. Dirzo, M. Wackernagel, Underestimating the challenges of avoiding a ghastly future. *Frontiers in Conservation Science* 1:615419. (2021).

[10].Carbon Brief, COP30 BELÉM: Key outcomes agreed at the UN climate talks in Belém, 23 November 2025 16:04, https://www.carbonbrief.org/cop30-key-outcomes-agreed-at-the-un-climate-talks-in-belem/

[11] D. Lin, L. Hanscom, A. Murthy, A. Galli, M. Evans, E. Neill, M.S. Mancini, J. Martindill, F.Z. Medouar, S. Huang, M. Wackernagel, Ecological footprint accounting for countries: updates and results of the National Footprint Accounts, 2012–2018. *Resources*, *7*(3), 58-80 (2018)

[12] G. Loewenstein, D. Schwartz, Noting to fear but a lack of fear: Climate change and the fear deficit. *G8/G20 Magazine*: 60-62 (2010) https://www.cmu.edu/dietrich/sds/docs/loewenstein/nothingFearLackFear.pdf

[13] Mann, Michael E. 2013. The Hockey Stick and the Climate Wars: Dispatches from the Front Lines. Columbia University Press. p. 23. ISBN 978-0-231-52638-8.

[14] Jack Hunter, 2020, The 'climate doomers' preparing for society to fall apart. BBC, 15 March 2020, https://www.bbc.com/news/stories-51857722

[15] Global Footprint Network, “Earth Overshoot Day 2024: Circular businesses are reversing overshoot” webpage of Global Footprint Network. https://overshoot.footprintnetwork.org/newsroom/press-release-circular-businesses-reversing-overshoot-english-2024/

[16] Lynham, John, and Juan Carlos Villaseñor-Derbez. "Evidence of spillover benefits from large-scale marine protected areas to purse seine fisheries." *Science* 386, no. 6727 (2024): 1276-1281.

[17] M.M. Baustian, C. L. Stagg, C. L. Perry, L. C. Moss, T.J.B. Carruthers, Long-term carbon sinks in marsh soils of coastal Louisiana are at risk to wetland loss. *Journal of Geophysical Research: Biogeosciences* **126(3)**, e2020JG005832. (2021).