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CLIMATE IMPACT RESEARCH

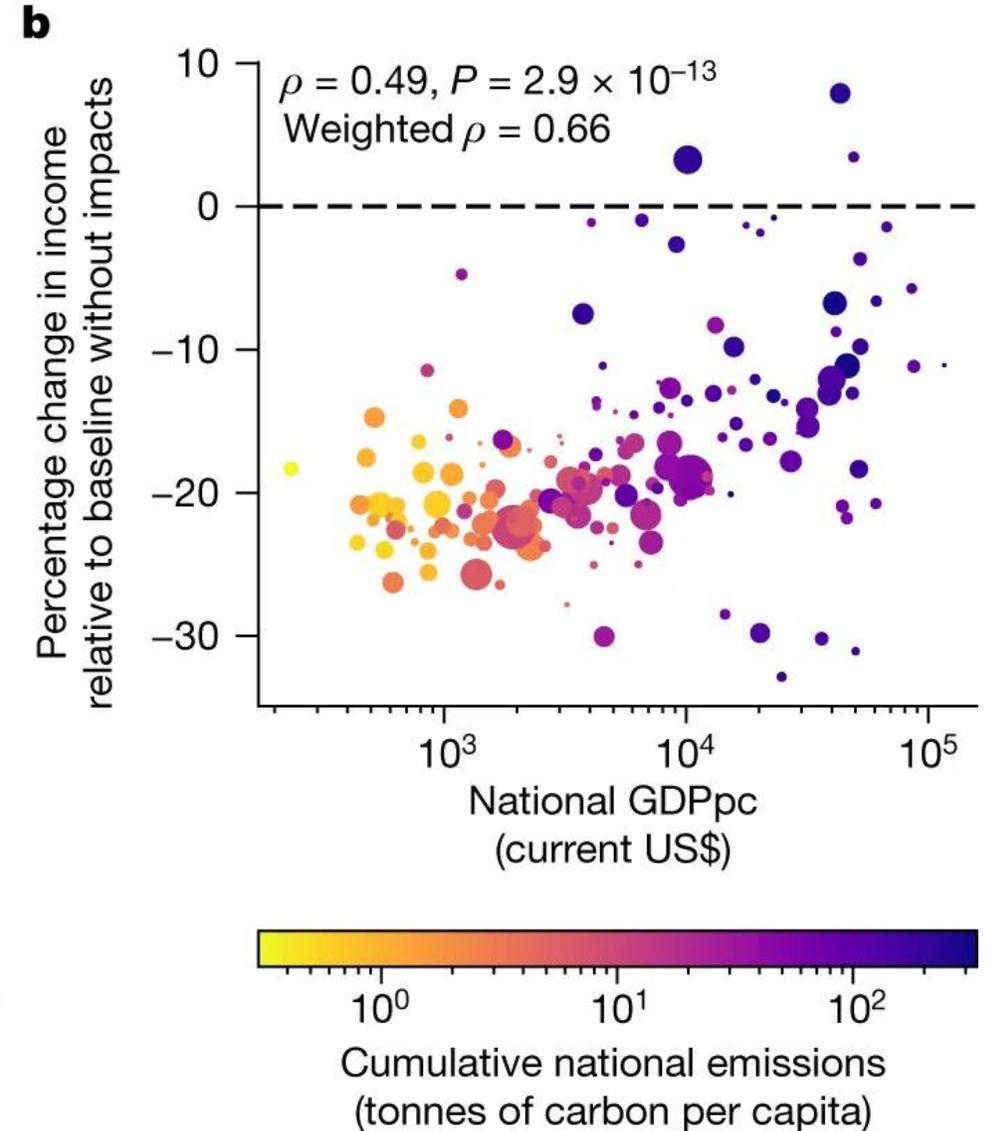
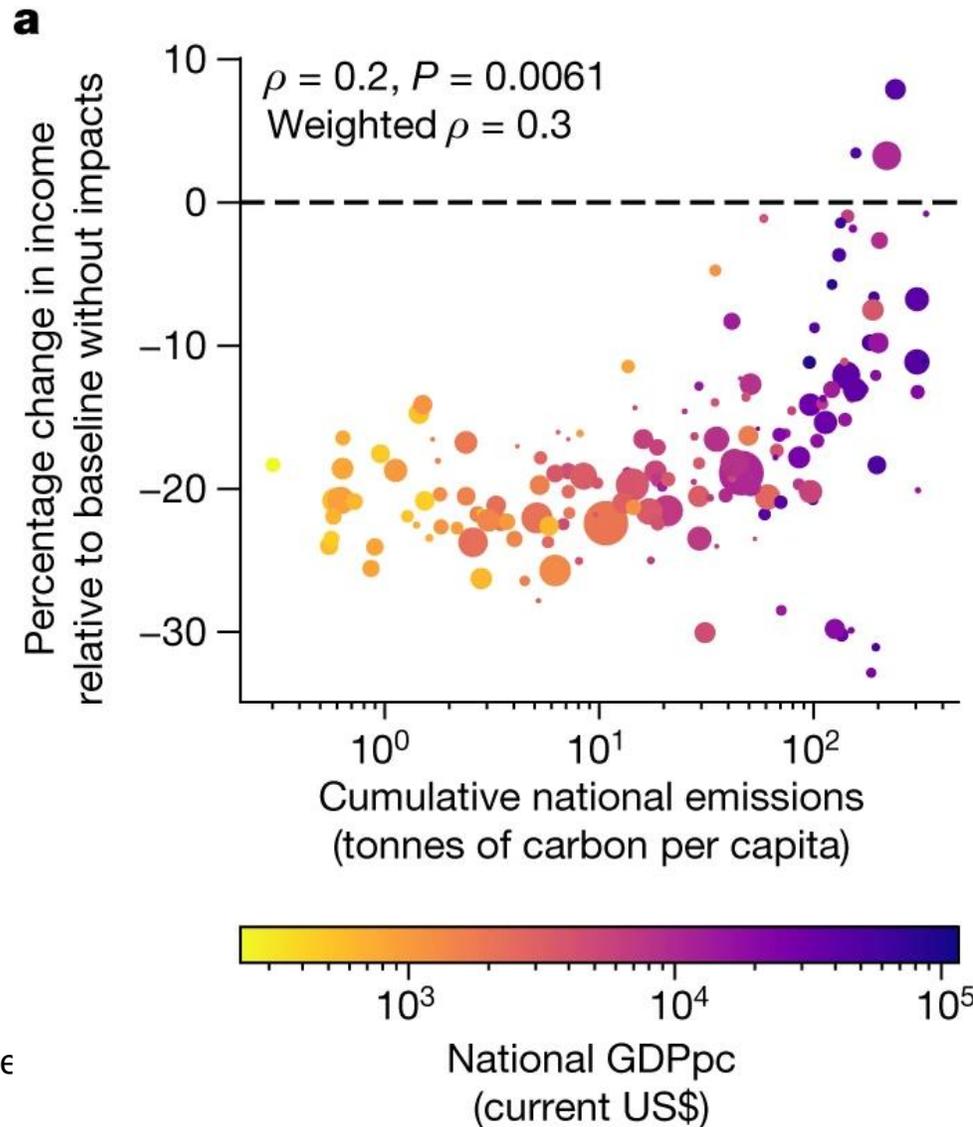
Sustainable Development and Climate Protection go hand in hand

Jessica Strefler, Potsdam Institute for Climate Impact Research

June 17th 2025, 17th Meeting of the SBSTA Research Dialogue, Bonn

Climate damages due to current policies threaten sustainable development

Committed climate damages by country (in 2050)



Kotz et al. (2024)
Nature 628, 551-557

Recent literature on different SDGs within mitigation pathway analysis

Food and land systems

nature communications

Article

<https://doi.org/10.1038/s41467-023-38043-1>

Projected landscape-scale repercussions of global action for climate and biodiversity protection

Received: 10 March 2023

Patrick José von Jeetze^{1,2}, Isabelle Weindl¹, Justin Andrew Johnson³,

Accepted: 13 April 2023

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Published online: 16 May 2023

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Check for updates

Sara Minoli¹, Christoph Müller¹, Hermann Lotze-Campen^{1,2} &

Alexander Popp¹

SCIENCE ADVANCES | RESEARCH ARTICLE

PUBLIC HEALTH

Food matters: Dietary shifts increase the feasibility of 1.5°C pathways in line with the Paris Agreement

Florian Humpenöder^{1,†*}, Alexander Popp^{1,2,†}, Leon Merfort^{1,3}, Gunnar Luderer^{1,3}, Isabelle Weindl¹, Benjamin Leon Bodirsky¹, Miodrag Stevanović¹, David Klein¹, Renato Rodrigues¹, Nico Bauer¹, Jan Philipp Dietrich¹, Hermann Lotze-Campen^{1,4}, Johan Rockström^{1,5}

Fair allocation approaches

Article

Navigating the black box of fair national emissions targets

Mark Dekker, Andries Hof, Yann Robiou du Pont, Nicole van den Berg, and 7 more

This is a preprint; it has not been peer reviewed by a journal.

<https://doi.org/10.21203/rs.3.rs-5023350/v1>

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PNAS

RESEARCH ARTICLE | EARTH, ATMOSPHERIC, AND PLANETARY SCIENCES OPEN ACCESS

Using net-zero carbon debt to track climate overshoot responsibility

Setu Pelz^{1, a, 1}, Gaurav Ganti^{1, a, b, c, d, e}, Robin Lamboll^{1, f, g}, Luke Grant^{1, h}, Chris Smith^{1, a, h}, Shonali Pachauri^{1, a}, Joeri Rogelj^{1, a, f, g}, Keywan Riahi², Wim Thiery^h, and Matthew J. Gidden^{a, e}

Edited by Piers M. Forster, University of Leeds, Leeds, United Kingdom; received May 9, 2024; accepted February 10, 2025 by Editorial Board Member Akkihebbal R. Ravishankara

March 24, 2025 | 122 (13) e2409316122 | <https://doi.org/10.1073/pnas.2409316122>

Justice perspectives

Perspective | Published: 08 January 2024

Justice considerations in climate research

Caroline Zimm[✉], Kian Mintz-Woo[✉], Elina Brutschin, Susanne Hanger-Kopp, Roman Hoffmann, Jarmo S. Kikstra, Michael Kuhn, Jihoon Min, Raya Muttarak, Shonali Pachauri, Omkar Patange, Keywan Riahi & Thomas Schinko

Nature Climate Change 14, 22–30 (2024) | [Cite this article](#)

Economic inequality from CC impacts and actions

Article | [Open access](#) | Published: 04 October 2024

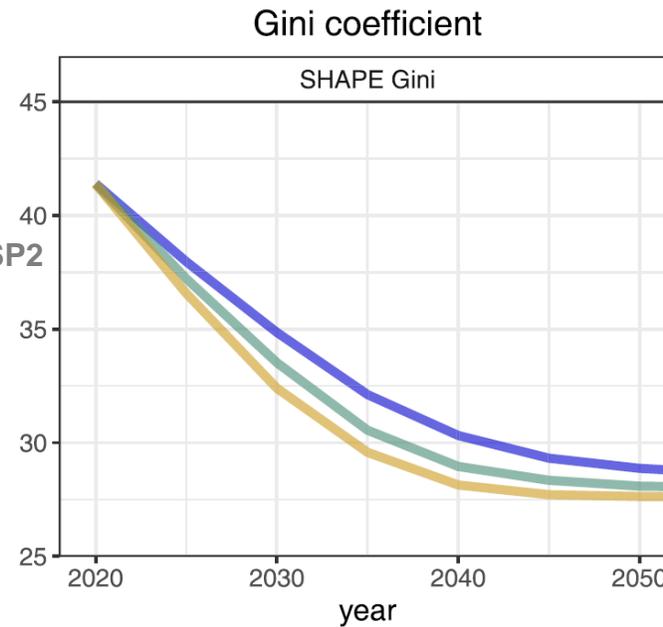
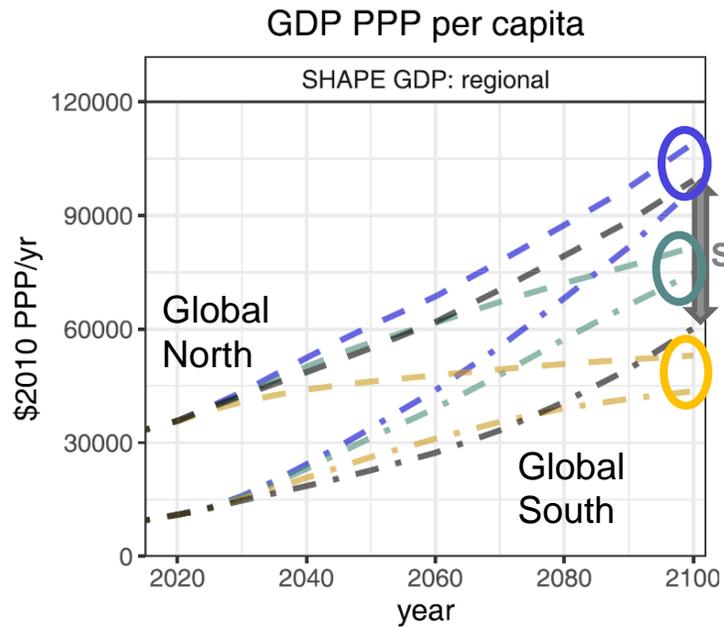
A multi-model assessment of inequality and climate change

Johannes Emmerling[✉], Pietro Andreoni, Ioannis Charalampidis, Shouro Dasgupta, Francis Dennig, Simon Feindt, Dimitris Fragkiadakis, Panagiotis Fragkos, Shinichiro Fujimori, Martino Gilli, Carolina Grottera, Celine Guivarch, Ulrike Kornek, Elmar Kriegler, Daniele Malerba, Giacomo Marangoni, Aurélie Méjean, Femke Nijssen, Franziska Piontek, Yeliz Simsek, Bjoern Soergel, Nicolas Taconet, Toon Vandyck, Marie Young-Brun, ... Massimo Tavoni[✉] + Show authors

Nature Climate Change 14, 1254–1260 (2024) | [Cite this article](#)

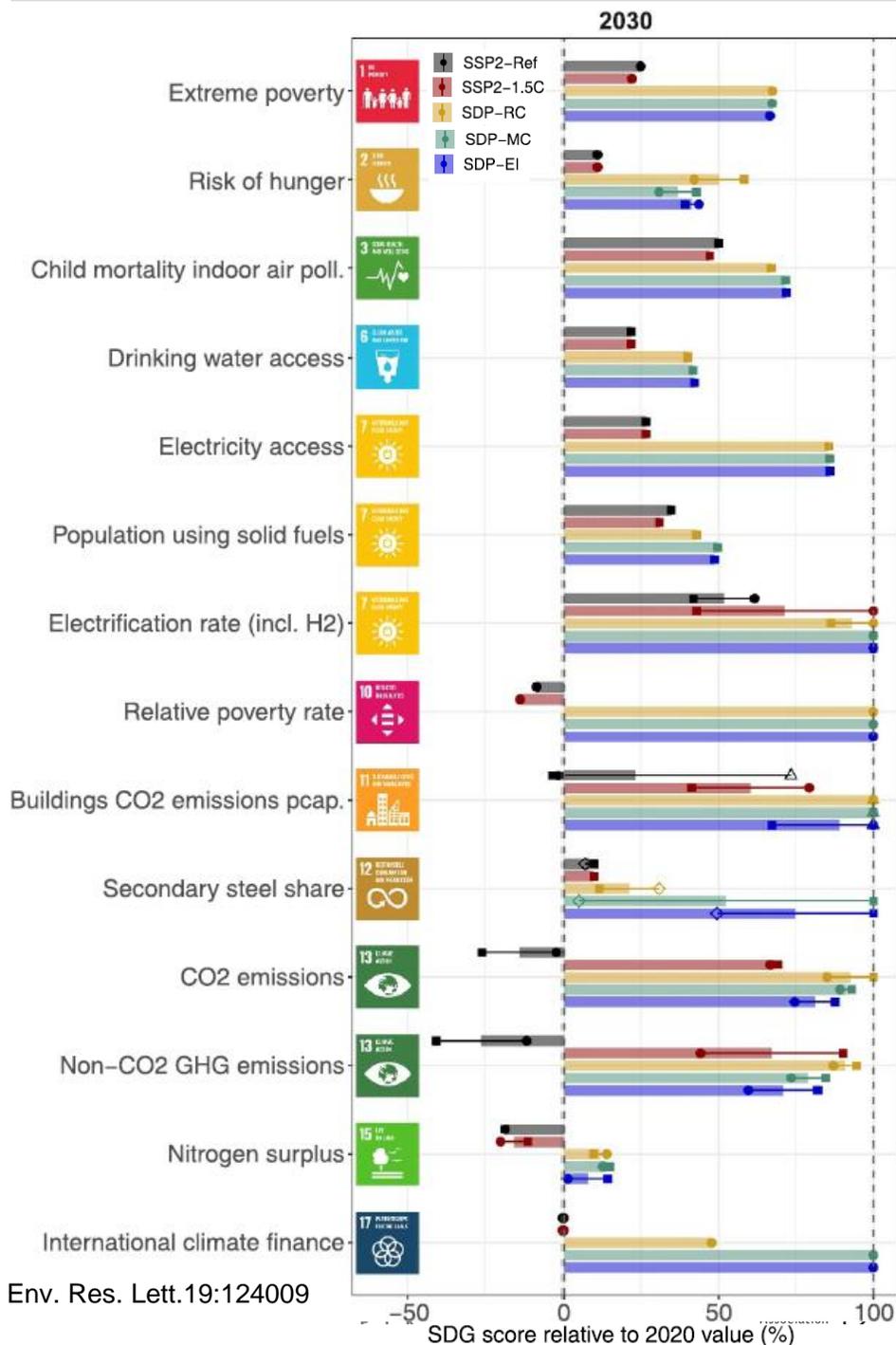
Multiple pathways towards sustainable development goals and climate targets

- Continuation of current trends far off-track from meeting SDGs
- Climate change mitigation without targeted SD policies has synergies (e.g. for biodiversity) but also trade-offs (e.g. food & energy prices)
- SDG scenarios substantially improve SD outcomes, including stronger convergence of across-country GDP and therefore lower Gini



Strefler, PIK: SD and climate protection go hand in hand – 4

Soergel et al. (2024) Env. Res. Lett.19:124009



Multiple pathways towards sustainable development goals and climate targets

Kikstra et al: SDPs can close decent living gaps including residential and commercial energy deprivation and industry energy gaps

ENVIRONMENTAL RESEARCH
LETTERS

LETTER • OPEN ACCESS

Closing decent living gaps in energy and emissions scenarios: introducing DESIRE

To cite this article: Jarmo S Kikstra *et al* 2025 *Environ. Res. Lett.* 20 054038

Min et al: SDPs show rapid and sustained reductions in within-country inequality, even with high economic growth

ENVIRONMENTAL RESEARCH
LETTERS

LETTER • OPEN ACCESS

Income and inequality pathways consistent with eradicating poverty

To cite this article: Jihoon Min *et al* 2024 *Environ. Res. Lett.* 19 114041

Weindl et al: SDPs align sufficient food supply with progress towards planetary integrity, halting biodiversity loss, mitigating adverse impacts from irrigation, and significantly reducing nitrogen pollution.

ENVIRONMENTAL RESEARCH
LETTERS

LETTER • OPEN ACCESS

Food and land system transformations under different societal perspectives on sustainable development

Isabelle Weindl*, Bjoern Soergel, Geanderson Ambrósio, Vassilis Daioglou, Jonathan Doelman, Felicitas Beier, Arthur Beusen, Benjamin Leon Bodirsky, Astrid Bos, Jan Philipp Dietrich

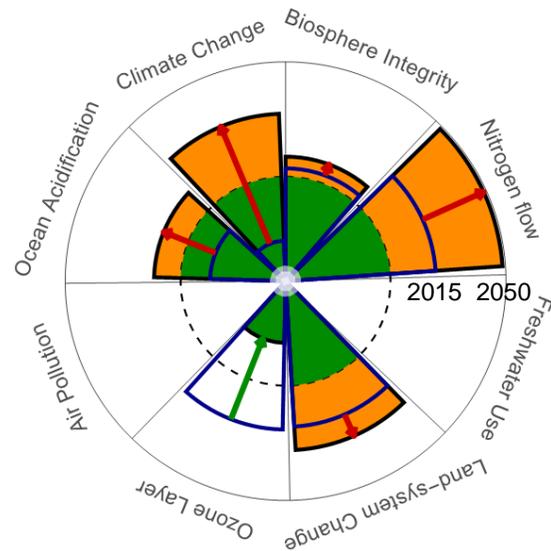
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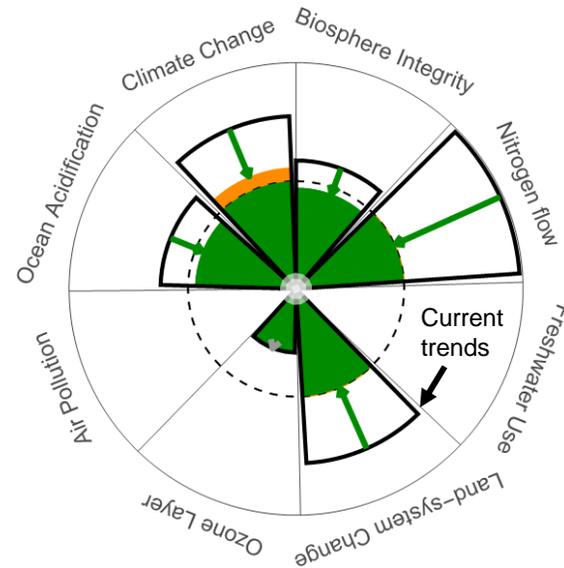
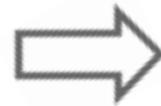
Transforming human systems to safeguard the Global Commons

Current trends transgress planetary boundaries:
 Biosphere integrity, nitrogen flow, land-system change further worsened, climate change & ocean acidification transgressed by 2050



Current trends
 2015 → 2050

Whole systems transformation allows return to planetary integrity
 Land systems transformation fundamental for preserving biosphere integrity, nitrogen flow, land-system change; combination with energy system transformation necessary to safeguard climate and oceans



State in 2050
 current trends → whole systems transformation



Abrahão et al. 2024. Transforming human systems to safeguard the Global Commons: A report by PIK and CGC. Potsdam, Germany and Tokyo, Japan

Summary

- › Without more ambitious climate policy, climate damages could be prohibitively high for sustainable development.
- › Climate change mitigation can avoid exacerbating inequality: avoided damages limit increases in income inequality in the long term, but redistribution of carbon price revenues are necessary to improve income inequality in the near term.
- › Yet climate change mitigation needs to be put into a broader sustainability context. A combination of ambitious climate change mitigation policies with targeted SD policies can substantially improve SD outcomes.
- › Recent studies show: Synergies between SD and climate protection are higher than trade-offs.

References

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- › Dekker et al., preprint, <https://doi.org/10.21203/rs.3.rs-5023350/v1>
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- › Emmerling et al. (2024), Nat. Clim. Change 14: 1254-1260
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- › Abrahão et al. 2024. Transforming human systems to safeguard the Global Commons: A report by PIK and CGC. Potsdam, Germany and Tokyo, Japan