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Solving poverty need not cost the Earth

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Progress on poverty eradication has yet to deliver access to basic services such as electricity and running water for all. Redistribution, better technologies and different lifestyles can address inequality without exacerbating climate change or degrading ecosystems.

In 2009, UN Secretary-General Ban Ki-moon declared that "climate change is the defining challenge of our time". The UN Sustainable Development Goals framework meanwhile states that poverty eradication is "the greatest global challenge". However we frame them, the two issues are interlinked. Climate change worsens poverty by fuelling natural disasters, bringing new diseases and eroding agricultural productivity[1]. And poverty renders people and communities less resilient in the face of catastrophe. Writing in *Nature Sustainability*, Rammelt and colleagues[2] explore how poverty eradication can in turn affect climate change. They show that some 4–5 billion people currently lack access to levels of food, housing, mobility, water and electricity commensurate with a decent living standard. Yet bridging this gap would increase global greenhouse gas emissions by up to 26%. While this is a lot, the authors show that it is less than the carbon footprint of the 5% richest globally — suggesting that a radical redistribution of resources could help reduce poverty without exacerbating environmental degradation.

For several decades, economic growth has improved traditional indicators of global poverty, but significant living standard deficits remain. In 1981, more than 4 in 10 people lived on less than US$1.90 per day — the threshold adopted by international organizations to define extreme poverty. In 2020, after 40 years of steadily declining poverty levels (interrupted temporarily by global crises, including the COVID-19 pandemic), fewer than 1 in 10 people lived in extreme poverty. Nonetheless, an estimated three billion people still cannot afford a healthy diet. When measured in terms of access to basic standards of living such as this, levels of global poverty might actually be increasing over time.

Rammelt and colleagues argue that the prime reason for this setback in the reduction of global inequity is the concentration of wealth. The world's 2,000-plus billionaires now collectively own more wealth than 60% of the global population. Also, the rich produce the most pollution: half of global greenhouse gas emissions in 2015 were emitted by the top 10% of earners, while the bottom half of the population was responsible for only 7% of emissions. In an unjust twist, environmental degradation erodes the living standards of people living in poverty, who are more likely to depend directly on ecosystem services. Small farmers, for instance, rely on nutrient-rich soils, while those lacking access to running water need clean wells.

Globally, if people living in poverty were to enjoy decent living standards, what would the impact on the environment look like? Based on international comparisons, Rammelt and colleagues propose a set of thresholds to define such standards. For instance, the World Bank estimates that with current technology, using a washing machine, a fan, a food processing appliance and basic lighting requires about 365 kilowatt-hours annually (a measure of how much electrical energy is consumed); adding a refrigerator, an iron and more lighting brings that to 1,250 kilowatt-hours[3]. Rammelt and colleagues use these numbers to define a low-energy and a high-energy consumption standard. They proceed similarly to set water, food, housing and mobility thresholds, measured in litres, calories, cubic metres and kilometres travelled, respectively.

Rammelt and colleagues then put forward indicators for environmental outcomes, taken from those used to track the so-called planetary boundaries, or human-driven disturbances to Earth systems[4]. These include greenhouse gas emissions, freshwater withdrawal, the destruction of virgin land, and the disruption of natural phosphorous and nitrogen nutrient cycles. Finally, they search the existing literature to quantify how, using current technology, human consumption creates a cost for the environment. For instance, some two-thirds of global power generation in 2018 came from coal, fossil methane gas or diesel, emitting 475 grams of carbon dioxide per kilowatt-hour consumed.

Rammelt and colleagues go on to elucidate that, given current technology and lifestyles, universal access to basic services would gravely exacerbate climate change but only marginally affect the other environmental indicators they consider. Greenhouse gas emissions would increase anywhere from 15% to 26%, depending on whether the low or high thresholds are used; while pressure on water and land ecosystems would rise more modestly, between 2% and 4%. For context, the authors show that these numbers correspond to the environmental footprint of the those in the top 1–4% of the income distribution.

So can the global economy sustain poverty reduction and environmental sustainability goals at the same time? By framing their study around the concept of environmental justice and underlining the environmental impact of the wealthy, the authors point to the important role that redistribution can play[5].

Another part of the solution, not quantified in the paper, lies in transforming the production system and reshaping consumption patterns to enable carbon-free prosperity[6]. Rammelt and colleagues' central assumption is that living standards need to be lifted using the technology that was used globally in 2018. Yet, better technology is already available to reduce the environmental impact of basic services provision. For instance, wind and solar power emit between 10 and 35 grams of carbon dioxide per kilowatt-hour, which is 13 to 45 times less than the 475 grams the authors used[7]. And a low-carbon energy system does not have to be more expensive[8]. Indeed, the cost of solar and wind power has fallen dramatically over the past four decades, making them the most abundant and cheapest energy sources ever available to humankind[7]. Similarly, whether people use gasoline-fuelled cars or have access to electric cars or, even better, to buses, trams or bicycles has a direct impact on emissions released per kilometre travelled. And as is increasingly recognized, the configuration of cities determines how much travel is needed to reach work or leisure centres in the first place[9]. Finally, dietary choices and agricultural practices dramatically affect the environmental impact of food production systems[10].

Of course, reshaping production and consumption patterns is easier said than done. For instance, government regulations can make it difficult for families to install solar panels on their rooftop or require that they disburse the full cost of the panels upfront. And in many countries, the existing infrastructure makes commuting by car a no-brainer, but makes walking, using the bus or biking a nightmare. These are but two examples of the many barriers known to prevent the adoption of low-carbon solutions. The good news is that the international experience shows that solutions exist[6] — even though there would be no space to list them all here.

In their *Nature Sustainability* paper, Rammelt and colleagues show that current production and consumption patterns cannot provide a decent living standard without jeopardizing climate change goals and worsening other planetary boundaries. A key task for governments is to organize the transition to a global economy that can.

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References

1. Hallegatte, S. & Rozenberg, J. *Nat. Clim. Chang.* **7**, 250–256 (2017).
2. Rammelt, C. F. et al. *Nat. Sustain.* https://doi.org/10.1038/s41893-022-00995-5 (2022).
3. Bhatia, M. & Angelou, N. *Beyond Connections: Energy Access Redefined* (World Bank Group, 2015).
4. Steffen, W. et al. *Science* **347**, 1259855 (2015).
5. Lakner, C., Mahler, D. G., Negre, M. & Prydz, E. B. *J. Econ. Inequal.* **20**, 559–585 (2022).
6. Fazekas, A., Bataille, C. & Vogt-Schilb, A. *Achieving Net-Zero Prosperity: How Governments Can Unlock 15 Essential Transformations* (Inter-American Development Bank, 2022).
7. IEA *World Energy Outlook 2021* (International Energy Agency, 2021).
8. McCollum, D. L. et al. *Nat. Energy* **3**, 589–599 (2018).
9. OECD *Transport Strategies for Net-Zero Systems by Design* (OECD, 2021); https://doi.org/10.1787/0a20f779-en
10. Searchinger, T. et al. *Creating a Sustainable Food Future: A Menu of Solutions to Feed Nearly 10 Billion People by 2050* (World Resources Institute, 2019).

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Competing interests

The author declares no competing interests.