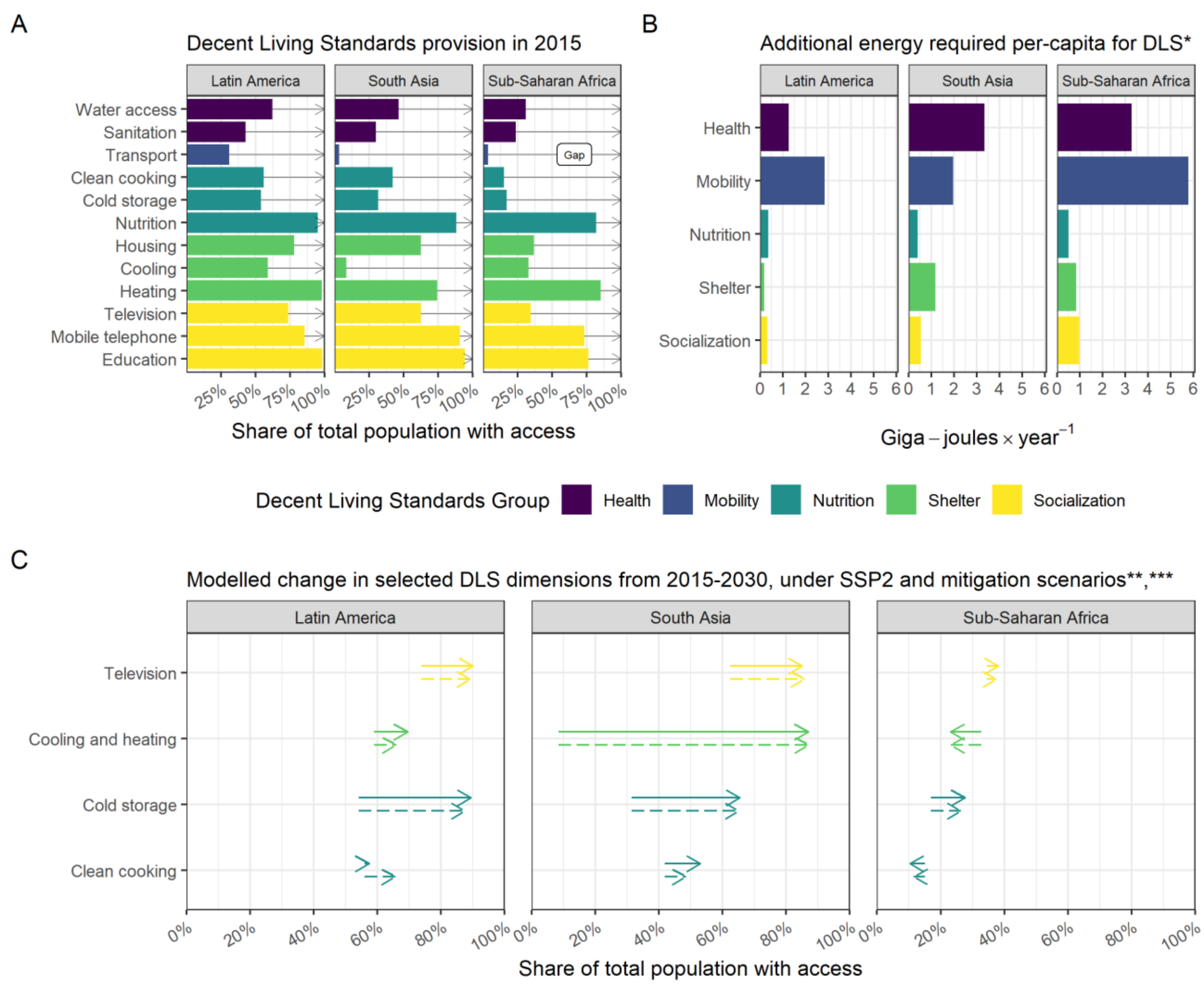
Eliminating multidimensional poverty by providing decent living standards for all

Jarmo S. Kikstra, Setu Pelz, and Shonali Pachauri (International Institute for Applied Systems Analysis, Austria)

The importance of meeting decent living standards for all

The new Working Group III contribution to the IPCC Sixth Assessment Report[1,2] underlines the interlinked challenges of eradicating poverty and addressing the climate crisis. Alleviating poverty in its many forms requires a growth in energy provision for the underserved. At the same time, meeting climate targets means deep and immediate emissions reductions. The transition towards low-carbon energy generation is intuitively less challenging under pathways that assume relatively lower growth or even reductions in overall energy consumption. However, integrated assessments exploring such pathways generally do not shed much light on corresponding shifts in multidimensional poverty. To fulfil both social and physical human needs, like education and nutrition, schools need to be built and heated and food needs to be produced and prepared. Energy and materials are required to build and operate such systems. Analysis of future socioeconomic pathways and climate change mitigation scenarios must consider the provision of services necessary for a decent life for all.



* Panel B: Based on cited energy efficiency assumptions.
** Panel C: Upper solid arrow: NNP; Lower dashed arrow: CP2°C.
*** Panel C: Reversals reflect inability to keep pace with population growth.

This policy brief introduces the decent living standards (DLS) as a framework for bridging efforts that guide progress towards both addressing the climate crisis and alleviating multi-dimensional poverty. A multi-dimensional perspective is necessary to recognize heterogeneous shifts in household access to energy services under climate change mitigation scenarios. This is necessary both from the perspective of achieving climate mitigation goals but also in terms of eradicating poverty more broadly. The DLS provide a suitable framework for addressing this need and is useful for integrating a human wellbeing perspective into climate mitigation scenario development and analysis.

Incorporating multi-dimensional poverty alleviation into energy modelling

The DLS framework accounts for poverty across several dimensions, including nutrition (food, preparation and conservation), shelter (housing, thermal comfort), health (health care, water and sanitation), socialization (education, communication and information), and mobility (motorized transport)[3]. It has been used to understand the provision of necessary services around the world[4] (see Panel A). It has also been extended to explore issues of energy poverty and climate justice. From a starting point of material and energy deprivation, one can determine how much additional energy would need to be provided for delivering necessary services to those that are currently deprived of them (the "energy gap", Panel B). Globally, on average about 17 GJ per capita per year would be required to provide DLS. This is only about a third of the current global average final energy consumption per capita. Depending on for instance climate and transport infrastructure, there are regional differences in the energy needs to provide the same service. Regional per capita energy needs are thus estimated to range from about 9 GJ in South Asia to 36 GJ in North America. The relative per capita gaps, as well as the absolute new infrastructure needs, are biggest in sub-Saharan Africa. Total final energy consumption is less than 20 GJ per capita and would need to grow by about 11 GJ to fill the energy gap. When accounting for a growing population under a middle-of-the-road scenario (SSP2), an estimated 89 EJ would be required to provide the new infrastructure for all in sub-Saharan Africa, by 2050.

Defining a level up until which energy contributes to satisfying the DLS also enables the identification for potential energy demand reduction measures. Such calculations of the energy requirements to meet DLS for all have bridged the gap between poverty studies and energy modelling[3,5,6]. These analyses also describe distributional effects in socioeconomic scenarios of the future and encompass multiple scales going from the individual to the regional level.

Regional disparities in access to decent living standards and services

The multidimensionality of the DLS framework enables a deeper understanding of equity and justice than aggregate residential energy demand assessment. A recent bottom-up analysis of socioeconomic pathways and climate mitigation scenarios from a DLS perspective provides insight into regional differences in household access to energy services[7]. Under a middle-of-the-road scenario, this work estimates that the provision of selected DLS dimensions will improve far less across sub-Saharan Africa than either Latin America or South Asia by 2030 (Panel C). Indeed, in the case of access to cooling and heating across sub-Saharan Africa, service provision would not keep pace with population growth, resulting in reversals in terms of aggregate access rates. In contrast, access to cooling and heating across South Asia improved significantly, overcoming the deficit relative to Latin America present in 2015. This work also describes shifts under climate mitigation policies, in this case a scenario consistent with 2°C of warming (CP2°C). Here, the likelihood of appliance acquisition was found to be inelastic to modelled changes expected under climate mitigation scenarios. This is partly explained in that the price of electricity is not significantly affected during the first half of the century under the mitigation scenarios[7]. Together, this suggests that improving household access to electrical services is not at odds with ambitious climate mitigation goals. Rather, the sustained deprivation and, in some cases, trend reversals highlight that policies aimed at improving access to electrical energy services necessary for a decent living standard must be more directly integrated into future climate change mitigation efforts.

The distributional effects of climate change mitigation scenarios on DLS

Synergies and tradeoffs are, however, evident in the adoption of clean cooking, which is indeed expected to be influenced by climate change mitigation policies through changes in fossil fuel prices[8]. Contrasting effects under the same scenario in South Asia and Latin America underline regional differences in household preferences, present reliance on biomass, and fuel costs that influence final technology adoption likelihoods in 2030 (Panel C). In South Asia, rising gas prices under mitigation policies are expected to hinder adoption among the urban poor. In Latin America, higher income inequality implies that many of the urban poor may stay reliant on solid biomass fuels. This work indicates both that universal access to clean cooking is out of reach under a range of socioeconomic pathways to 2030 and that progress is sensitive to climate change mitigation policies, necessitating coordination of these with national efforts to achieve DLS across different regional contexts. Without additional support policies, clean cooking could become unaffordable for about 470 million people by 2030 if a post-pandemic recovery is slow, and for about 200 million people by 2030 under ambitious climate mitigation action. Acceleration of clean cooking transitions by tapping into pandemic recovery and climate funds to target the poorest people and regions globally is urgently needed.

Across both electrical energy services and clean cooking, trends in household adoption are strongly heterogeneous across regions, with diversified effects on the poor and the rich, as well as on rural and urban populations. This can be observed both in aggregate terms and more sharply when disaggregating sub-nationally and across the income distribution. The growing DLS literature is in agreement that rural and poorer households are far more likely to be deprived of access to energy services necessary for a decent life by 2030 than their wealthier and urban counterparts without any new policy intervention[7,8]. The distributional effects of climate change mitigation policy are thus especially important here. For example, government efforts to increase poorer household's access to clean cooking across several countries relies strongly on broad and extensive subsidies for liquid petroleum gas (LPG). Changes in fossil fuel prices under a climate change mitigation scenario require this policy lever to be replaced with adequate alternatives that better target underserved populations, combining this with energy efficiency and demand displacement interventions among wealthier populations. For climate change mitigation policy goals to be met, interventions must be designed with direct considerations of regional differences and in alignment with multi-dimensional poverty alleviation efforts.

References

1. IPCC. Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. (Cambridge University Press, 2022). doi:10.1017/9781009157926.
2. Rao, N. D. & Min, J. Decent Living Standards: Material Prerequisites for Human Wellbeing. Soc Indic Res **138**, 225–244 (2018).
3. Kikstra, J. S. and M., Alessio and Min, Jihoon and Riahi, Keywan and Rao, Narasimha D. Decent living gaps and energy needs around the world. Environmental Research Letters (2021).
4. Rao, N. D., Min, J. & Mastrucci, A. Energy requirements for decent living in India, Brazil and South Africa. Nature Energy **4**, 1025–1032 (2019).
5. Millward-Hopkins, J., Steinberger, J. K., Rao, N. D. & Oswald, Y. Providing decent living with minimum energy: A global scenario. Global Environmental Change **65**, 102168 (2020).
6. Poblete-Cazenave, M., Pachauri, S., Byers, E., Mastrucci, A. & van Ruijven, B. Global scenarios of household access to modern energy services under climate mitigation policy. Nat Energy **6**, 824–833 (2021).
7. Pachauri, S., Poblete-Cazenave, M., Aktas, A. & Gidden, M. J. Access to clean cooking services in energy and emission scenarios after COVID-19. Nat Energy **6**, 1067–1076 (2021).