



Global hotspots of multi-sector climate risks and vulnerability

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Increasing the understanding of how multi-sector risks may impact society is required to effectively prioritize action and best prepare for the impacts of climate change. Global assessments add value by using consistent methods and datasets at broad scale, enabling global decision makers (e.g. development funders) to prioritize action and resources appropriately to affected regions. We present a framework and global analysis of multi-sector risks and vulnerability through different levels of climate (1.5°, 2.0° and 3.0°C) and socioeconomic change (SSPs1-3). We assessed changes in 14 impact indicators across the water, energy and land sectors, spatially represented at 0.5° grid level, for example, water stress index, drought intensity, heat event exposure, habitat degradation and crop yield.

Our assessment identifies hotspots (i.e. spatial correlation) of multi-sector risks – to identify regions that will face the most severe pressures. We assess exposure using global gridded projections of population, including new projections of the most vulnerable populations with income levels <\$10 / day.

Global exposure to multi-sector risks increases ~2.5x between 1.5°C and 3.0°C global mean temperature change, regardless of SSP, and ~3x between the best and worst cases (SSP1/1.5°C vs SSP3/3.0°C, 1.7-4.8bi). For populations vulnerable to poverty, the exposure is an order of magnitude greater in the high poverty and inequality scenario (SSP3) compared to sustainable socioeconomic development (SSP1). Whilst 75% of global exposure falls to Asian and African regions, they have 85-90% of the exposed and vulnerable population, approximately half of which in South Asia. In higher warming scenarios, African regions have higher fractions of the global exposed and vulnerable population, ranging from 8-21% at 1.5°C, to 29-54% at 3°C.