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Reconciliation of climate protection & development: the role of OECD & developing countries

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Although developing countries are called to participate in CO_2 emission reduction efforts to avoid dangerous climate change, the implications of proposed reduction schemes in human development standards of developing countries remain a matter of debate. We show the existence of a positive and time-dependent correlation between the Human Development Index (HDI) and per capita CO_2 emissions from fossil fuel use. We employ this empirical relation under consideration the parallel constraint of the 2°C target, extrapolations of the HDI, and using population scenarios to determine emission pathways for countries. We assume that developing countries will rely on fossil fuel use in the future, e.g. due to cost reasons (Development as Usual - DAU), but we also define as turning the 0.8 HDI threshold. Beyond this value a country is commonly considered as developed. We show if current demographic and development trends are maintained that around 85% of the world's population will live in countries with high HDI (above 0.8) by 2050. In such a case 300 Gt of cumulative CO_2 emissions are estimated to be necessary for the development of 104 developing countries in the year 2000 between 2000 and 2050. This value represents between 20 % to 30 % of previously calculated CO_2 budgets limiting global warming to 2°C. These constraints and results are incorporated into a CO_2 reduction framework involving four domains of climate action for individual countries. The framework reserves a fair and equitable emission path for developing countries to proceed with their development by indexing country-dependent reduction rates proportional to the HDI in order to preserve the 2°C target after a particular development threshold is reached. It can be shown that in such a case the pressure to the OECD countries could be higher than assumed. For example, in each time step of five years, countries with an HDI of 0.85 would need to reduce their per capita emissions by approx. 17% and countries with an HDI of 0.9 by 33 %. Under this approach, global cumulative emissions by 2050 are estimated to range from 850 up to 1100 Gt of CO_2. These values are within the uncertainty range of emissions to limit global temperatures to 2°C.