



Where do climate impacts really matter? The AHEAD framework

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We present a novel approach to systematically linking climate impacts to human livelihoods and well-being. It is based on the transdisciplinary concept of Adequate Human livelihood conditions for well-being And Development (AHEAD), and allows addressing several topical challenges of climate impact assessments, such as the integration of research philosophies and concepts from different disciplines, but also aspects of data integration as well as the combination of processes at different scales. Another particular challenge for such assessments lies in the treatment of uncertainties, which normally multiply along the assessment chain. Especially uncertainties deriving from modelling differences as well as emission scenarios play an important role here. As the Inter-Sectoral Impact Model Intercomparison Project (ISI-MIP) has recently shown, these impact modelling uncertainties are generally large. Our approach offers a useful way of dealing with these uncertainties, by assessing their relevance in a fuzzy-logic framework.

To illustrate the utility of the AHEAD approach, we assess the adequacy of AHEAD conditions on a global scale at national resolution. We focus in particular on the availability of water resources in adequate quantity and quality, which plays an important role in meeting human livelihood needs, and we use multi-model water resource estimates from ISI-MIP. Our results indicate that water availability limits the adequacy of livelihood conditions in some countries today, a situation which will aggravate over the course of the century; however for the majority of countries other aspects limit the adequacy of livelihood conditions. The presented approach shows how uncertainty ranges in modelling results may be framed in a way which allows assessing their relevance with regard to specific questions. The uncertainty range of data on water availability is considerable for many countries, but for more than a third of the countries this range is outside of critical thresholds for water security and overall AHEAD conditions.