Four key challenges for counting the true costs of climate change

This year's Impacts World shines a spotlight on the challenges that lie ahead to count the true costs of climate change, going beyond monetary accounting to cover the impacts on human lives and livelihoods. In order to estimate the consequences of climate change, its impacts must be aggregated across affected natural and human systems. In order to estimate the consequences of climate change, its impacts must be aggregated across affected natural and human systems. This can only be done with a consistent framework for simulations and analyses in a holistic manner - accounting for extreme events, tipping points and long-term changes. At Impacts World 2017, plenary sessions, workshops and an interactive poster session will be devoted to addressing these tasks with a focus on four key challenges in quantifying climate impacts as described below.

Counting the economic costs of climate change

Estimating the economic costs of climate impacts is key for informed decision-making. Costs can arise from changes in the mean climate, as well as climate-induced extreme events, via destruction of assets and impacts on economic growth, development and wellbeing in the short and long term. In particular, climate impacts strongly depend on and further change the distribution of income, wealth, and adaptive capacities. Moving forward, improving economic-cost assessment requires a more comprehensive quantification and documentation of economic losses, reflecting risk and uncertainties, and a better accounting for different preferences and conceptions of social welfare.

- Through which channels does climate-change induce economic impacts?
- How are economic costs realized over different time scales -- short-term, long-term and persistently?
- How can economic costs be aggregated across spatial scales, e.g. using location-specific vulnerabilities?
- What is the relationship between different conceptual scales such as the household or the national level?
- Which methodological improvements are necessary for a meaningful cost-benefit analysis? Is this possible, appropriate or even desirable?
- How can we incorporate and evaluate non-monetary losses? What about appropriate indicators of wellbeing beyond GDP; how are these affected by climate-change?
- How can we capture distributional consequences and what do these mean for poverty?
- How can we evaluate the economic co-benefits of mitigation strategies?
- What are cost-effective adaptation strategies and their limits? What are the consequences of reaching those limits?

Climate change and human migration

Human migration and displacement, be it within a country, or across borders, is driven by myriad interacting factors, not least conflicts and natural disasters. Climate change is already adding to these strains, through the increased frequency and intensity of extreme weather and climate events, the prolonged effects of enduring changes to climatic conditions on food systems and water availability, or the disappearance of land due to rising sea levels.

- What is needed in order to grasp the scale and scope of climate-induced migration under different climate-change scenarios?
- ○ How can the influence of climate change on migration be separated from other influences?
- How do we define the climate, social and economic thresholds leading to migration?
- How can societies adapt their livelihoods in the face of climate stressors to avoid migration?
- How can policy and science enable people to make informed decisions about when, how or where to migrate in the face of climate stressors?
- How do displacement and longer-range migration interact with one another and with the societies and environments in regions of origin and destination?
- What is the relationship between migrants and societies in regions of origin as well as destination?
- For whom is migration a viable and preferred adaptation option? What happens to the trapped populations left behind?

Climate Change and human health

The propagation of vector-borne diseases, occurrence of extreme heat stress, nutritional shortages, and the deterioration of air quality are among the human-health issues likely to be exacerbated under climate change. Furthermore, impacts on labor productivity could be one of the main economic consequences of climate change. Investigating the interaction of climate change from other governance, infrastructure and environmental issues, and to the extent possible separating these, will help to identify the adaptation measures to reduce risks for human health. Furthermore, understanding the influence of these drivers separately contributes to quantifying how climate mitigation policies can help to alleviate pressure on our health systems.

- What are appropriate indicators for measuring climate-change impacts on human health?
- How can we derive a more comprehensive understanding of the direct and indirect impacts of extreme events (floods, temperature and droughts) on human health?
- What are the direct and indirect impacts of climate change on human health, including detrimental effects and risks, and co-benefits?
- Where do the limits to adaptation lie for health risks from climate change? By which mechanisms (physiological, behavioural, technological, economic) will these be reached in different locations?
- How can we strengthen research on morbidity increases from climate change, moving beyond the current focus on mortality?

- What are the appropriate methods to transfer our understanding of local health impacts to the global scale?
- How does climate causally interact with other factors (e.g. demographic shifts, health care systems, behavioural patterns) in defining the health status of a population?
- How can we improve the coordination and funding of efforts across sectors to improve projections of and thereby potentially modify effects of climate change on health effects?

Climate change and the Sustainable Development Goals

Climate action is one of the 17 Sustainable Development Goals (SDGs) adopted by the United Nations in 2015, but all 17 goals are highly interlinked. Climate change impacts, adaptation as well as mitigation action needs to be considered for achieving most, if not all other 16 goals. The climate-impacts research community can therefore contribute to identifying the challenges associated with and required strategies for meeting these goals, and shed light on the particular vulnerabilities of poor and disadvantaged sections of society.

- Through which channels do climate change impacts, adaptation and mitigation affect fulfillment of the SDGs and their interactions?
- What are impacts of climate change on the SDGs' mottos of "universality" and "leave no-one behind"? Which are the vulnerable populations and regions at different time scales?
- How compatible and crucial are climate-change mitigation and resilience for achieving the SDGs?
- How can adaptation to climate-change impacts support the SDGs, and which level of adaptation is required to meet the SDGs under different scenarios?
- Which are important interactions among the SDGs that can positively/adversely affect the fulfillment of the SDGs?
- How do climate-change impacts on the food, energy, water security nexus propagate to the SDGs?
- How do interactions between climate change and other drivers of environmental changes (e.g. overexploitation of natural resource depletion of freshwater, biodiversity loss, soil degradation) affect the likelihood of reaching the SDGs?

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Together with myclimate Deutschland gGmbH we are calculating and offsetting the CO2 emissions arising from the participant travel and further CO2 emissions associated with this conference.