

Next generation of advanced integrated assessment modelling to support climate policy making

Modelling adaptation dynamics

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Introduction

- Adaptation can substantially reduce negative impacts of climate change
 - Adaptive capacity describes the ability of systems to successfully plan and implement adaptation
 - We have limited understanding of how people, regions and ecosystems can successfully adapt to climate change and how **effective** the adaptation measures will be, especially at higher levels of warming
- Quantitative scenarios of adaptation and adaptive capacity are still largely absent
 - In IAMs adaptation is either absent or treated in a stylized way (no adaptation versus optimal adaptation)
 - Risk of underestimating climate impacts and thereby the urgency for mitigation
- Global inequalities in socioeconomic conditions will be decisive for the actual ability of systems to deploy successful adaptation



Socioeconomic barriers to adaptation (IPCC, AR5)

Regions (chapter)	Constraints	
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Polar regions (28)	1	
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Quantified dimensions of SSPs:			
GDP	(Crespo Cuaresma 2014; Leimbach et al. 2014; Dellink et al. 2014)		
Population and education dynamics (KC and Lutz 20			
Urbanization		(Jiang and O'Neill 2014)	
Human Development Index (HDI)		(Crespo Cuaresma and Lutz 2015)	
Inequality		(Rao et al. 2018)	
Governance		(Andrijevic et al. 2019)	
Gender equality		(Andrijevic et al. 2020)	



Sustainable irrigation



(van Maanen et al., forthcoming)



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Global Latin America & Caribbean Middle East & North Africa Central Asia East Asia & Pacific Operation Middle East & North Africa Middle East & North Africa JAVIGATEE Scentral Asia Scentral Asia Central Asia

- We establish a statistic relationship between the SIDI and the countries' socioeconomic indicators (for which projections along the SSP scenarios are available)
- Then projections for sustainable irrigation within the SSP framework can be derived.
- SSP1 and SSP5 are the most optimistic scenarios and reach the highest levels of sustainable irrigation
- Improving socioeconomic conditions of countries will enhance their ecapacity



Conclusions

- The approach, which comes with a number of limitations (e.g. limited set of quantified socioeconomic variables), allows for consistent projections alongside the SSPs for sustainable irrigation and potentially other adaptation measures (e.g. AC access)
- Overcoming socioeconomic constraints to improve adaptation deployment under climate change is a distinct possibility and might be a necessity to prevent substantial impacts (e.g. substantial reductions in agricultural productivity)
- We identify a need to incorporate socioeconomic variables into projections of future adaptation developments
- Assessing the future adaptive capacity of countries and including this information in impact assessments are of key importance to assess pathways towards climate resilience





Thank you!

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