



Environmental context will affect achieving long-term Sustainable Development Goals: The case of coastal deltas

Murray Scown^{1,2*}, Frances Dunn³, Stefan Dekker¹, Detlef van Vuuren^{1,4}, Philip Minderhoud³, and Hans Middelkoop³

¹Copernicus Institute of Sustainable Development, Utrecht University, Netherlands

²LUCSUS, Lund University Centre for Sustainability Studies, Lund University, Sweden

³Department of Physical Geography, Utrecht University, Netherlands

⁴PBL Netherlands Environmental Protection Agency, The Hague, Netherlands

*m.w.scown@uu.nl



Utrecht University



LUND UNIVERSITY

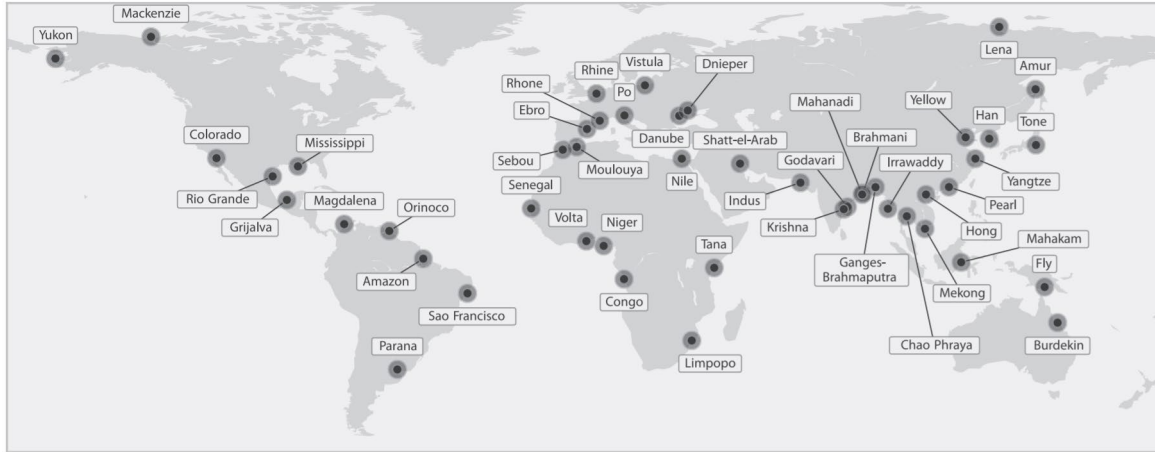


@MurrayScown



Methods: overview

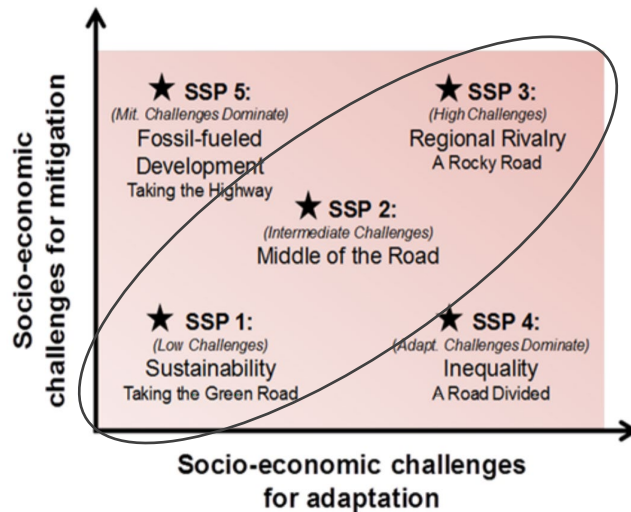
Case study of 49 coastal river deltas



Tessler *et al.* (2015) Science

Three plausible future scenarios

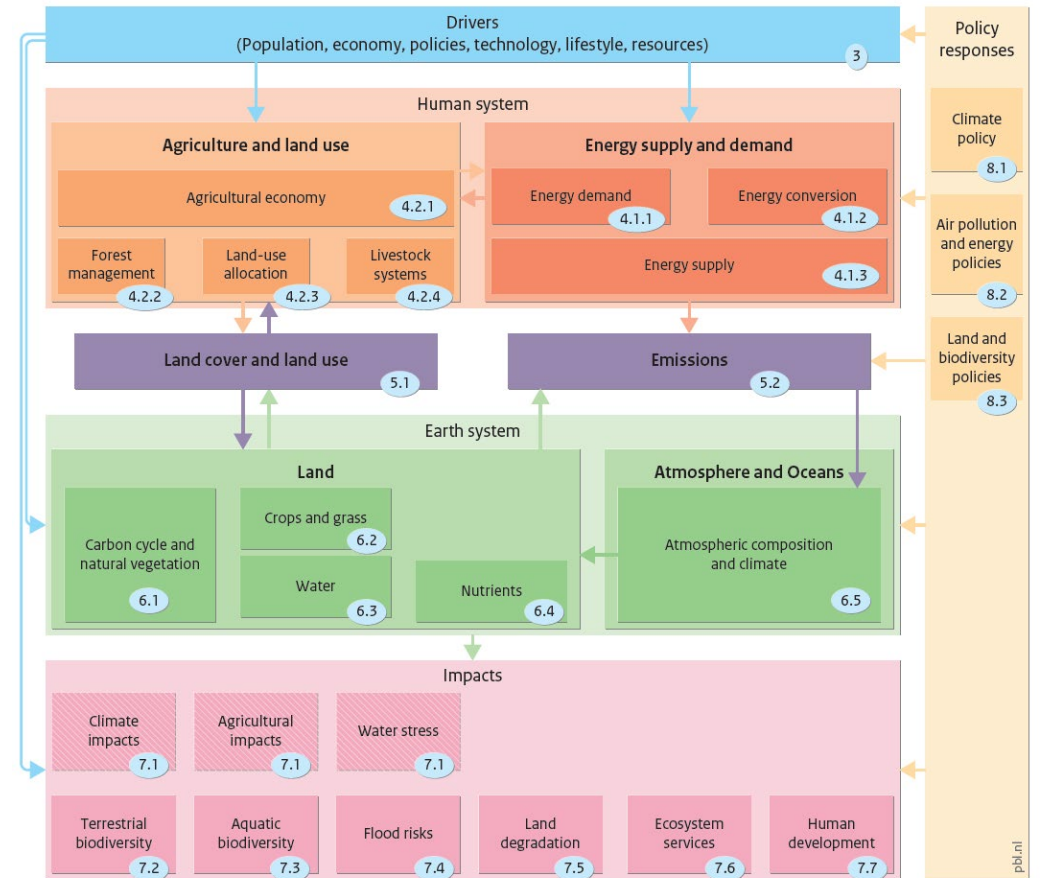
- SSP1 – Sustainability
- SSP2 – Middle of the road
- SSP3 – Regional rivalry



O'Neill *et al.* (2016) Glob. Env. Change

Integrated Assessment Modelling (IMAGE)

- Global gridded population and land use to 2100

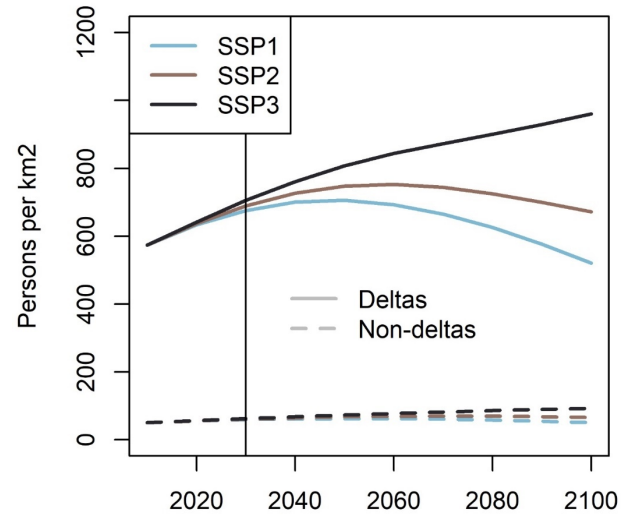


x Section

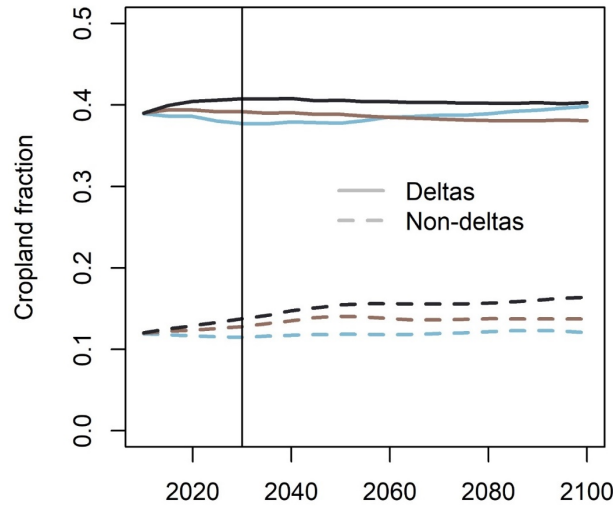
Source: PBL 2014

Results: deltas highly important for achieving the SDGs past 2030

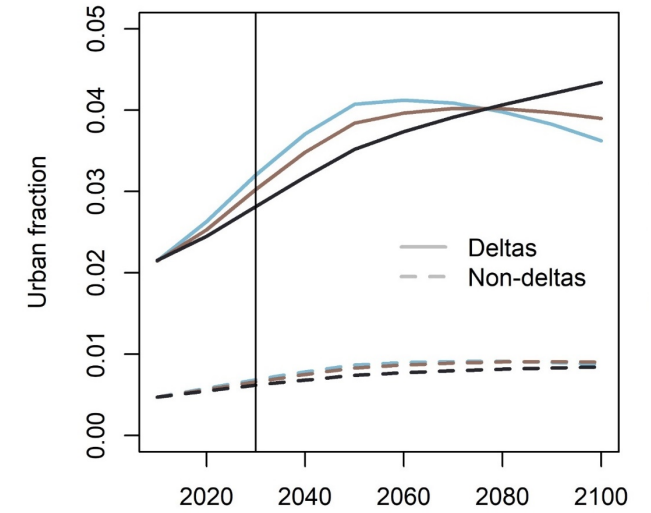
Population density



Cropland



Urban area



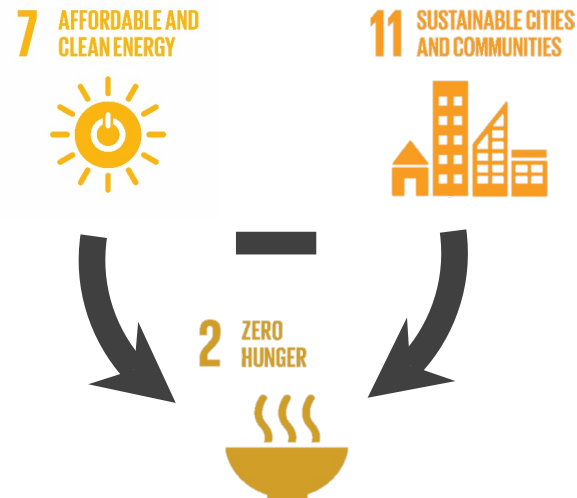
Population density much higher in deltas, affecting many SDGs through health, access to clean water, food demand, migration, and risk from extreme events

Many deltas already saturated with cropland important for food security; but SLR and salinization threaten agricultural productivity

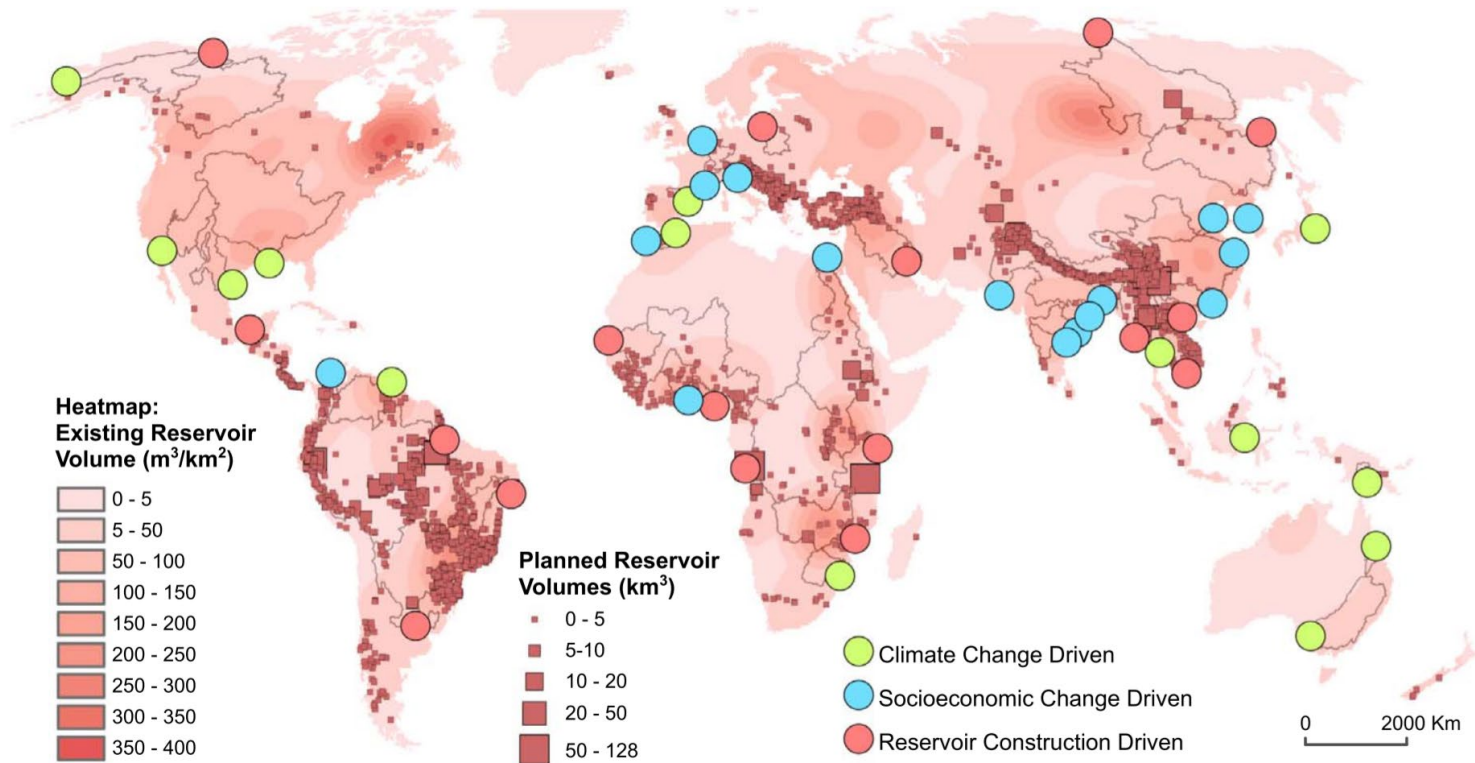
Many deltas rapidly urbanising, accelerating land subsidence and increasing risk from extreme events

SDG challenges in deltas: hydrological disconnection

Hydropower for clean energy (SDG 7) and levees to protect settlements (SDG 11) impact catchment sediment flow, accretion, nutrient delivery, and threaten food security (SDG 2)



E.g., future reservoirs

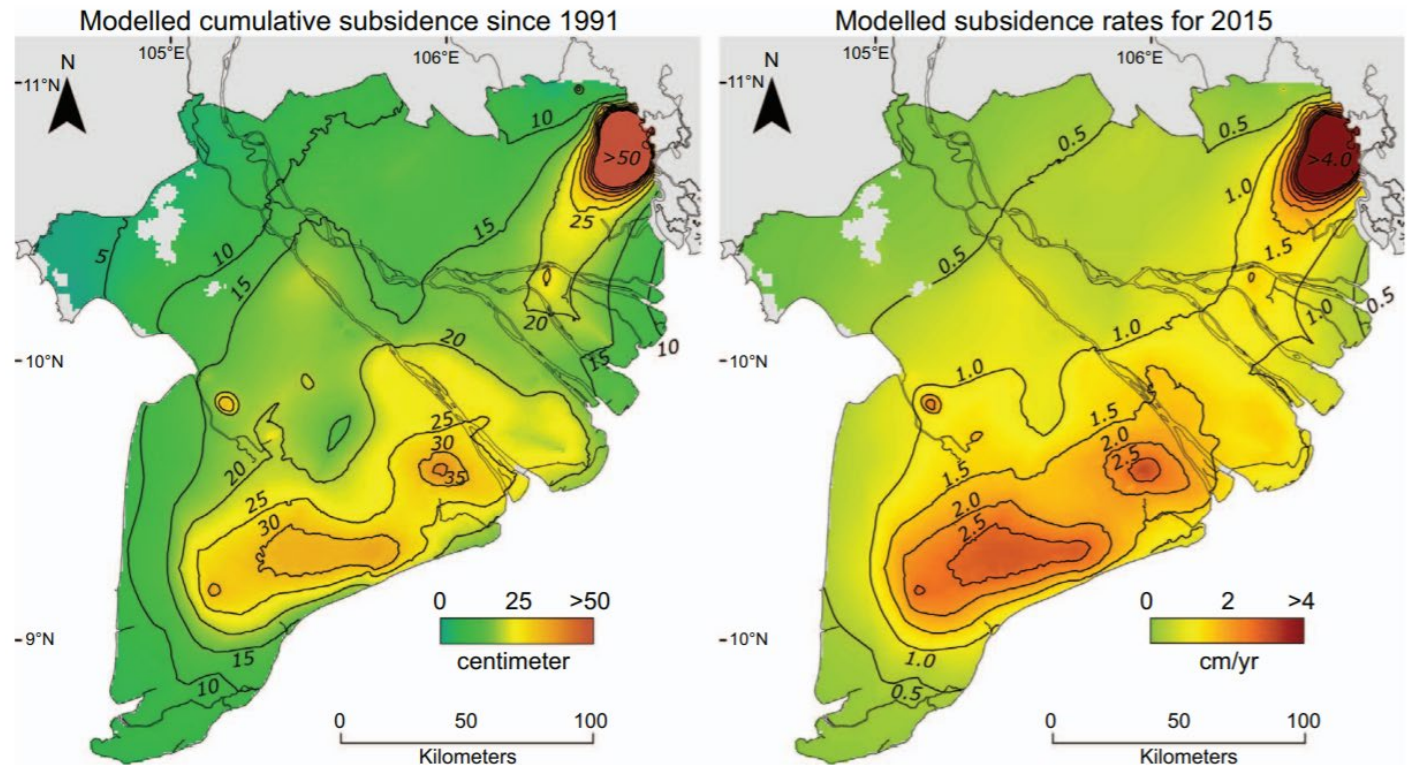


SDG challenges in deltas: groundwater extraction and subsidence

Groundwater an important source of fresh water (SDG 6) but extraction causes land subsidence and leads to increased risk of flooding and salinization, with negative consequences for crop production (SDG 2) and cities (SDG 11)



E.g., Mekong delta



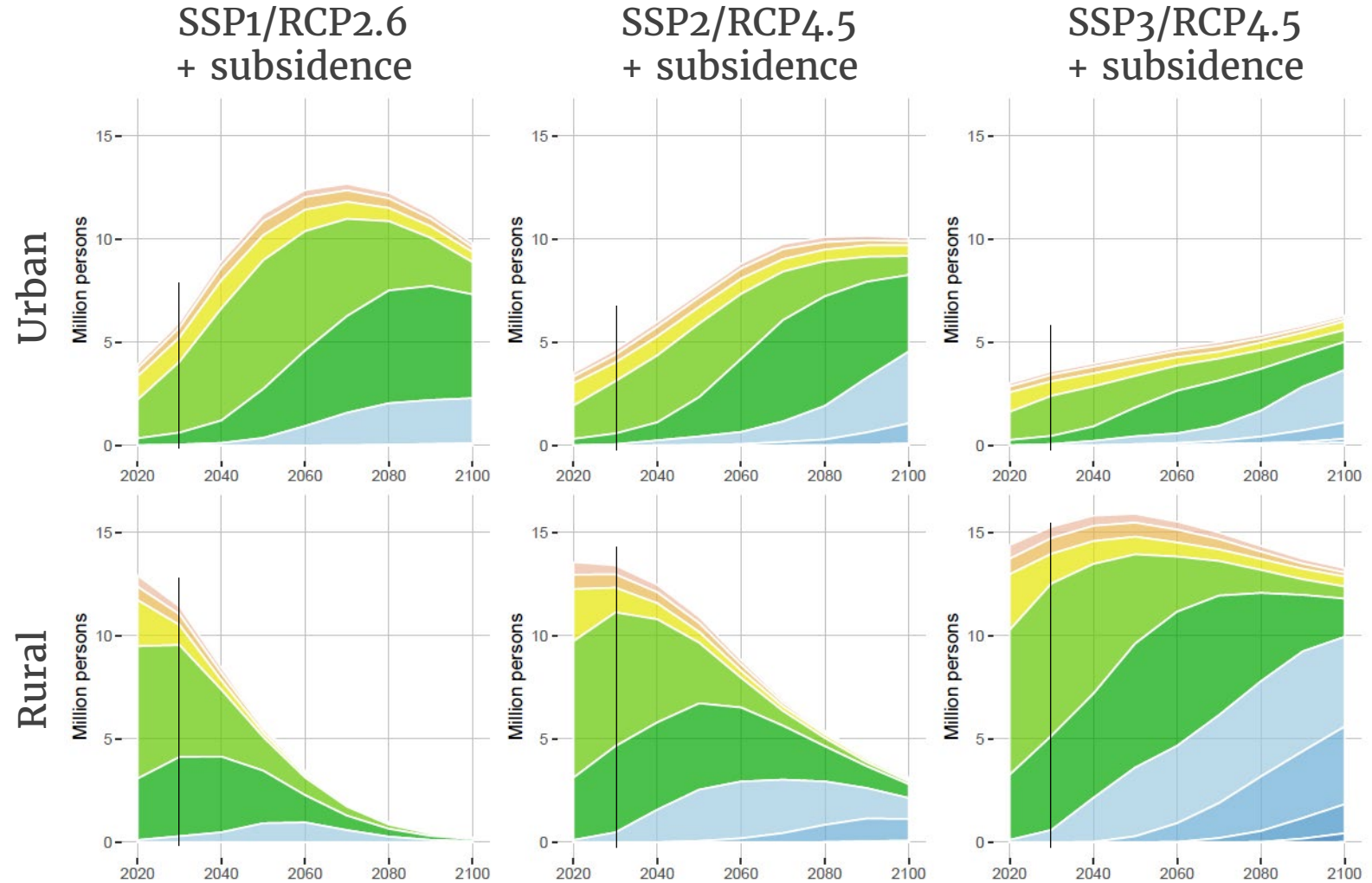
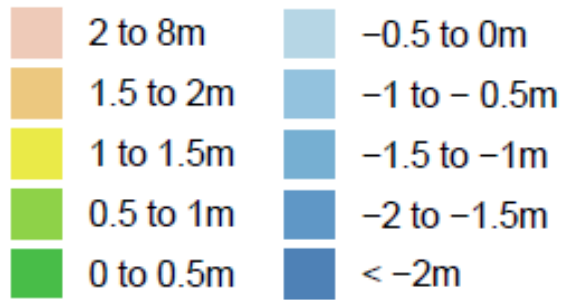
Minderhoud *et al.* (2017) *Environ. Res. Lett.*

SDG challenges in deltas: migration and long-term goals

Exposure to threats and loss of rural livelihoods could drive massive migration to urban areas; how to effectively manage such migration in deltas beyond the 2030 SDG horizon?

E.g., Mekong delta urban/rural population

Elevation




If researchers know the environmental challenges, can inform policy

1. Researchers: get environmental context on the 2030 Agenda
 - Start thinking about environmental processes for local SDG implementation, not just socio-economic context
2. Policy makers: think longer term, because of feedbacks
 - Timescales of environmental processes extend way beyond 2030, so actions pushing for a short-term goal could have long-term consequences
3. Geoscientists: contribute to SDGs research and action
 - Discussion currently dominated by policy makers and social scientists



Commentary | Published: 21 September 2015

Sustainability rooted in science

Jane Lubchenco , Allison K. Barner, Elizabeth B. Cerny-Chipman & Jessica N. Reimer

Nature Geoscience **8**, 741–745 (2015) | [Download Citation](#) 