



POTSDAM INSTITUTE FOR
CLIMATE IMPACT RESEARCH

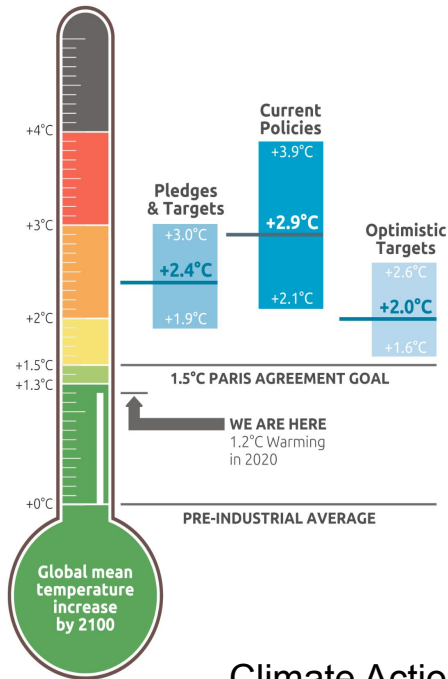
A sustainable development pathway for climate action within the UN 2030 Agenda

Bjoern Soergel, Elmar Kriegler, Isabelle Weindl, Sebastian Rauner, et al.

ENGAGE/NAVIGATE expert workshop, 22 Sep 2021

The world is not on track towards the targets

Projection for 2100 warming levels



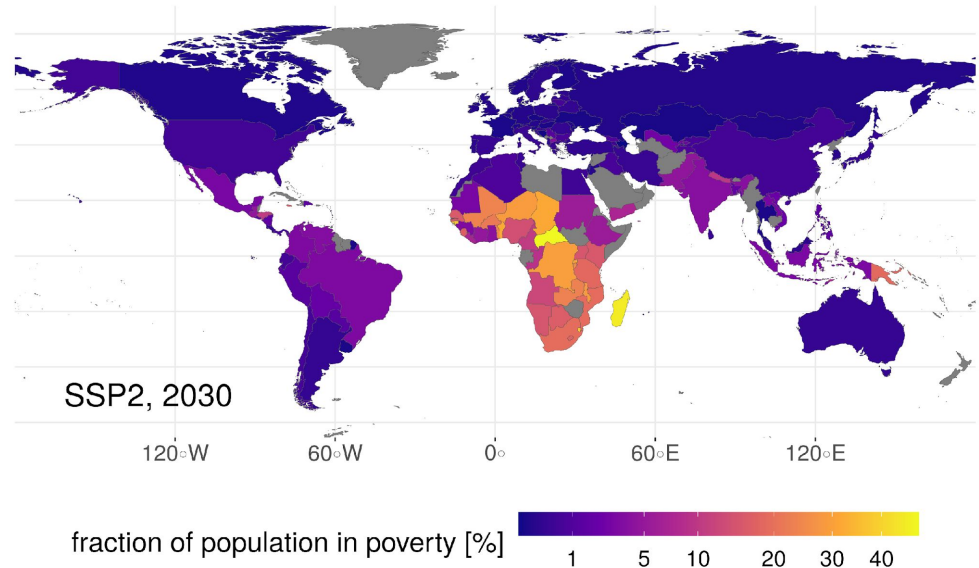
Climate Action Tracker



CAT warming projections
Global temperature increase by 2100

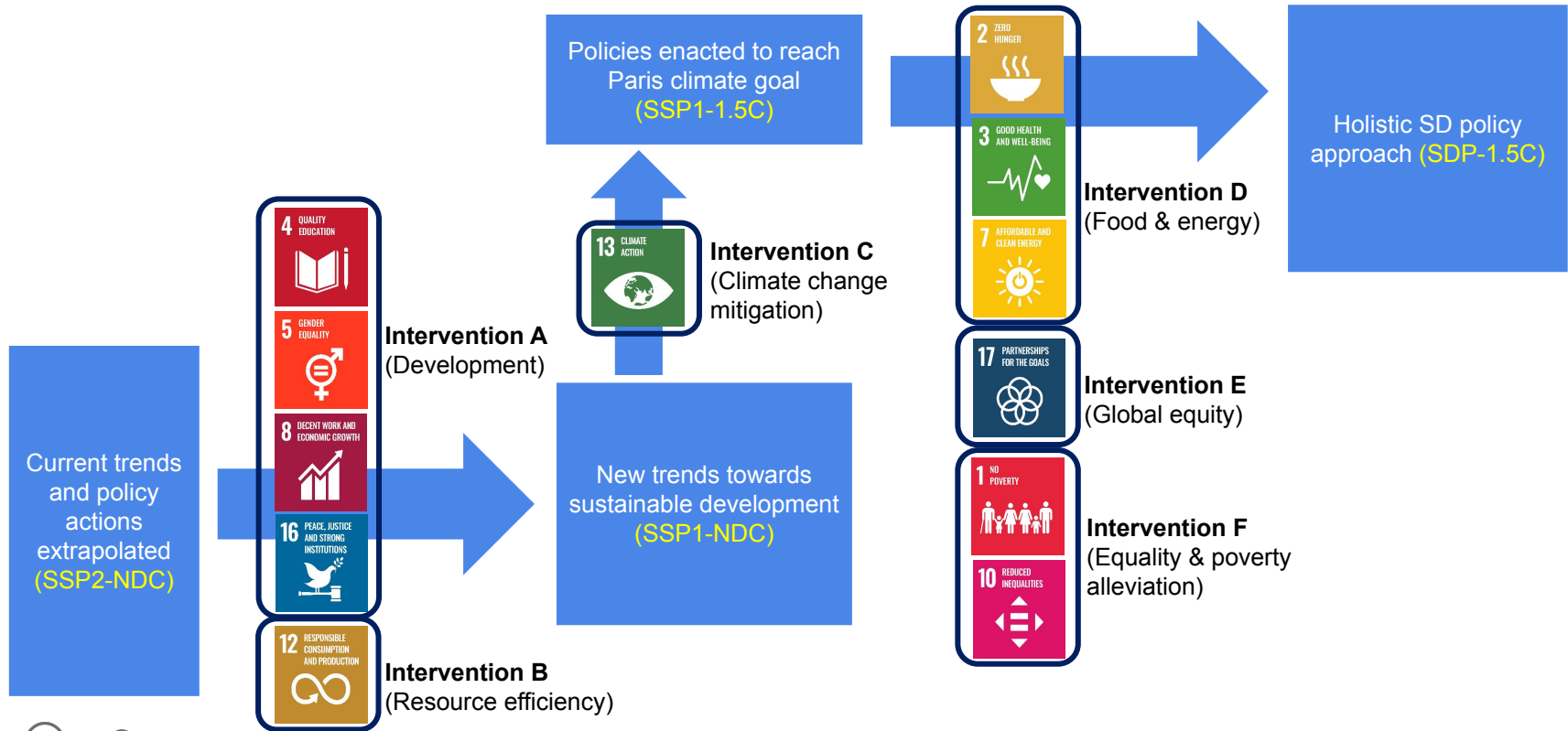
May 2021 Update

Projection for 2030 poverty rates (pre-COVID)

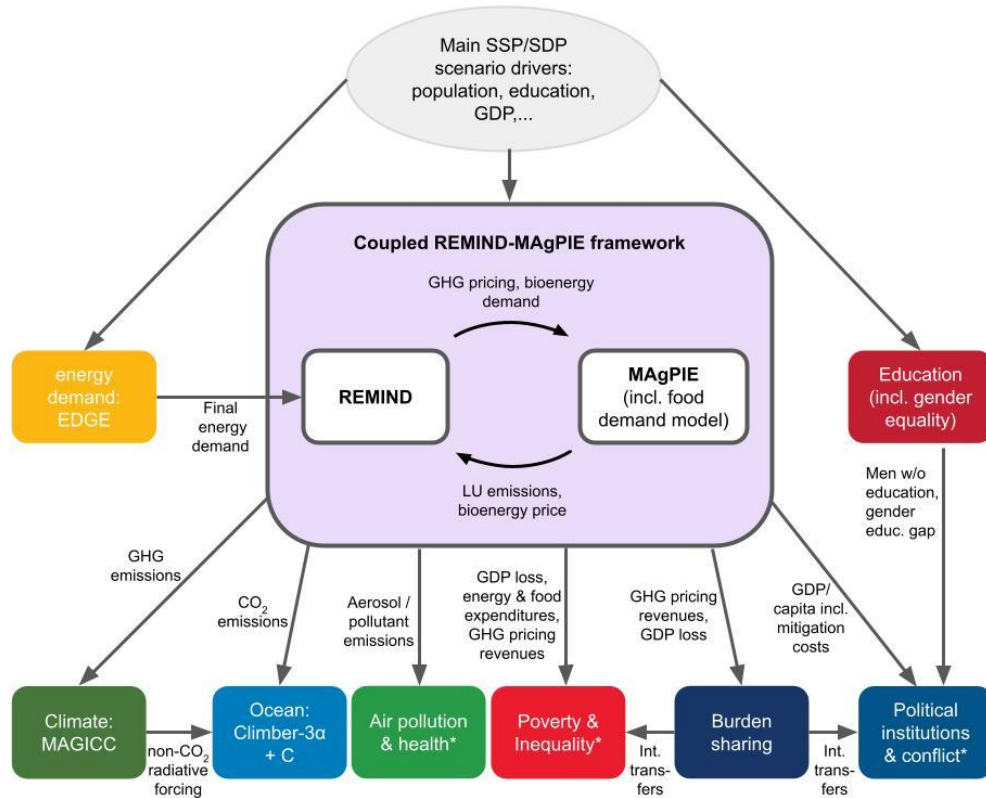


-> 350 million people left in extreme poverty by 2030
(Soergel et al. 2021, Nature Communications)

A sustainable development pathway (SDP)



Modelling toolbox + indicators



* post-processing models use additional SSP(-based) inputs, e.g. Gini coefficients, population downscaling, education projections

- SSP scenarios as basis
- energy-economy-land-climate modelling framework REMIND-MAgPIE as workhorse
- additional downstream models for SDG indicators
 - Ocean (SDG 14)
 - Air pollution & health (SDG 3,11)
 - Inequality & Poverty (SDG 1,10)
 - Political institutions & violent conflict (SDG 16)

Goal: quantify indicators or meaningful proxies for all 17 SDGs

Interventions towards sustainable development

Intervention D (Food & energy)



- transition to zero hunger and healthy diets (EAT-Lancet) by 2050 (**ScAs**)
- meet energy demand for decent living standards in developing regions (**ScAs / MoDy**)
- reduce energy consumption in high-income regions (**ScAs / MoDy**)
- additional energy and land system sustainability policies, e.g. coal phase out, BECCS limit, biodiversity hotspot protection (**ImPo: constraint**)

Intervention E (Global equity)



- international redistribution of part of the carbon pricing revenues ('climate & development finance') (**ImPo: post-proc**)

Intervention F (Equality & poverty alleviation)

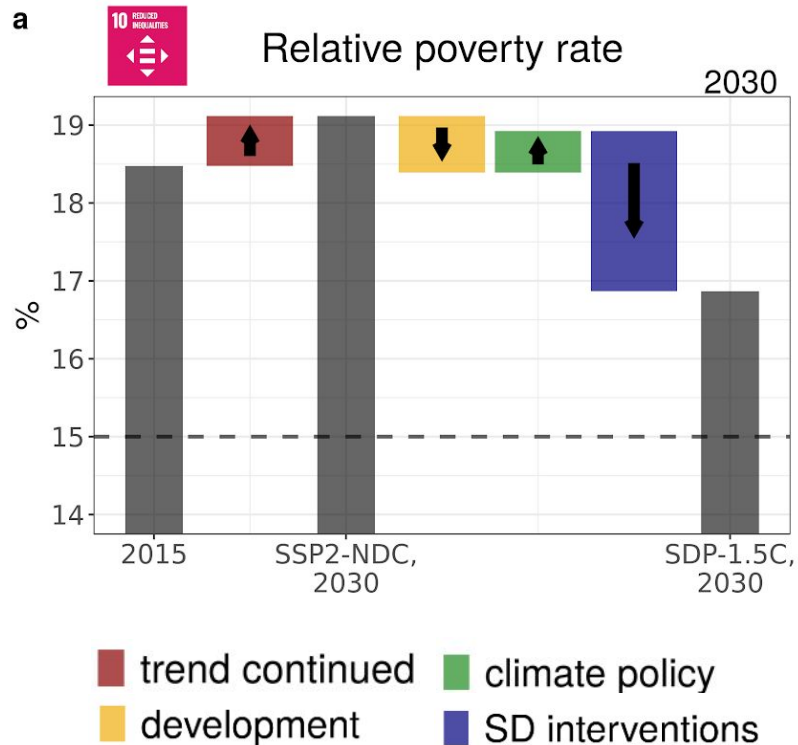


- national redistribution of carbon pricing revenues (+ int'l transfers) as climate dividend (**ImPo: post-proc**)

Legend*: **Scenario Assumption**; **Implemented Policy**; **Model Dynamics**

* see Supplementary Tables of paper for detailed description

Effects of SD interventions: overview



Combination of

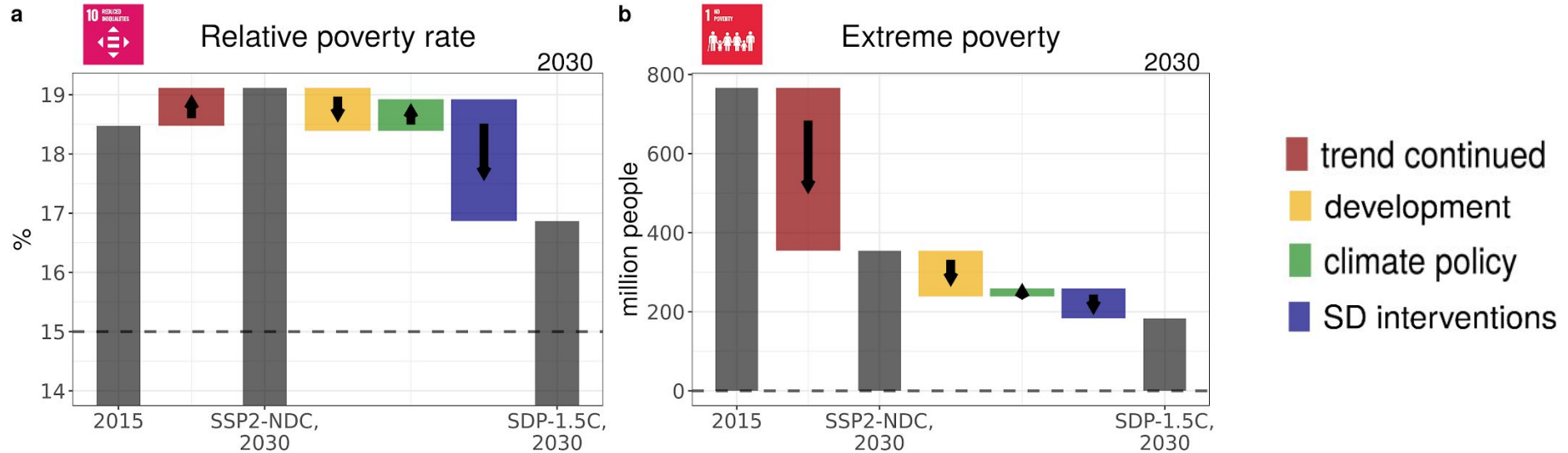
- Reference trends
- faster development/resource efficiency
- climate policy

is insufficient to meet SDG targets.

Additional SD interventions:

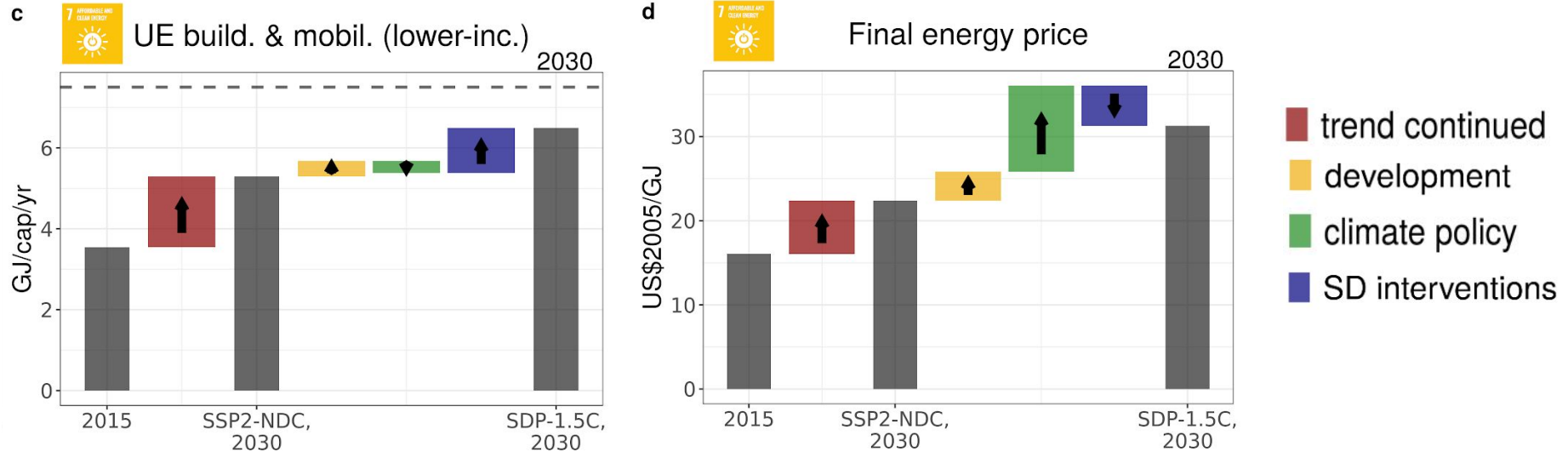
- compensate existing trade-offs
- enhance progress.

Effects of the different interventions: inequality



- **Redistribution policies funded from carbon pricing revenues reduce inequality and poverty.**
- **Climate policy trade-off is more than compensated.**

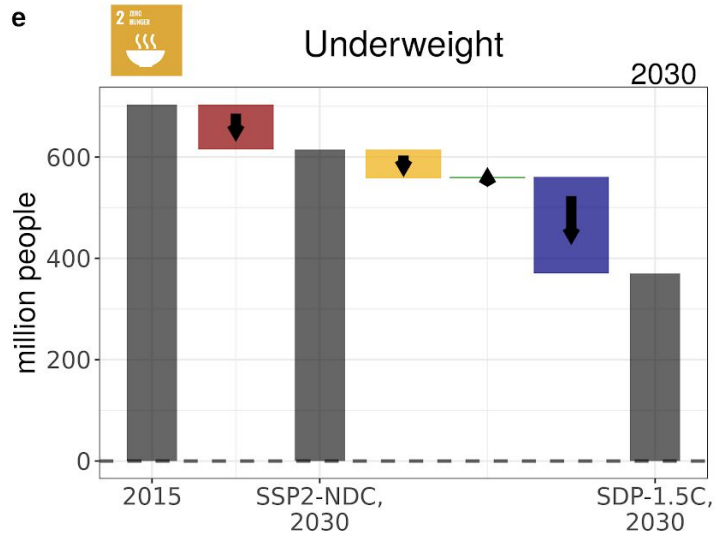
Effects of the different interventions: energy



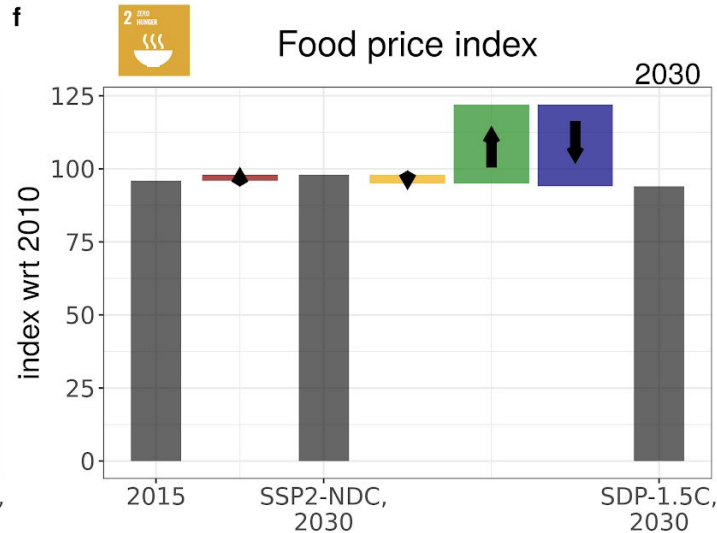
- improved availability of modern energy services in lower-income regions
- ambitious shift to sustainable lifestyles in high-income regions
- price increase caused by climate policy is dampened

Effects of the different interventions: food

e



f

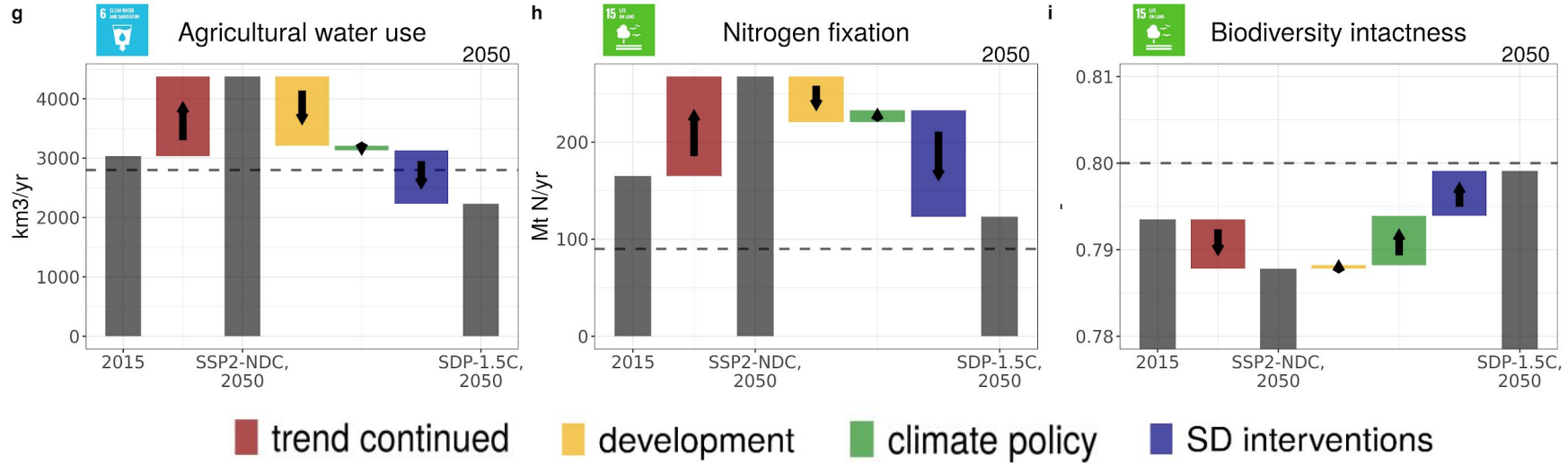


- trend continued
- development
- climate policy
- SD interventions

- **Transition to healthy and sustainable nutrition (EAT-Lancet)**
- **Prevalence of underweight is substantially reduced (zero by 2050)**
- **Effect of climate policy on food prices is fully compensated.**

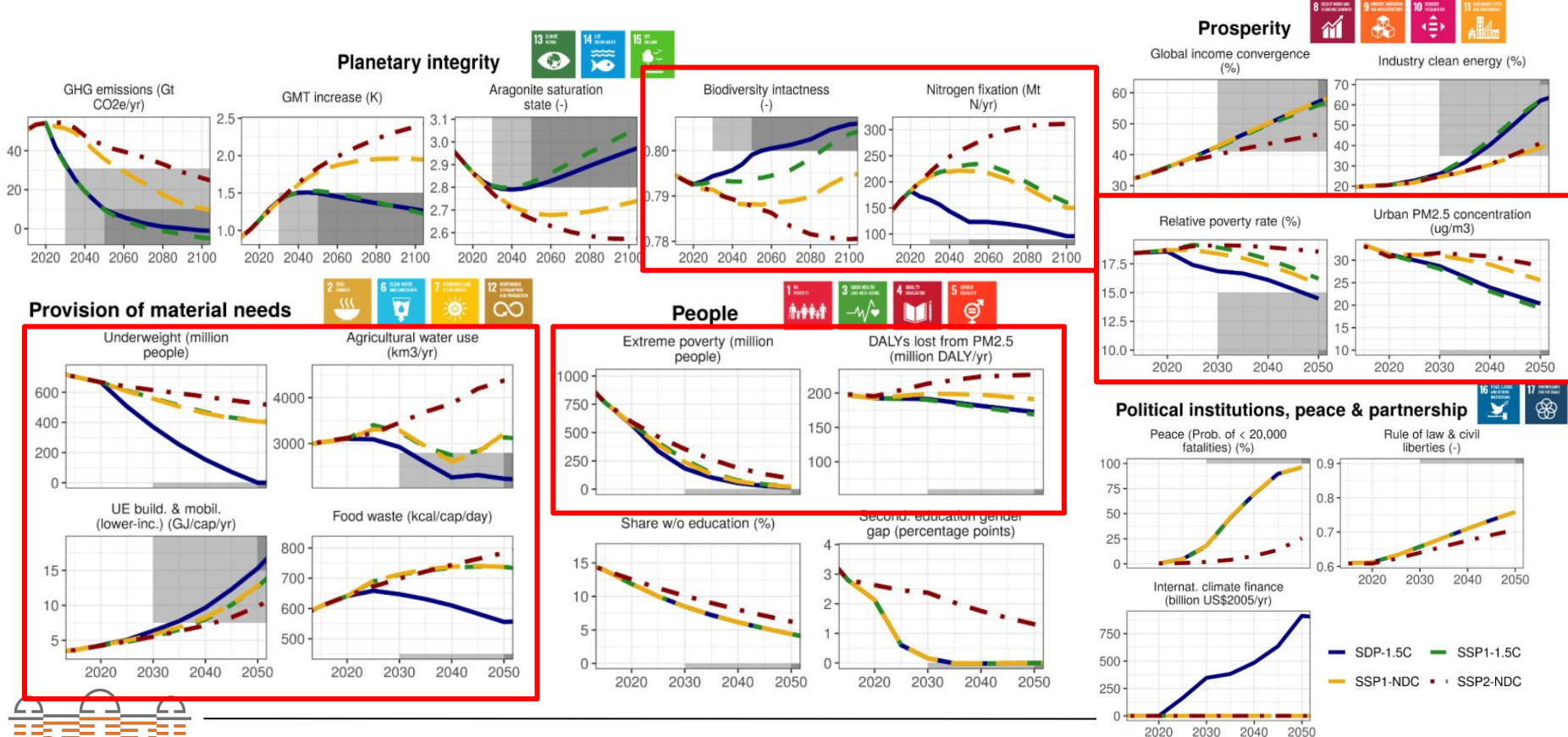
Effects of the different interventions: land & water

Planetary boundaries in 2050

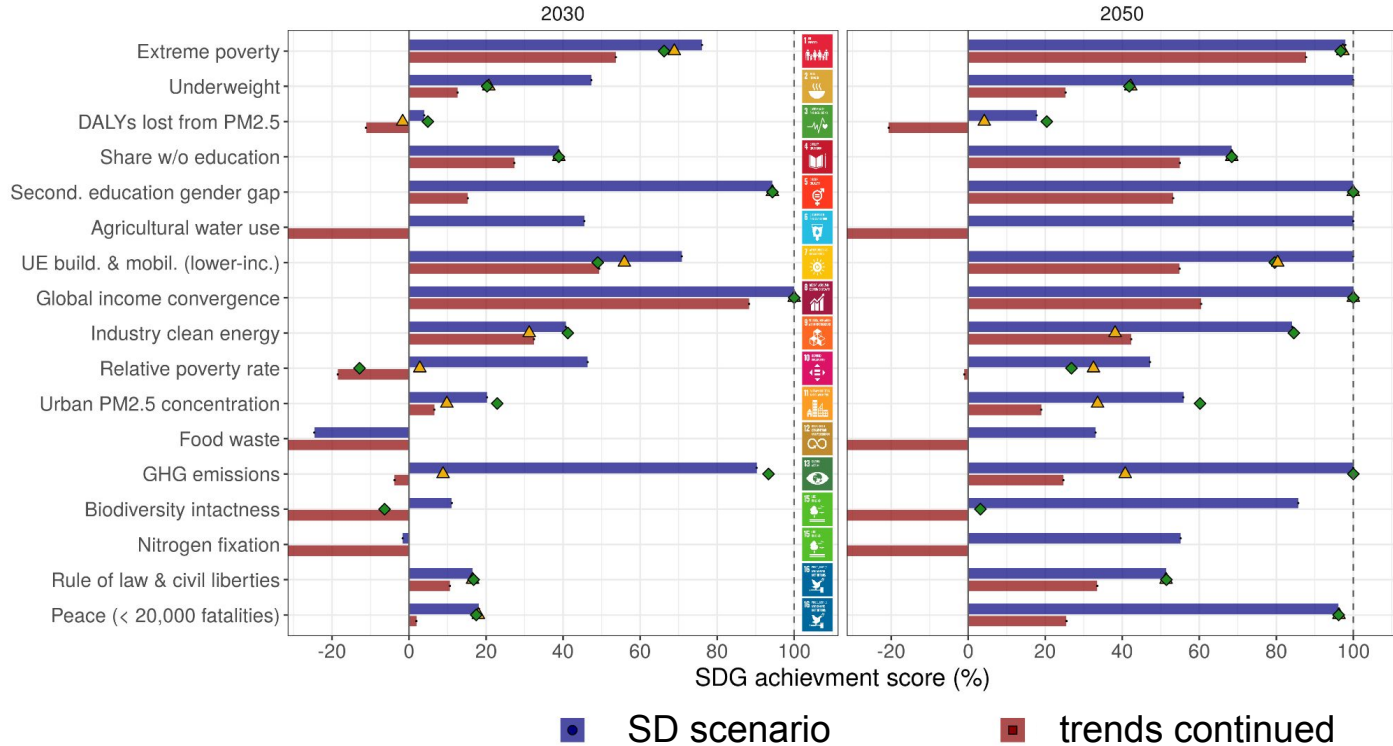


Large co-benefits of healthy and sustainable nutrition for multiple planetary boundaries.

Comprehensive coverage of the SDG space

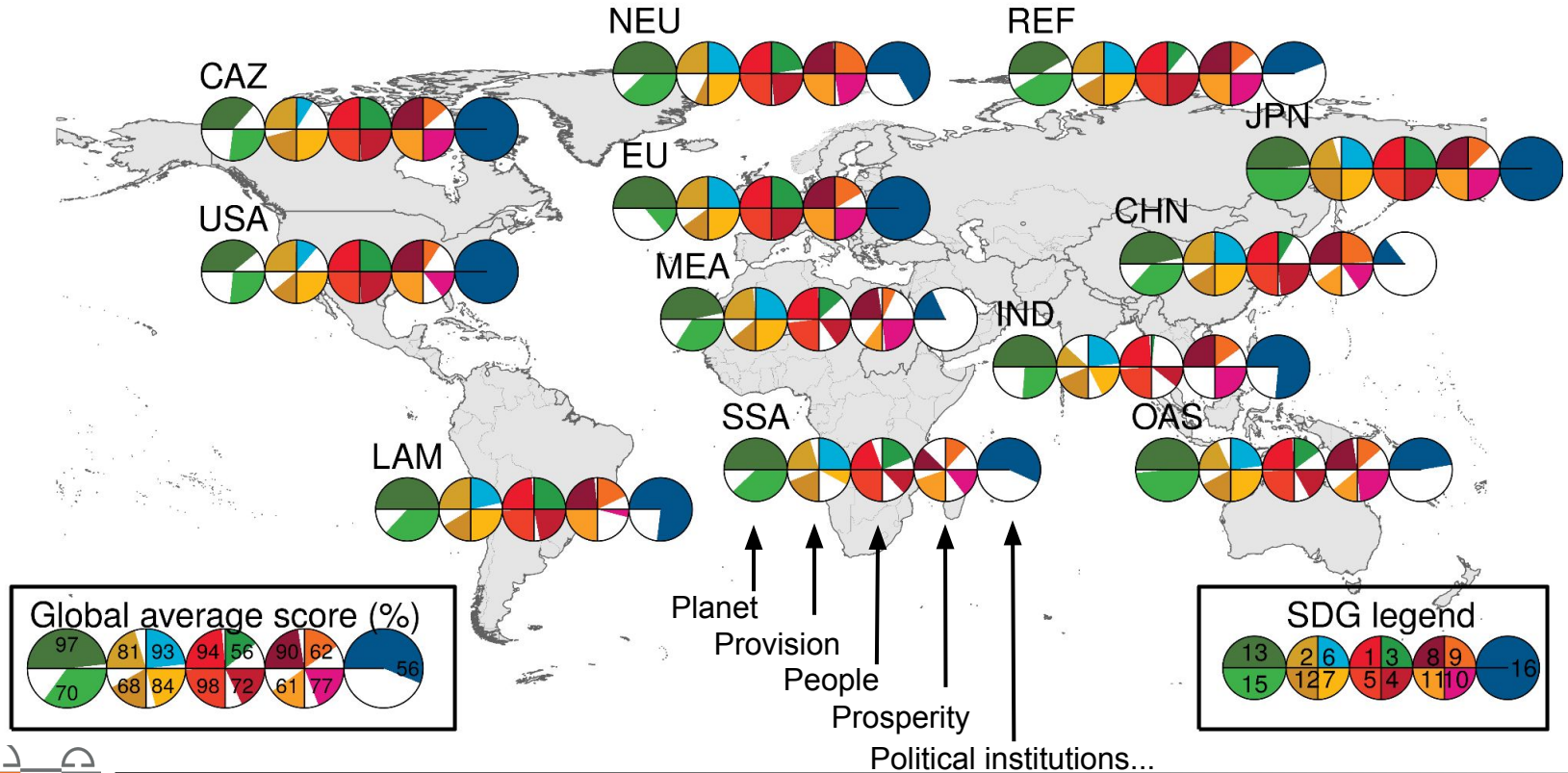


Global SDG achievement and gaps



- SDP scenario improves substantially over reference scenario across nearly all SDGs.
- Nonetheless: many targets are difficult to meet by 2030.
- Further progress until 2050 can close most of the gaps.

Regional SDG achievement and gaps (SDP 2030)



Conclusions

- **development, resource efficiency and moderate lifestyle change + climate policies are insufficient to meet SDGs**
 - additional **SD interventions** required:
 - **global cooperation**: “climate & development” scheme
 - **national redistributive policies** funded from carbon pricing revenues (“policy linking”)
 - **food & energy** -> co-benefits of healthy diets for climate, land, water, nitrogen cycle, biodiversity
- => Substantial improvements towards nearly all SDGs
- comprehensive coverage of SDG space
 - SDG achievement **gaps remain in 2030**, but can largely be **closed by 2050**

