

Visualizing the water–energy–food nexus in the Indus basin toward the end of the century

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Upper Indus Basin

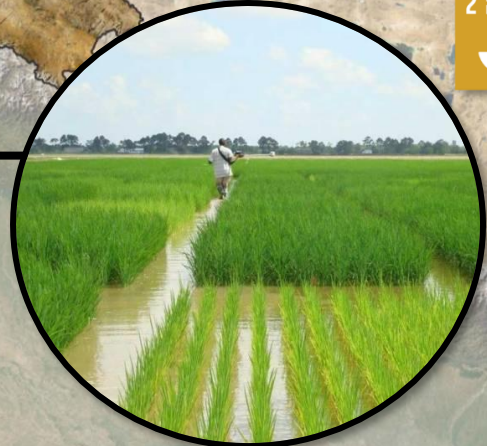
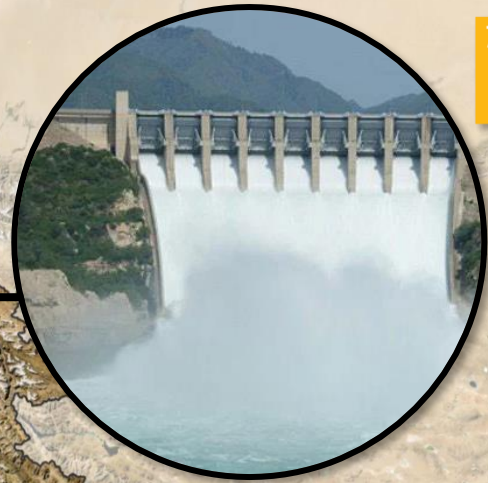


Extremely water stressed
Groundwater depletion
Rapid population growth
"Climate change hotspot"

Immerzeel, W. W., & Bierkens, M. F. P. (2012). Asia's water balance. *Nature Geoscience*, 5(12), 841-842.

Lower Indus Basin



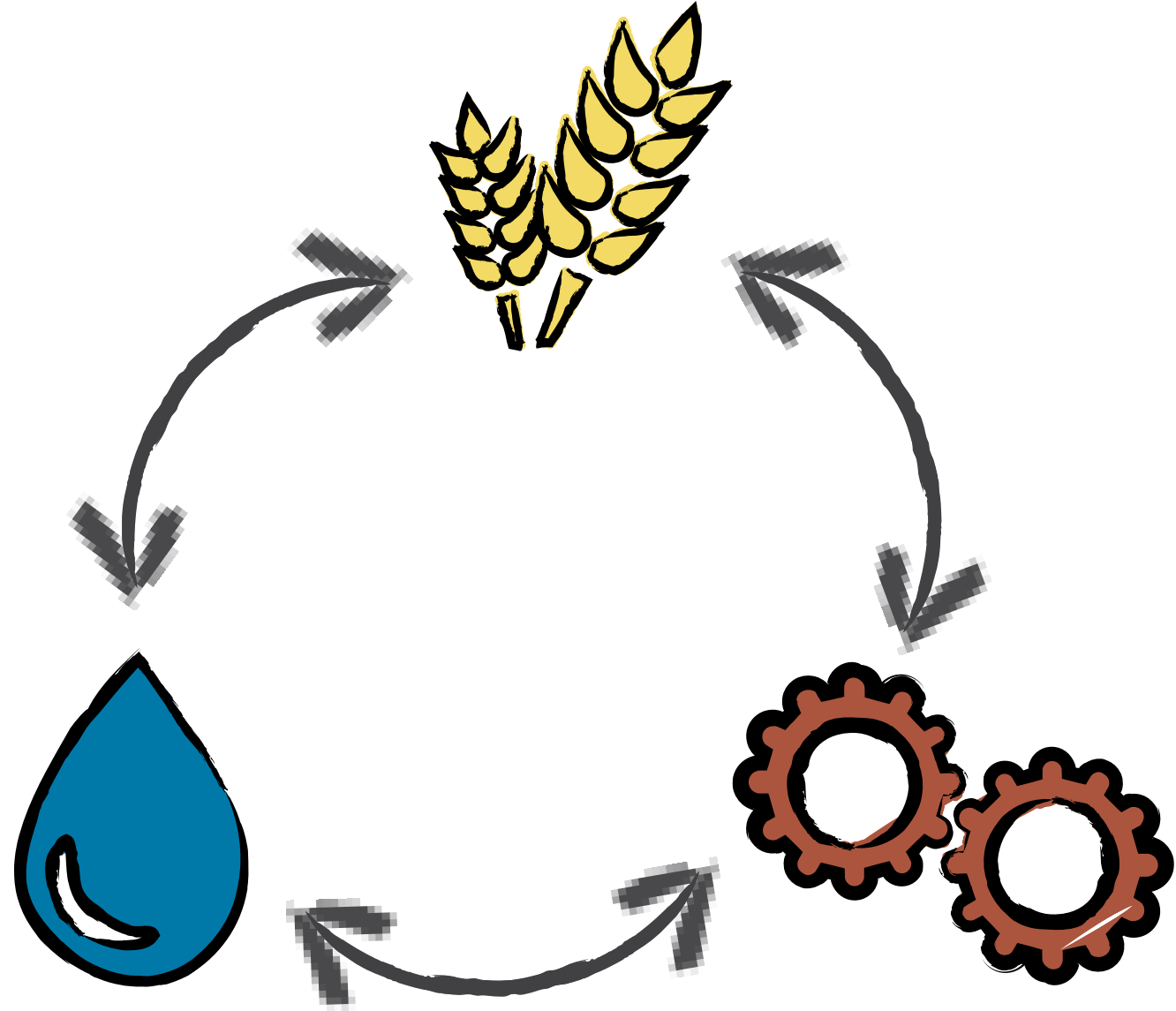


Water, Food, Energy & Ecosystems are intrinsically linked; **Nexus**

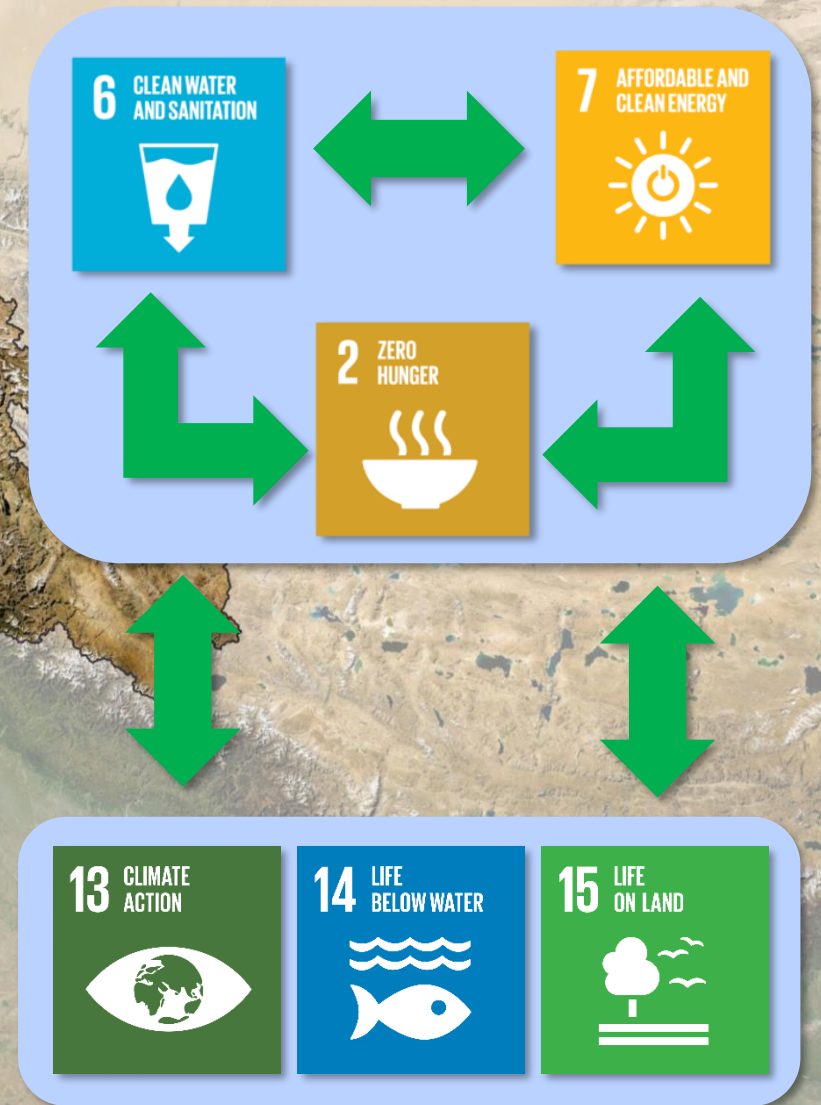
Changes cause pressure on the sectors and linkages:

- Climatic
- Socio-economic
 - Population growth
 - Economic change
 - Urbanisation

Changes in one sector can thus have drastic consequences across the nexus and affect the status of others sectors...



Adaptive action towards achieving **SDGs 2, 6 and 7** must therefore not occur in a siloed and sectoral manner, but as integrated pathways that also account for **SDGs 13, 14 and 15**

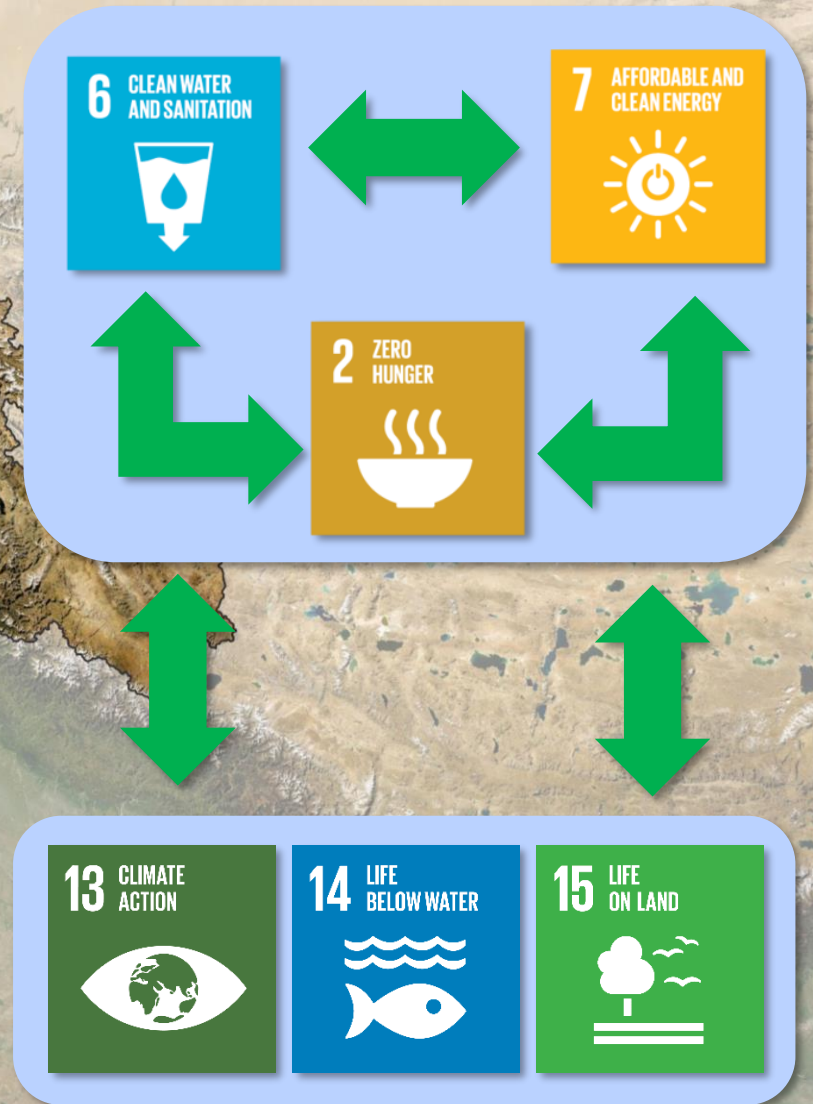


Advantages

- Negative feedbacks can be prevented
- Synergies can be found and exploited

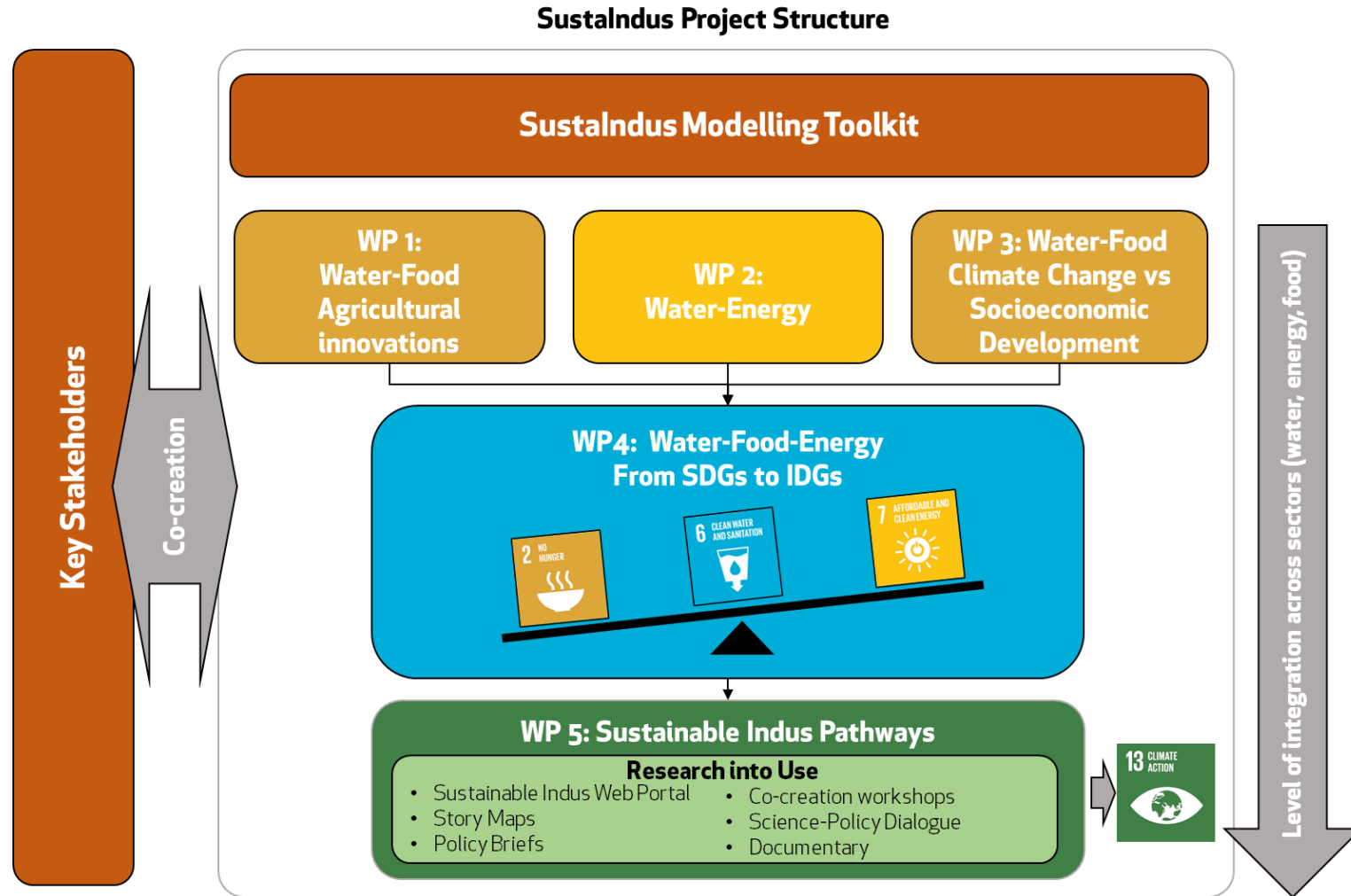
Disadvantages

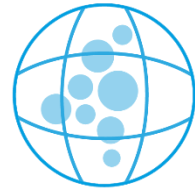
- Holistically complicated
- What is the optimum? (Political) priorities define a 'good' approach and acceptable trade-offs



SustainIndus project

*“To develop sustainable pathways that support decision makers and practitioners to develop science-based policy and climate-smart solutions to provide food (**SDG 2**), water (**SDG 6**) and energy (**SDG 7**) to all people in the Indus now and in the future.”*





Climate
Adaptation
Services

ICIMOD



WAGENINGEN
UNIVERSITY & RESEARCH



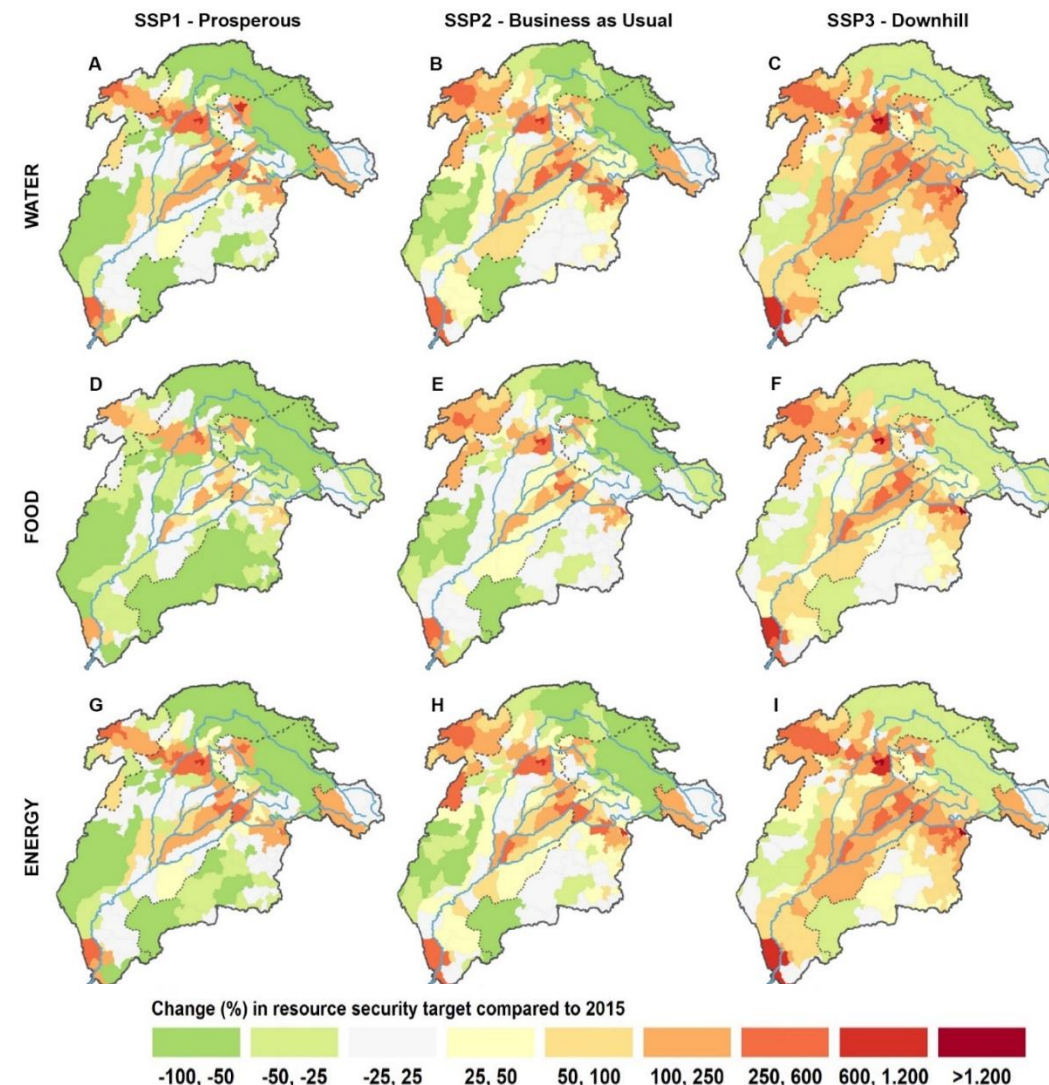
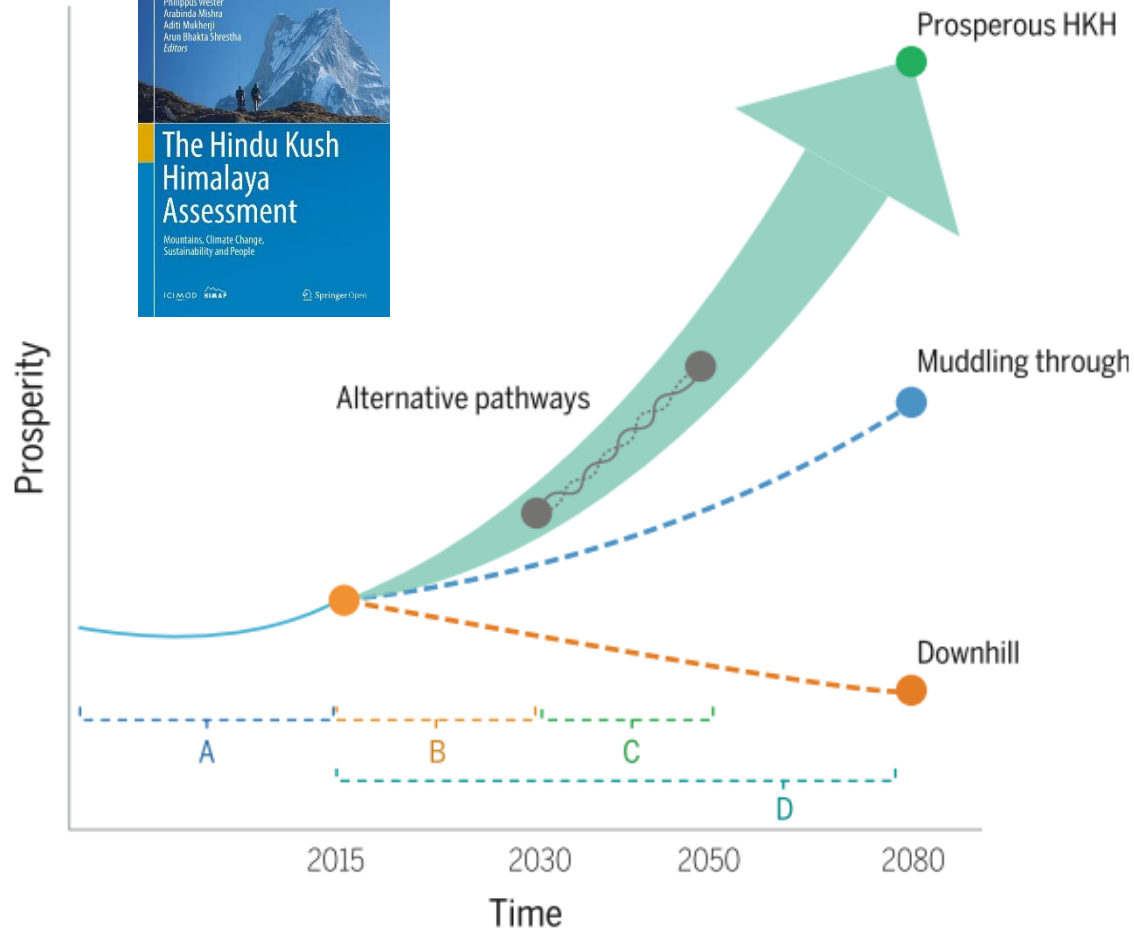
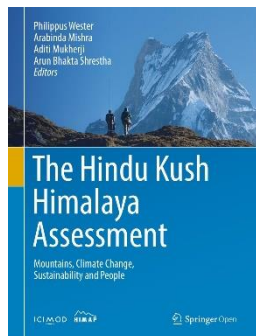
Universiteit Utrecht



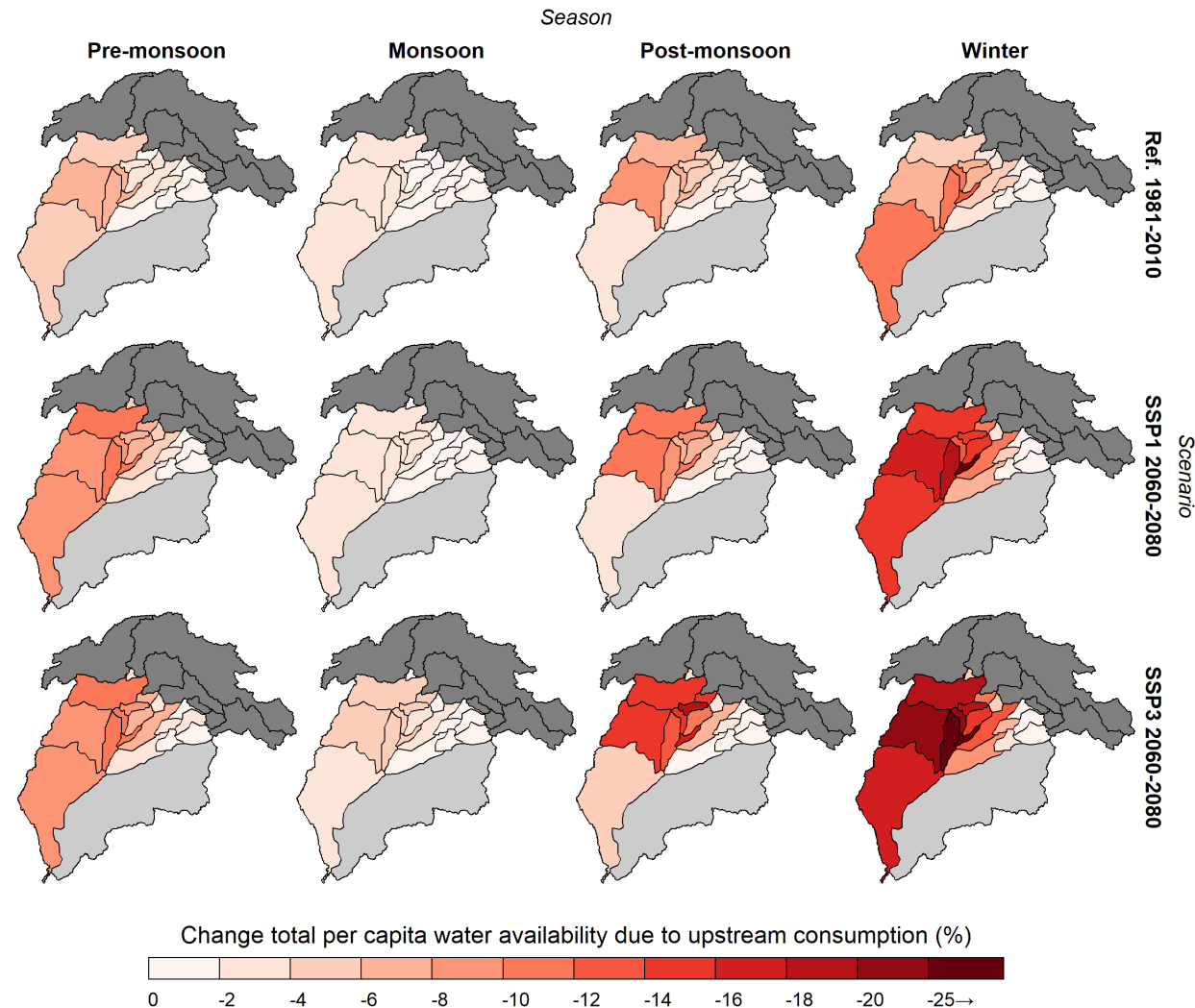
Global SDGs to IDGs



Resource security targets



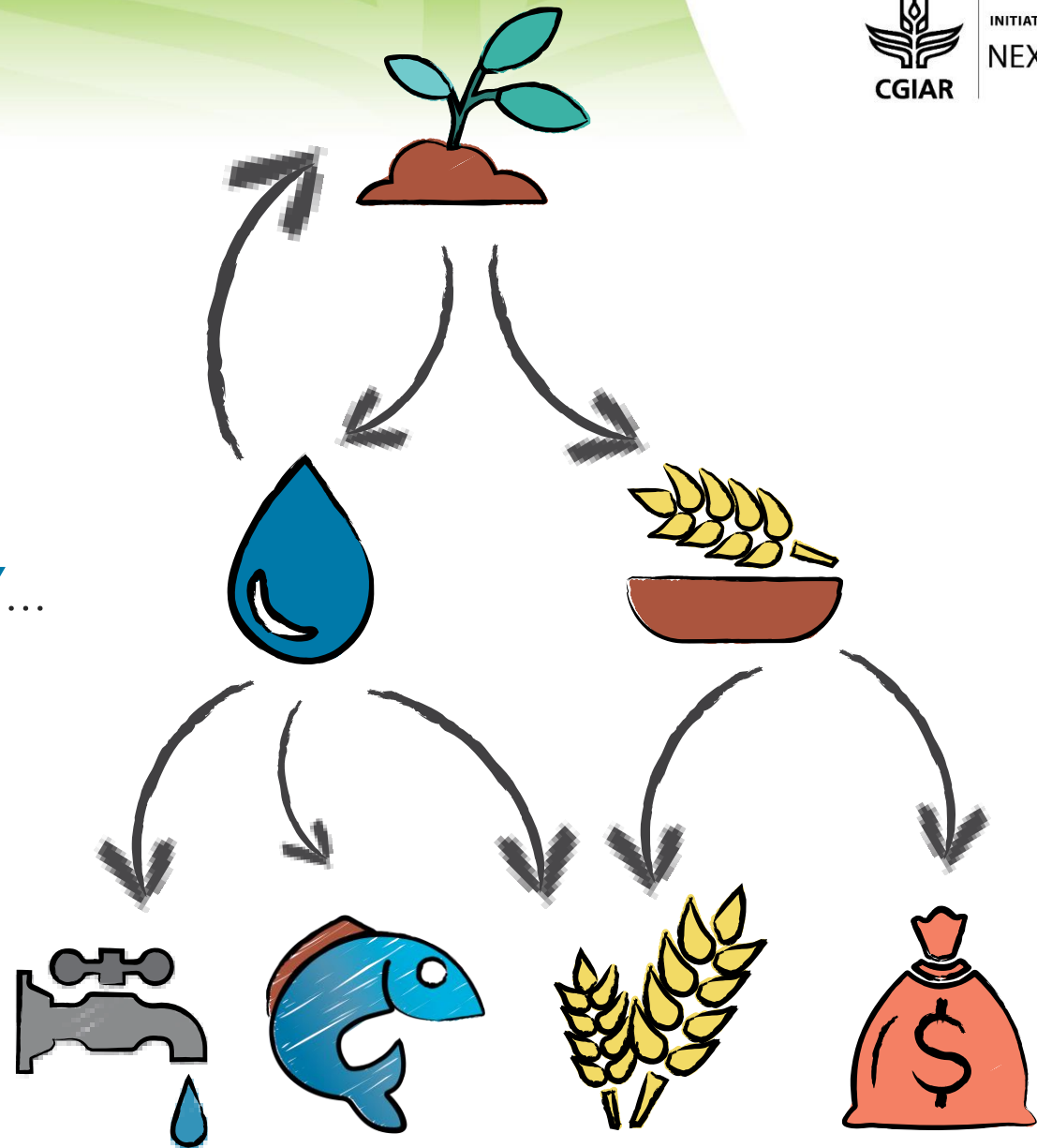
Upstream-downstream linkages

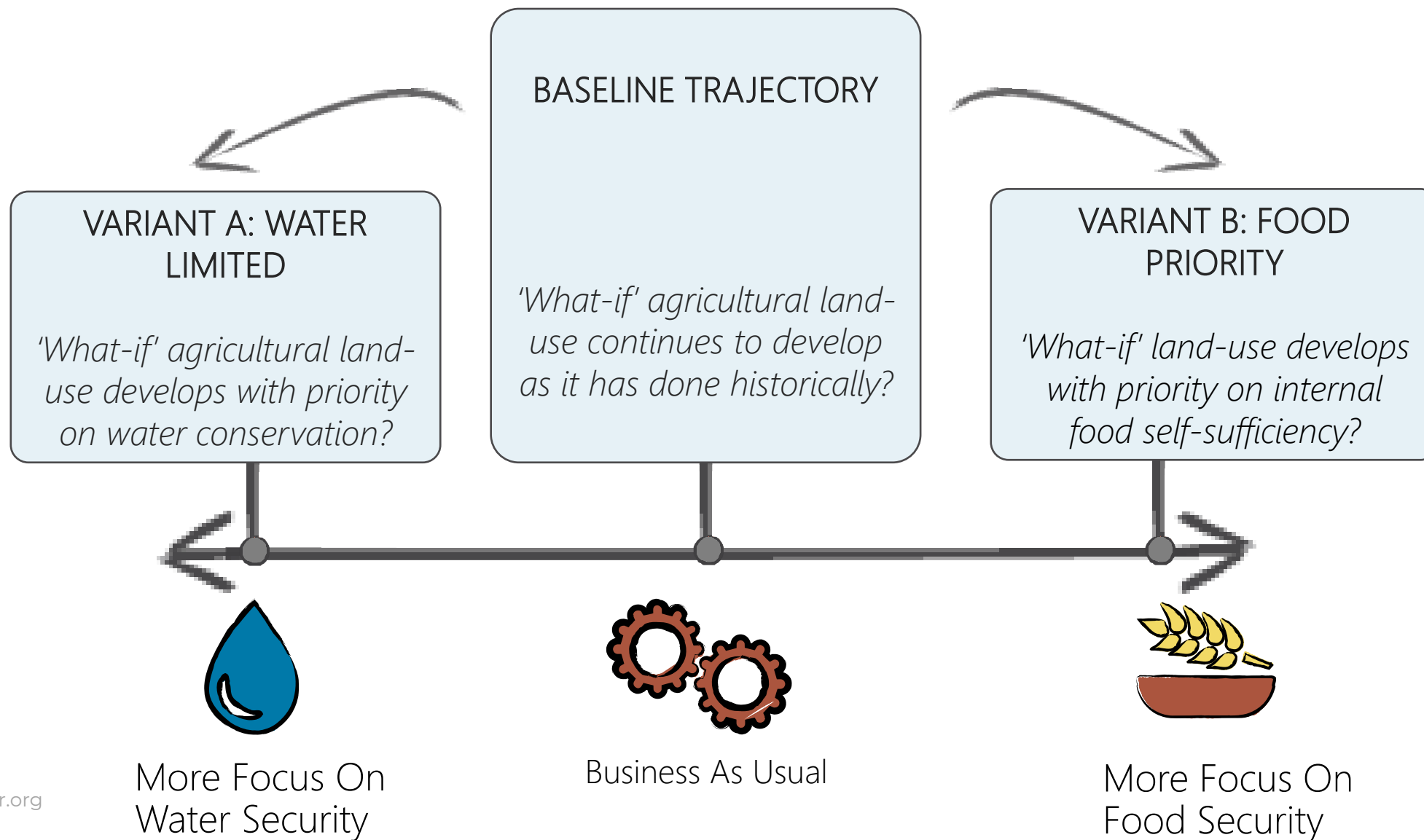


To improve **FOOD** availability, future agricultural expansion, intensification & crop choices are needed...

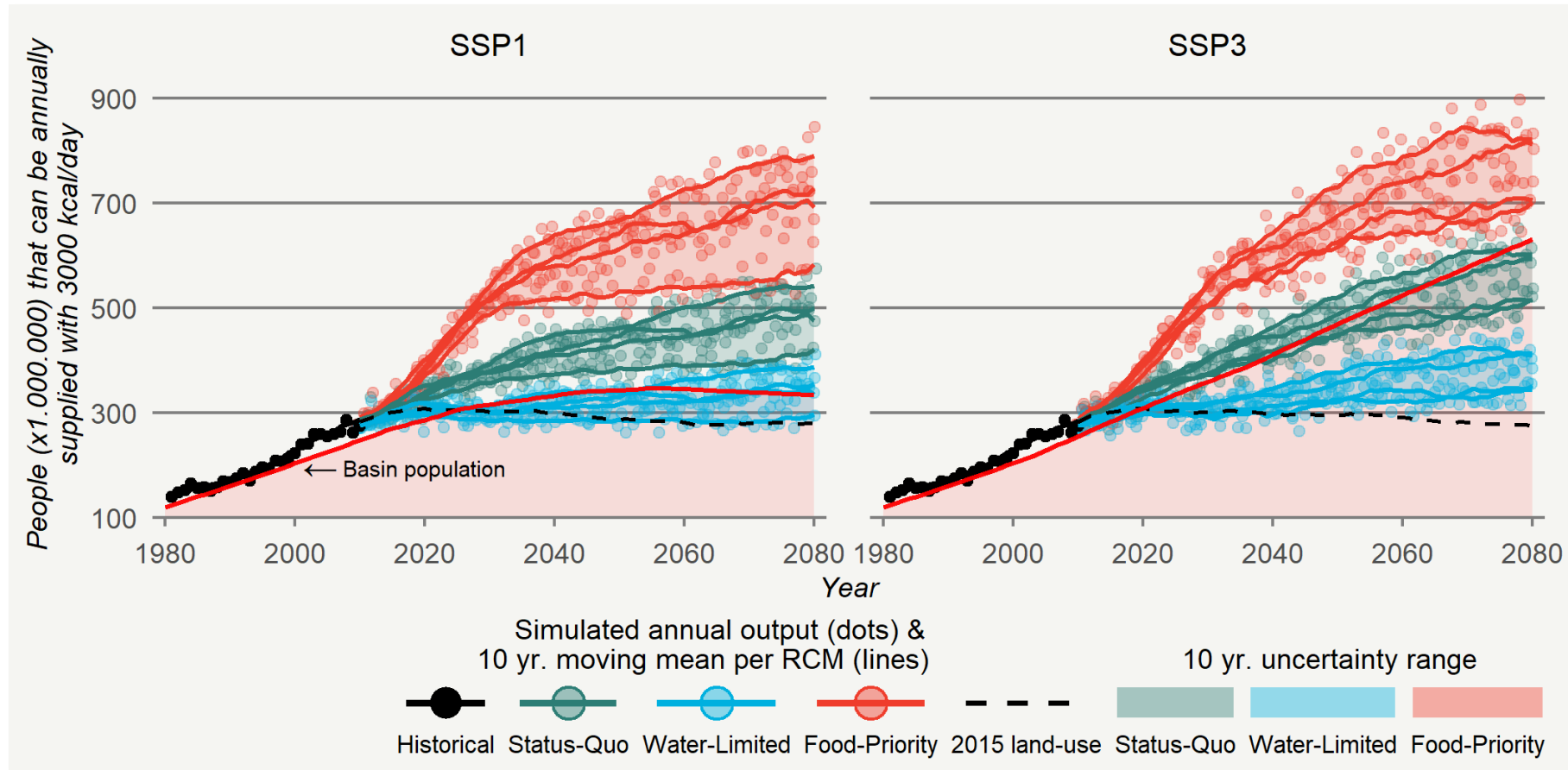
...these will affect **FOOD SECURITY**
but can also impact **WATER SECURITY**...

...and changes in land use to reduce **WATER** use are also possible.

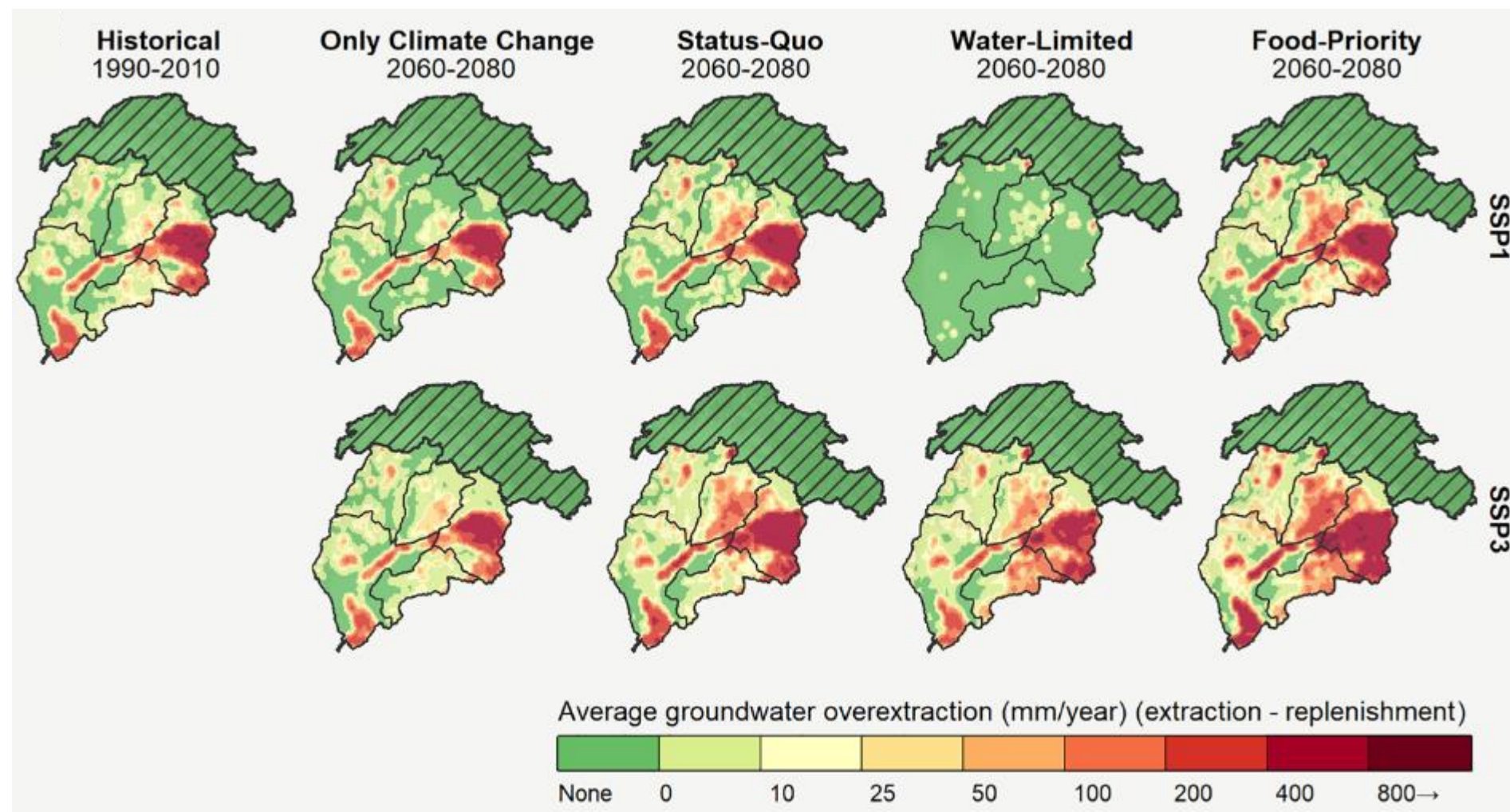




Different pathways



Different pathways have different impacts



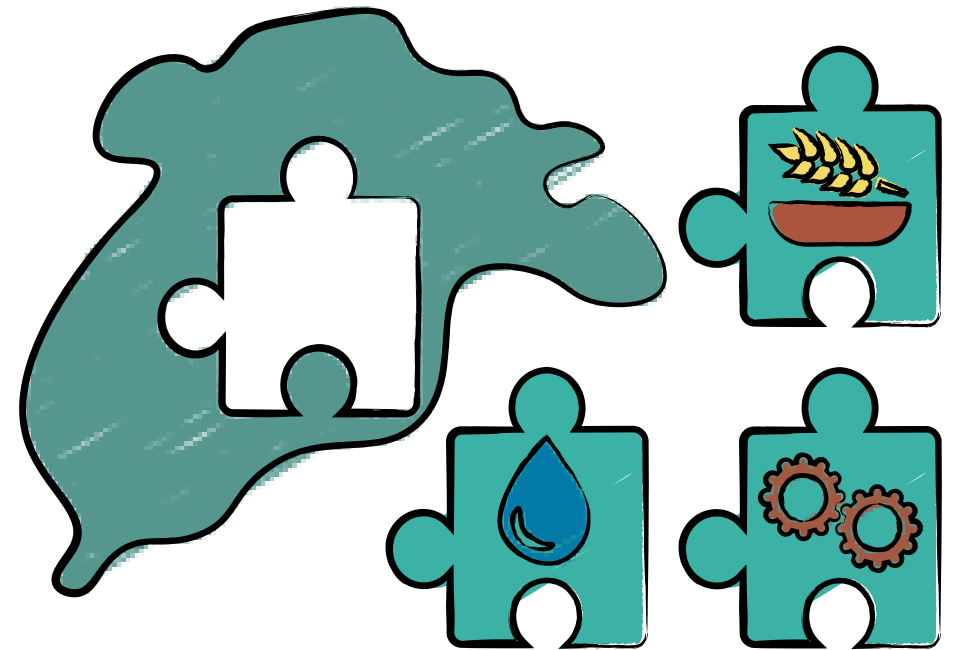
Conclusions

Climatic and socioeconomic changes increase pressure Indus basin water and food security

- Increase demand food and water downstream;
- Increasing impact of upstream water use downstream availability

Adaptative land-use changes important for future water and food security

- Highly dependent on policy priorities
- Challenging to meet both targets
- Adaptation besides land-use changes essential (i.e. climate smart measures)





INITIATIVE ON
NEXUS Gains

Thank you



www.sustainus.org