

# Equitable development pathways and integrative solutions for resilient futures

Lisa Schipper (University of Bonn)

Aditi Mukherji (CGIAR)

SBSTA 62 – 17<sup>th</sup> Meeting of the Research Dialogue – 17 June  
2025

- Point 1: Adaptation interventions have many benefits, across multiple dimensions, and research and innovation should continue documenting those benefits rigorously, but there are methodological challenges in linking adaptation outcomes to climate risk reduction – another focus of research.
- Point 2: Clear evidence that effectiveness of many adaptation declines at higher levels of global warming – hence important to link adaptation with temperature goals.
- Point 3: There are various options of adaptation which also have mitigation co-benefits, but many of those are not cost-effective yet – R&D needed for increasing cost-effectiveness
- Point 4: Choices and actions now and in the future can lead to shifting development pathways toward sustainability, given the presence of certain enabling conditions.
- Point 5: Finding synergy between climate action and SDGs is critical but some trade-offs remain, and knowledge gaps and limited evidence make complete alignment challenging at the moment.

# Adaptation has multiple benefits, but methodological challenges remains in linking adaptation to risk reduction

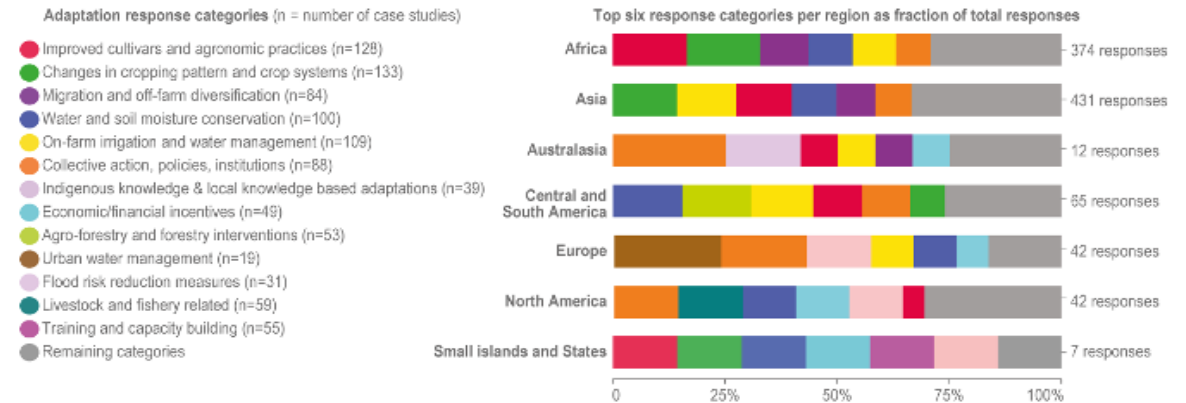
- Adaptation has multiple benefits along various dimensions like economic, ecological, institutional and other outcomes, including for vulnerable groups, which research and implementing agencies should continue to document rigorously;
- However, methodological challenges remain in attributing climate risk reduction to adaptation interventions, as literature base for directly linking adaptation to reduction in exposure, vulnerability and hazard is limited.

Observed water-related adaptation responses with positive outcomes

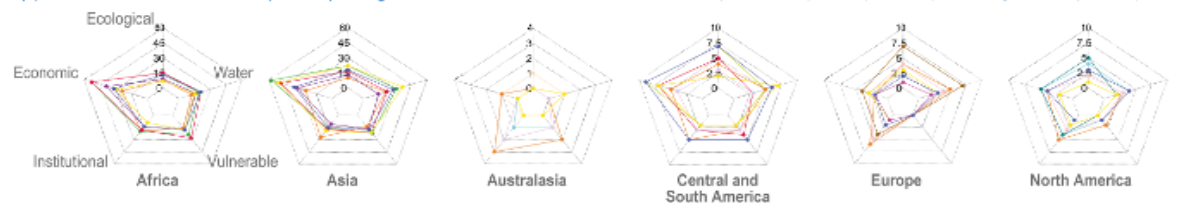
(a) Map depicting 319 case studies of current water related adaptation responses with documented beneficial outcomes of adaptation



(b) Fraction of top six adaptation responses to total responses

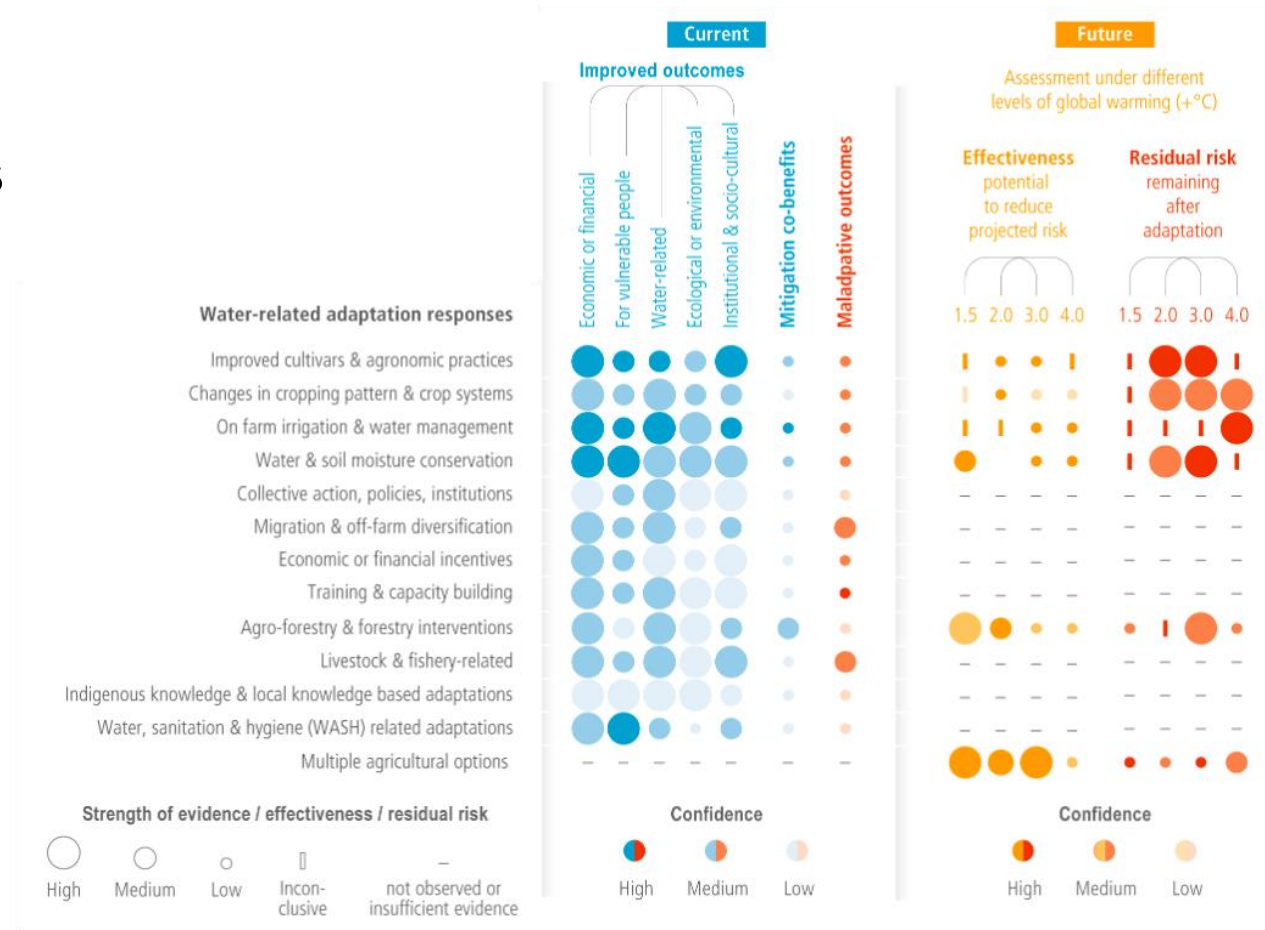


(c) Beneficial outcomes of adaptation per region across five dimensions. Innerlines correspond to the top six adaptation response categories from previous panel.



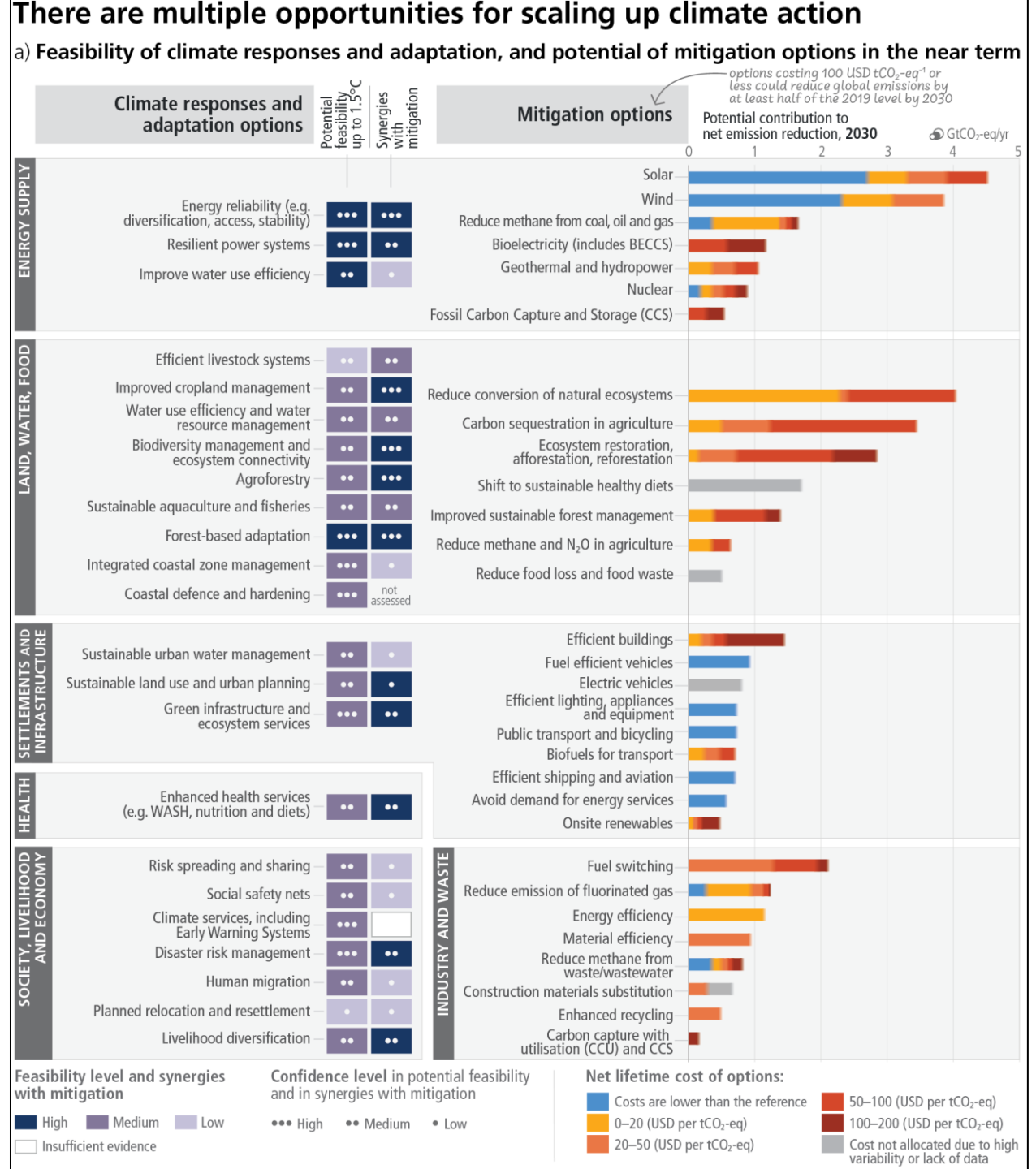
# Effectiveness of adaptation in reducing climate risk declines at higher level of warming

- For example, adaptation to water related hazards such as floods and droughts, is most effective up to 1.5°C and effectiveness decreases with increasing warming
- Residual impacts remain, especially at higher levels of warming
- There are hard limits to adaptation in response to global warming levels, e.g. many heat and drought tolerant seed varieties (one of important adaptation for farmers), will not work as effectively in a warmer world.

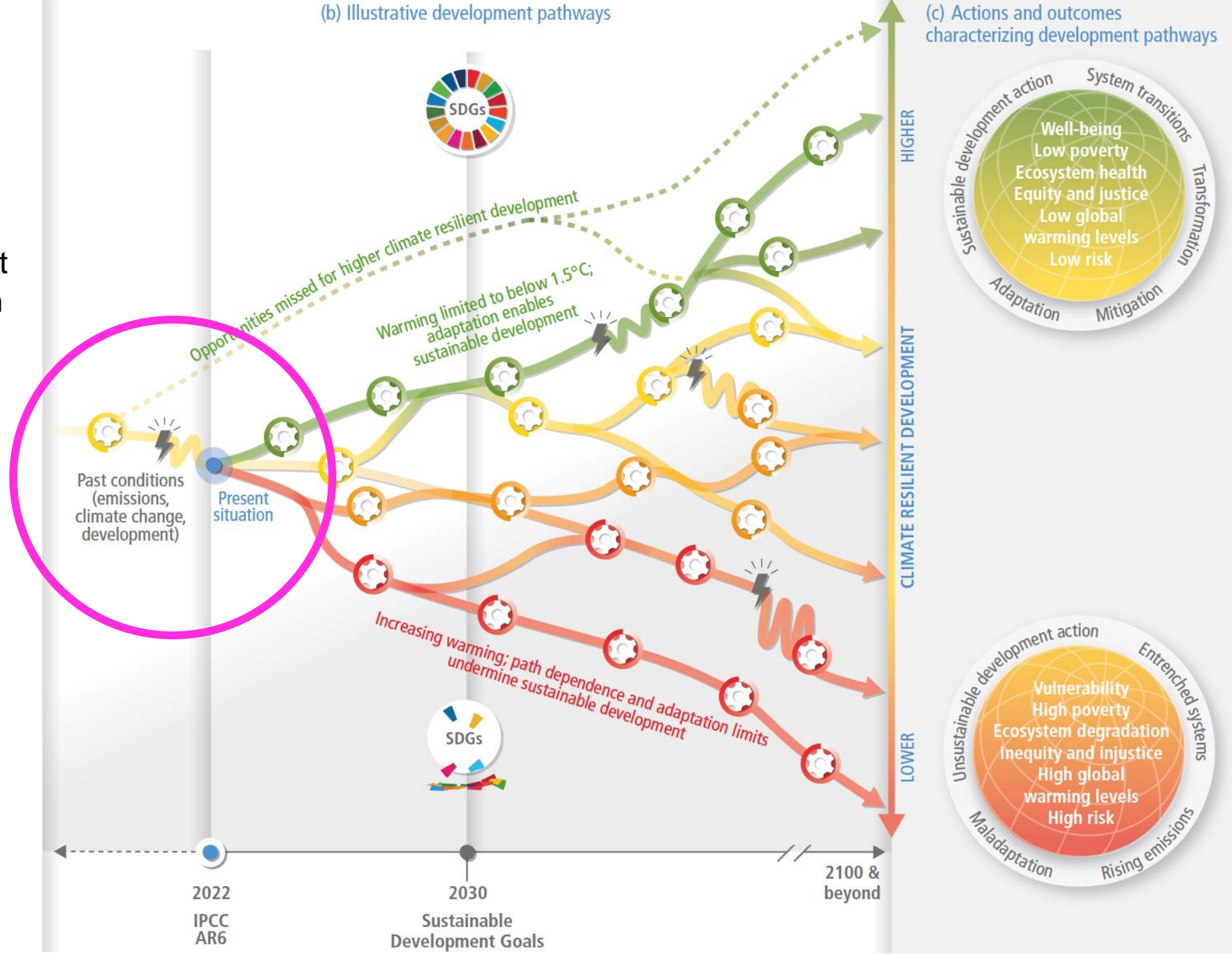


There are many options for adaptation which also have mitigation co-benefits, but many are not yet cost-effective, for example in land, water and food systems related action, many actions are not yet cost effective – need for more research and investments on cost-effectiveness of measures with adaptation and mitigation co-benefits

IPCC AR6 SYR SPM Figure 7

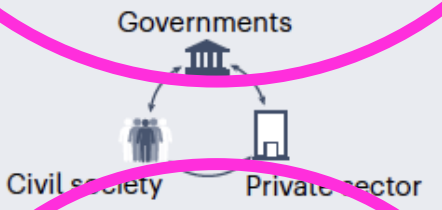


Climate resilient development refers to action on adaptation and mitigation to support sustainable development



**Conditions that enable individual and collective actions**

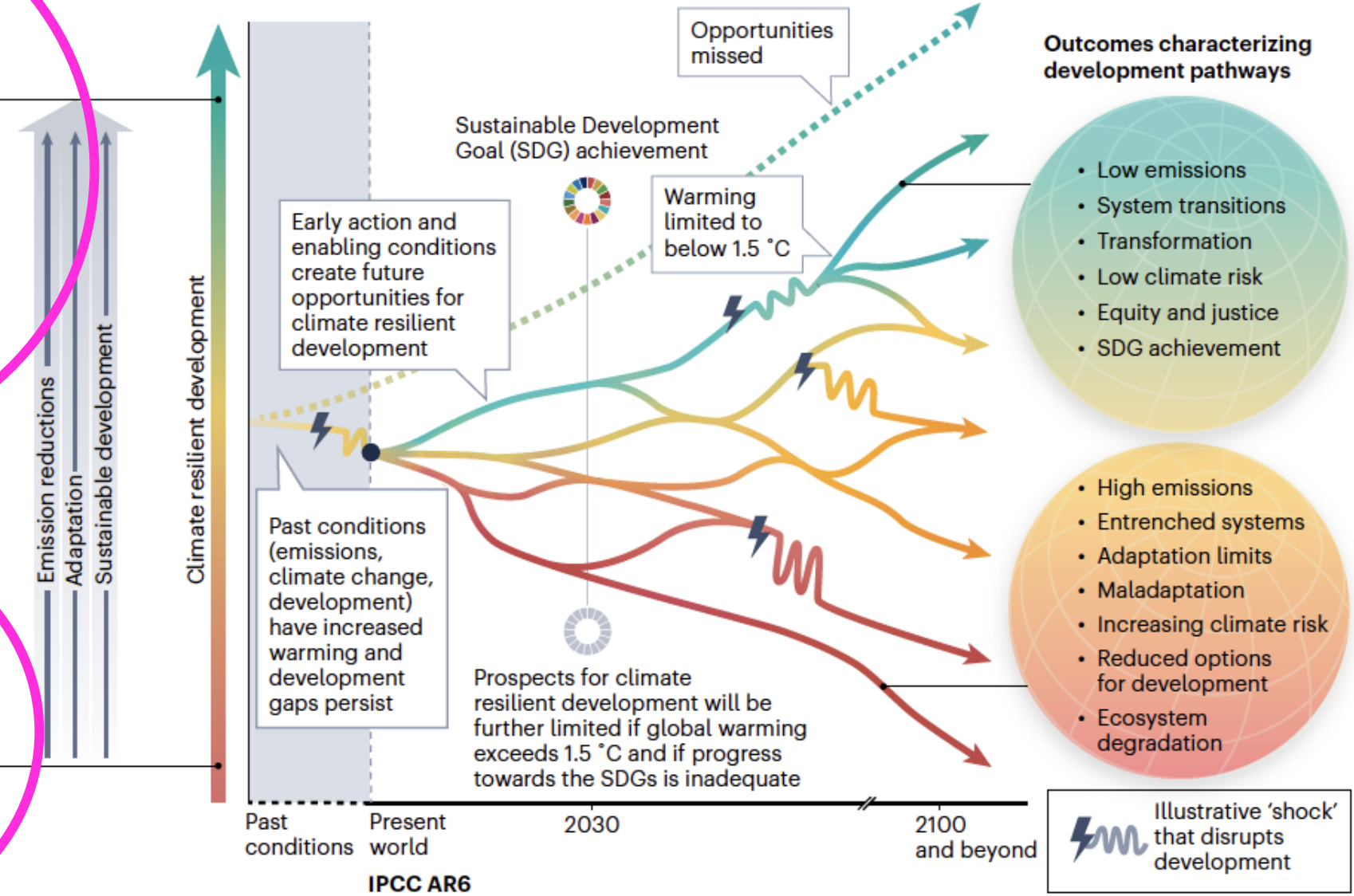
- Inclusive governance
- Diverse knowledges and values
- Finance and innovation
- Integration across sectors and timescales
- Ecosystem stewardship
- Synergies between climate and development actions
- Behavioural change supported by policy, infrastructure and sociocultural factors



**Conditions that constrain individual and collective actions**

- Poverty, inequity and injustice
- Economic, institutional, social and capacity barriers
- Siloed responses
- Lack of finance, and barriers to finance and technology
- Tradeoffs with SDGs

**There is a rapidly narrowing window of opportunity to enable climate resilient development**  
 Multiple interacting choices and actions can shift development pathways towards sustainability

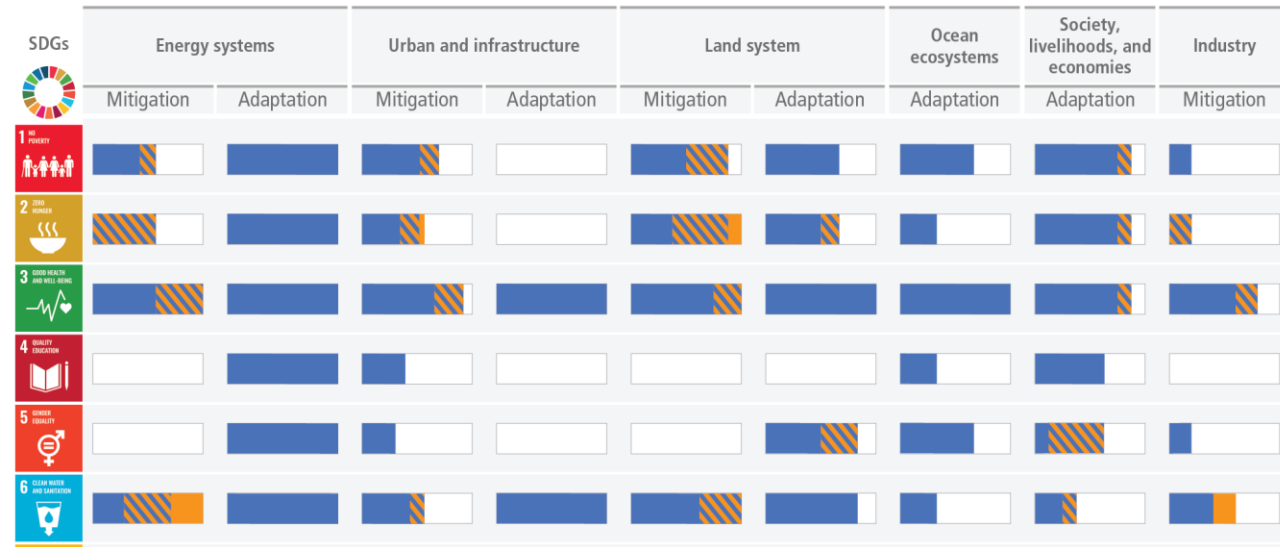


IPCC AR6

Illustrative 'shock' that disrupts development

# Near-term adaptation and mitigation actions have more synergies than trade-offs with Sustainable Development Goals (SDGs)

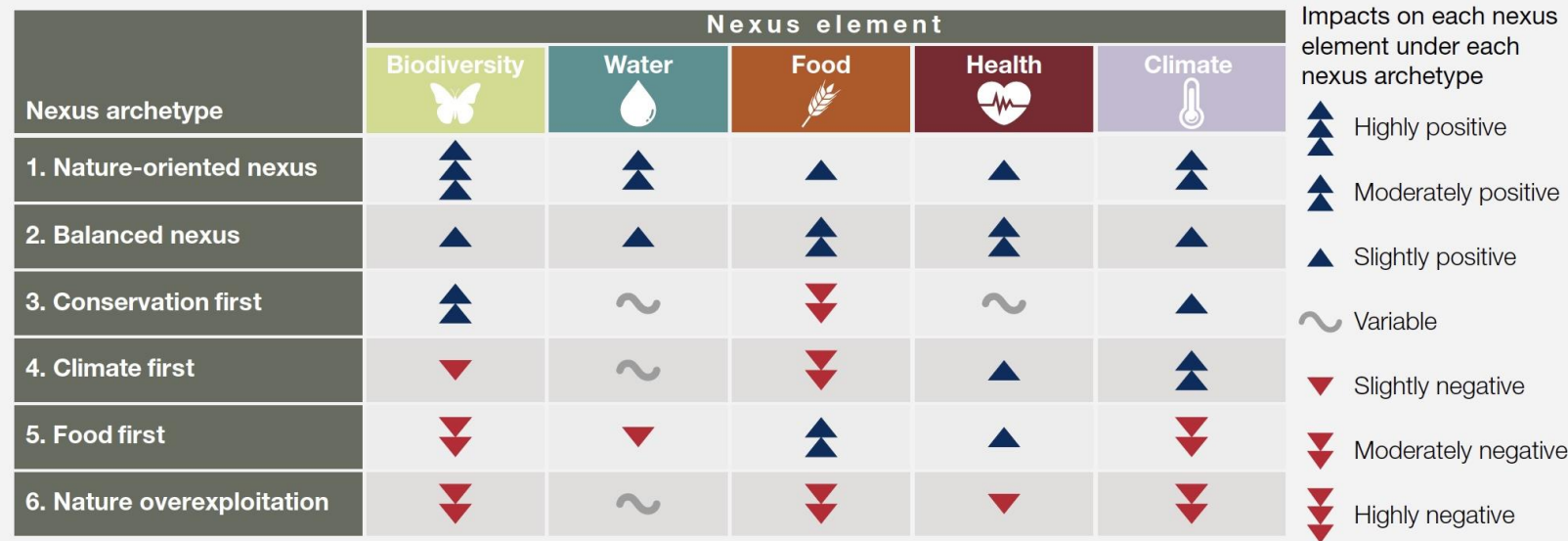
Synergies and trade-offs depend on context and scale



The development context in which climate actions are taken makes a difference.

Reduction of adaptation effectiveness → higher global warming levels; missing SDGs, reversing development gains

## A PROJECTED FUTURE IMPACTS ON THE NEXUS ELEMENTS



IPBES Nexus Assessment SPM.5

IPCC AR6 SYR Figure 4.5

Key: Blue Synergies, Orange Trade-offs, Blue/Orange Both synergies and trade-offs/mixed, White Limited evidence/no evidence/no assessment