Co-creation Activity

Scenario Development for Low Emissions Futures in Pakistan

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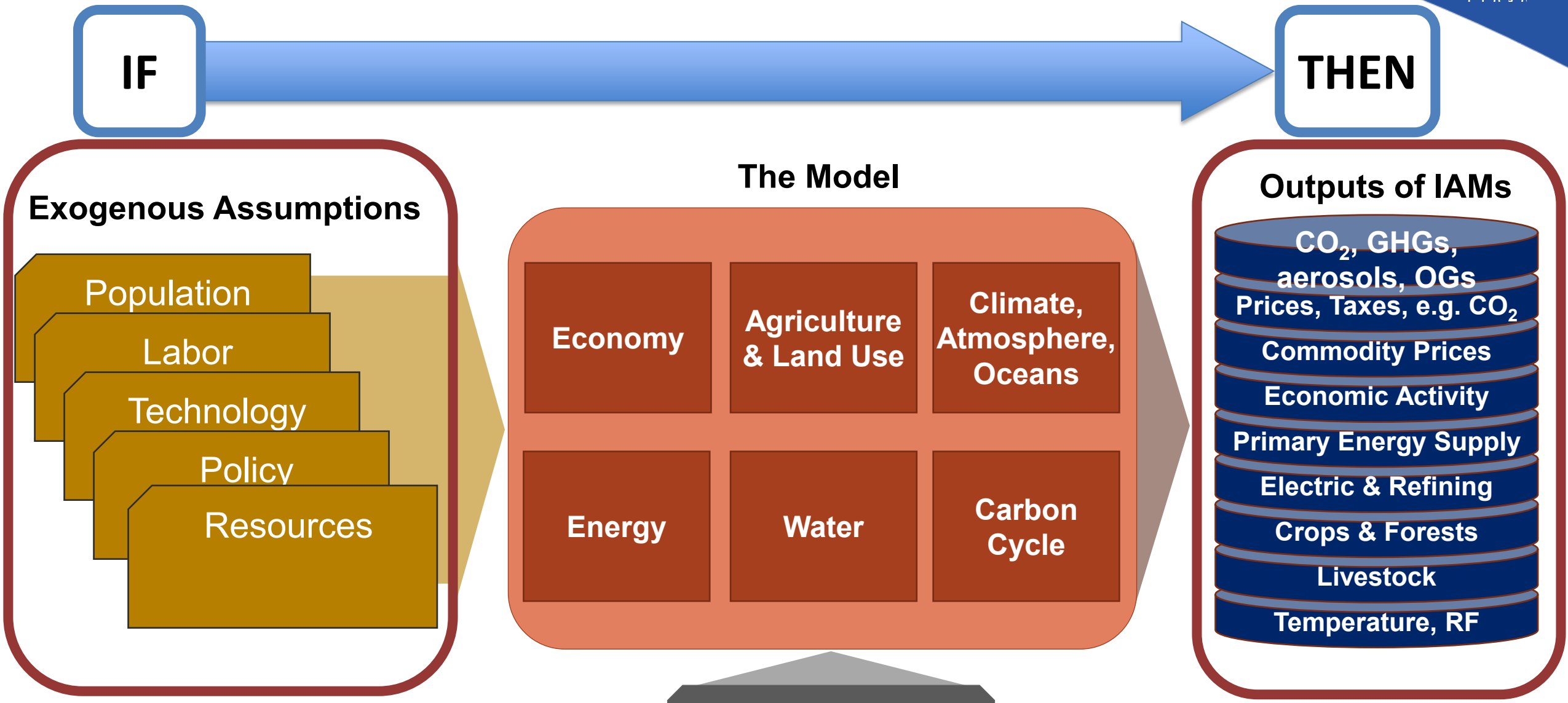
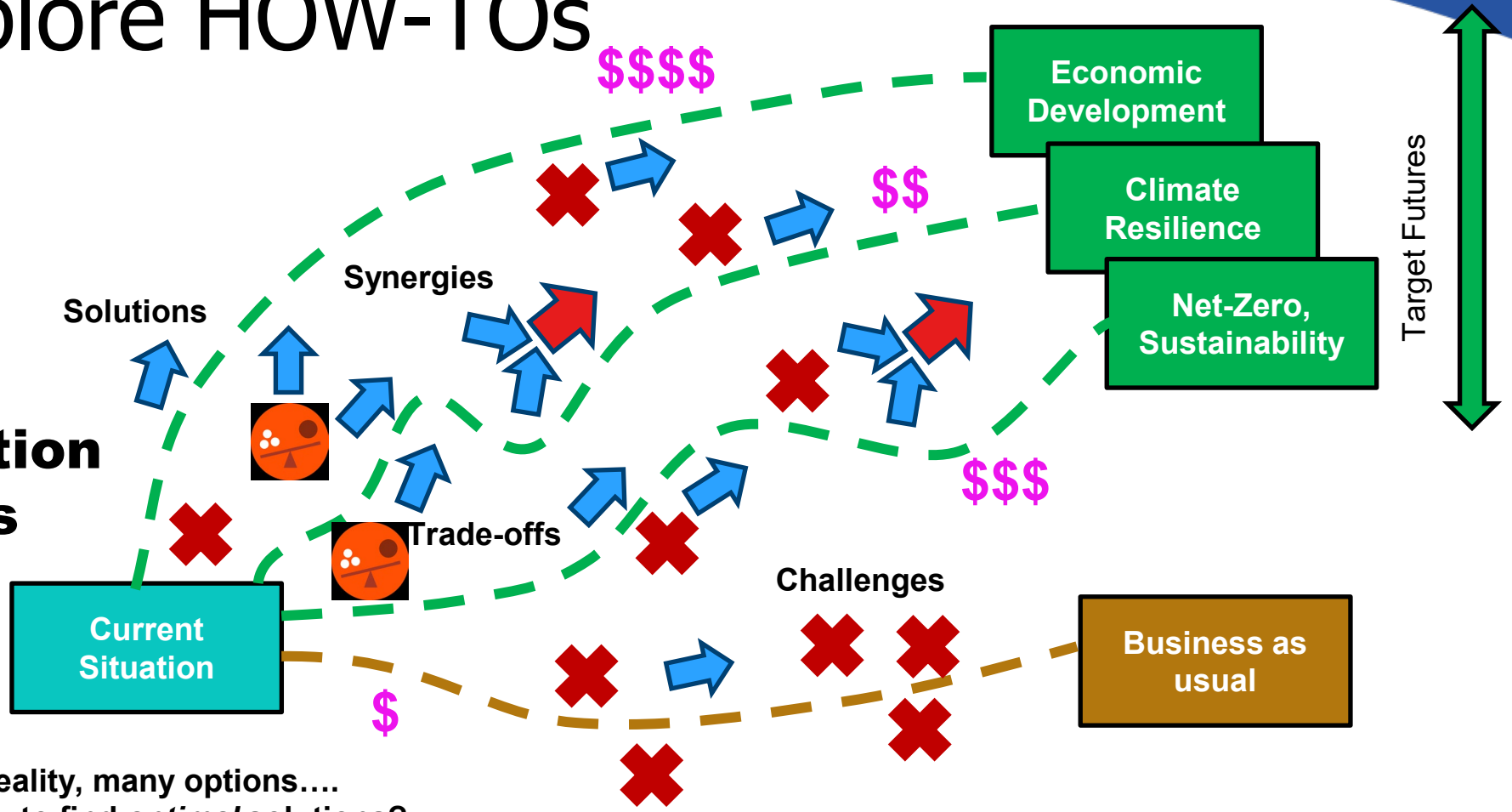
Scenarios are WHAT-IF situations…

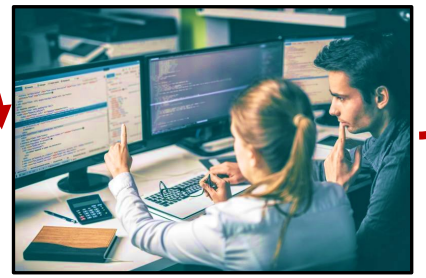


…to explore HOW-TOs

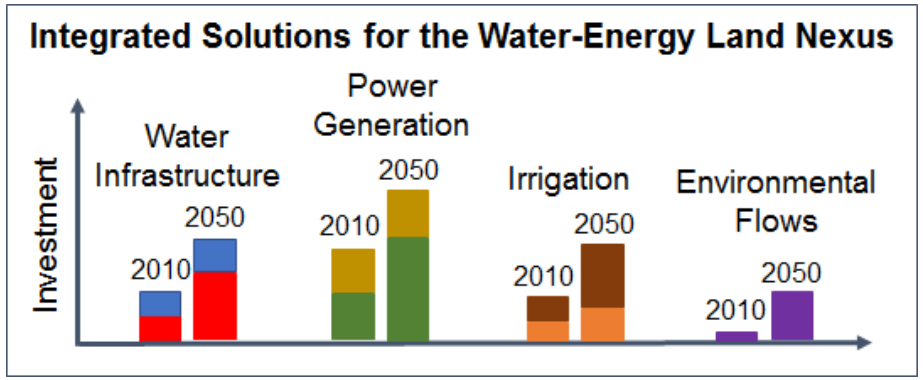
System Transformation Pathways



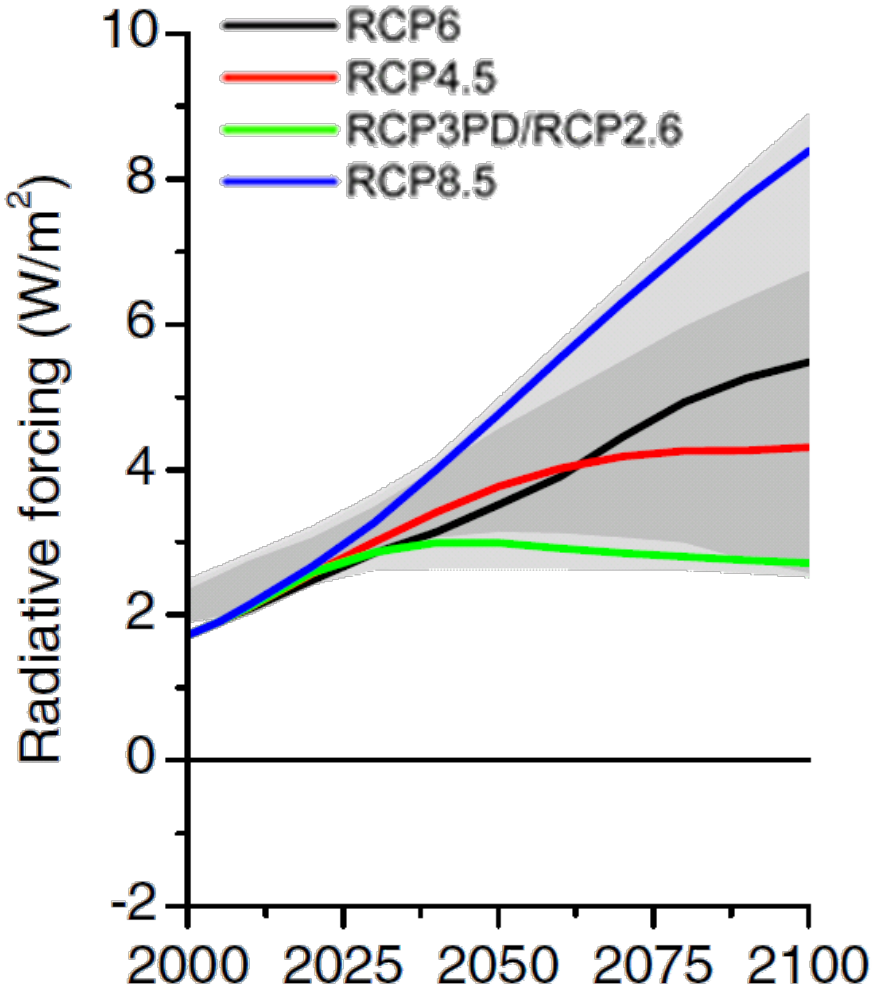
In reality, many options….
How to find *optimal* solutions?



Computational modeling



Standard IPCC-inspired SSP-RCP matrix



You can create your own scenarios






- SSP1
- SSP2
- SSP3
- SSP4
- SSP5

Shared Socioeconomic Scenarios (SSPs)

- RCP2.6
- RCP4.5
- RCP6.0
- RCP8.5

Representative Concentration Pathways (2.6, 4.5, 6.0, 8.0 Wm^{-2}).

- GFDL
- HadGEM
- IPSL
- MIROC
- NorESM

CMIP5-era GCMs (GFDL, HadGEM, IPSL, MIROC, NorESM)

- 5%
- 25%
- 40%

Groundwater availability scenarios of the physical water availability are allowed

- Restricted
- Expanded

Surface water storage scenarios (NoExp: No additional reservoir storage; MaxExp: full expansion of surface reservoirs

- WaterGapHM
- PCR-GLOBWB

Observational groundwater depletion datasets that we calibrate against

Stakeholder pathways

	Policy	Question	Description/	Stakeholder pathway
	Environmental flow	What level of environmental flow is a good compromise between costs, benefits and water demand?	Per capita electricity demands remain at historical levels	Economy: per capita electricity demands increase
ENERGY	Electricity demand reduction	SGD 7.3 + 20% end-use efficiency improvement relative to 2015	Per capita electricity demands remain at historical levels	Environment: improve demand side efficiency
ENERGY	Clean energy access	SDG 7.2 By 2030, 50% substantially the share of renewable energy in the global energy mix	No policies beyond current planned infrastructure	Environment Society: set targets of renewable penetration
ENERGY	Power plant cooling	SDG 7.b By 2030, expand infrastructure and upgrade technology	No policy	Environment: Increase the available storage level from 2030 onwards
CLIMATE	Climate change impacts	SDG 13.a Implement the commitment undertaken at the UN Framework Convention on Climate Change	No constraints on emissions	Environment: targets on GHG emission reduction

Scenarios Co-creation – Targets

Sectors	Indicators	Low Emissions	Climate Resilience	Economic Development
Water	1(a) Sustainability/ Environmental Flows			
	1(b) Irrigation technologies			
	1(c) Extreme Events			
Energy	2(a) Access/ Loadshedding			
	2(b) Demand side measures			
	2(c) Supply side measures			
Land	3(a) Land cover/ land use			
	3(b) Yields/ technologies			
	3(c) Unintended consequences			

Scenarios Co-creation – Feedbacks

	Scenarios →	Low Emission		Climate Resilience		Economic Development	
Sectors	**Indicators**	**Tradeoffs**	**Synergies**	**Tradeoffs**	**Synergies**	**Tradeoffs**	**Synergies**
Water	1(a) Sustainability/ Environmental Flows						
	1(b) Irrigation technologies						
	1(c) Extreme Events						
Energy	2(a) Access/ Loadshedding						
	2(b) Demand side measures						
	2(c) Supply side measures						
Land	3(a) Land cover/ land use						
	3(b) Yields/ technologies						
	3(c) Unintended consequences						

Scenarios Co-creation – Targets

Sectors	Indicators	Low Emissions	Climate Resilience	Economic Development
Water	1(a) Sustainability/ Environmental Flows			
	1(b) Irrigation technologies			
	1(c) Extreme Events			
Energy	2(a) Access/ Loadshedding			
	2(b) Demand side measures			
	2(c) Supply side measures	Increase biomass production by 25% by 2050	Increase hydropower by 15% by 2050	Increase fossil production by 15% by 2050
Land	3(a) Land cover/ land use			
	3(b) Yields/ technologies			
	3(c) Unintended consequences			

Note: Don't worry about the feasibility of the scenario! Not all scenarios solve

Scenarios Co-creation – Feedbacks

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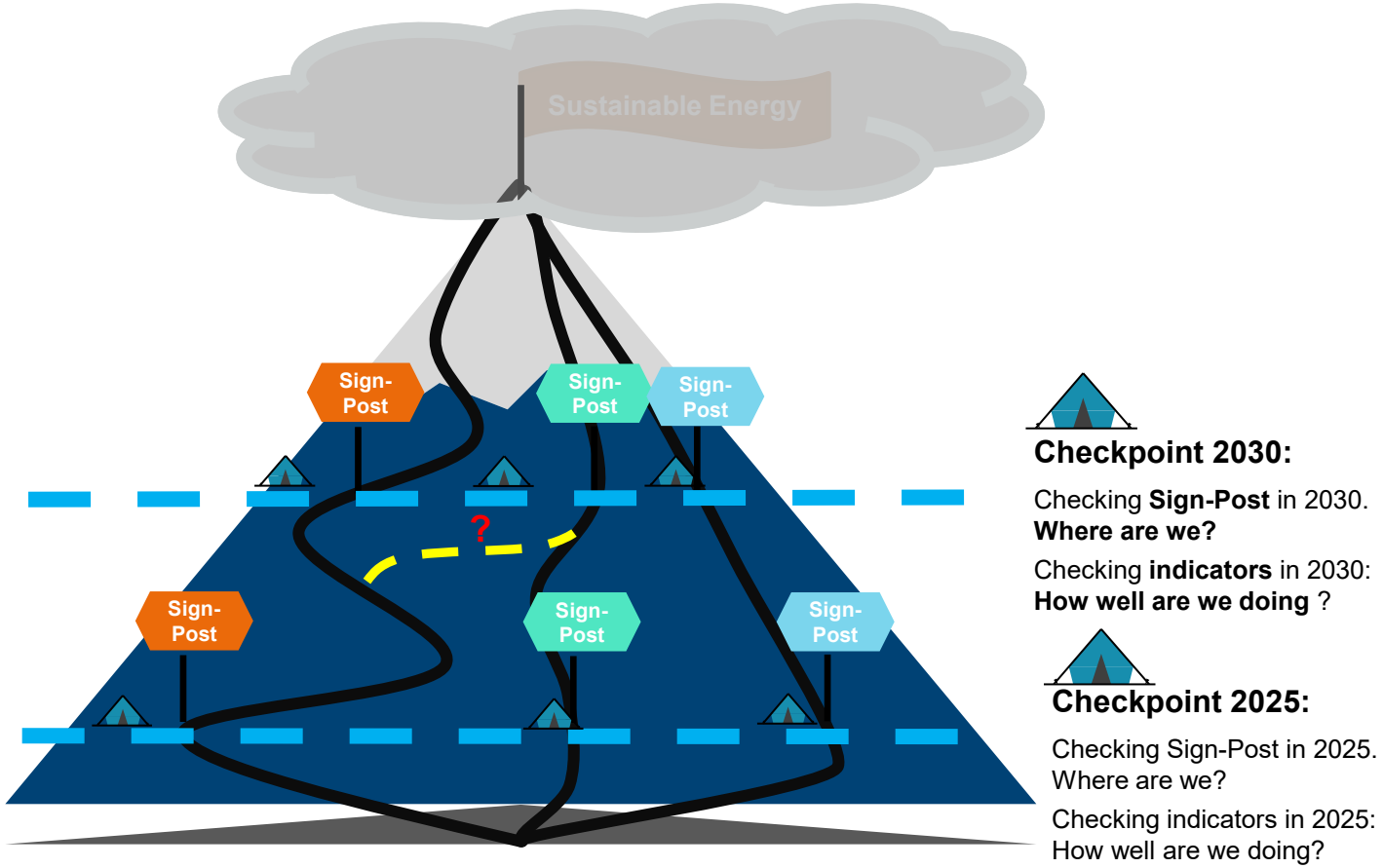
Sectors	**Indicators**	**Tradeoffs**	**Synergies**	**Tradeoffs**	**Synergies**	**Tradeoffs**	**Synergies**
Water	1(a) Sustainability/ Environmental Flows						
	1(b) Irrigation technologies						
	1(c) Extreme Events						
Energy	2(a) Access/ Loadshedding						
	2(b) Demand side measures						
	2(c) Supply side measures	1a – large water footprint	3b – more sugar crops				
Land	3(a) Land cover/ land use						
	3(b) Yields/ technologies						
	3(c) Unintended consequences						

Thank you

Understanding Pathways

- **Energy,water, land systems** are path-dependent, capital intensive, involving many technologies, agents, and interactions between them Transition is not straightforward
- **Alternative pathways** may exist to reach the same target.
- **Implications of decisions** made today may last over several decades. Testing each pathway is not possible or it may be too costly.
- **Planning tools** can help us to estimate/understand the implications of each pathway for reaching certain development or policy goals.



Same starting point - different pathways represent different policy options

Figure: Holger Rogner (IIASA)

Scenarios Co-creation – Feedbacks

Sectors	Indicators	Tradeoffs	Synergies	Opportunities/Policy tools
Water	Sustainability/ Environmental Flows			
	Irrigation technologies			
	Extreme Events			
Energy	Access/ Loadshedding			
	Demand side measures			
	Supply side measures			
Land	Land cover/ land use			
	Yields/ technologies			
	Unintended consequences			

Session Goals

Session Objectives:

- To foster cross-sectoral discussions and co-create actionable strategies towards achieving diverse objectives e.g., net-zero emissions.
- To align Pakistan's National Determined Contributions (NDCs) with global temperature targets.
- To integrate global climate scenarios into national modeling efforts, focusing on the water, agriculture, energy sectors, and climate impact.

Methodology:

- Collaborative scenario development aligned with temperature goals.
- Sector-focused group discussions for in-depth analysis.
- Cross-sectoral dialogues to identify synergies and interdependencies.
- Diverse stakeholder engagement for comprehensive perspectives.

Agenda

Introduction and Climate Policy Overview (20 minutes):

- Policy frameworks Policies in Pakistan (10 minutes)
- Discussion on Policy Development and Challenges (10 minutes)

Scenario Co-creation (45 minutes):

- *Breakout Group Discussions (30 minutes):* Participants divide into groups, preferably each focusing on specific policy challenge e.g., water, agriculture, climate, energy, mitigation, adaptation
- *COMMITTED Scenario Protocol Survey (15 minutes):* Participants fill out the survey in breakout groups led by Lara (CMCC)

Synthesis (30 minutes):

- *Synthesizing Discussions (20 minutes):* Participants discuss summarize key insights from breakout groups and discuss priority areas.
- *Reflection (15 minutes): A 15 min reflection session led by Dr Asif Khan*.