The use of scenarios in adaptation planning:

Managing complex risks

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VICTORIA UNIVERSITY | A NEW SCHOOL OF THOUGHT

Science!

- Science's approach has been to communicate what it knows about climate change
- This comes from an underlying belief that if people are informed about risk, they will respond to it in a rational manner
- Social scientists know this not to be true

What is a risk?

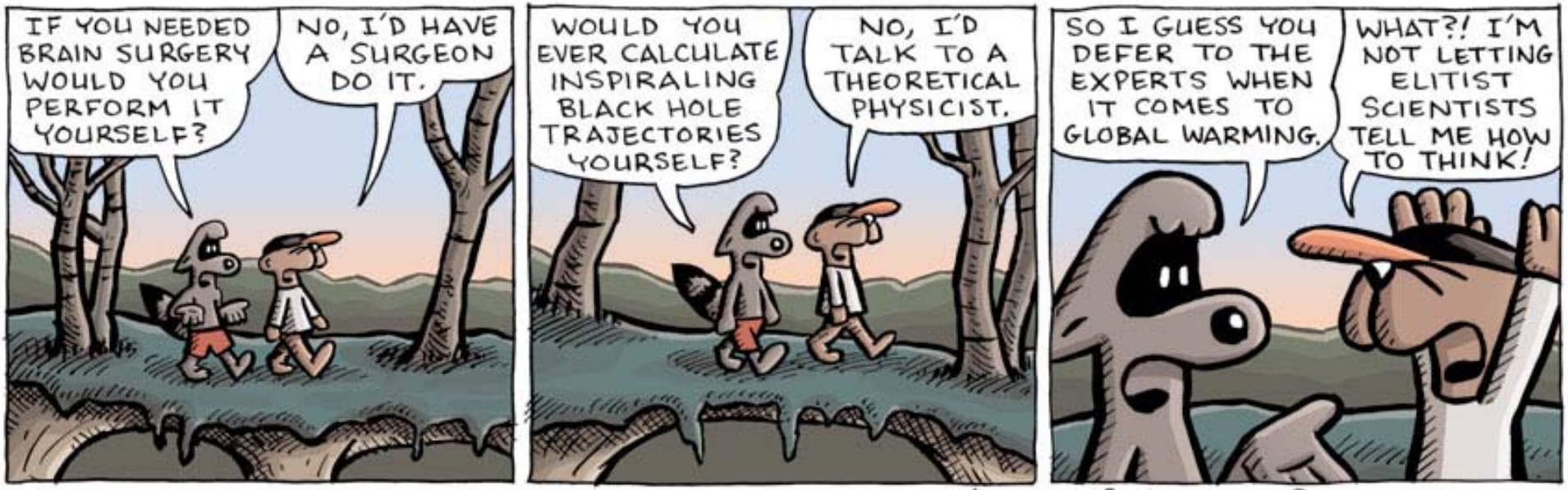
- *the effect of uncertainty on objectives* (ISO:31000 2009)

- Hazard (event), outcomes (benefit, harm), likelihood

- Part has a degree of objectivity (understanding the event, assessing likelihood)
- Part is subjective (defining values, evaluating alternatives, deciding if/when to act)

Major types of risk

- Idealised risk: the conceptual framing of problem at hand.
  1. Avoiding dangerous climate change
  2. Fire exposure in peri-urban areas
- Calculated risk: model product based on a mix of observation and theory.
  1. Likelihood of exceeding 2°C warming from pre-industrial; 1,000 tones C emissions since 2000; 350, 450, 550 ppm CO_2-e
  2. Fire risk x number of people x damage / protection
- Perceived risk: the rough estimate of idealised risk made by an individual.
  1. The science is right, the science is wrong, the end of the world, the ruin of the economy etc.
  2. Privatise the benefits, publicise the risk, speculation on the urban growth boundary, control burning, bunkers etc.



What do we know? Ontology

What can we believe? Epistemology

What do we believe? Risk perception

Tame and complex risks

- Tame risk: agreed framing, bounded values, agreed process for calculating risk, process for reconciling perceived and calculated risk

- Complex risk: multiple frames, unbounded values, ‘deep’ uncertainty and has risks attached to acting and not acting

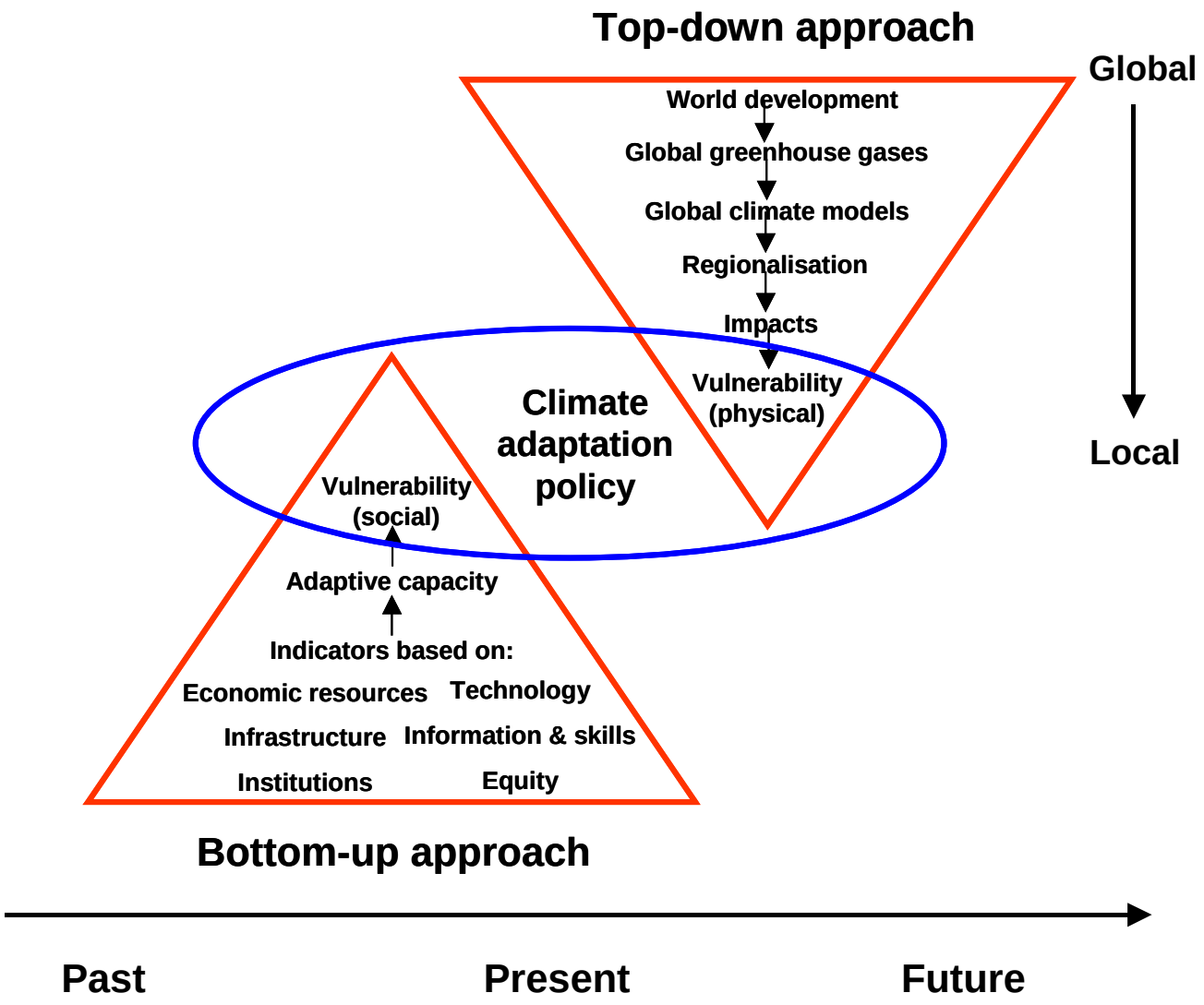
From @Risk ⇒ 2Risk

At risk – noun	To risk – verb
Something of value is at risk	To seek advantage under uncertainty
Calculated risk	Goal-driven
Predictive	Diagnostic
<u>Heuristics</u>	<u>Heuristics</u>
Loss aversion	Risk-seeking
Fear-loss reaction	Goal oriented
High rate of time preference	Low rate of time preference
Tells us what not to do, not what to do	

Applying risk assessment to adaptation

Assessment	Stage of risk assessment	Methodological approaches	Scenario requirement
Problem identification	Scoping the question, risk identification	Sensitivity analysis	Exploratory scenarios investigating major drivers
Problem analysis and evaluation	Risk analysis	Scenario-driven impact assessment	Problem-based scenarios: Exploratory, normative and two-way
	Risk evaluation	Risk assessment Vulnerability assessment	
Solutions	Risk management	Mainstreaming adaptation	Solution-based scenarios
Ongoing	Implementation and monitoring	Implementation, monitoring and review	Reflexive scenarios

Top-down v bottom up



Dessai and Hulme 2005

Natural hazard-driven approach (so-called top down)

Approach

- What risks are faced under these hazards?

Method

- Analyse possible outcomes from a given climate hazard(s) ± other drivers of change

Outcome

- An understanding of current/future climate-related risks

Scenarios

- Exploratory scenarios of climate with other biophysical and socio-economic conditions

Criteria:

- Probabilities of hazard constrained
- Main drivers known
- Chain of consequences understood
- P(Hazard) × Consequences
- Largely exploratory

Vulnerability-driven approach (so-called bottom up)

Approach

- Who or what is at risk?

Method

- Determine the likelihood of critical threshold exceedance/level of harm

Outcome

- Understanding of exposure to harm and harmful processes

Scenarios

- Characterisation of socio-economic outcomes; can use climate scenarios or diagnose exposure through inverse methods

Criteria:

- Probabilities of hazard not constrained
- Many drivers resulting in vulnerability
- Multiple pathways and feedbacks
- P(Vulnerability)/Hazard (e.g. critical threshold exceedance)
- Largely normative

Resilience-driven approach (solution focused bottom up)

Approach

- What opportunities arise from change?
- Assess ability to withstand shocks, recover from setbacks and manage change

Method

- Better knowledge of coping mechanisms and socio-political institutions, barriers to adaptation, increased benefits

Outcome

- Baseline adaptation, adaptation analogues from history, other locations, other activities

Scenarios

Criteria:

- Impacts and/or vulnerability understood
- Evidence of successful adaptation
- Benefits thought to be likely
- Barriers to adaptation recognised
- Risks that require treatment
- Willingness to act

Policy-driven approach

Approach

Method

Outcome

Scenarios

Criteria:

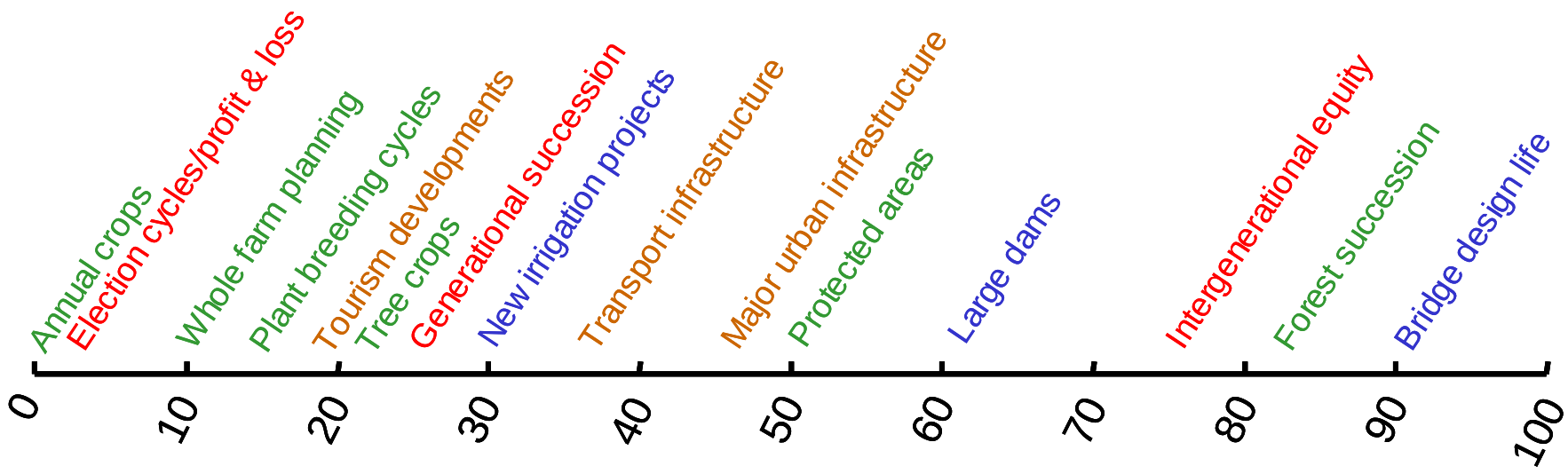
- How will our future plans be affected by climate change?
- Assess the efficacy of an existing or proposed policy under climate change
- Fitter policy under climate change
- How a specific policy plays out under climate and other change
  - Policy aims are sensitive to climate change
  - Desire to “mainstream” adaptation

Framing adaptation

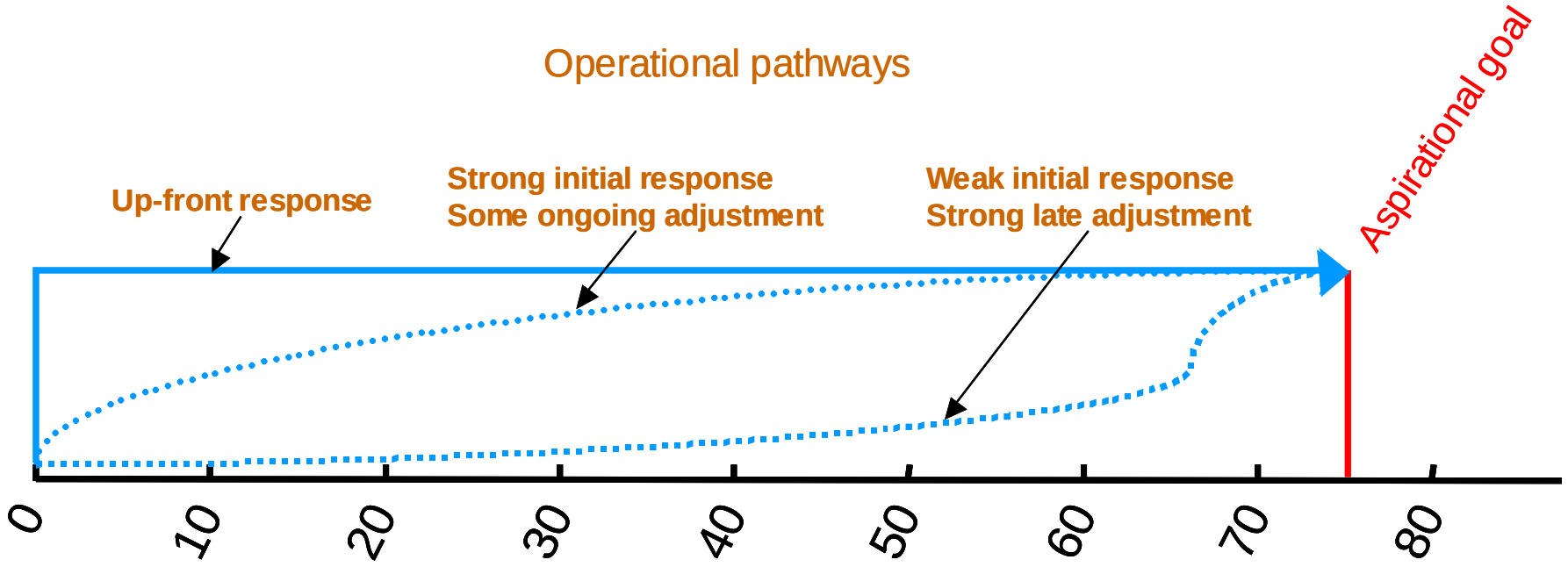
- Goal setting
- Where do we want to go? (aspirational goals)
- How do we want to get there?

- What are the risks?
- What are the barriers? (e.g., lack of adaptive capacity)

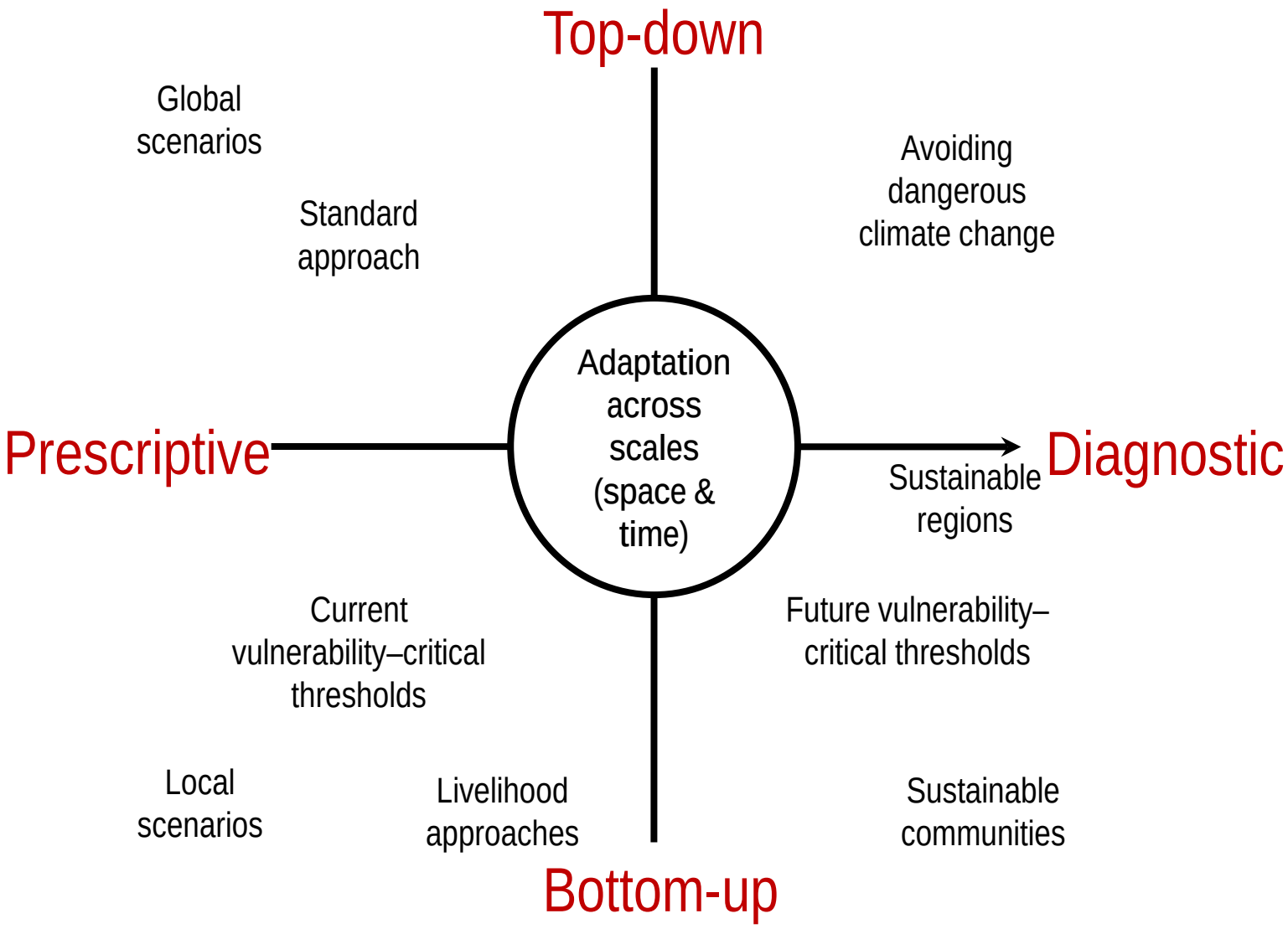
Planning horizons



Operational pathways and aspirational goals



Scales and directions of approach



Tame risks

- Scenarios communicate risk amongst stakeholders, visualise, contextualise and link problems with solutions

Complex risks

- Exploratory ‘what if’ scenarios to explore the problem
- Exploratory and normative scenarios to assess the problem and identify solutions
- Normative scenarios to map out how solutions can be applied
- Reflexive scenarios monitor risks, achievements and update methods and goals

Stage of assessment	Research question	Top-down approaches Natural science-dominated Model projections Calculated risk	At risk$_{(noun)}$ Chance of loss Assesses what not to do	Scenarios
Scoping	What is the domain of the area of interest, who will be involved and what methods will be applied?			Exploratory scenarios of climate change tested on system (top down)
Identification	What risks do we need to assess?			Exploratory scenarios of system under climate change (bottom-up) Normative scenarios of policy/desired futures under climate change
Analysis	What is their likelihood and potential impact?		Social amplification of risk	
Evaluation	Which options best manage those risks?			Adaptation scenarios testing management options
Management	How do we implement adaptation actions?	Perceived risk Contextual development Social science-dominated Bottom-up approaches	To risk$_{(verb)}$ Chance of gain Action under uncertainty	OR Reflexive scenarios validated and updated by monitoring and review, involving some or all of the above

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