

Decision making is a minor miracle

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The Institute for Water Futures acknowledges the Traditional Owners of the lands on which we meet, collaborate and learn, and pay our respects to Elders past, present and emerging. We recognise and respect First Nations' traditional knowledge and cultural values of water as a fundamental aspect of our shared Water Futures.



A Fox was boasting to a Cat:

"I have a whole bag of tricks," he said, "which contains a hundred ways of escaping my enemies."

"I have only one," said the Cat; "but I can generally manage with that."

At the sound of hounds the Cat immediately scampered up a tree

"This is my plan," said the Cat. "What are you going to do?"

The Fox thought first of one way, then of another, and while he was debating, was caught.

"Better one safe way than a hundred on which you cannot reckon."



Aesop's The Fox and the Cat
Heinrich Steinhöwel 1501

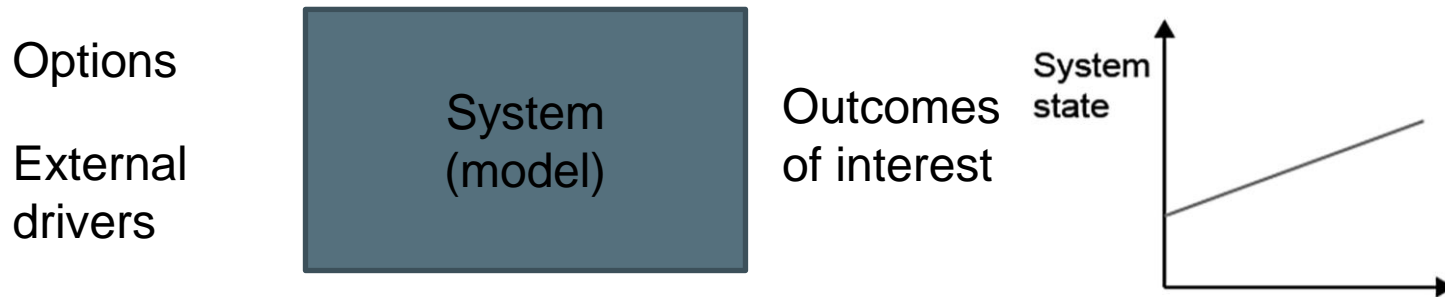
https://commons.wikimedia.org/wiki/File:De_vulpe_et_catto.JPG

Decisions require a collapse of uncertainty

- Only one decision but countless ways of deciding, countless possible alternatives, and potential consequences

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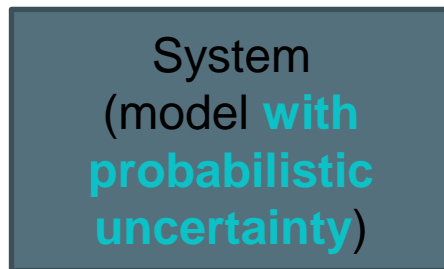


- Choose the first option we can think of that satisfies requirements
- Use optimisation to find the best possible option
- Identify most promising candidates for a political trade-off between objectives
- ...

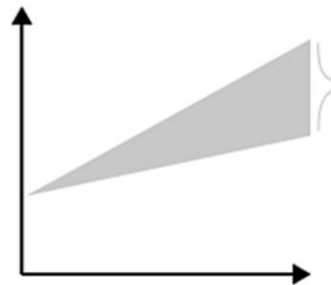
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Options
External
drivers
(probability
or frequency
distribution)



Outcomes
of interest

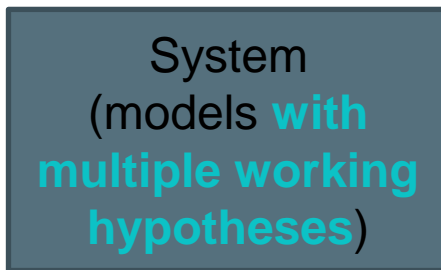


- Maximise expected utility
- Maximise reliability
- Maximise “worst case” performance
- ...

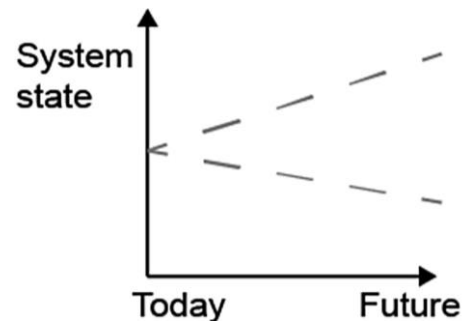
Decisions require a collapse of uncertainty

- Only one decision but countless ways of deciding, countless possible alternatives, and potential consequences

Options
External
drivers
(scenarios)



Outcomes
of interest



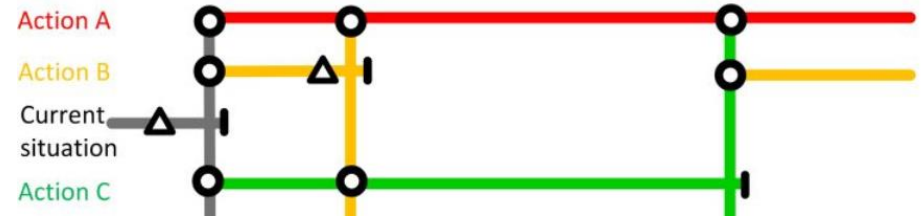
Tailoring scenarios to suit the decision you need to make,
using bottom-up vs top-down approaches

- Robust decisions that perform well across different scenarios, using stress testing and measures of robustness
- Adaptive decisions that allow for action to be taken now by planning for change in the future
- ...

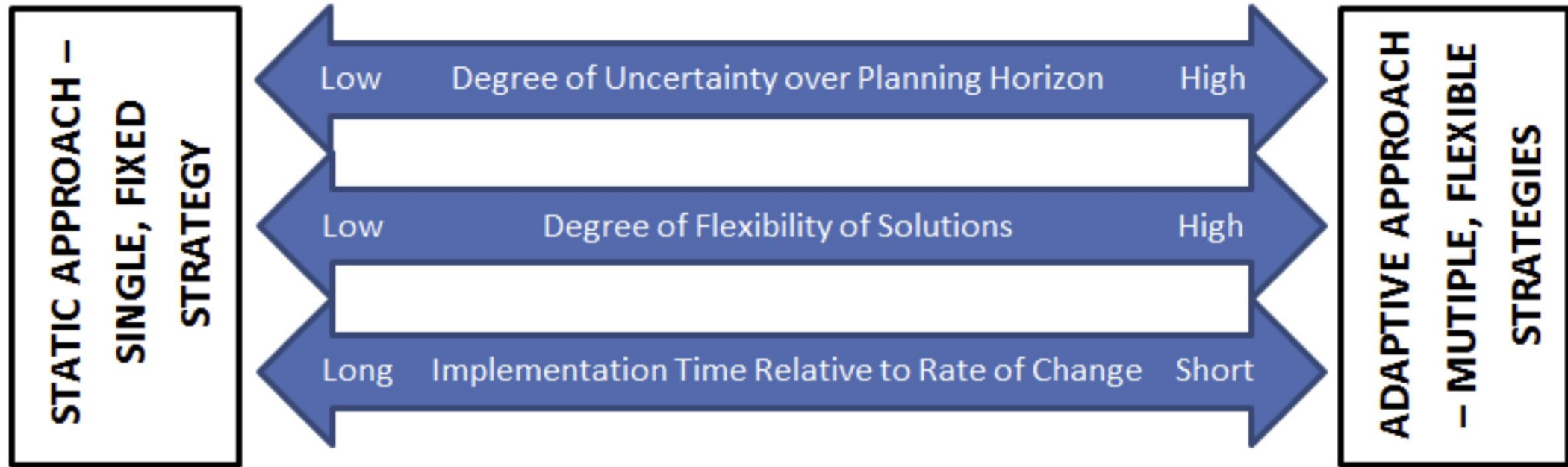
Robust decisions

- We get good results regardless of how the future turns out
 - It doesn't matter which scenario actually happens
 - Stress testing: in what scenarios will a proposed decision perform poorly?
- Performance-robustness trade-offs
 - Higher robustness usually requires sacrificing some performance
 - Higher performance usually requires accepting losses in some scenarios
 - Robustness metrics: measuring the cost of performance
 - Multi-objective optimization: measuring the cost of robustness

Adaptive decisions



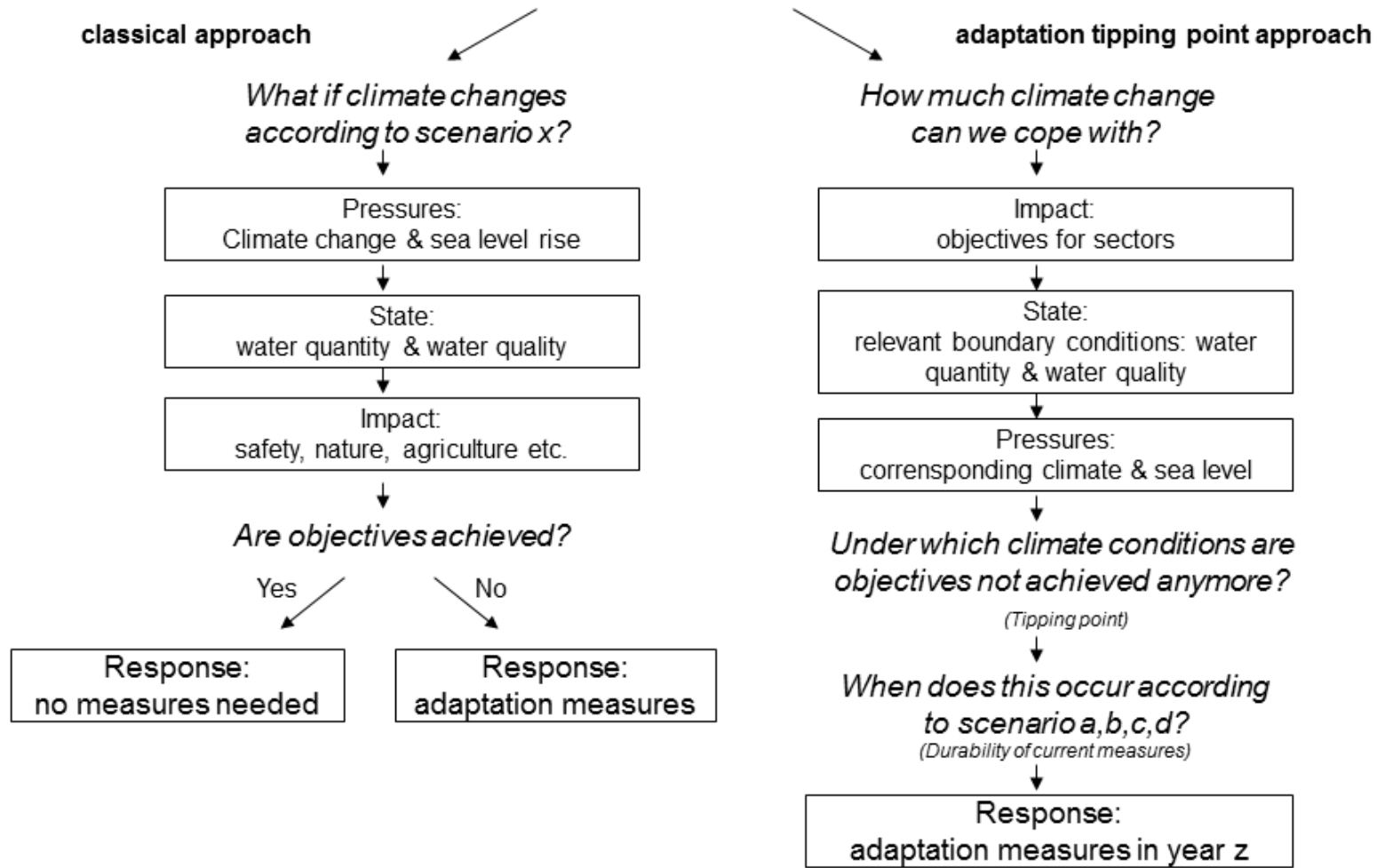
- Scenarios represent our current knowledge, which will change in future
→ plan how decisions will change in future
- Adaptive pathways
 - Plan what decisions can be taken in future, under what conditions
 - What monitoring and governance is needed to ensure adaptation occurs?
- Accounting for future changes in a first decision
 - An action that keeps options open
 - An action that is often chosen first within a sequence
 - An action that has good performance after accounting for future decisions
 - ...



How vulnerable are we for climate change and sea level rise and what adaptation measures should we take ?

“top-down”

“bottom-up”



- Our approach:
 - Simple concepts to make your own
- Alternatives:
 - Pre-defined decision frameworks to adopt or adapt
- Open Access book:
Decision Making Under Deep Uncertainty – From Theory to Practice.
<https://link.springer.com/book/10.1007/978-3-030-05252-2>
- An international community:
<http://www.deepuncertainty.org/>

