From risk to action: Climate decision-making under deep uncertainty

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We want to make the best adaptation decisions possible, given uncertainty about climate risk. What drives decision robustness?

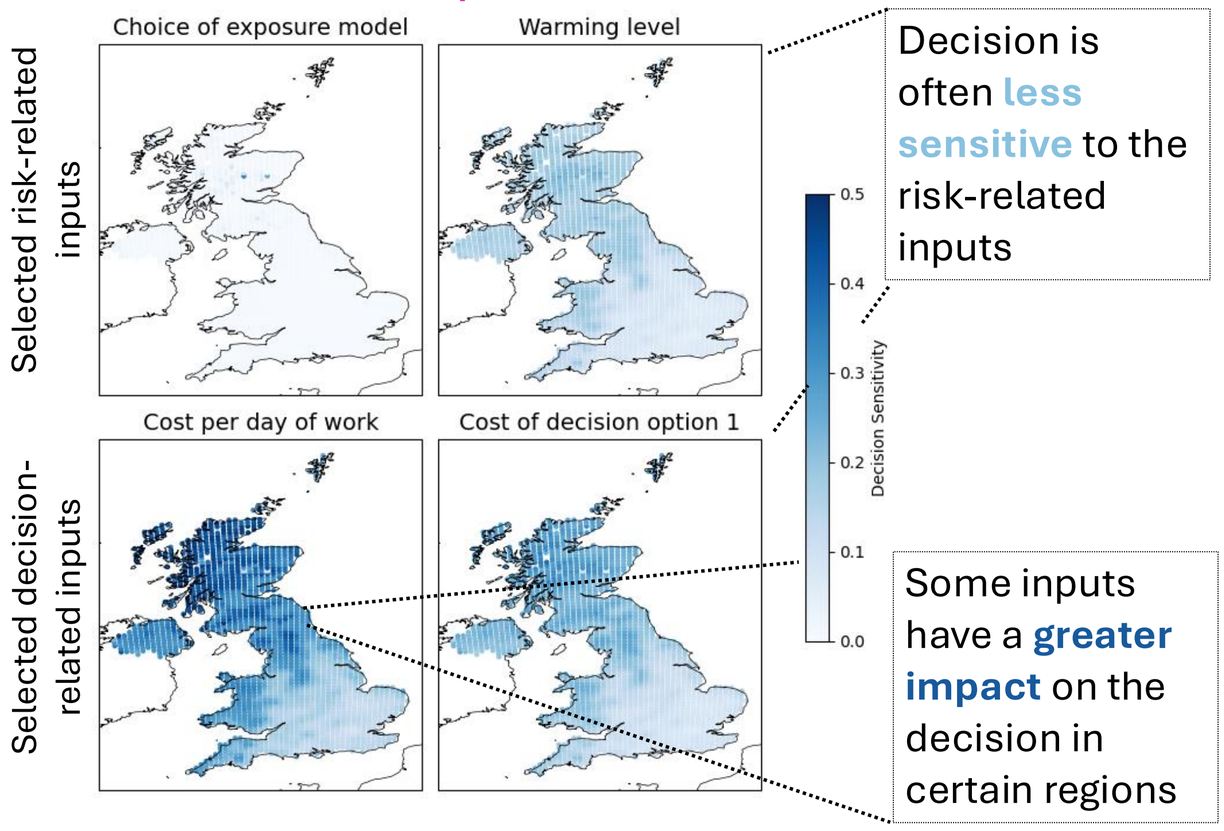
Objectives

In an idealised example of heat-stress mitigation for outdoor workers in the UK, we investigate: (1) how **uncertainty** in climate risk relates to uncertainty in the optimal decision, (2) **sensitivity** of that decision to risk- and decision-related inputs, (3) **spatial variation** in decision sensitivity.

Workflow

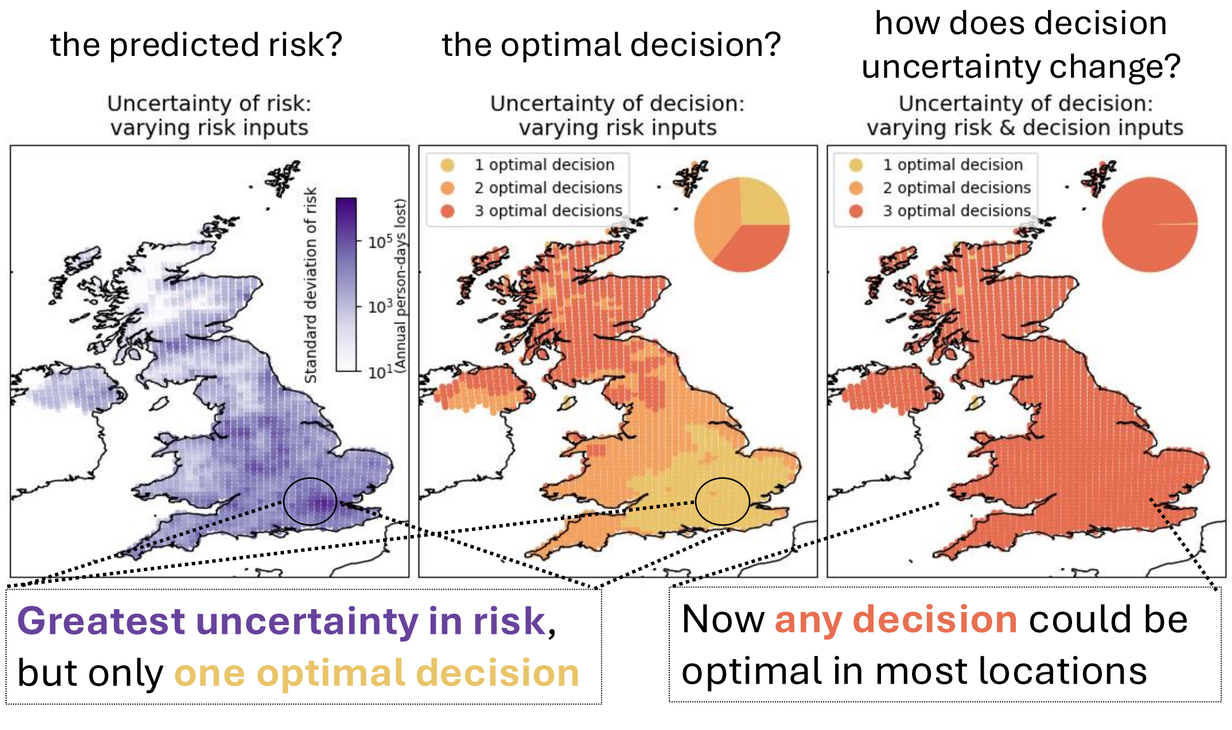
- Select values for **risk-related inputs**, e.g. warming level
- Model the **distribution of risk** in annual days of work lost
- Select values for **decision-related inputs**, e.g. cost of implementing each decision
- Select the decision with the **highest expected utility** to the company across the distribution of risk
- Conduct **uncertainty and sensitivity analysis** to explore how the decision responds to variation in all inputs

How sensitive is the optimal decision to...



Varying all risk-related inputs, how uncertain is...

Also varying decision-related inputs...



Conclusions

- The decision can be robust even when risk is highly uncertain and vice versa: uncertainty and sensitivity analysis should be carried all the way through to the optimal decision.
- The decision is often more sensitive to decision- rather than to risk-related inputs: identifying what the ultimate decision is most sensitive to allows decision-makers to prioritise where they need to reduce uncertainty.
- Decision sensitivity varies spatially: decision-makers need to consider what factors influence the optimal decision on a local basis.

By analysing the uncertainty and sensitivity of decisions, we can be as confident as possible in the optimal decision despite uncertainty.

What's next?

Apply this decision-making framework to a **real-world example** to understand uncertainty and sensitivity of decisions in a more complex context.

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