University of Exeter

Land, Environment, Economics and Policy Institute (LEEP)

Dragon Capital Chair

Bringing nature into public decision making

HM Treasury/Defra Biodiversity Working Group Proposals

Ian Bateman and Ben Groom

With analyses from:

Amy Binner, Brett Day, Mattia Mancini, Danny Williamson & others

Presented at:

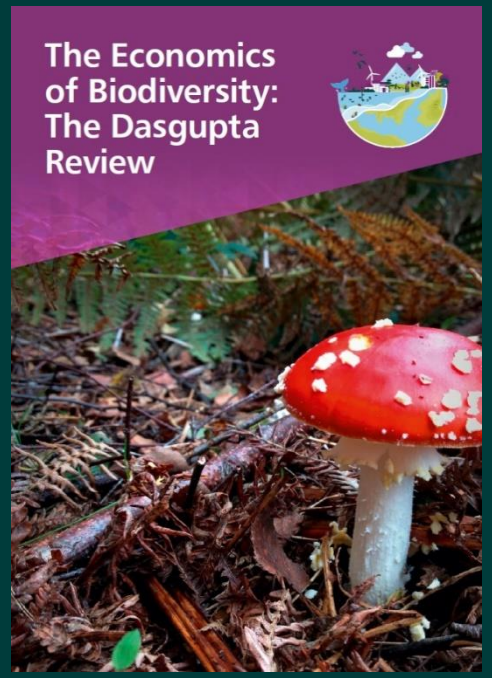
Bringing nature into public decision making

One Great George Street, London, SW1P 3AA

15th July 2025

University of Exeter

Biodiversity, Environment and Economic Growth



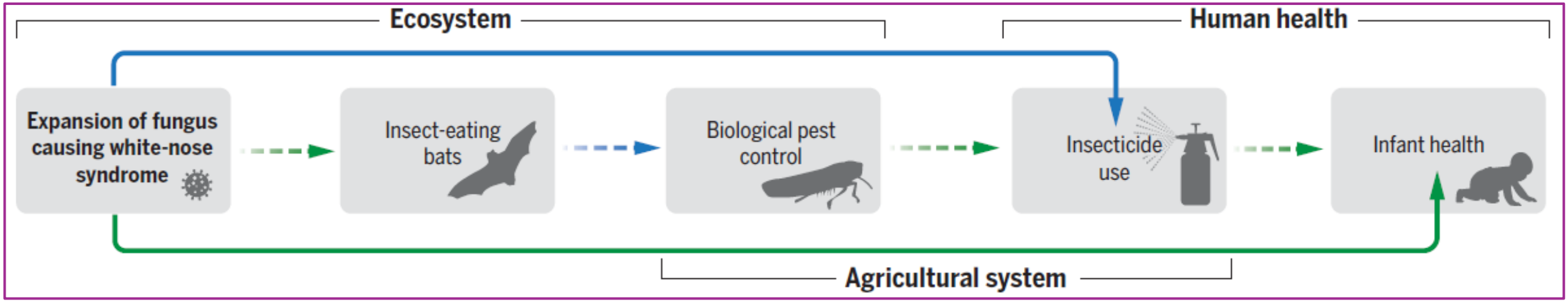
Biodiversity and Economic Growth

Frank (2024, Science), Manning and Ando (2022, JAERE), Fenichel et al., (2025)

Agriculture losses $27bn, 12% of Ag GDP

Infant health $10bn

Cost of municipal borrowing increases



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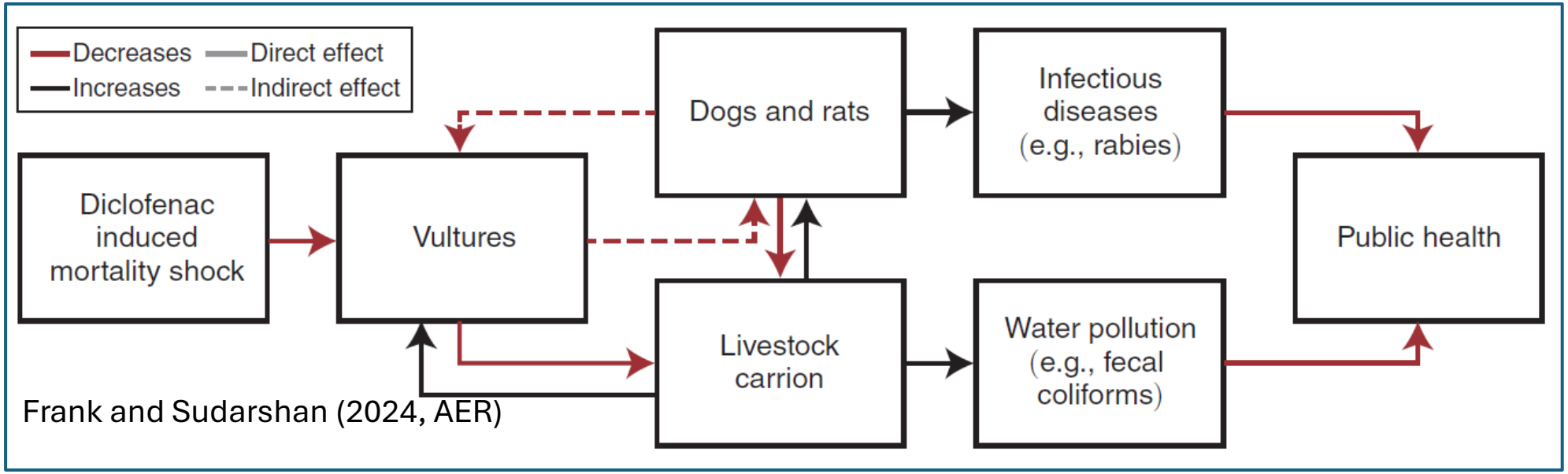

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0.48 deaths/1000 increase, 104,386 deaths

VSL = $665,000, Total loss: $69.4bn/a

Biodiversity and Economic Growth

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Frank and Sudarshan (2024, AER)

Biodiversity, GDP and Natural Capital

Pesticides appear in GDP

Bats do not

Growth and ‘value’

POLICY FORUM

ENVIRONMENTAL ECONOMICS

Accounting for the increasing benefits from scarce ecosystems

As people get richer, and ecosystem services scarcer, policy-relevant estimates of ecosystem value must rise

By M. A. Drupp[1], M. C. Hänsel[2,3], E. P. Fenichel[4], M. Freeman[5], C. Gollier[6], B. Groom[7,8], G. M. Heal[9], P. H. Howard[10], A. Millner[11], F. C. Moore[12], F. Nesje[13], M. F. Quaas[2,14], S. Smulders[15], T. Sterner[16], C. Traeger[17], F. Venmans[8]

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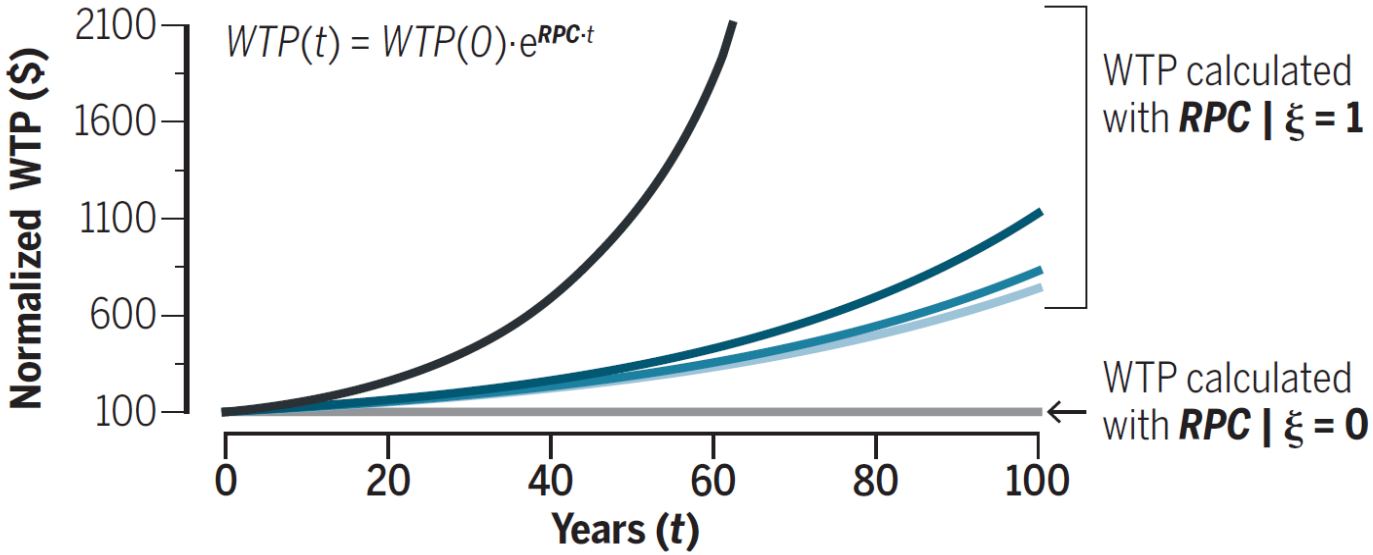

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Growth and environment

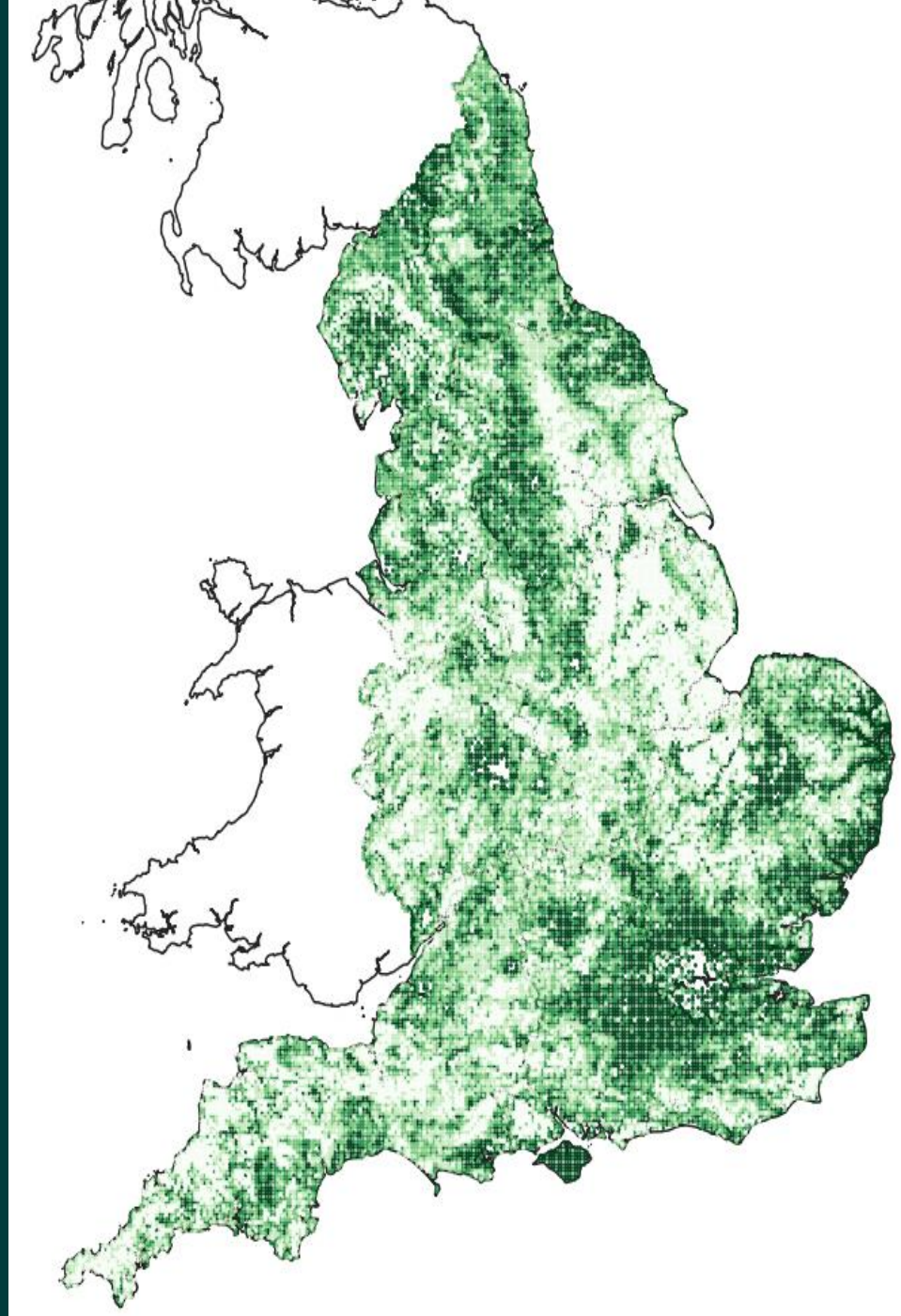
Complex

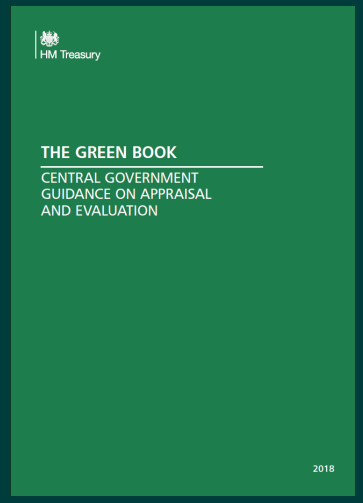
Complementary

Bring nature into public decision-making

University of Exeter

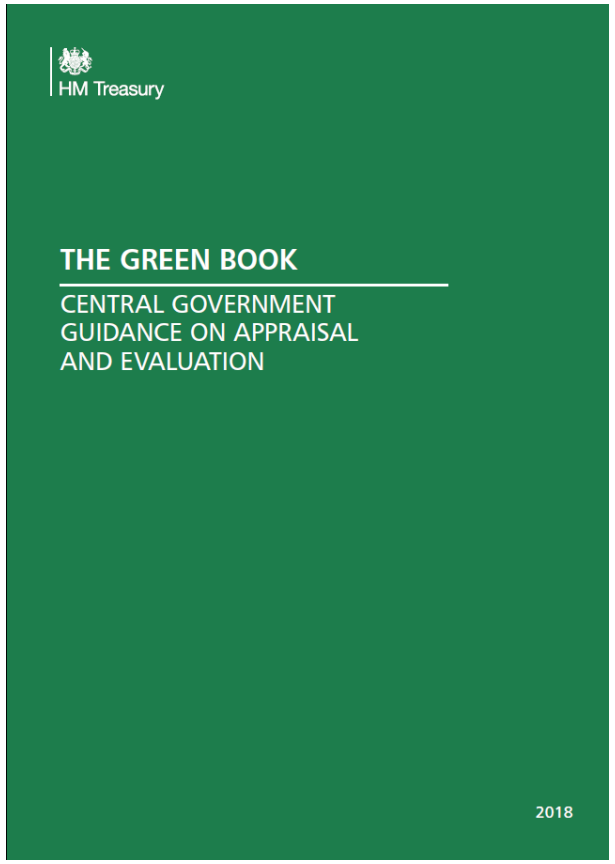
Bringing nature into public decision-making





The official guidelines for appraising government spending

The HM Treasury Green Book sets out guidelines for the appraisal of government spending



- Assess the value of **all** the benefits and costs of a policy option
- Consider **all** the options for delivering a policy and choose the one providing the best outcomes for society

There are two cases where the benefits are so complex that valuations are not robust:

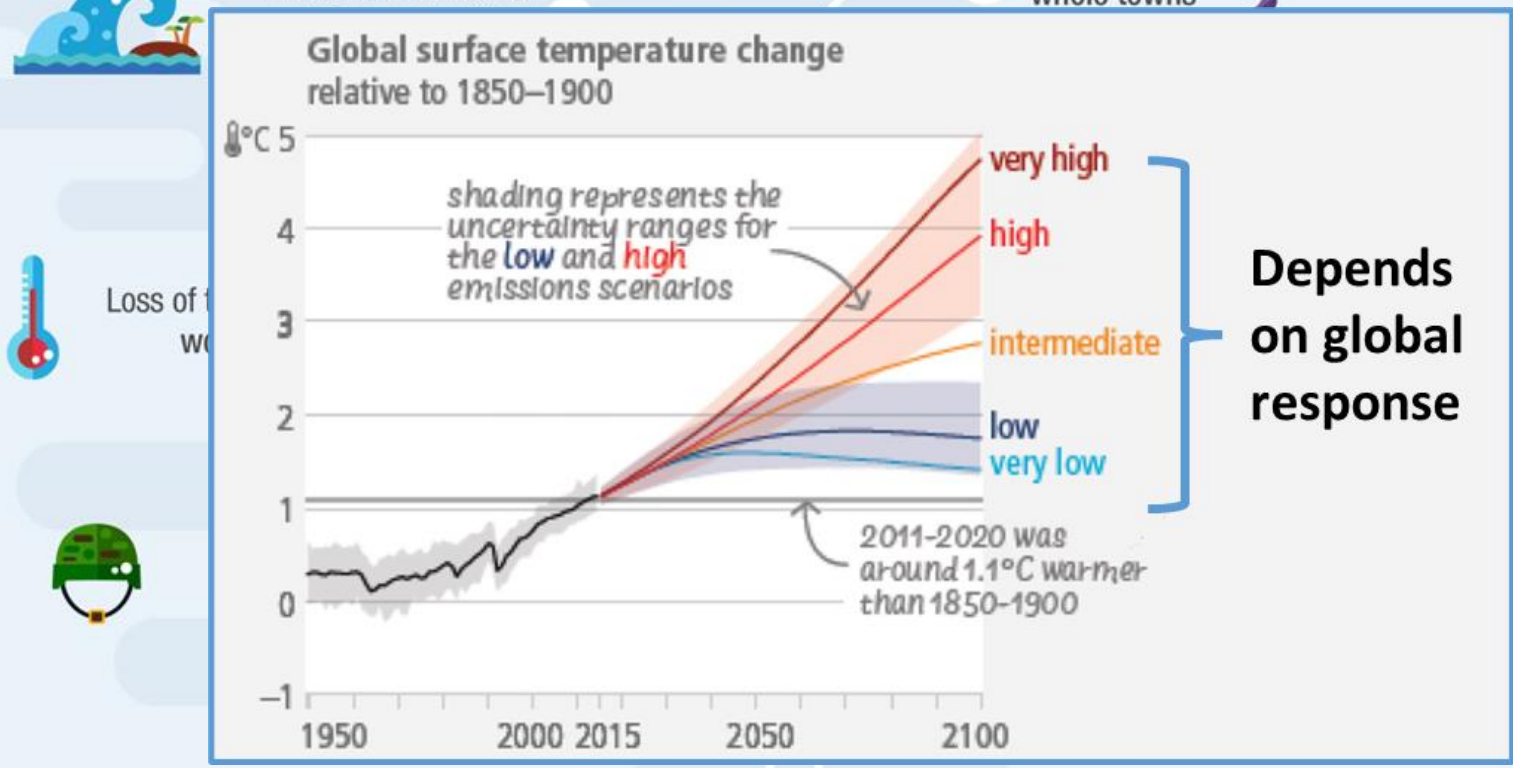
- The benefits of avoiding climate change
- The benefits of avoiding biodiversity loss

The approach taken for climate change shows us a way to tackle the incorporation of biodiversity into economic decision making

The benefits of avoiding climate change

The cost of adapting

Relocation of whole towns



Loss of

tuffs

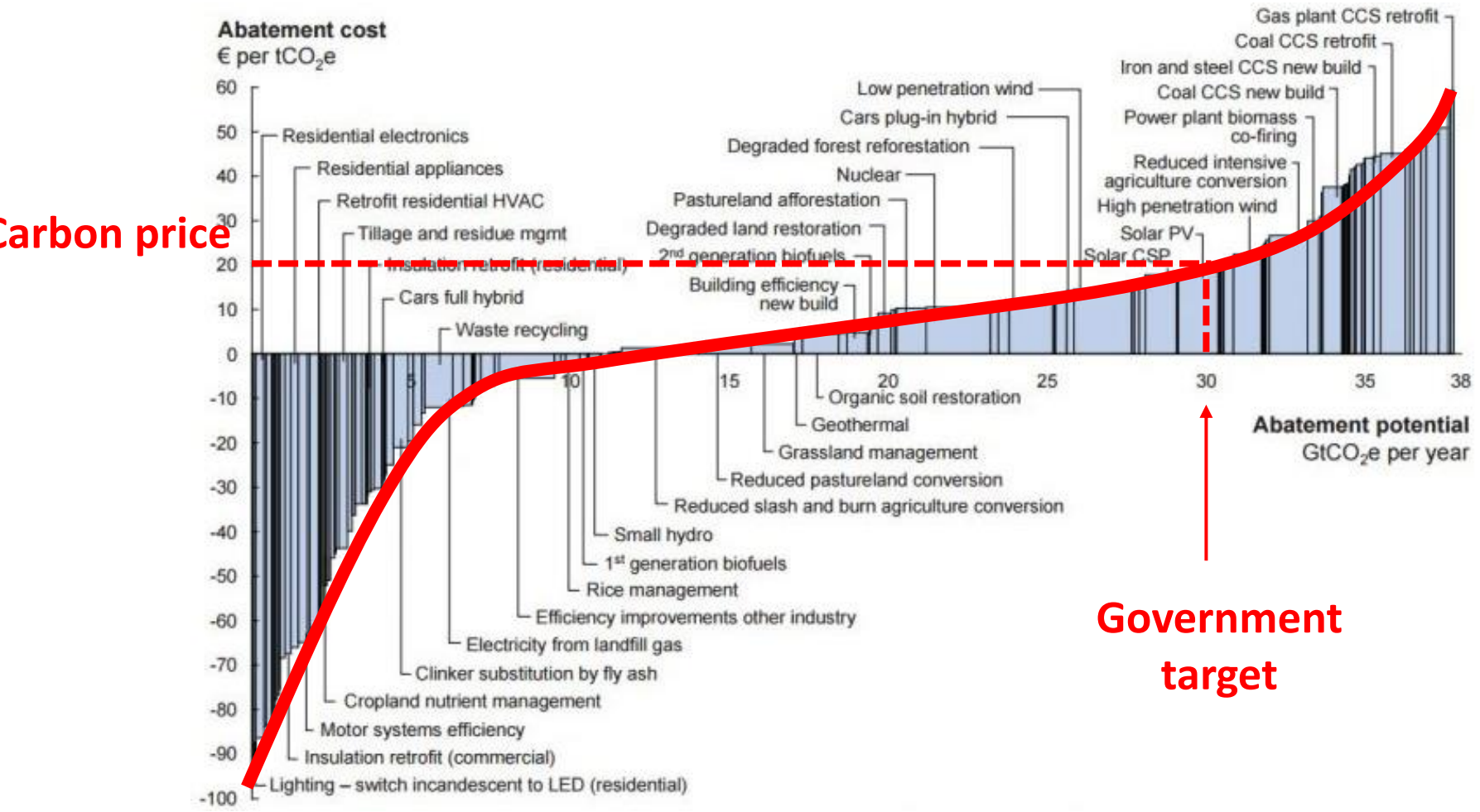
Fresh water will be in short supply in some areas

Diseases will spread due to higher temperatures

Sources: NOAA; IBERDROLA; Xepapadeas 2024

Incorporating climate change into economic decisions

The benefits of avoiding climate change are very high but too complex to robustly value so the Government sets a **target** (in the UK net zero by 2050) and works out the **costs** of hitting that target



Marginal abatement cost (MAC) curve for greenhouse gasses

Source: Global GHG Abatement Cost Curve v2.0

Greenhouse gas reduction technologies are ranked from the cheapest (on left) to most expensive (on right) per tCO_{2e} removed

Government sets its target (e.g. net zero) and technologies are chosen to deliver that target cost effectively.

This Target and Cost Analysis (TCA) sets the target-compatible price for carbon

The challenge of measuring the value of biodiversity

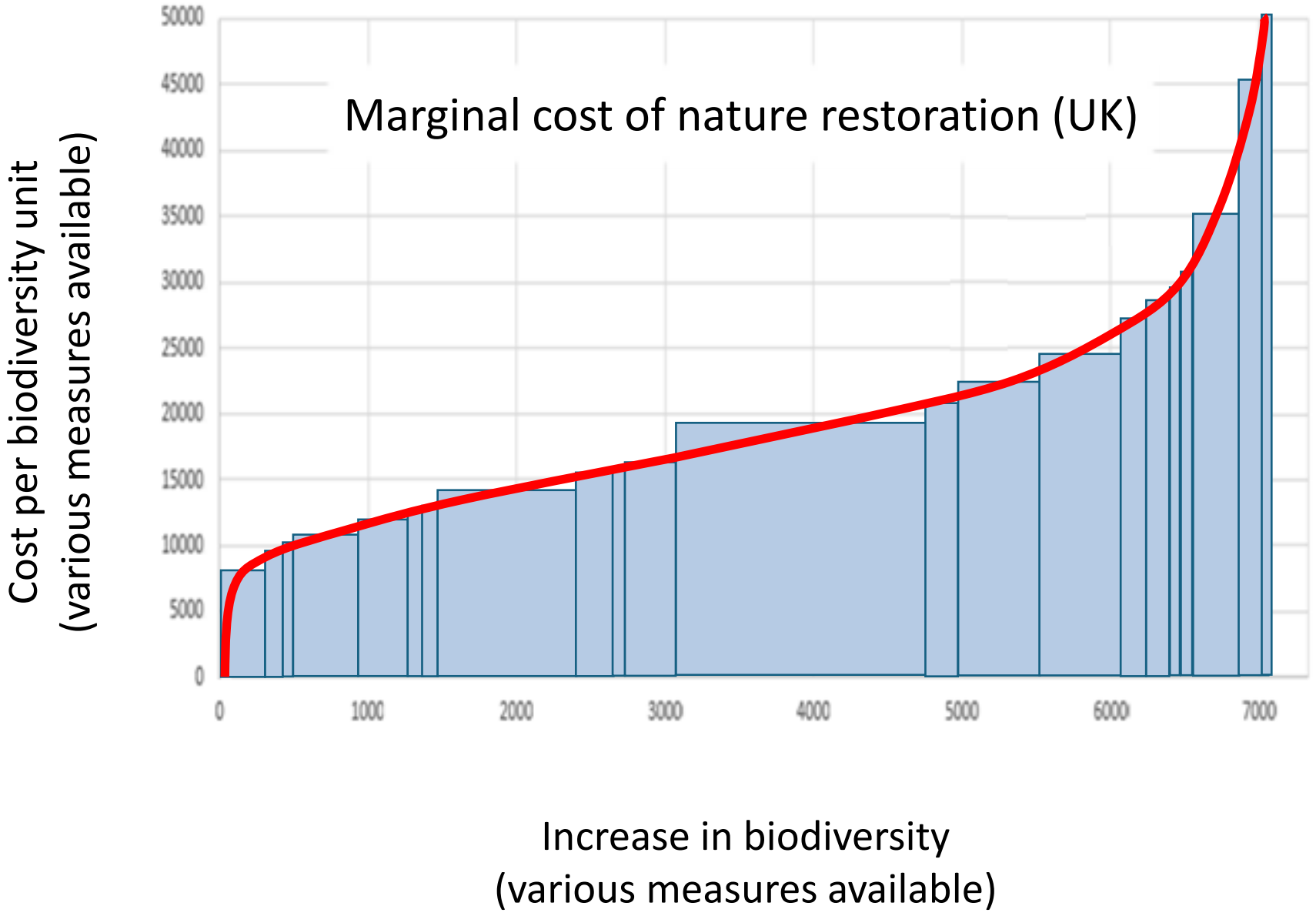
Wild species biodiversity delivers a wide range of values

Some, such as the role of biodiversity in supporting wider ecosystem functions including the water and carbon cycle, are imperfectly understood

Nearly all of these values are difficult to assess in economic terms, leading to biodiversity often being given insufficient weight in decision making

The HM Treasury Biodiversity Working Group has sought to address this by proposing a **focus on the cost of delivering biodiversity targets**

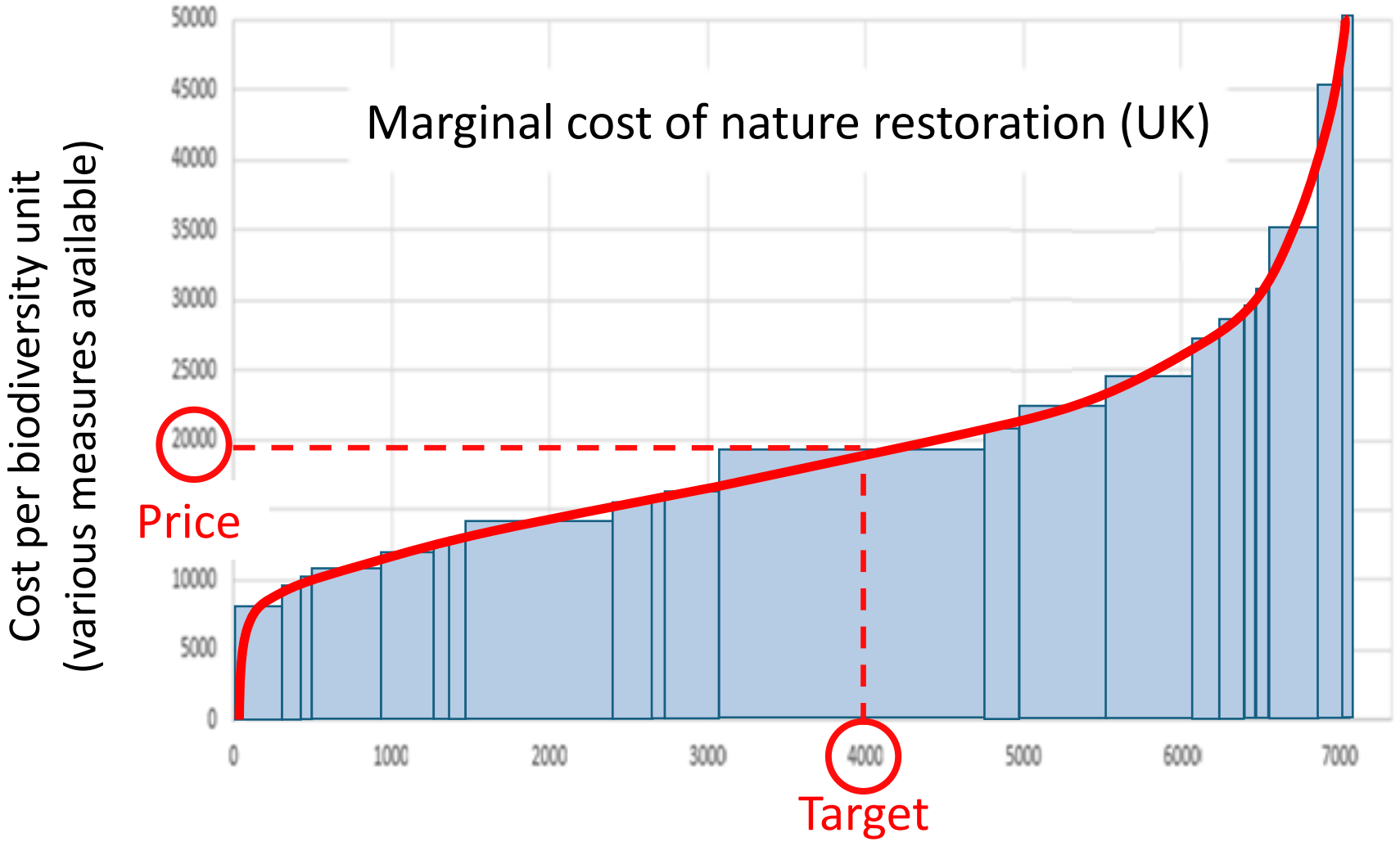
Incorporating biodiversity into economic decisions



Restoration technologies and locations are ranked from cheapest (on left) to most expensive (on right) per unit increase in biodiversity

This gives the costs per unit increase in biodiversity

Incorporating biodiversity into economic decisions



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Ecological expertise informs Government target

This dictates the biodiversity price for use in appraisals of Government decision making (both conservation and development projects)

Estimating the cost of nature restoration in practice

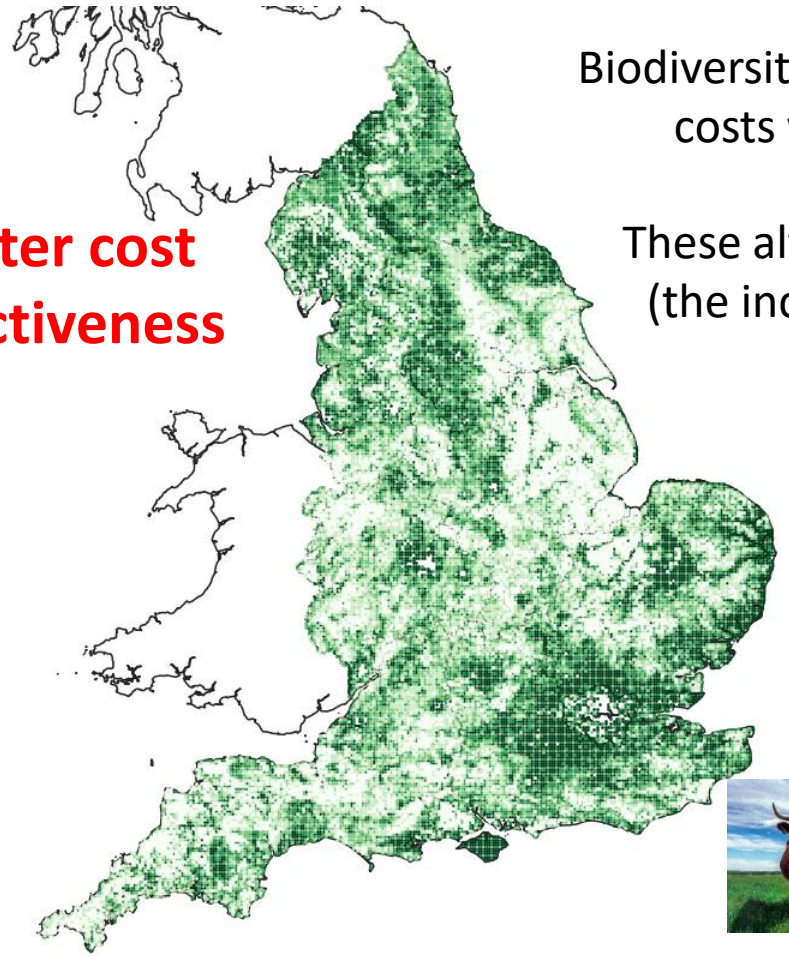
Two approaches to providing the biodiversity associated with semi natural grassland

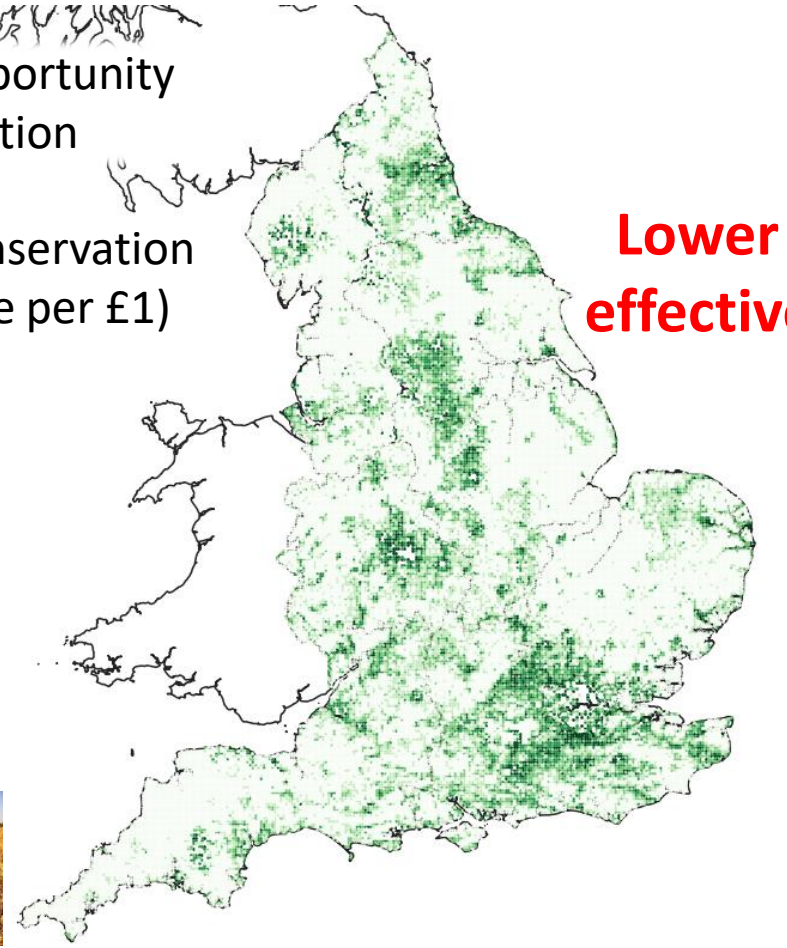
Biodiversity restoration outcomes and opportunity costs vary by both approach and location

These alter the cost effectiveness of conservation (the increase in biodiversity abundance per £1)

Better cost effectiveness

Lower cost effectiveness



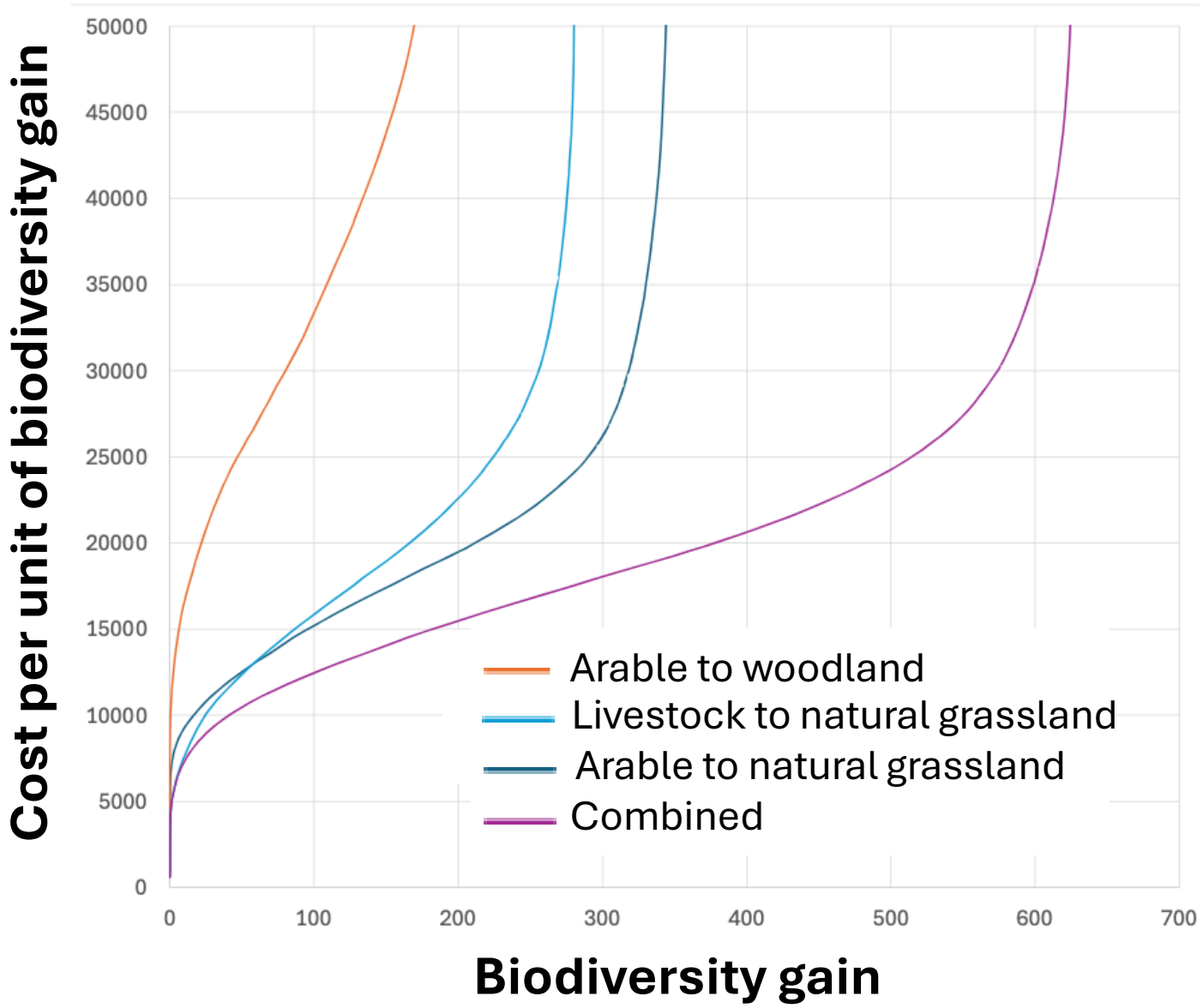


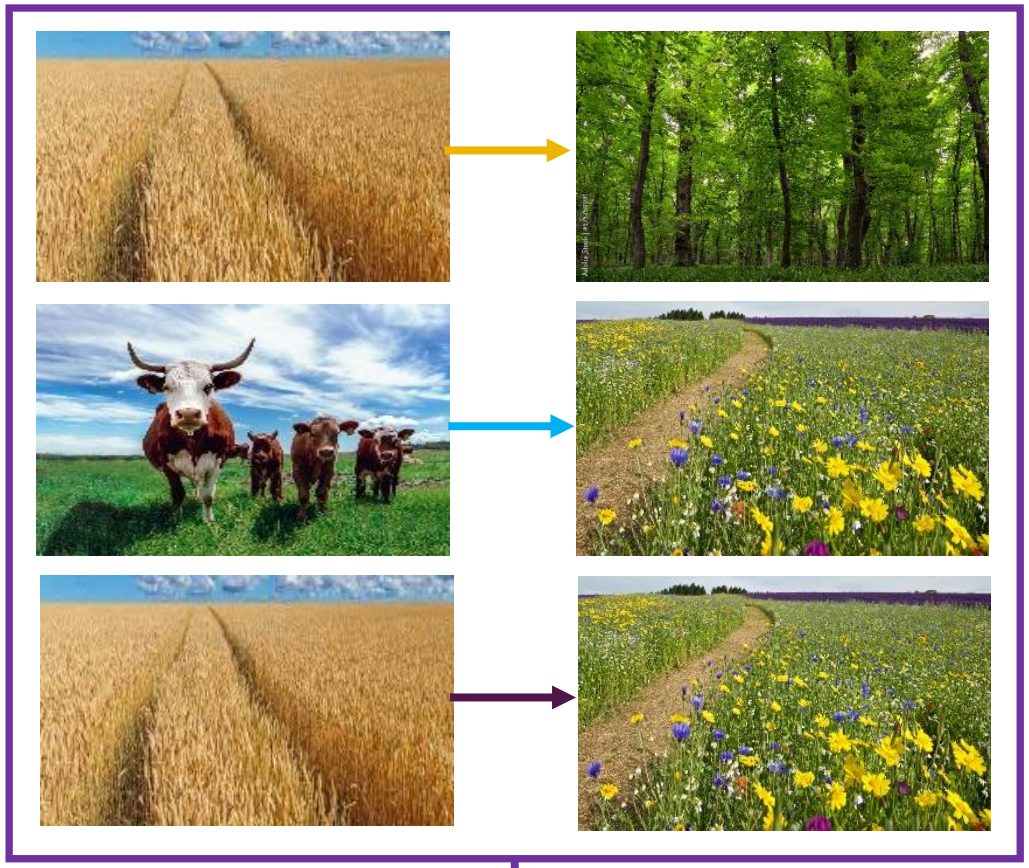
- **Better cost effectiveness per ha/yr**
- **Lower cost effectiveness per ha/yr**

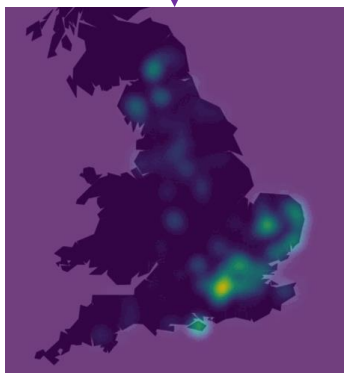
Converting livestock farmland to semi natural grassland

Converting arable farmland to semi natural grassland

Cost curves for species richness gains across England







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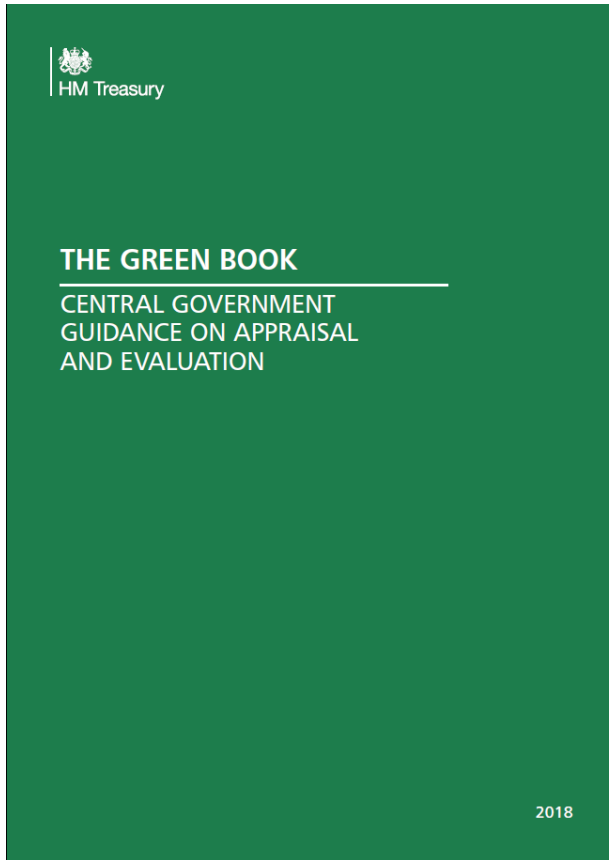

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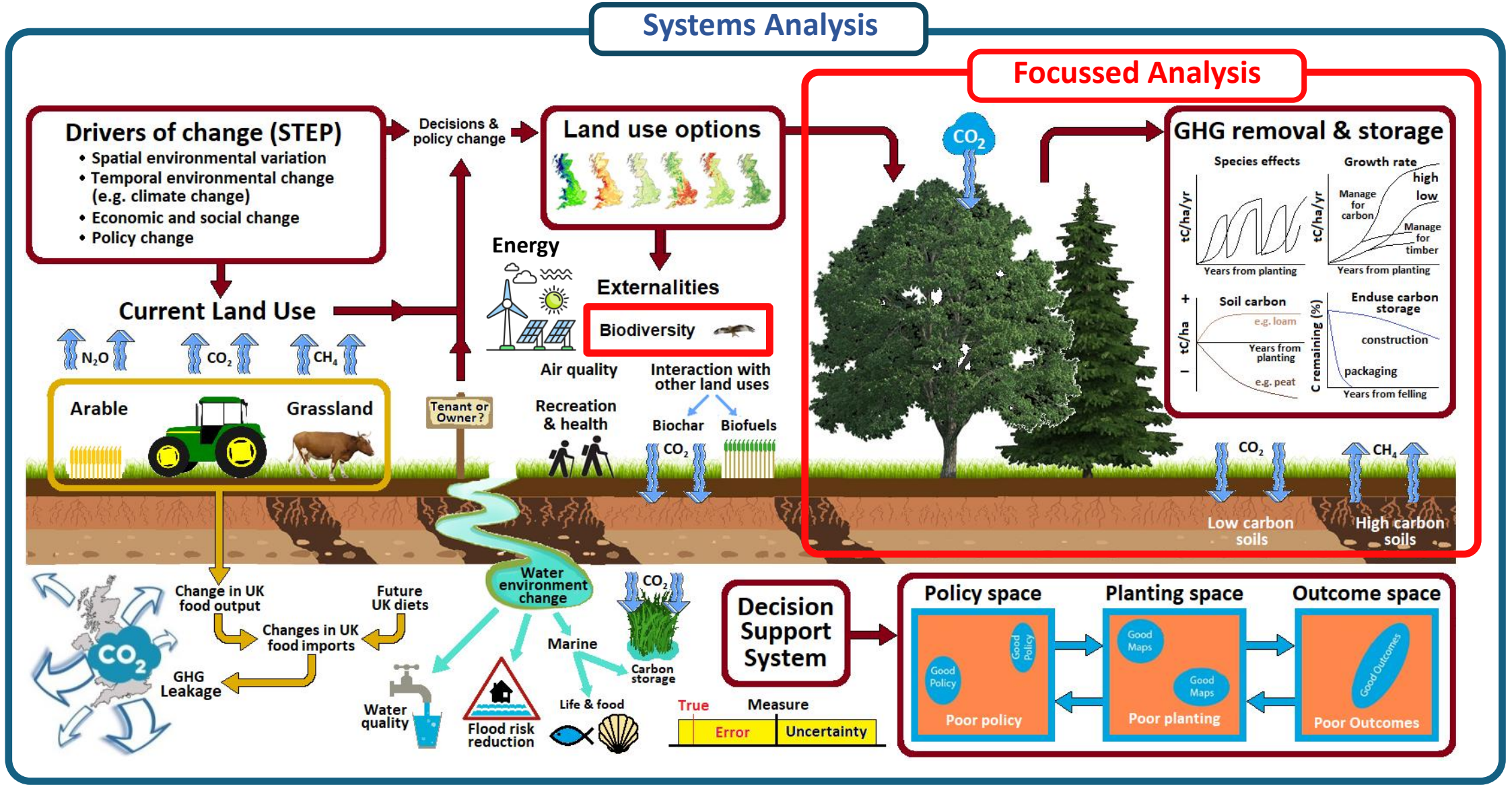
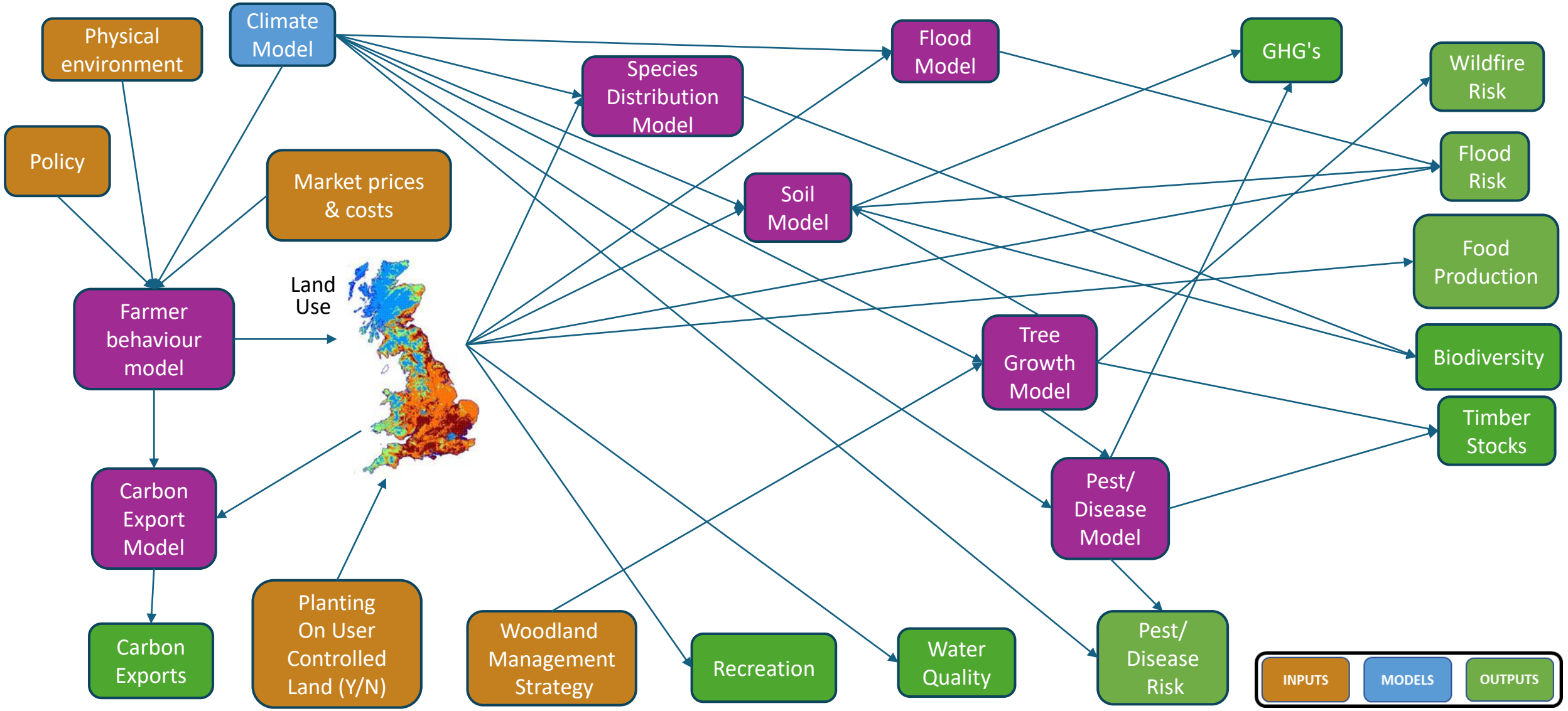
We cannot know if a policy is beneficial if we do not assess all of its effects



Analysing the full effects of change

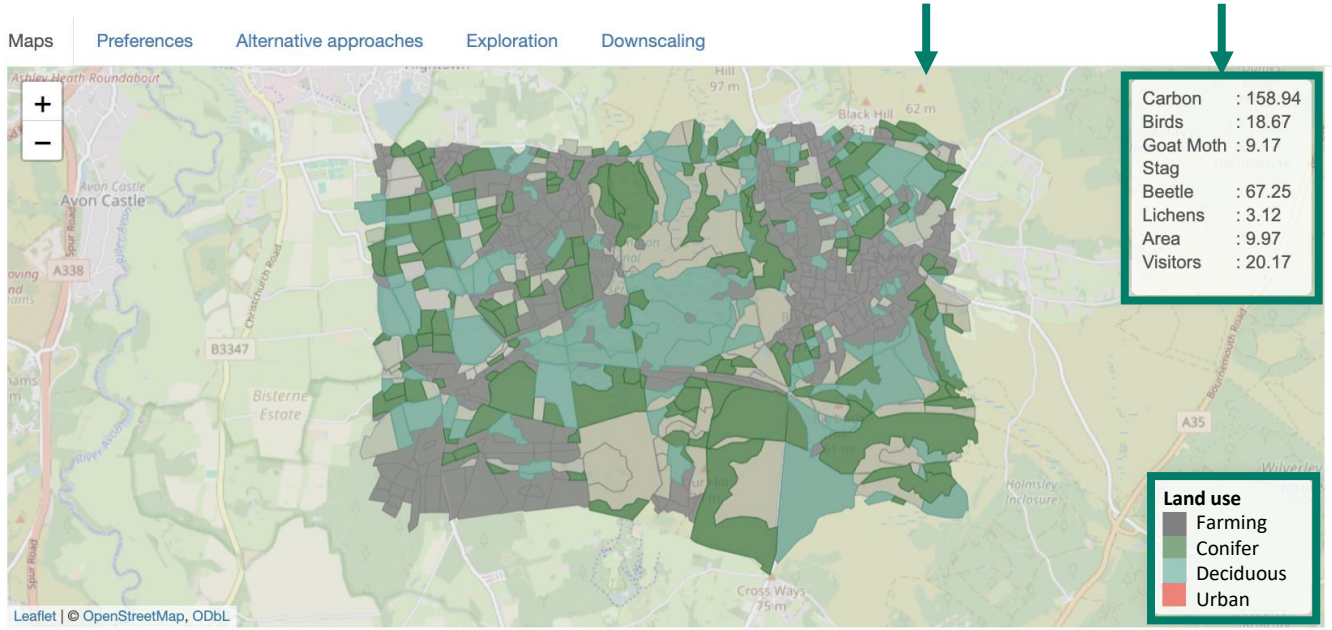
Connecting data, models and research to reveal the full effects of land use change impacts over space & time

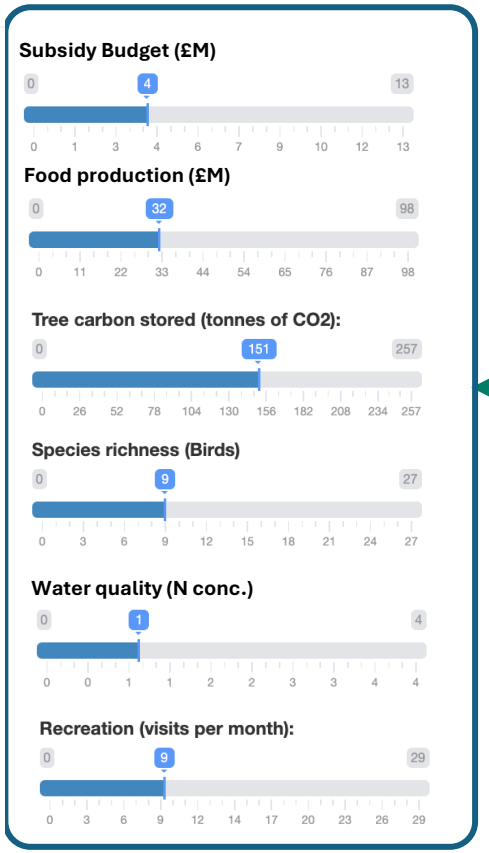


Turning research into decision support

Co-designed decision support systems

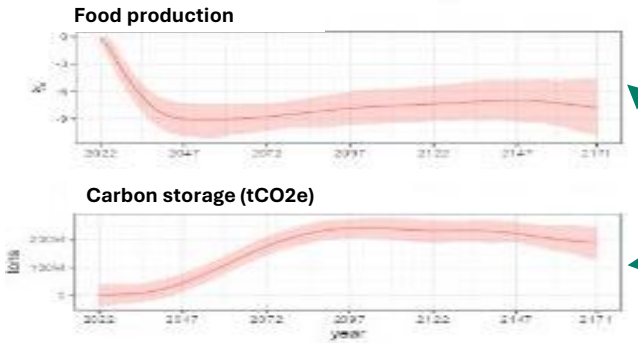
Decision support system identifies land use strategies which deliver desired outcomes





The decision maker selects outputs of interest and uses sliders to set budget and desired targets for food, carbon, water, biodiversity, recreation, etc

Year slider



Outcomes achieved p.a.: food, carbon, etc

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