



Systems approaches in agriculture and land use systems science in Scotland

Keith Matthews, Kirsty Blackstock, Matt Aitkenhead, Naomi, Beingessner, Alessandro Gimona, Mike Rivington, Hebe Nicholson

James Hutton Institute, Aberdeen.

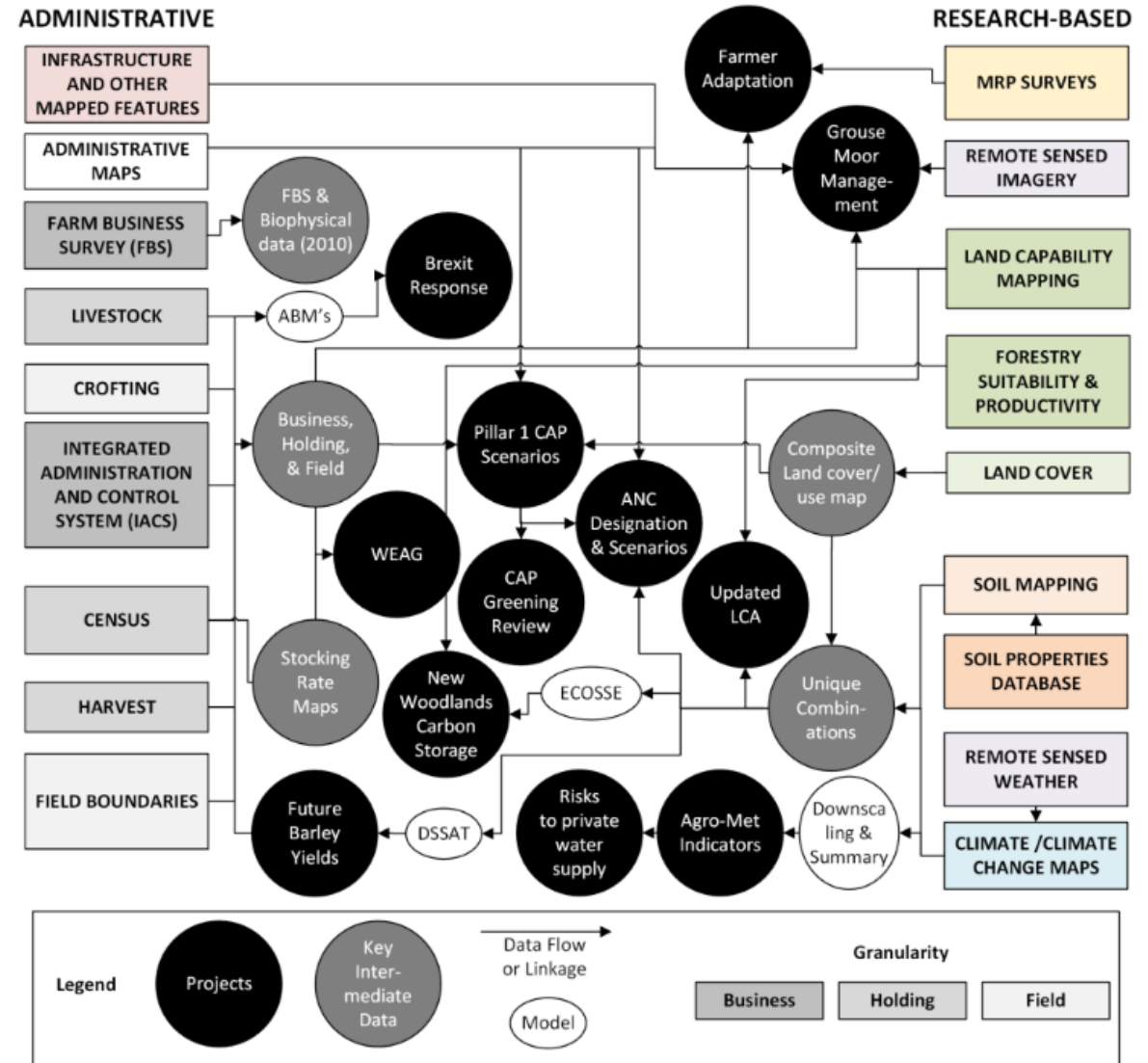
Systems Thinking workshop with Scottish Government, 28 January 2025, Online



The James
Hutton
Institute

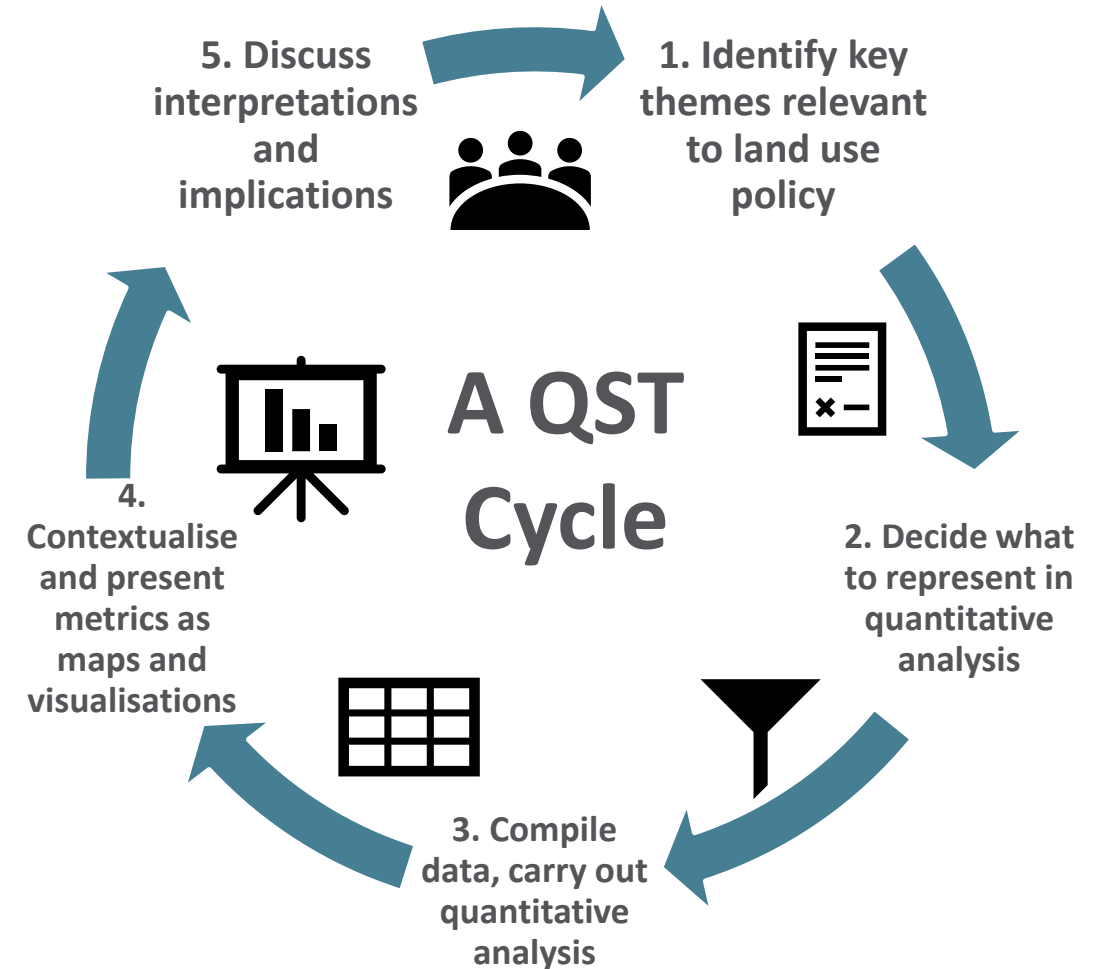
Background – land systems

- [Land systems team](#) @ Hutton
- Land use science – natural, social and computational sciences, see [Nexus Times](#), p85.
- From 1990's work on farm level [decision support](#)
- Integration of administrative and research-based data
 - Linking to modelling teams
 - Increasing engagement with SG policy teams and other stakeholders
- Systems based policy support, since 2008
- [Land Use Transformations](#) project



Operationalising systems thinking

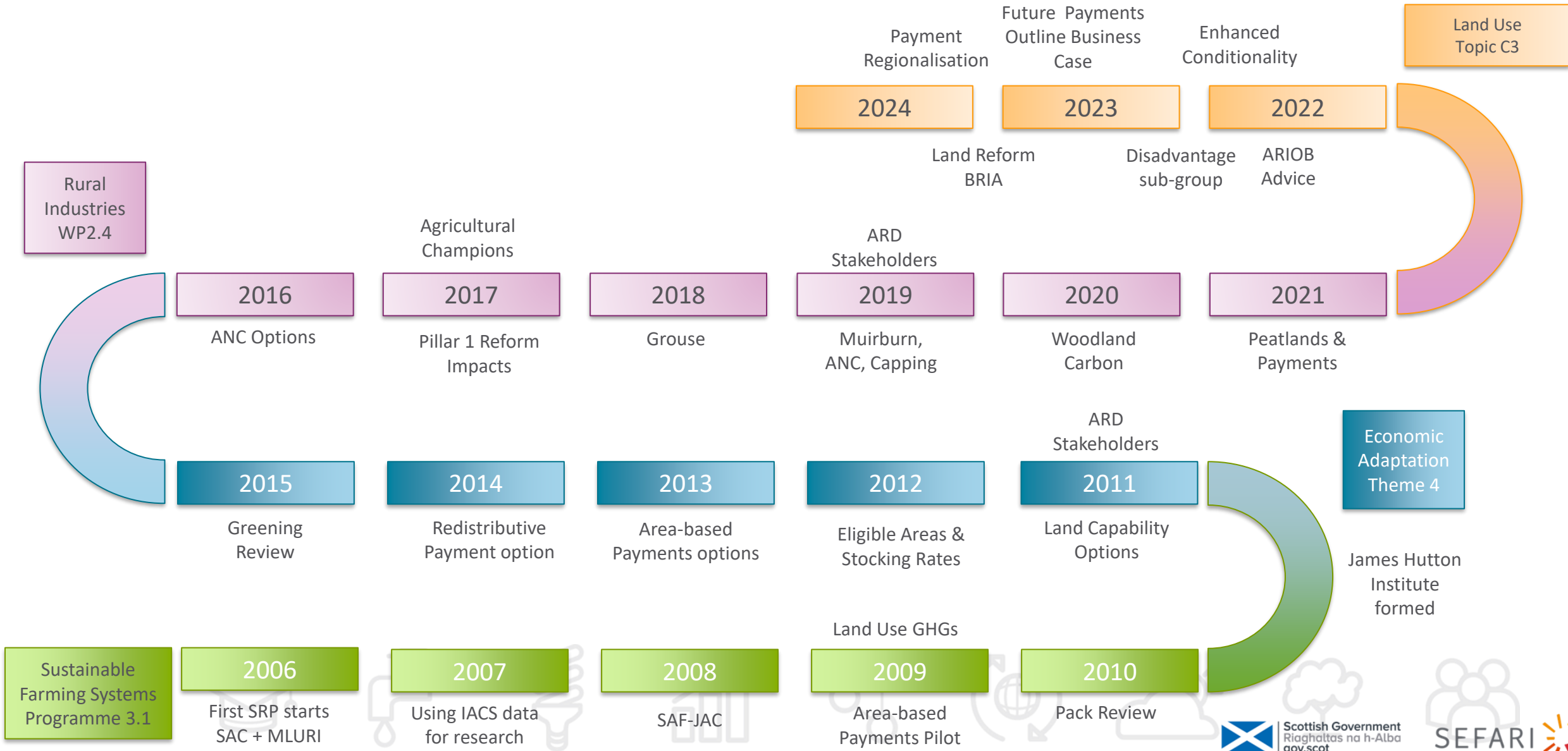
- To inform deliberations within Scottish Government, and between Scottish Government and stakeholders on future agriculture policy
- Quantitative Story Telling
 - A process for defining, undertaking and interpreting research with policy
 - 5-stages - cycles of analysis
 - Co-construction
 - Co-interpretation



See also Matthews et al 2023, [QST Methods briefing](#)



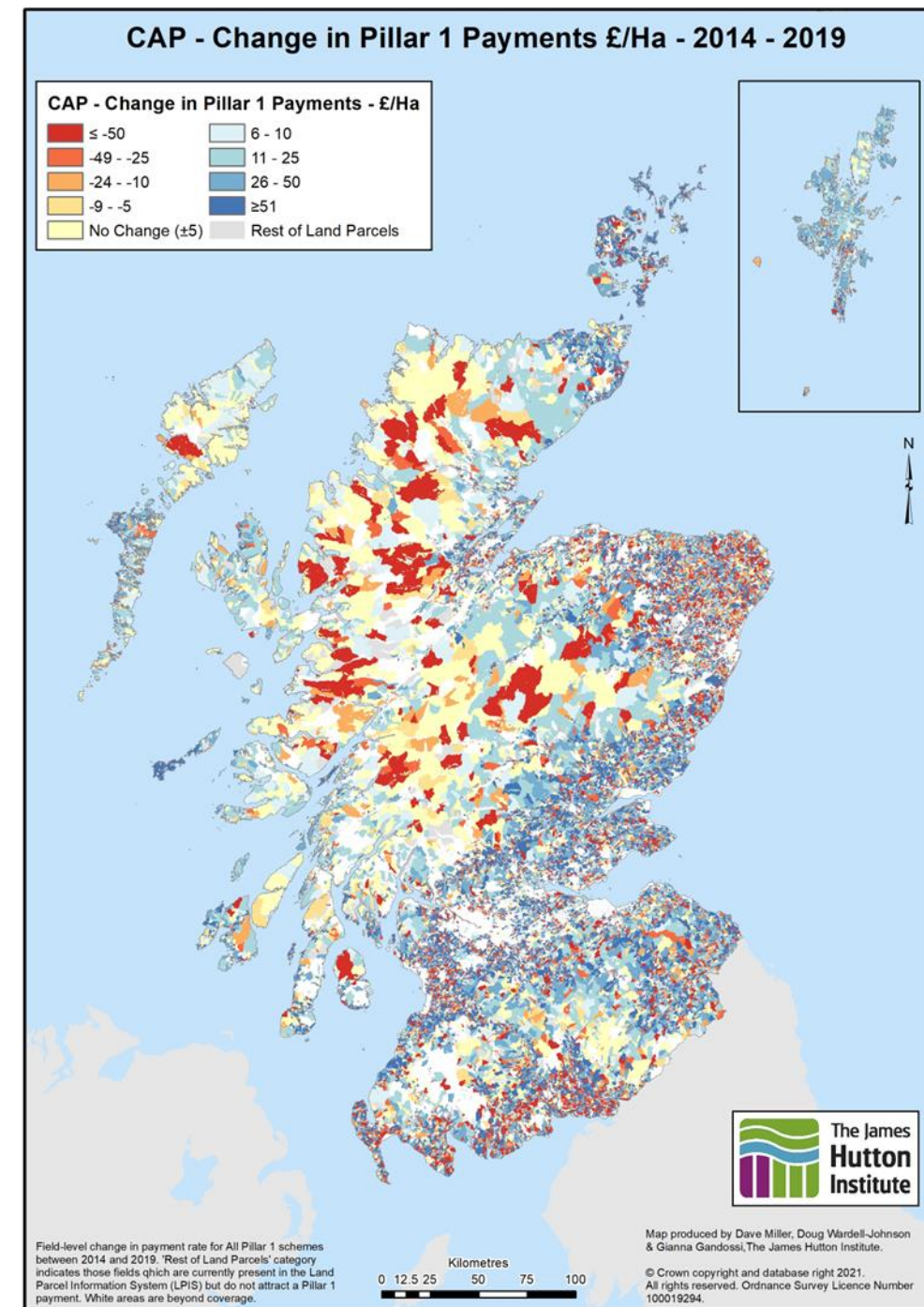
Timeline – evolution of policy supporting analyses



Types of Outputs

- Proactive and reactive
- Diagnostic – state of play
- Counter-factual - what-if, options
- Formats
 - Presenting – participating in deliberation
 - Reports, briefings, workshop handouts
 - Working papers, PowerPoint
 - Visualisations – relationships, flows
 - Static maps, story maps, interactive maps
 - Data for further analysis within Scottish Government (less often)
 - Models, apps, tools (rarely) – but see QST2

Map: Matthews *et al.* (2021) 2014 vs 2019 Pillar 1 and 2 payments comparisons for ARD stakeholders. Online, December 2021. <https://ics.hutton.ac.uk/research/land-systems-research-team/cap-analysis/cap-pillar-1-analysis/>



QST Monitoring and Evaluation

- Formalised evaluation of the QST processes
 - QST 1 – Enhanced Conditionality
 - QST 2 – Payment Regionalisation
- 360-degree review
 - Independent – non-QST staff
 - Available March 2025.
- Impacts framework
 - Awareness
 - Enduring Networks
 - Capacity Building
 - Instrumental Change
 - Conceptual Change

Metric	QST1	QST2
Meetings, Workshops, Documents & Interviews	42	53
Events	64	
Participants	113	
MRP researchers	25	

Delivering systems thinking

- **Strategic Research Programme**
 - Resources – data, methods, tools, time
 - Capability – knowledge, experience
 - Capacity – policy relevant/led
 - Credibility building
- **Underpinning Capacity**
 - Policy-led, “call-down” – co-construction
 - Salience shaping
 - Network building – analysts, officials, stakeholders
 - Knowledge elicitation
- **Contract Research Fund**
 - Policy-led: project based
 - Beyond MRP teams (e.g. Pareto Consulting)
- **Platform Funding**
 - Participation in UK and EU wide projects
 - Alternative policy options



Contact – Keith Matthews, The James Hutton Institute, Aberdeen, AB15 8QH,
Tel - +44 (0)1224 395271, Email – keith.matthews@hutton.ac.uk

Further research in the RESAS Strategic Research Programme 2022-27, in the [Land Use Transformations](#) (C3-JHI-1) and [Land Reform](#) (E3-JHI-1) projects.

Land Use Transformations - [Storymaps Collection](#), with [Land Use Change Scenarios](#), [Adding Farm Structure to Land Use Change](#), [Peatlands and Payments](#), [Updating Peatland Condition Mapping](#), [Updating Land Capability for Agriculture](#) and [Climatic Water Balance in Scotland](#).

Website for [Agrometeorological Indicators](#) across the UK under current and future conditions.

The [Review of Land Ownership Data in Scotland](#).

Previous related analyses are from the Hutton Land Systems Research Team website - <https://ics.hutton.ac.uk/research/land-systems-research-team/>

The sets of slides and maps generated in Agriculture Policy analysis from 2010 onwards are available from - <https://ics.hutton.ac.uk/research/land-systems-research-team/cap-analysis/>

For woodland expansion analysis see - [online mapping](#) and [paper](#).

The James Hutton Institute is supported by the Scottish Government's Rural and Environment Science and Analytical Services Division (RESAS)

