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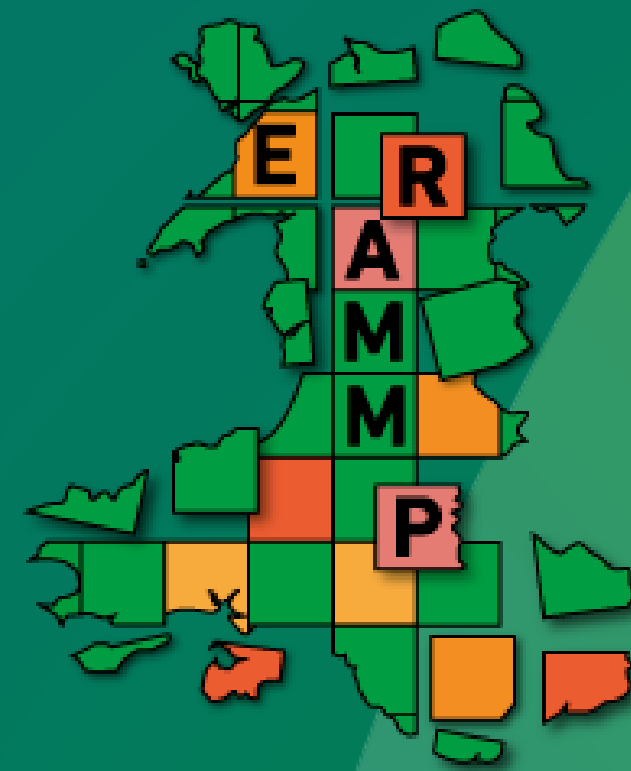
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UK Centre for
Ecology & Hydrology

Land Use Modelling in Wales



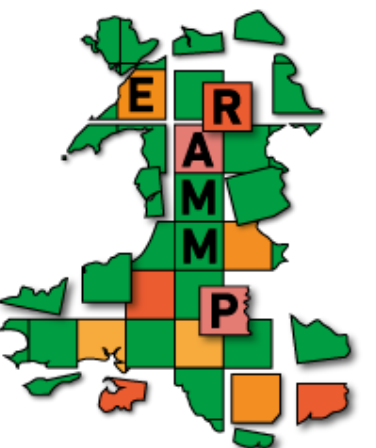
Bridget Emmett
UKCEH Bangor
Head of Soils and Land Use

April 2021

Why?

Lots of land use change is happening and this is expected to accelerate due to:

- Changes in the economics of agriculture sectors due to Brexit (e.g. fewer sheep; more chicken, pigs and dairy)
- Diet shifts (e.g. vegan)
- The need to reduce greenhouse gas emissions and protect water, air, soils and biodiversity (i.e. Net Zero plus)
- Public and government desire for more woodland to capture carbon and for many other benefits if done right.
- Climate change
- etc.



How do we do it?

We use skills across all UKCEH sites to do this work by:

Using models to explore 'possible futures' so government, business, charities and private land owners can understand the choices they have and what the impacts will be for jobs, food and biomass production, economics and the environment.

Then we monitor the change in land use, soils, air, water and biodiversity in real time so we can report if the change is what was hoped for and adapt if not.

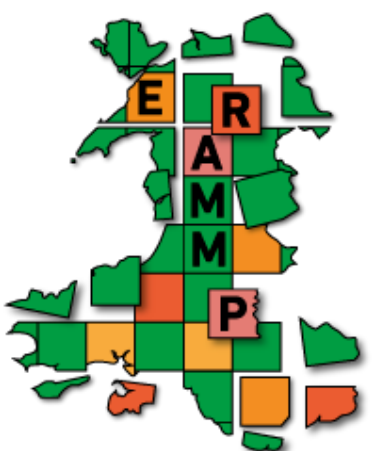
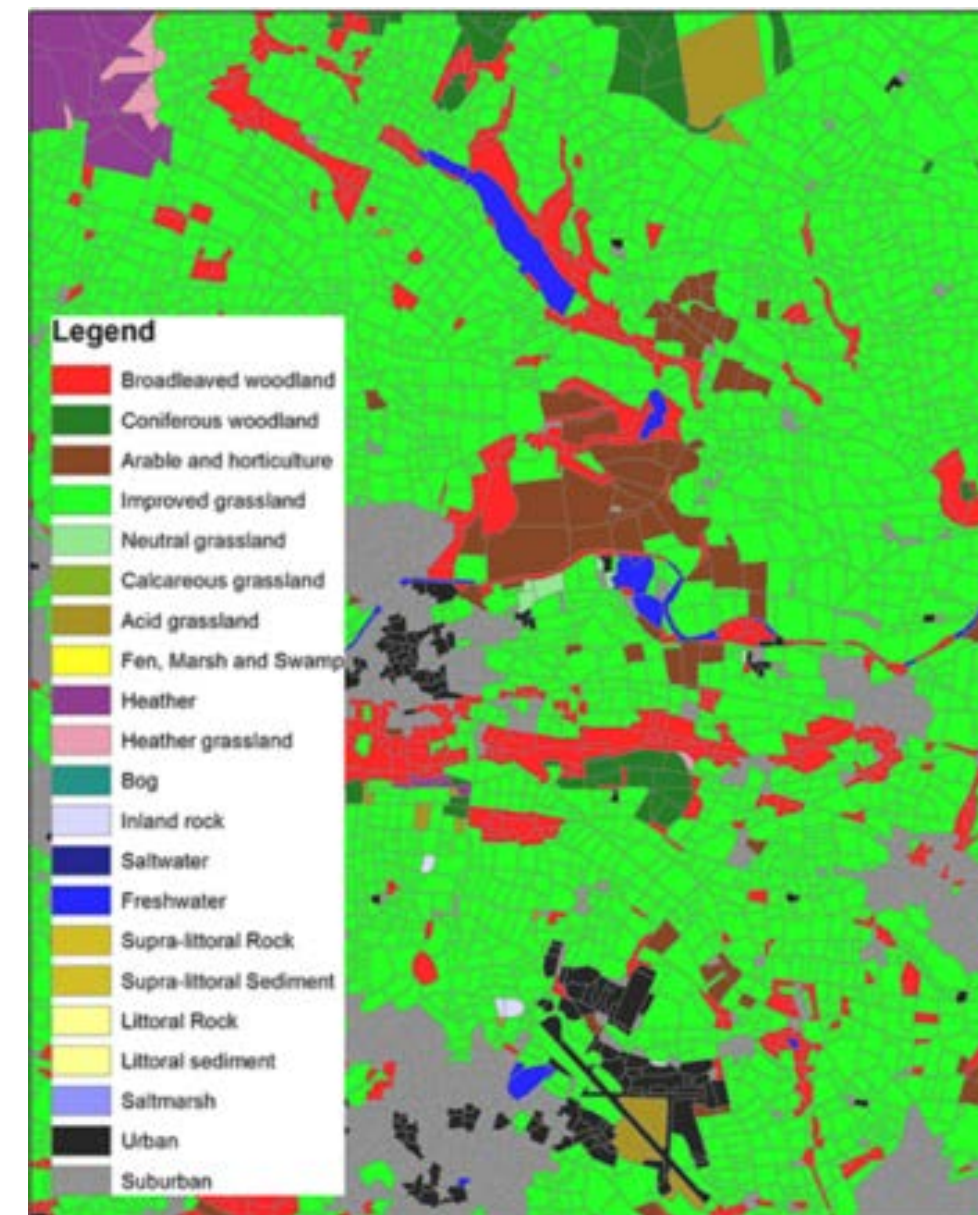


Modelling and monitoring

Should always go hand in hand as:

- No model is the 'truth'
- But neither is field-data as we can't sample everywhere for everything
- Satellites, i.e. Earth observation (EO), can only 'see' some things

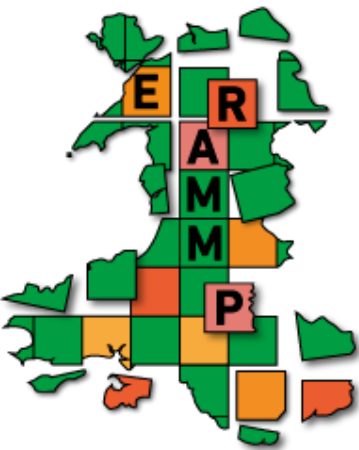
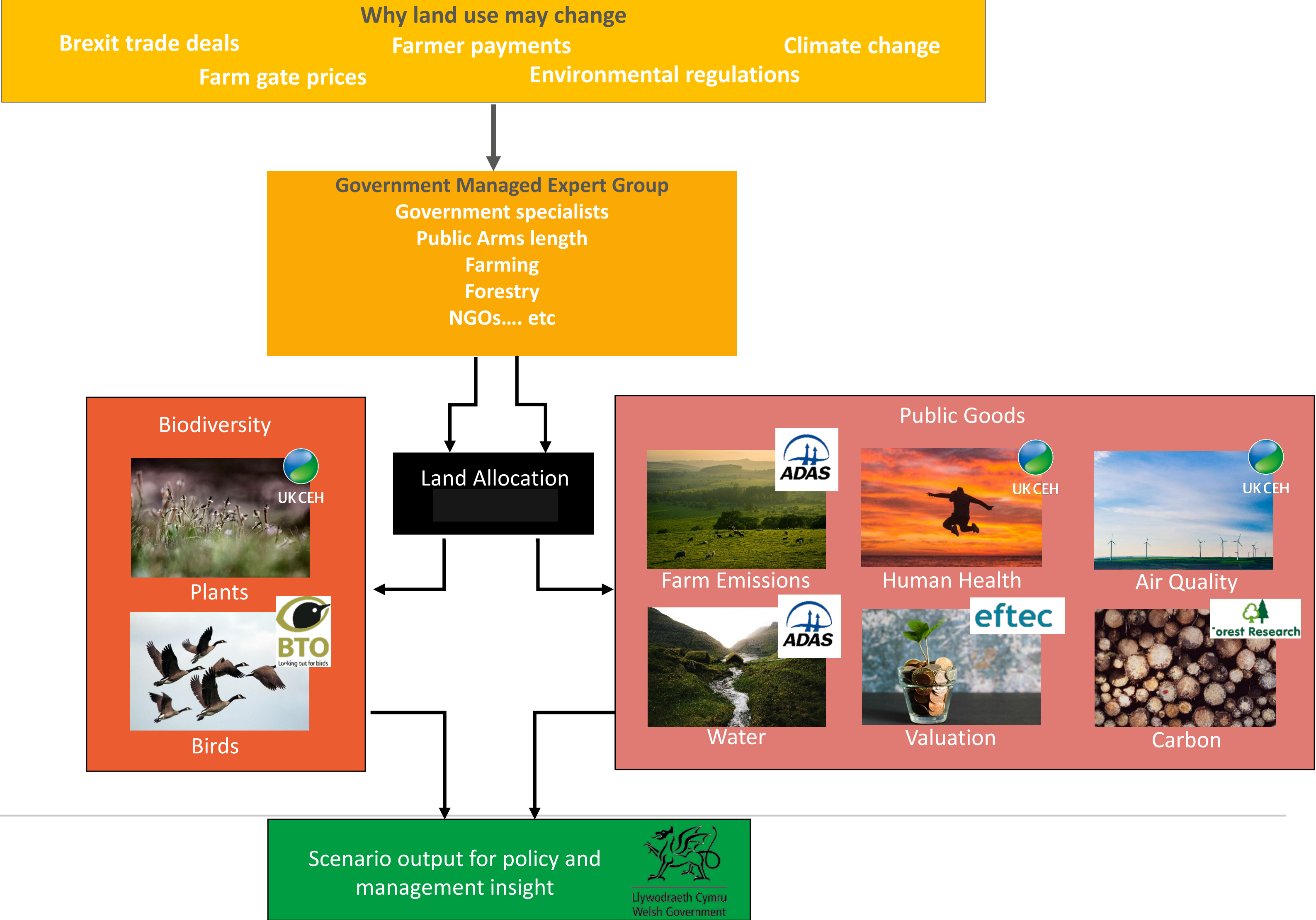
All together they constrain each other and also help us upscale and explore why things are changing.



The approach: Working with partners as a community leader and working fast!

Our Land Use modelling brings together industry standard models built by:

- UKCEH
- ADAS
- Forest Research
- BTO
- eftec
- Cranfield University

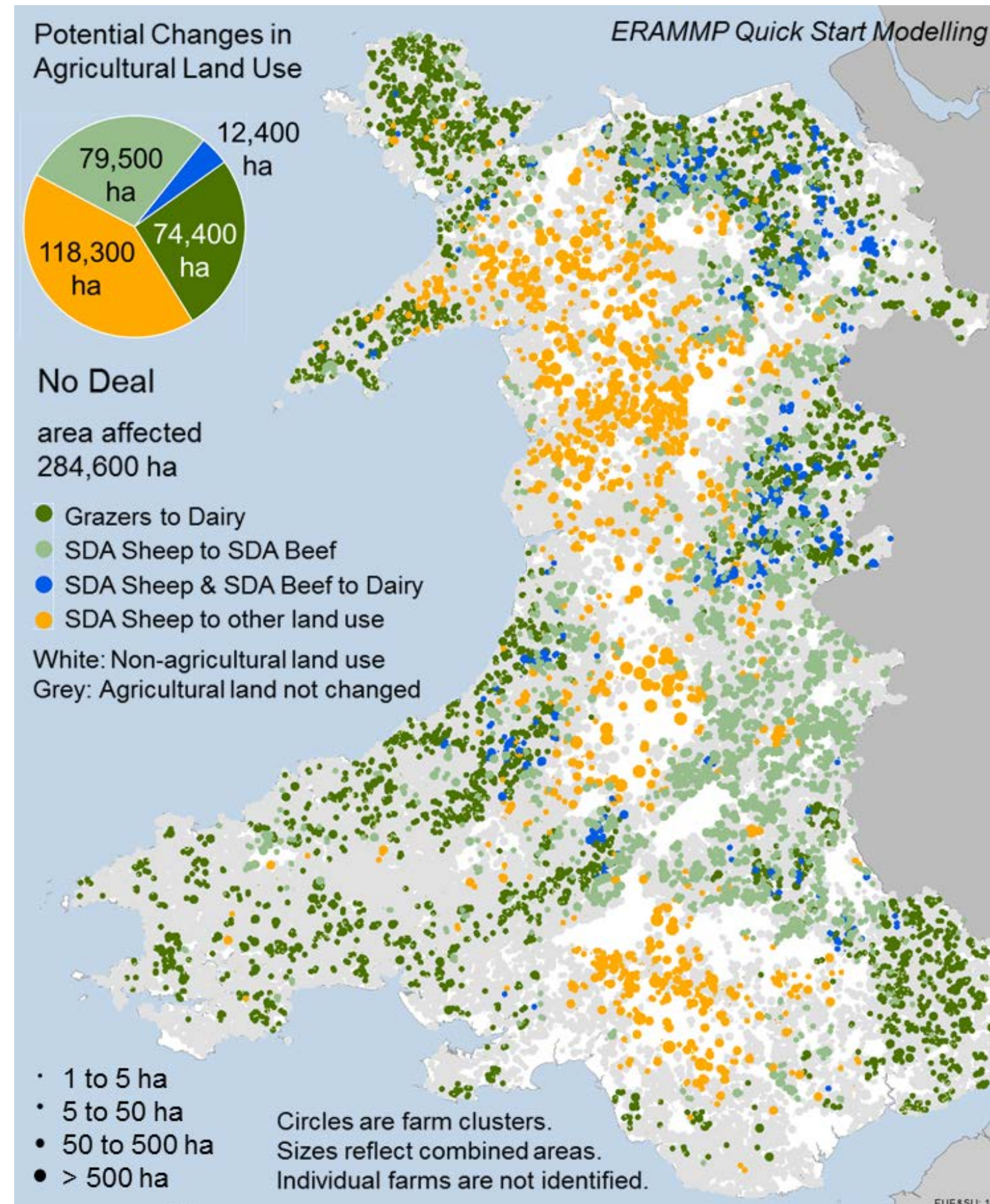


Rapid working to be in time for Brexit negotiations (< 1 year!)

Green/Blue = change between sectors e.g. sheep to dairy

Yellow/orange/red = land potentially out of agriculture

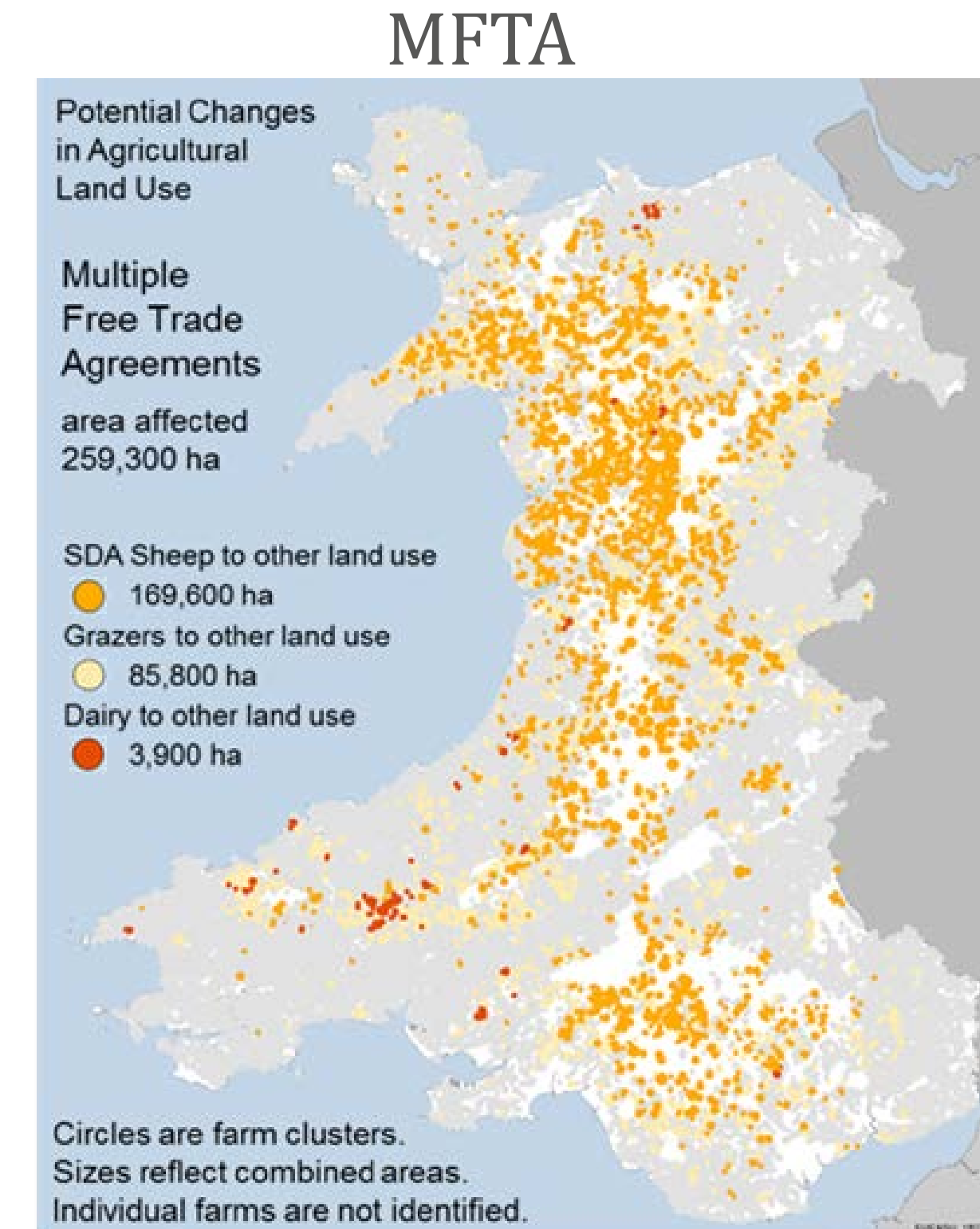
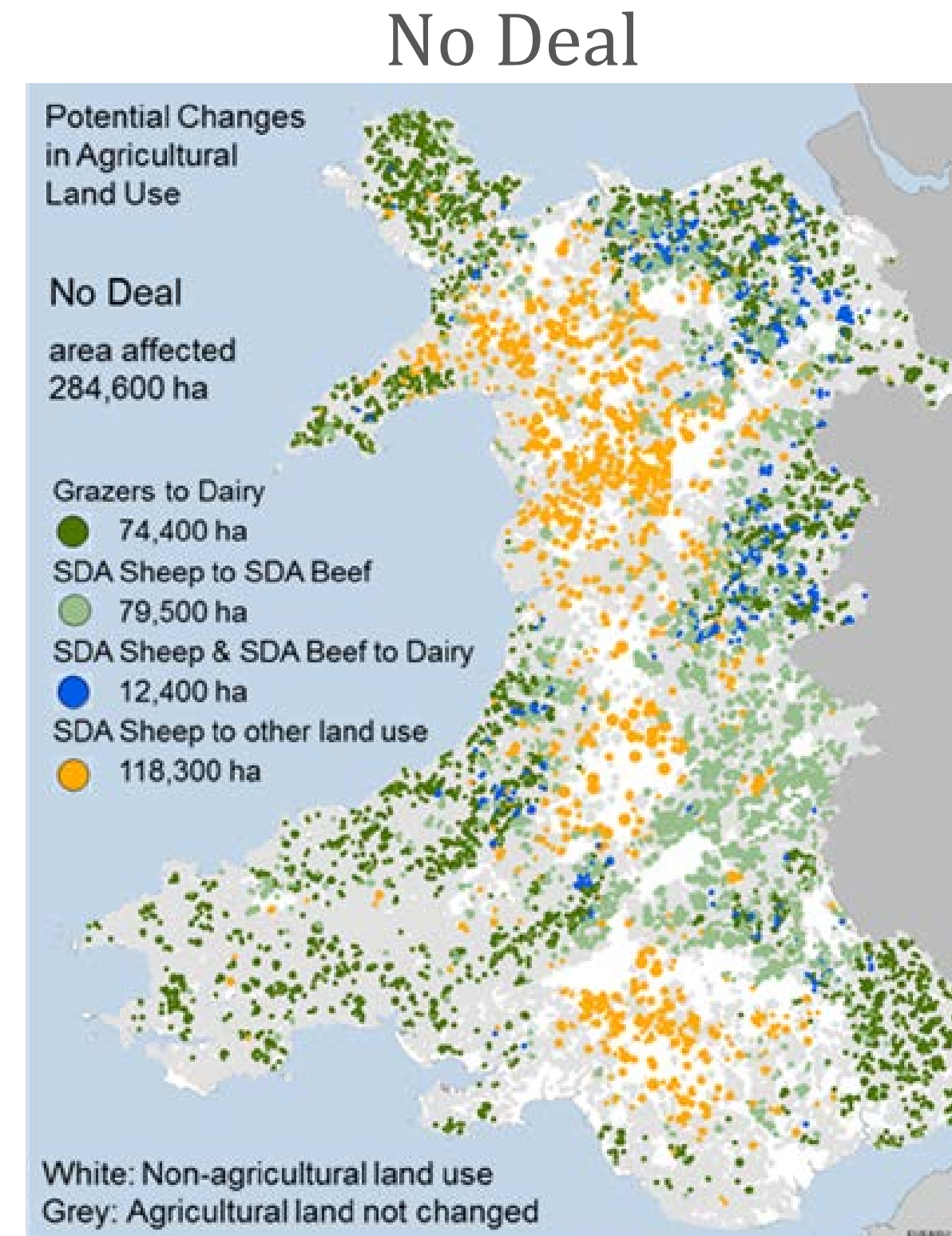
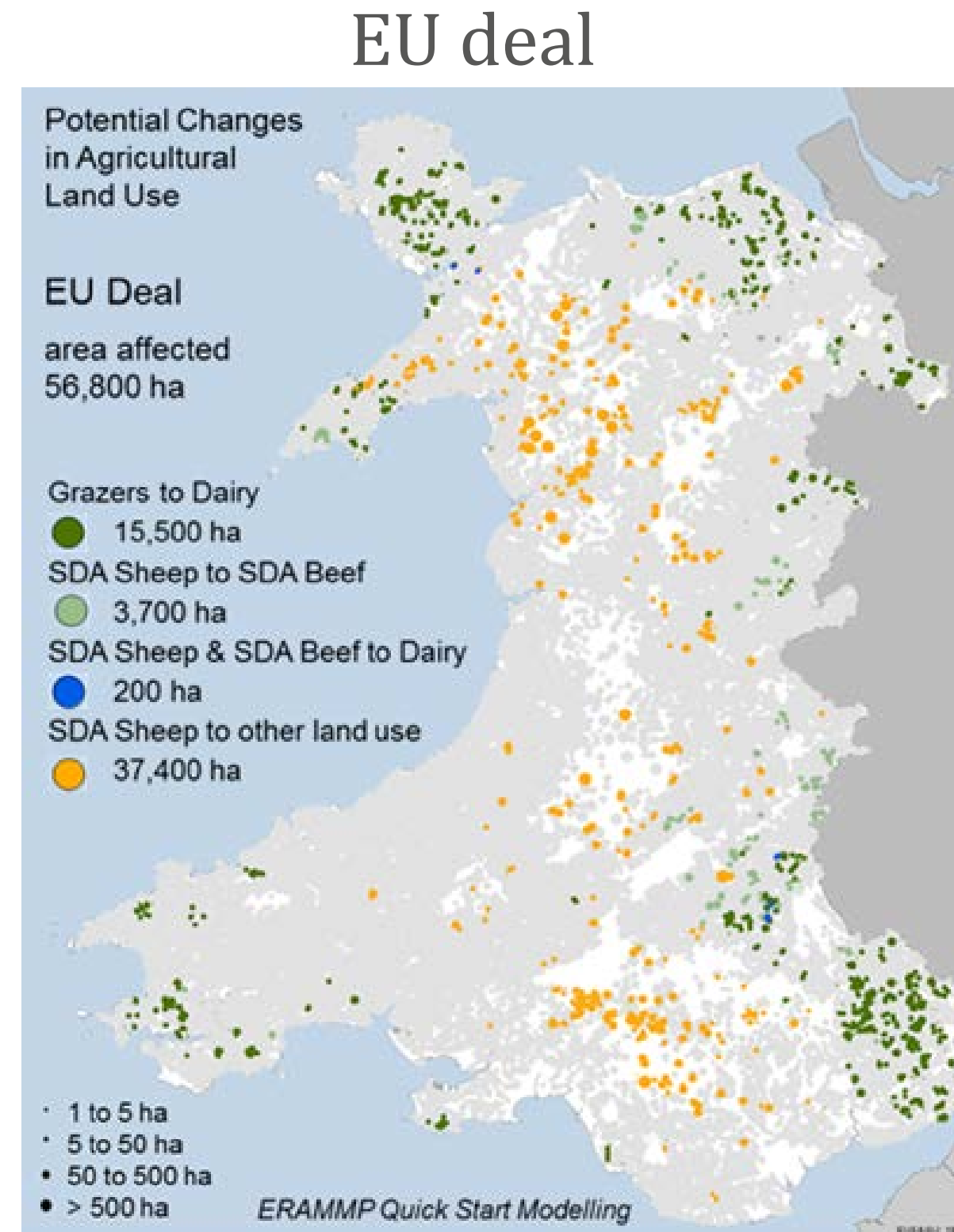
“No Deal” Scenario



Source: ERAMMP 'Quickstart' report : www.erammp.wales/12

Comparing trade deals

- Up to 15% of land out of agriculture – sheep industry most at risk – dairy benefitting.
- Up to 7000 jobs directly at risk.
- Environmental outcomes were highly spatially variable by region – many benefits (not ammonia due to dairy) but just exporting the footprint globally.
- Environmental economics were not ‘as expected’.



Source: ERAMMP 'Quickstart' report : www.erammp.wales/12

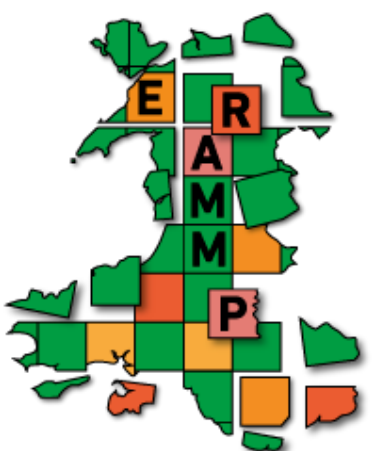
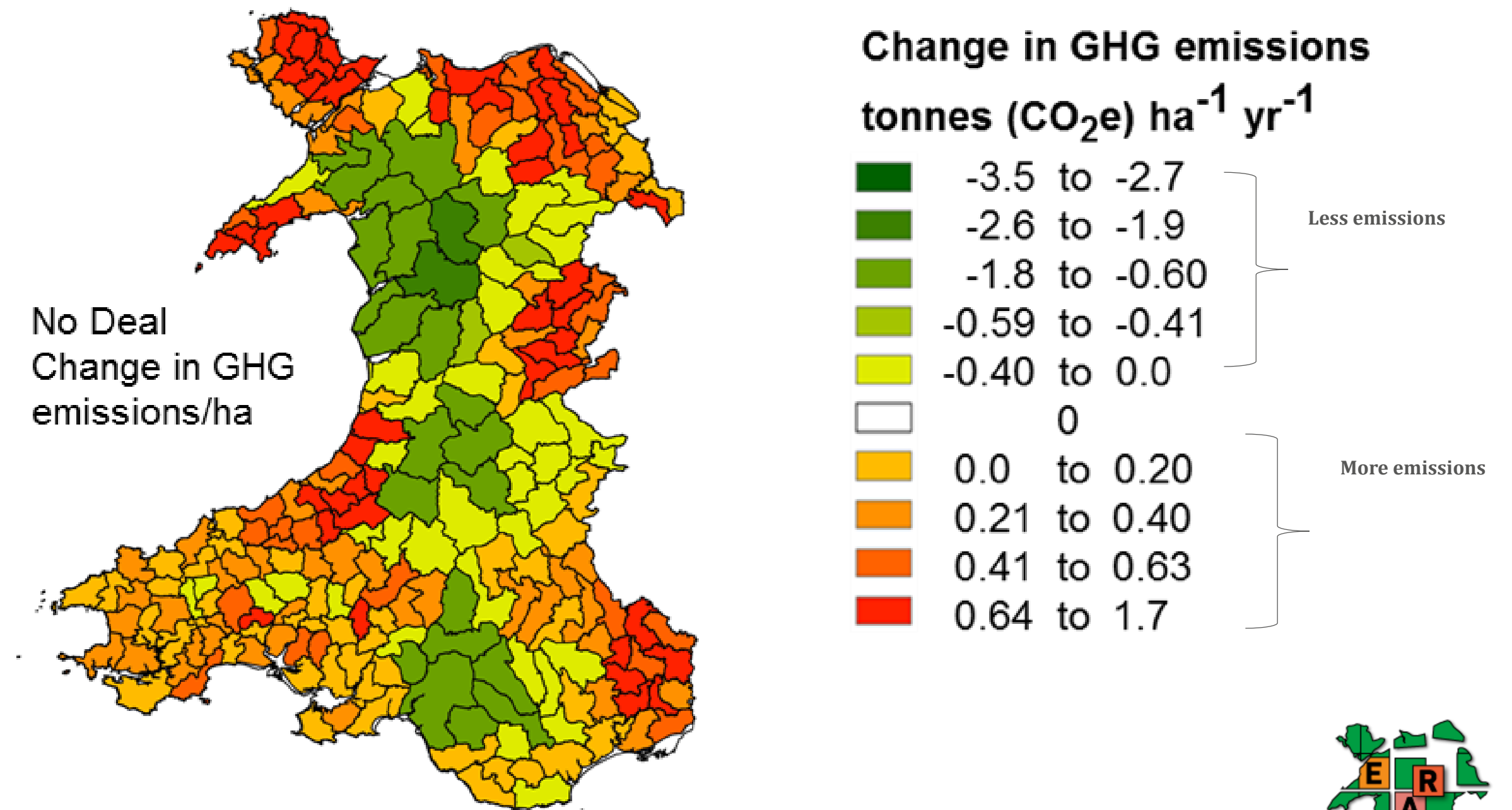
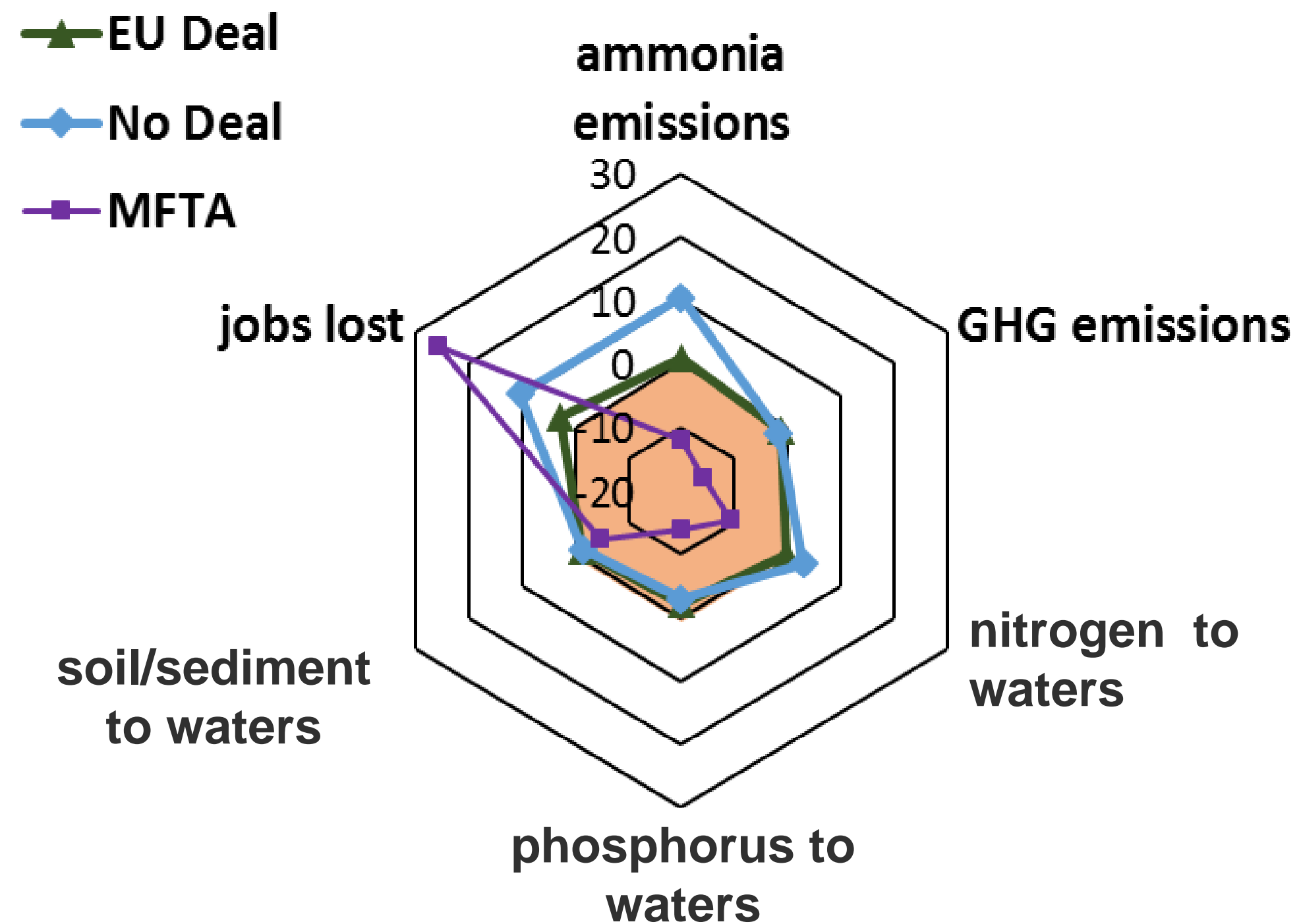
So what did we find?

Model outputs for air, water, biodiversity and farming jobs

EU Deal: Small impact on jobs and limited change in environmental impacts

No Deal: Loss of jobs and environmental impacts increase but very variable spatially

MFTA: Loss of jobs and environment improves but export of problems

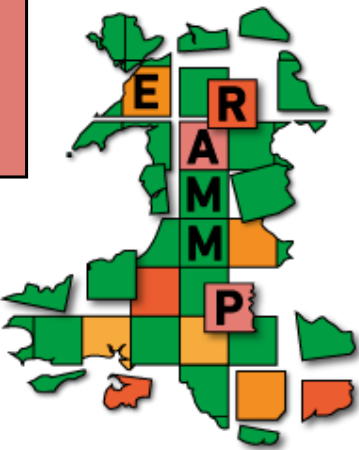
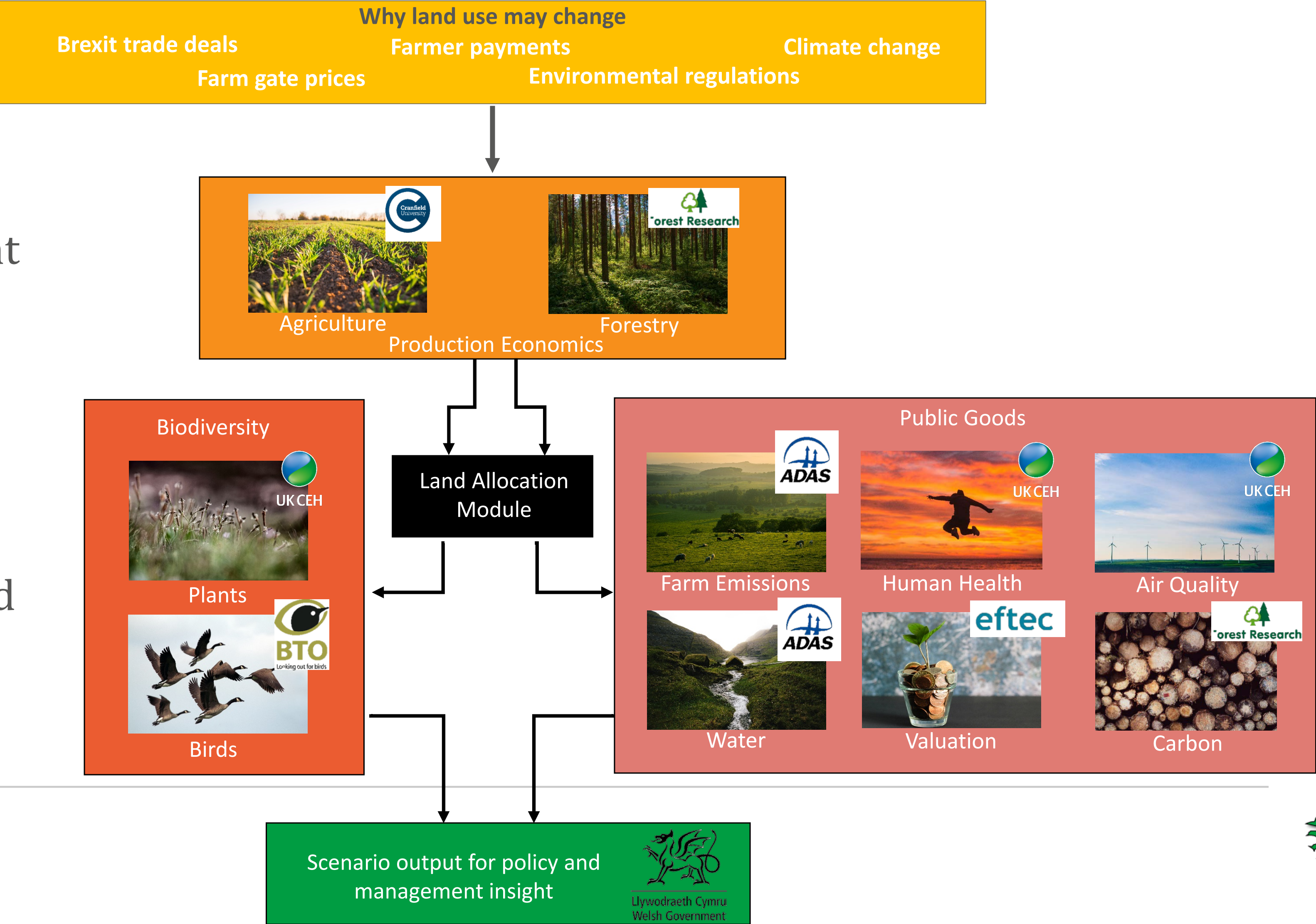


What next?

Now moved to a flexible dynamic modelling platform using 'rules' not experts to drive the land use change.

The ERAMMP Integrated Modelling Platform (IMP) is very flexible and now being used by the Welsh Government to test options for:

- Farmer payment schemes
- Planning of new national forest
- New regulations
- Decarbonisation of the land sector
- etc.



Thank you
Any questions?

