Yield and quality of food and feed in organic farming systems with and without livestock

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SRUC

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L'INSTITUT agro Rennes Angers

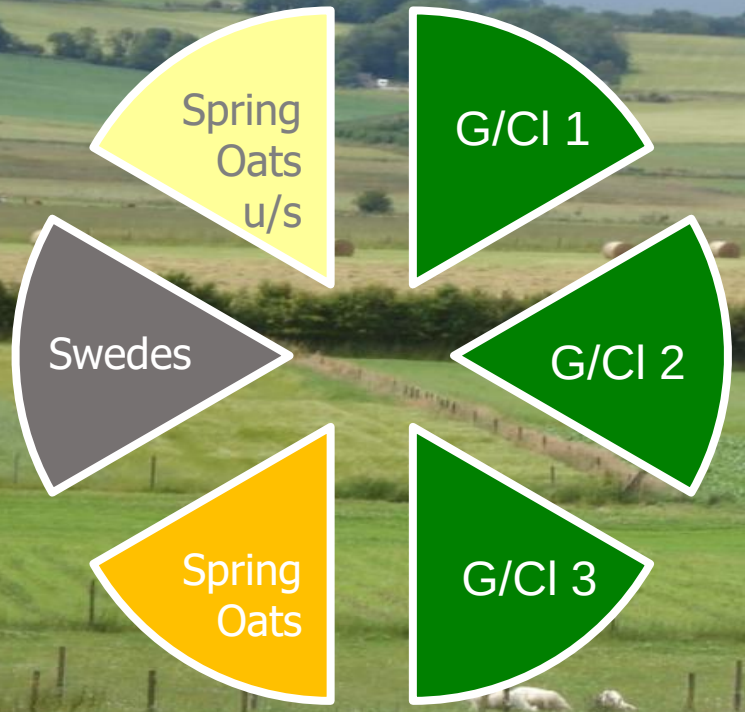
INRAE

esa EUROPEAN SOCIETY FOR AGRONOMY

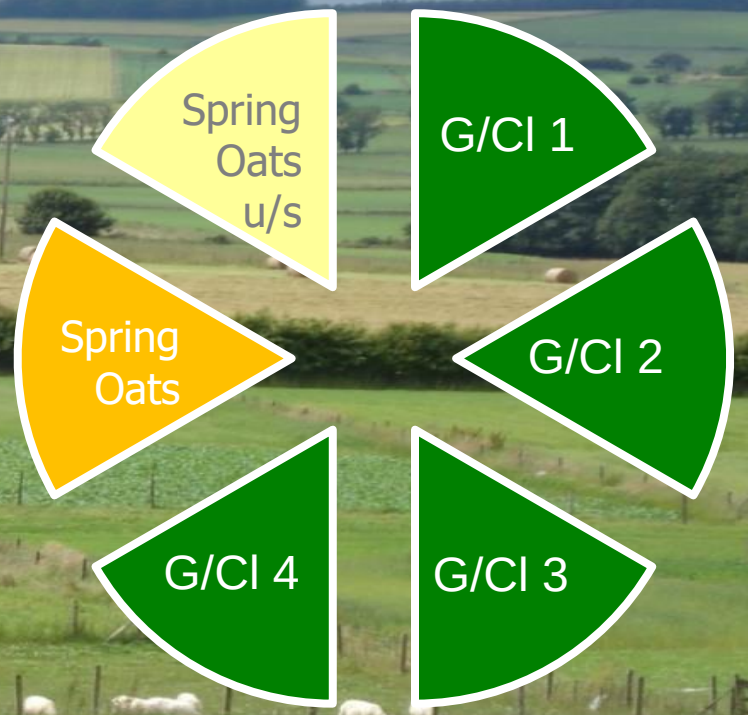
1990: The original question – what is the best rotation for an organic farm in North East Scotland?

A rotational trial or a system experiment…a rotational trial or a systems experiment….

T50

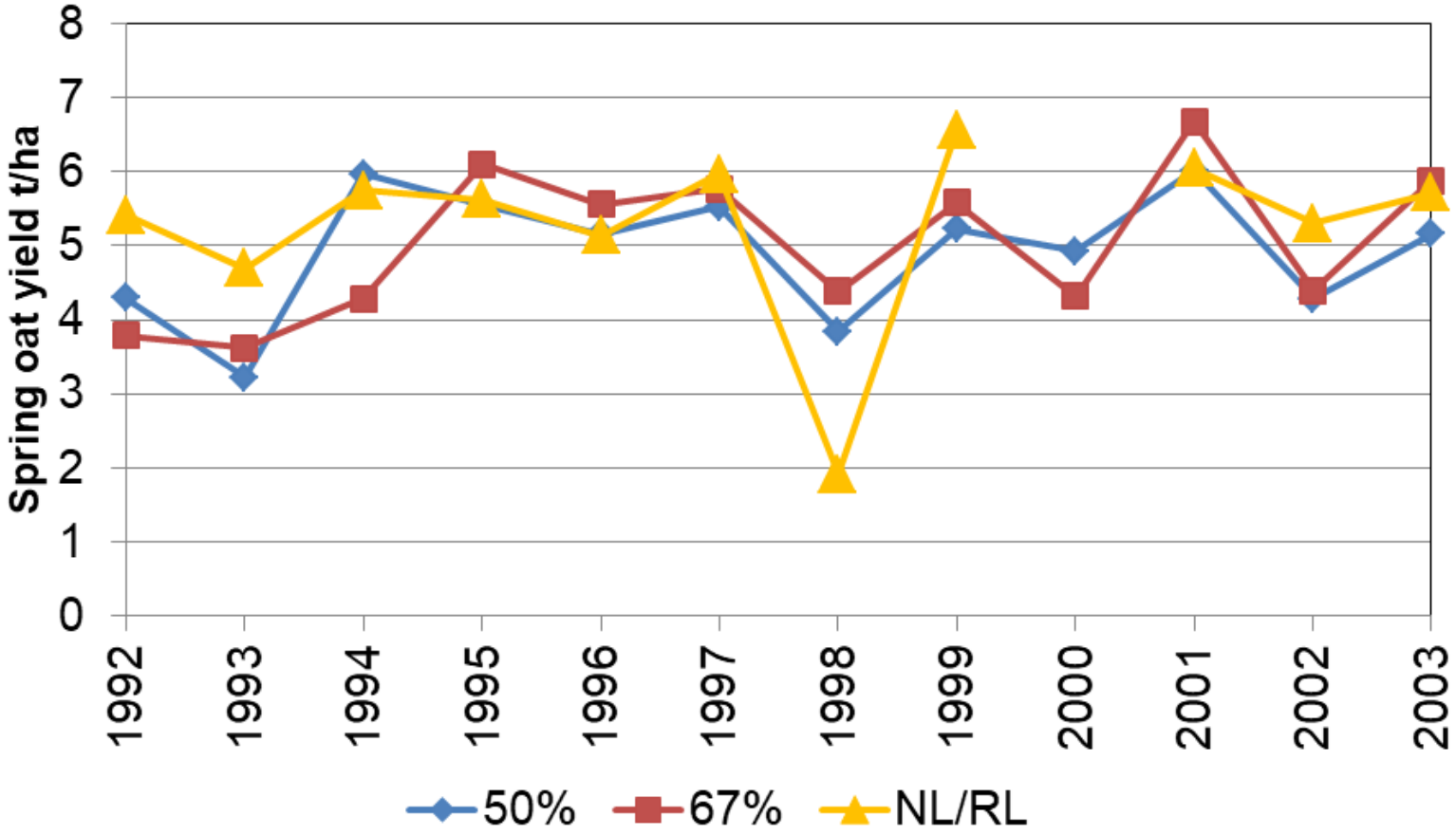


T67



Organic system Soil Association Standards
pH 6, LoI 9%

Yields of spring oats (Phase 1)



Watson et al. (2011). Organic Agriculture 1, 147-159.

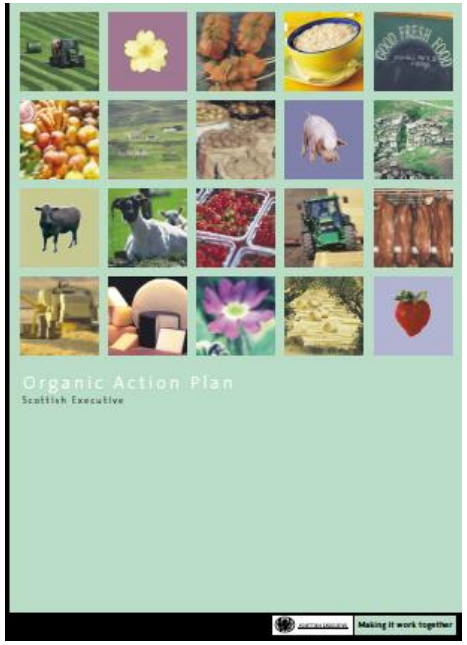
% loss on ignition soil (Phase 1)

Time for a change?

Cam.144, 435-447.

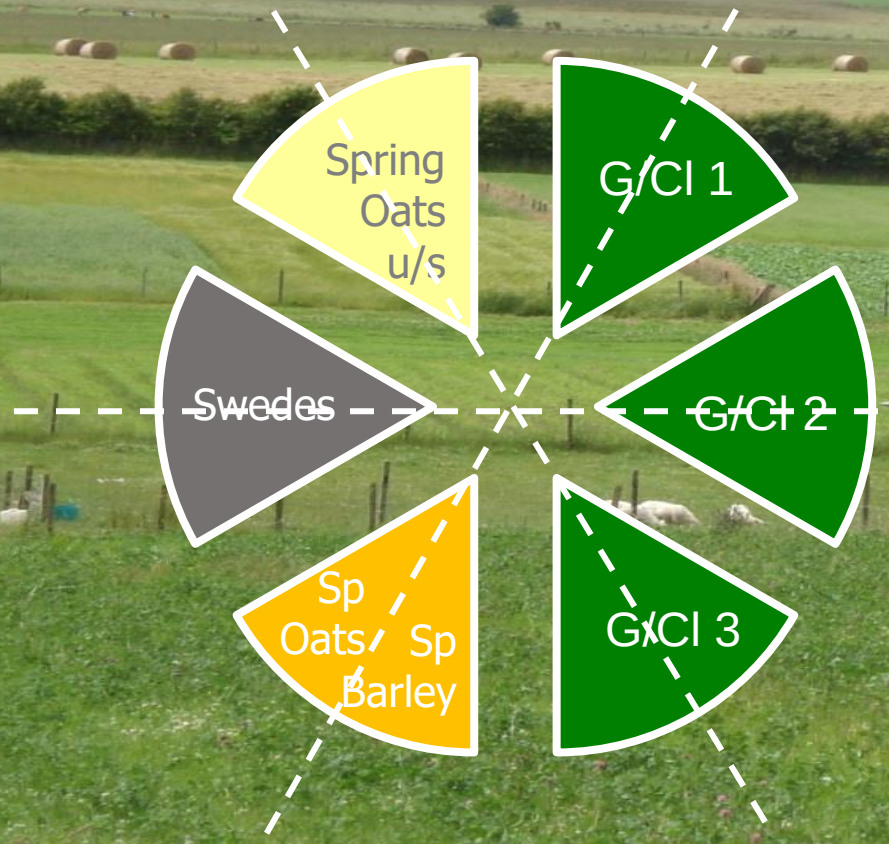
So, let’s think about redesign and co-design

- 2006
- Scottish Organic Action Plan supporting more arable production
- Participatory approach with researchers, farmers, advisors and certification body to redesign trial.

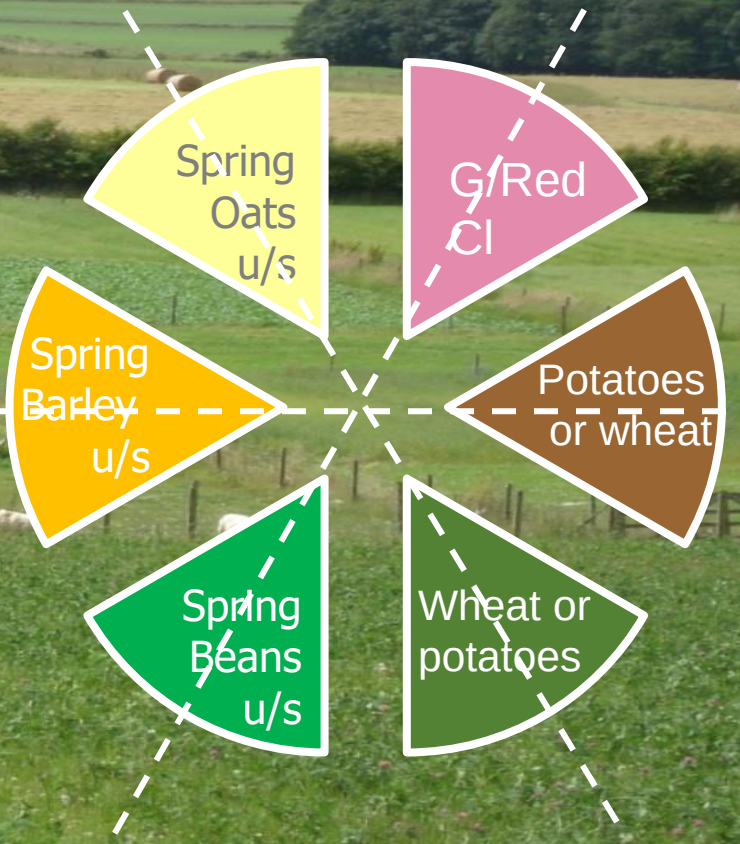


Tulloch Organic Rotation Phase 2

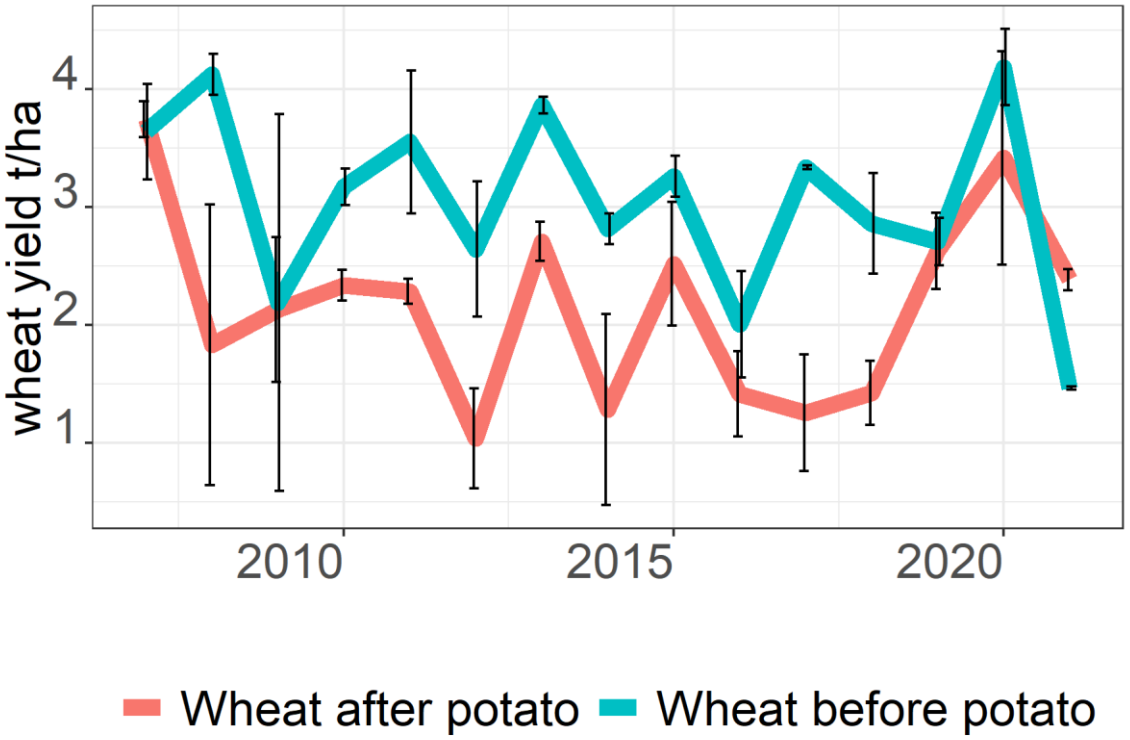
T50
1991-date



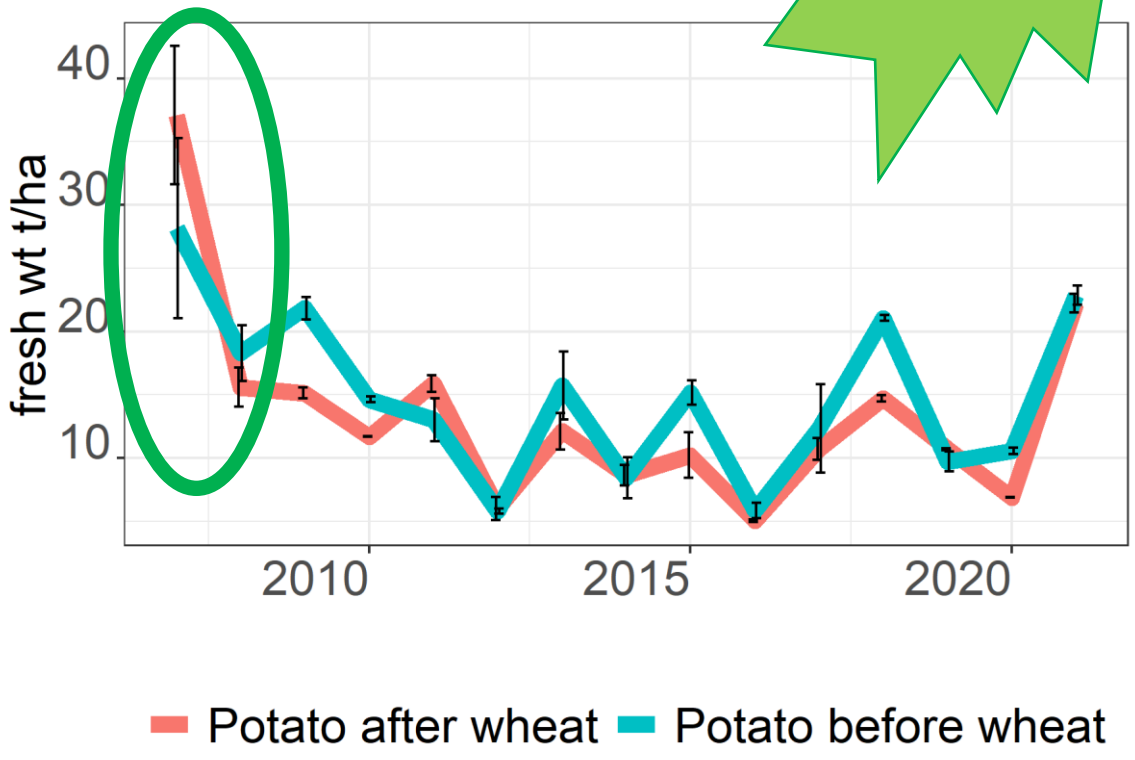
Stockless
2007-2022



Crop sequence effects on yield – Phase 2

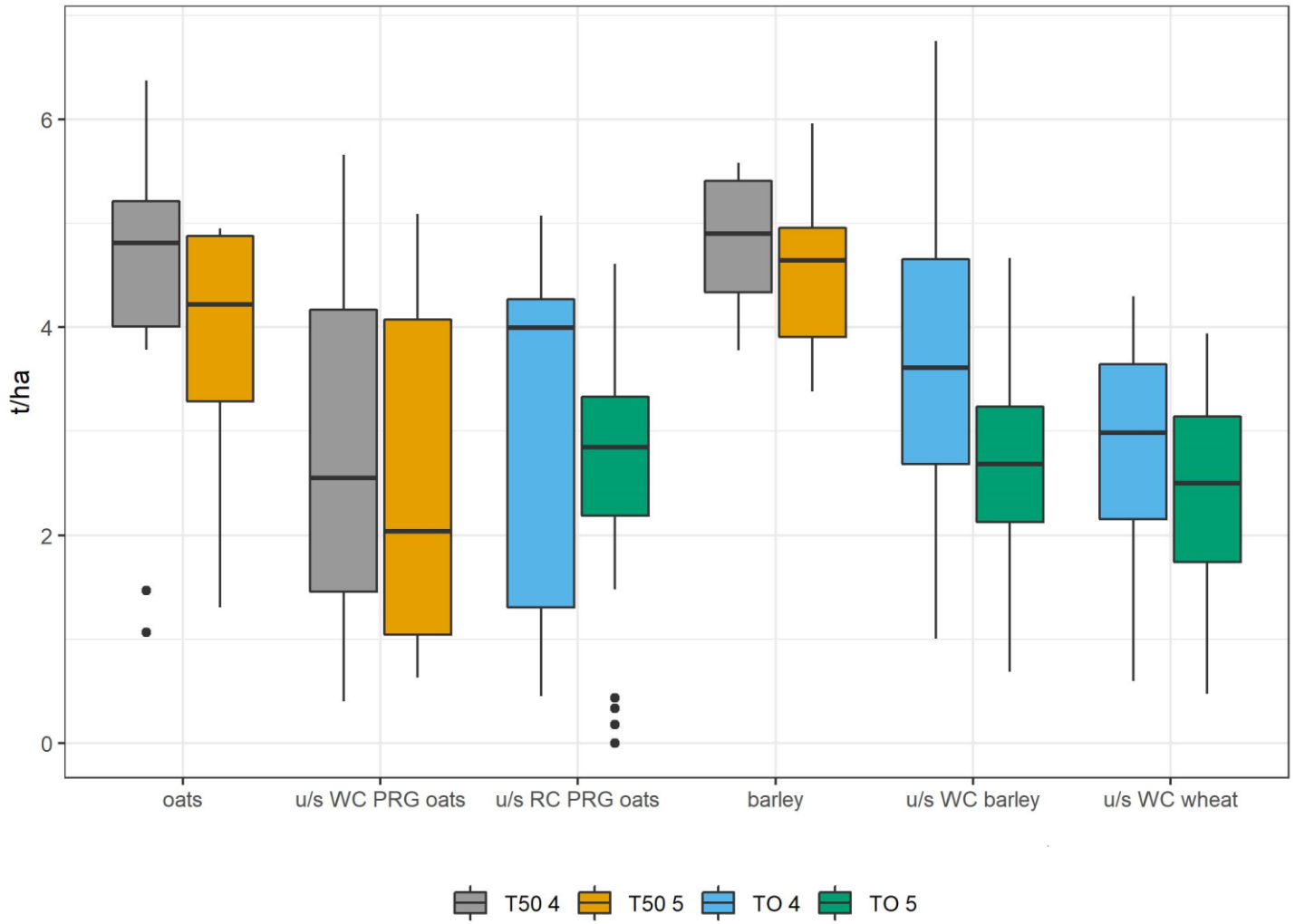


But beware legacy effects of making changes…..



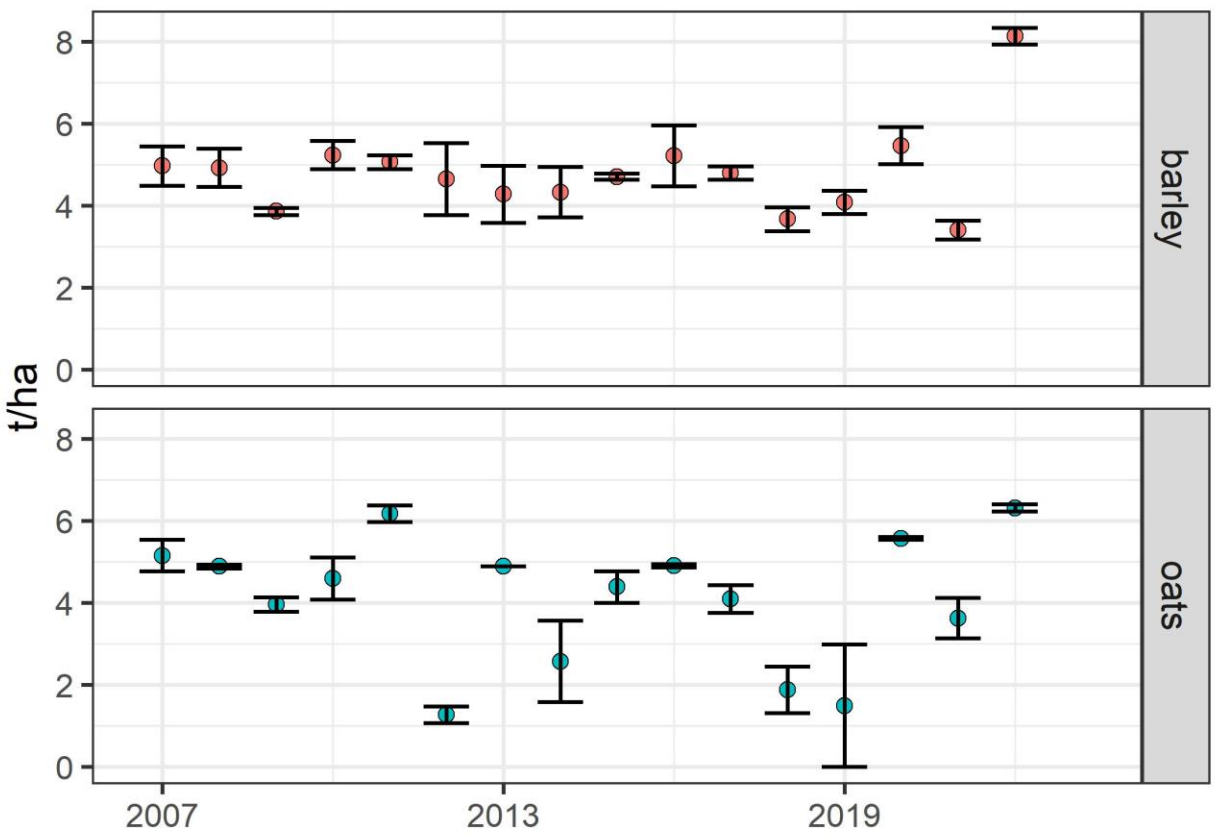
Grain yield (t/ha) 15% MC – Phase 2

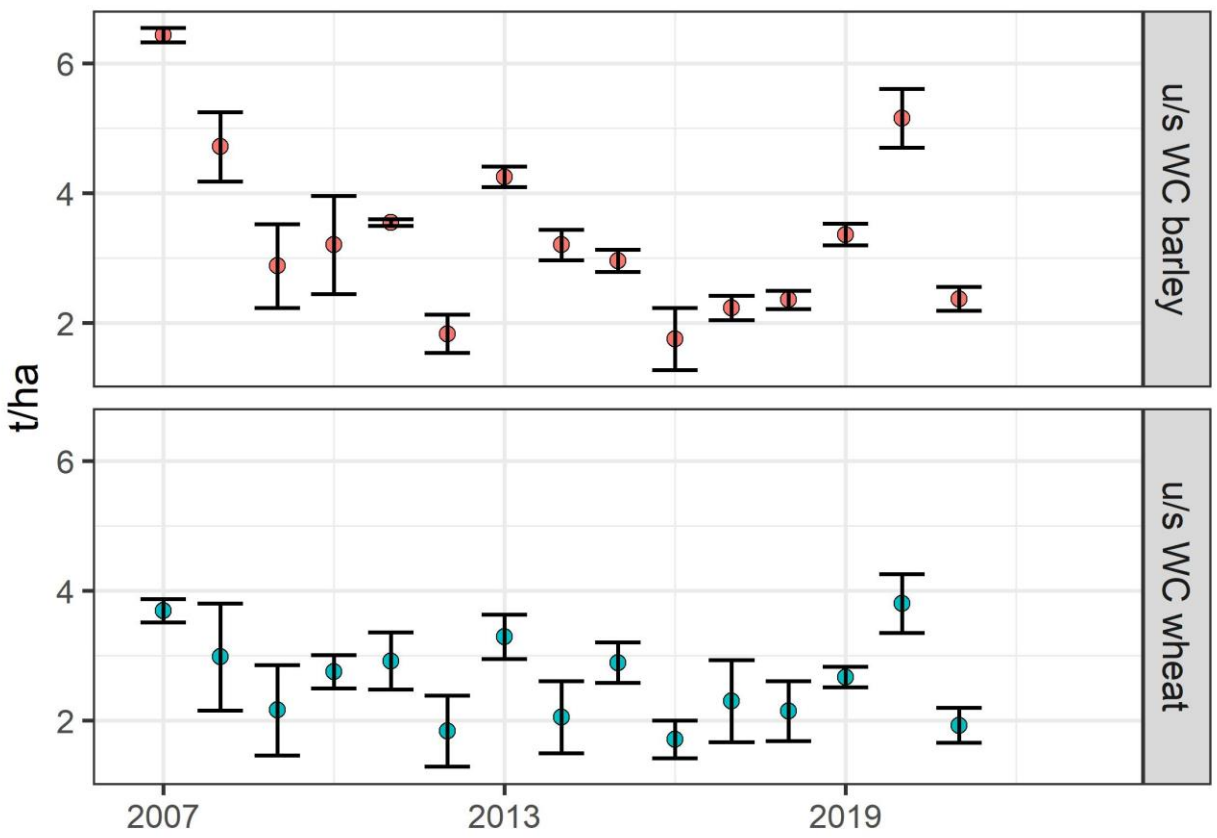
Cycle 4 (2008-2013)
Cycle 5 (2014-2019)

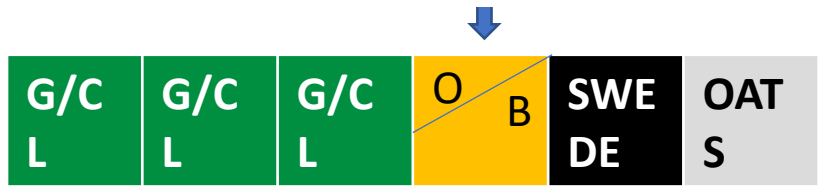


Concern over yield decline in stockless

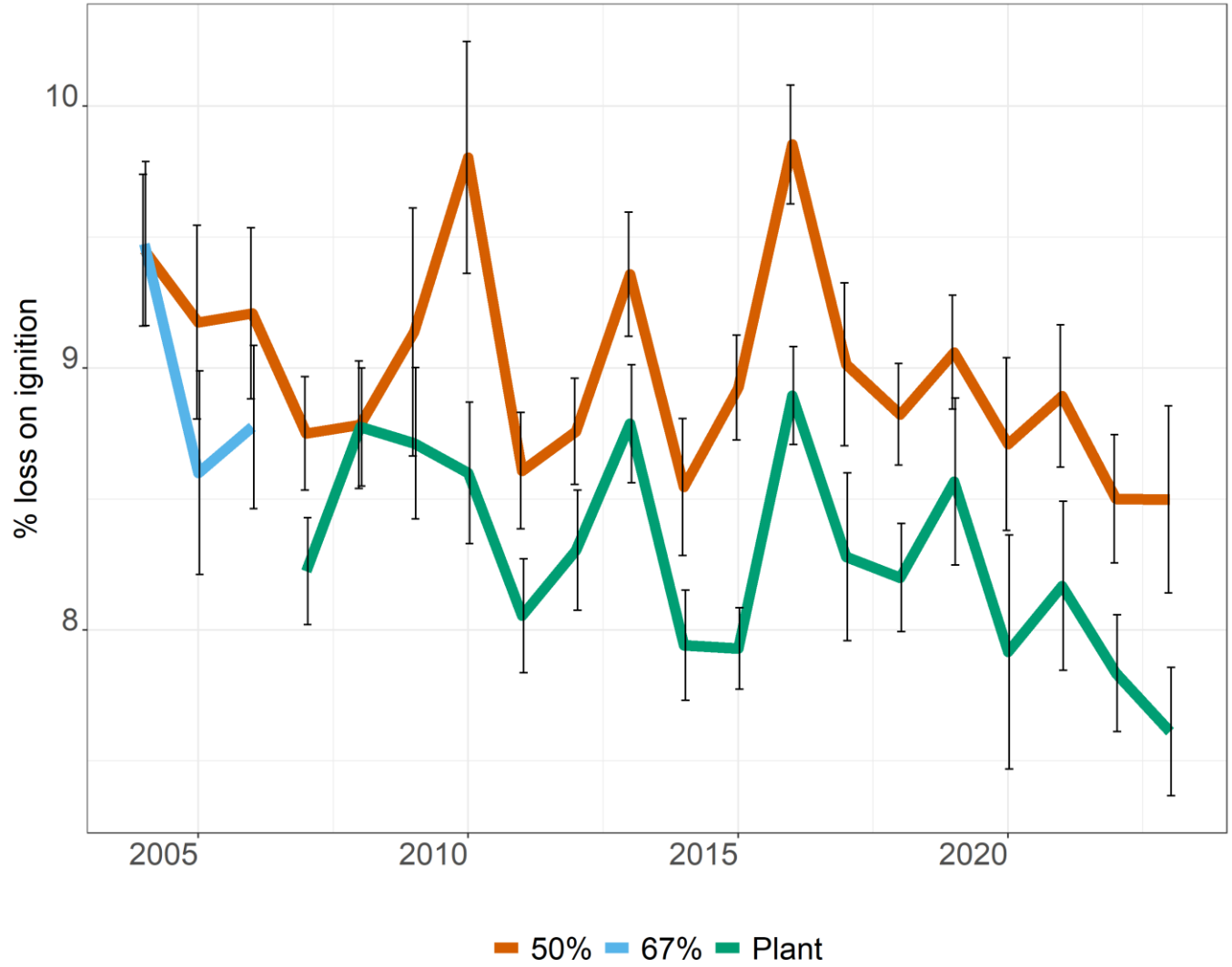
Yields over time in the 2 rotations



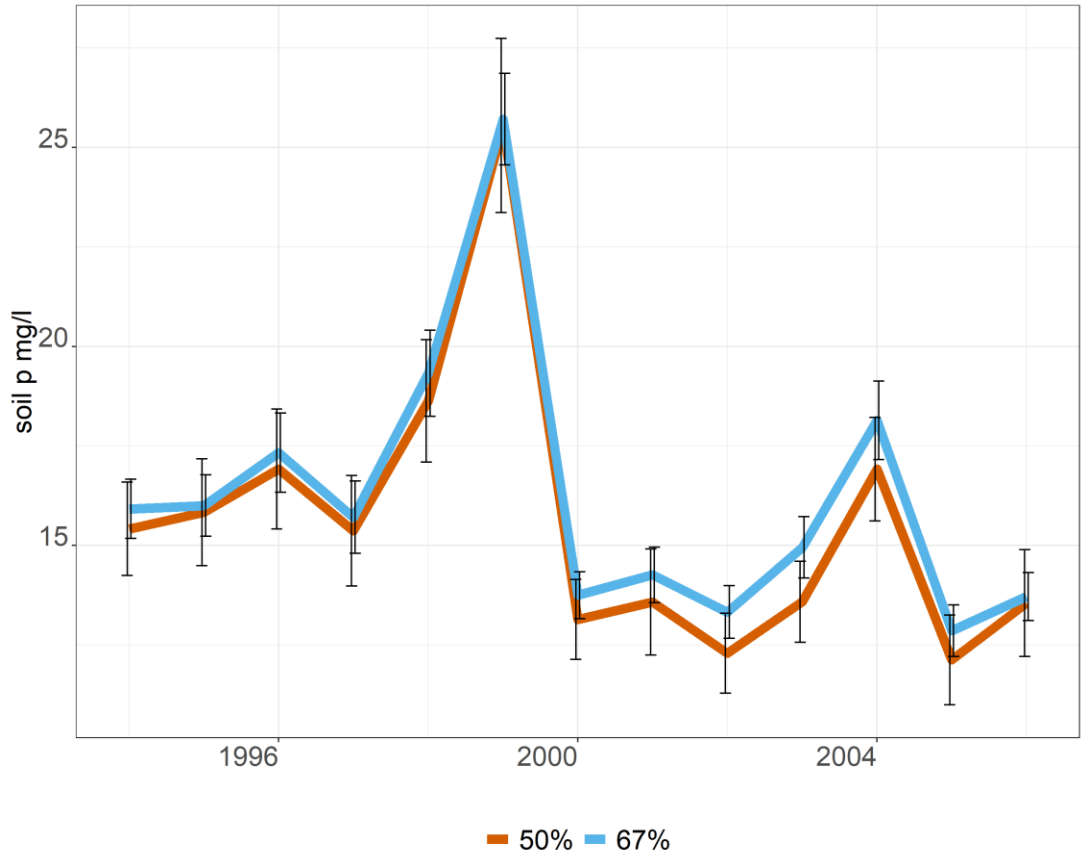


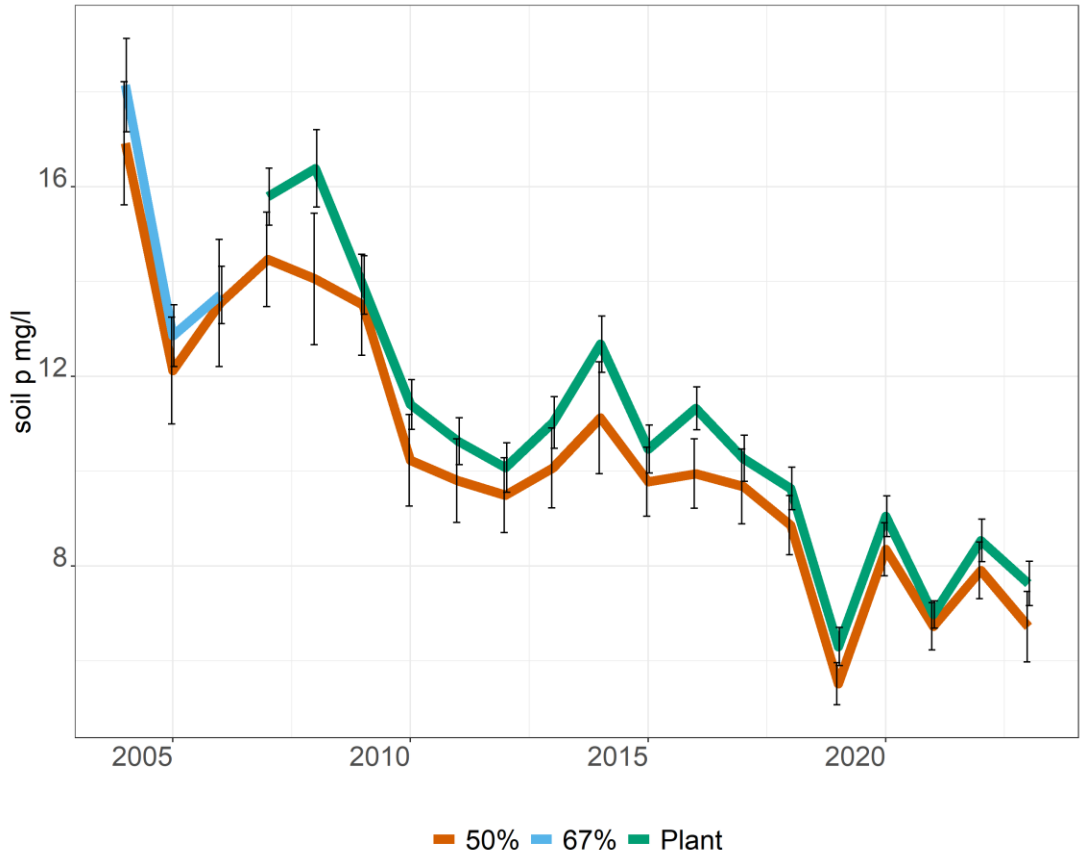


Soil organic matter from organic rotations (% Loss on Ignition)

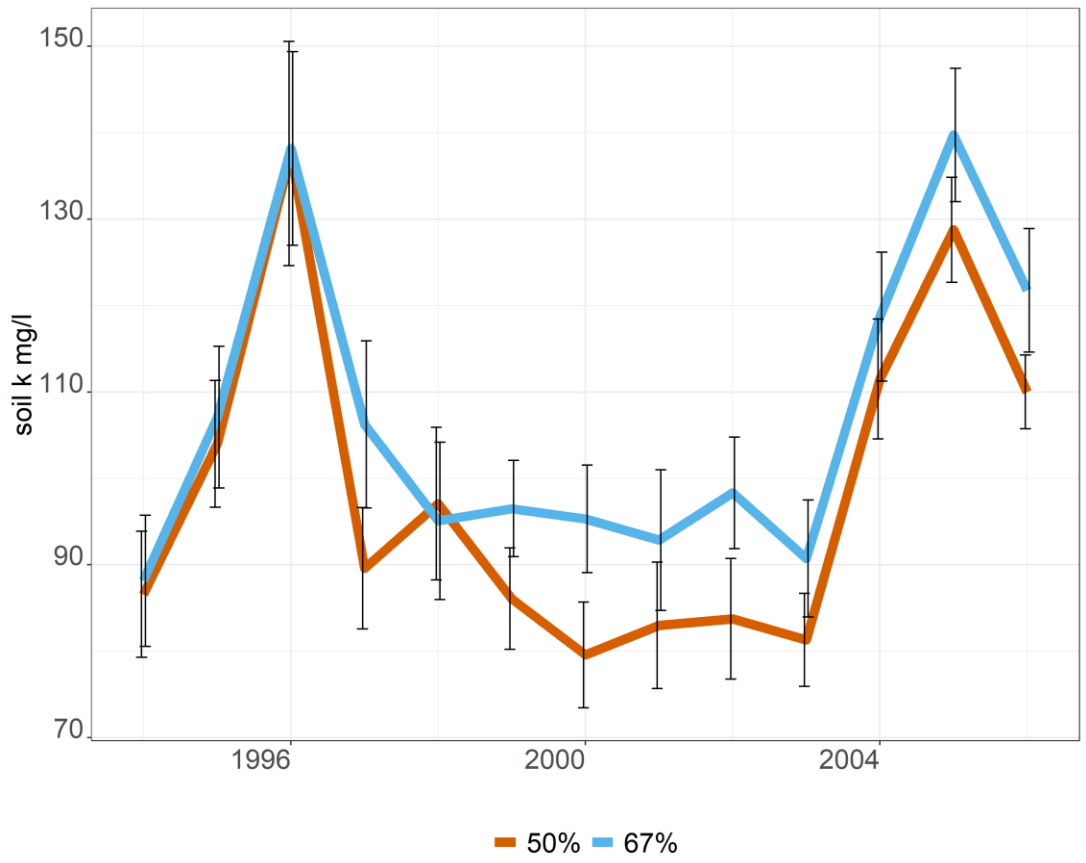


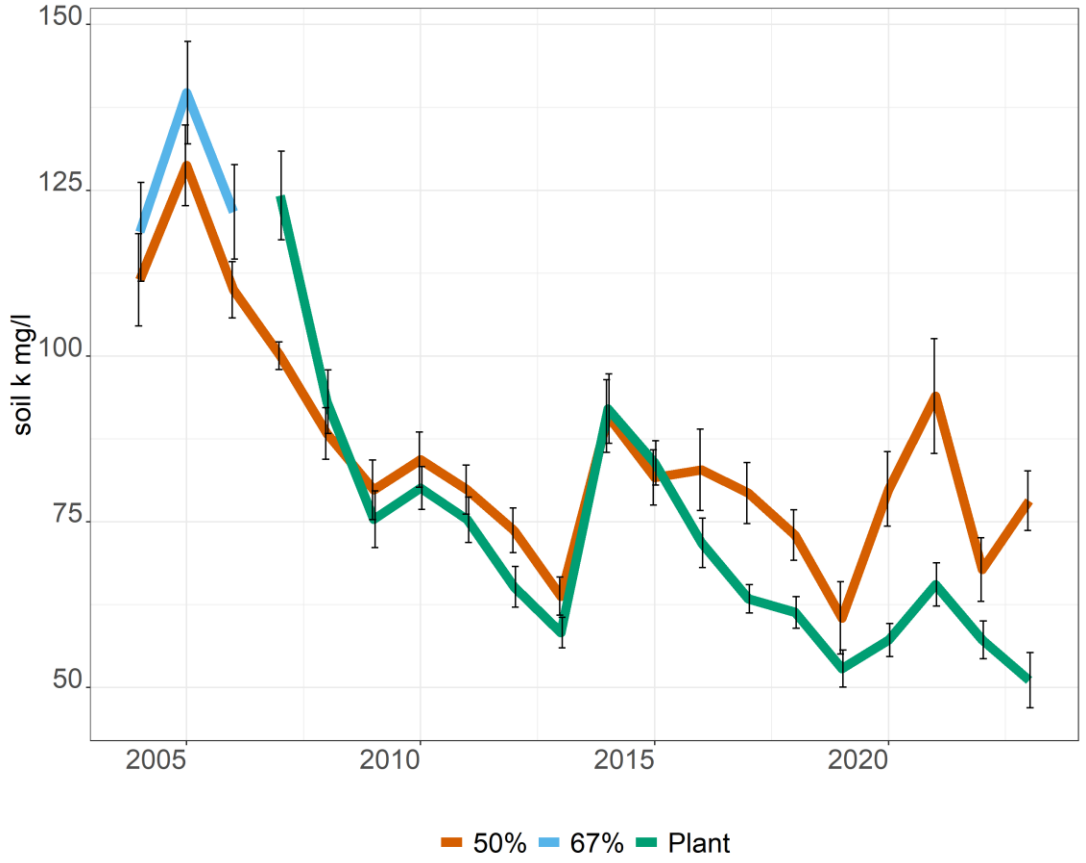
Extractable soil P from Organic Rotations



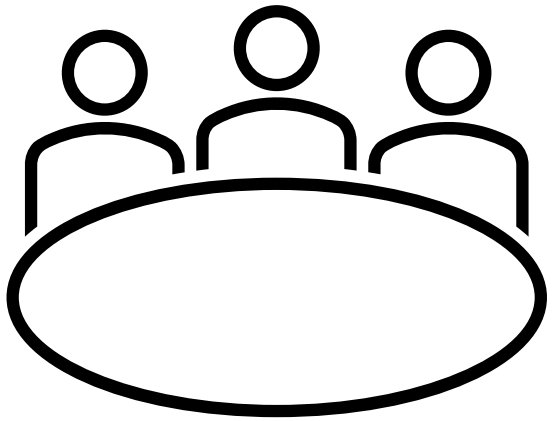


Extractable soil K from Organic Rotations





Stakeholder engagement – Time to redesign

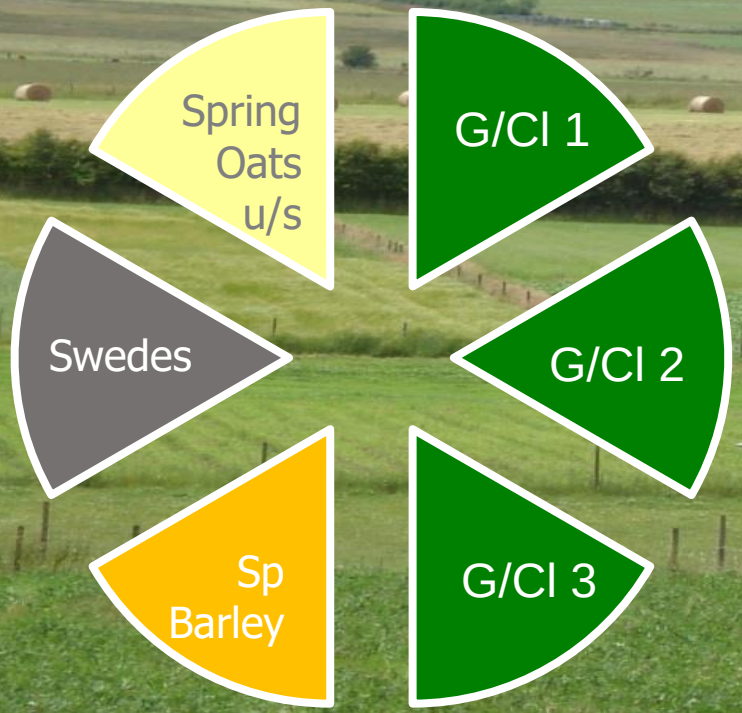


UK & International researchers
Organic certifiers
UK organic farmers

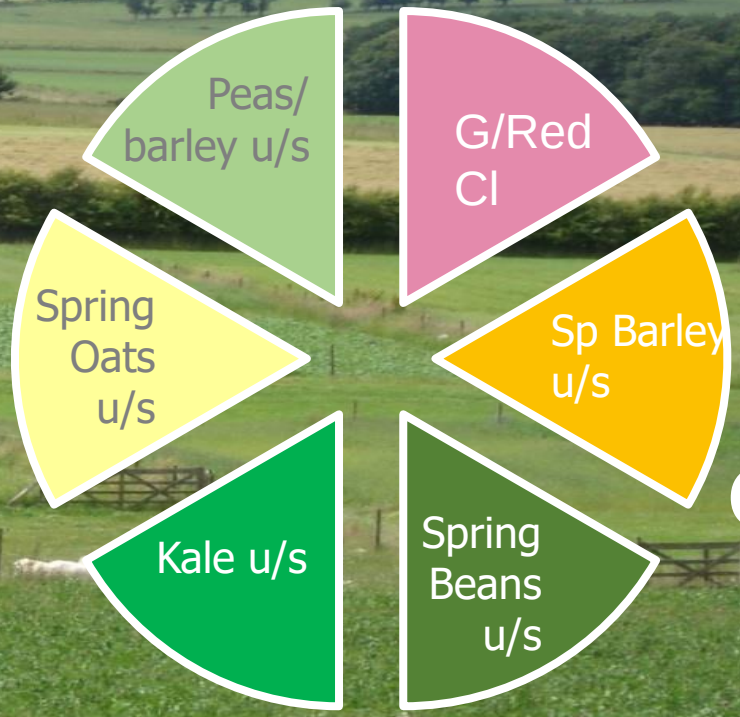
- Stockless
  - Declines in fertility
  - Yields low
  - Massive weed problem
- What are the big questions
  - Reducing GHGs / maintaining yield
  - Use of alternative bulky manures
  - Bio-stimulants

Tulloch Organic Rotation Phase 3

T50
1991-date



Stockless
2022-date



Adding Compost

+/- bio-stimulant

Acknowledgements

Scottish Government
Riaghaltas na h-Alba
gov.scot

HEALTHY SOILS
FOR A GREEN RECOVERY

SRUC

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