

# Barriers & Enablers of Intercropping and Enhanced Crop Diversification in the UK

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## ABSTRACT

Increasingly volatile weather conditions and extreme weather events have increased challenges in pest management in single variety cropping. A need to enhance Integrated Pest Management (IPM) has led to the use of plant species mixtures or 'plant teams' to optimise performance, improve yield stability, reduce pest and disease damage and enhance stress resilience in agricultural systems. Combined with supporting Integrated Farm Management (IFM) practices, intercropping, in field crop mixtures and other examples of enhanced crop diversification have gained attention in recent years due to the beneficial effects of soil fertility, nutrient recycling and pest, weed and disease management.

However, uptake remains limited in the UK. Barriers to and opportunities presented by enhanced crop diversification are illustrated through a series of case studies from across three projects LEAF collaborated on between 2017 and 2020. Enablers and barriers to adoption of enhanced crop diversification are illustrated, concluding that a range of approaches will be necessary to support upscaling of these practices in the UK.

## Materials and Methods

Through H2020 projects [DIVERSify](#), [DiverIMPACTS](#) and Esmée Fairbairn Foundation project [SEAMS](#), LEAF has been working with a range of UK farmers and stakeholders since 2017 on enhanced crop diversification projects. A farmer engagement workshop 'Experiences, barriers and opportunities in plant teams' was carried out at West Gilson Mains, Fife as part of the SEAMS project. The outcome of this event was a summary of plenary discussions between farmers, agronomists and industry representatives. Two farmer led case studies were delivered as part of LEAF's contribution to the H2020 project cluster 'Crop Diversification' which includes the DIVERSify and DiverIMPACTS projects. Enablers of barriers to the uptake of enhanced crop diversification approaches such as intercropping, companion cropping and rotation extension were the focus of all three outputs.

Enablers were classified as site specific farm business approaches which improved access, incentive or motivation to employ enhanced crop diversification strategies. Barriers were categorised as unresolved challenges or perceived risks in the adoption of such approaches.



## Enablers

- Soil health and fertility
- Integrated Pest Management
- Mixed farming systems lend themselves well to enhanced crop diversification



## Outcomes



## Barriers

- Investment and availability of machinery
- Seed separation
- Establishment
- Lack of knowledge exchange

## CASE STUDY 1- Andy Howard, Intercrops, IPM and supplying lentils to Hodmedod's

Farming 300ha's of arable ground, intercropping trials have been a particular interest in the farms diverse 9 crop wide rotation. Seed separation is closely linked to market access for mixed cropping. There is not necessarily a market for mixed crops for human consumption, the market wants the seed/grain to be separated. Andy Howard, participatory farmer of both DIVERSify and DiverIMPACTS projects has overcome this barrier by building his own separator on farm therefore increasing flexibility for market access.



**IPM** - Past years linseed crops on the farm have suffered from poor establishment, due to the linseed stems being attacked by Flax Flea Beetle (*Apthona euphorbiae*) before the seed has a chance to emerge. In 2019 Andy trialled an companion crop of linseed and oats. Once the linseed established the oat companion was sprayed off. Results showed pest pressure in the linseed was reduced compared to an equivalent linseed crop, negating the need for insecticidal spray. Representing a positive IPM strategy.

**Market access**- Andy has been working with [Hodmedod's](#). Hodmedod's work with farmers to source and produce a range of niche pulses and grains popular in intercropping. Working with Hodmedod's has helped farmers like Andy Howard explore new markets for multigrain and pulses as well as providing trusted guidance and advice for growing niche crops.

**'Selling mixed crops can be advantageous to mixed farming systems where you can grow mixed and sell for feed, but the market for human consumption is still low as separated seed is preferred'**

Watch the case study in full [here](#)

## CASE STUDY 2 - Combined rotation, cover crops and companion cropping a UK success story

Farming 300ha's of arable ground, 4<sup>th</sup> generation farmer Duncan Farrington revolves his farm practices around creating healthy soils. Cover, catch and companion cropping is helping to broaden the rotation. Having completely different species in the mix is helping with weed control as well as complimenting the crop and soil nutrition. Successes include:

- Increased nutrient availability e.g. Buckwheat phosphate fixing and legumes such as vetches and beans nitrogen fixing, making nutrients available for the next crop in the rotation
- Growing vetch as companion to oil seed rape to help mitigate pigeon damage over winter
- Different species = different root structures e.g. cover mix of phacelia (lateral roots) and black oats (fibrous, deep roots) help to break up soil and give structure minimising the need for heavy tillage operations.



**'A broader crop rotation is the way forward both economically and environmentally sustainable'**

Watch the case study in full [here](#)

## Discussion

Companion, cover and intercropping and extended rotations all have potential to enhance sustainability in UK cropping. An increase in effective knowledge exchange to highlight opportunities, and advice and support to help overcome barriers will be required. Where the balance between risks against benefits is seen to pay off, an increase in the adoption of enhanced crop diversification is more likely.

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