



Andrew Howard - Bockhanger Farms, Kent

“The answers to your soil problems are beneath your feet, not in the machinery shed.”

Andrew farms about 300 hectares of mainly arable crops with a small amount of permanent pasture.

Following his Nuffield Scholarship, Andrew Howard set himself the target to reduce inputs by 50% over 5 years and he is well on his way to achieving that! Over the last 5 years he has been experimenting with intercrops and companion crop mixtures. He is enthusiastic about enhancing the beneficial interactions between plants for multiple benefits, including pest and disease management, suppressing weeds, providing scaffolding, and enhancing soil and plant health; to build a more sustainable and resilient system through diversity.

Andy's approach to IPM is wholehearted. Practices he employs include:

- Novel crops
- Soil and plant monitoring
- No Tillage
- Trap crops
- Undersowing
- Mixed farming
- Companion crops
- Cover crops
- Diversified rotation
- Intercropping

Andrew's whole philosophy revolves around improving soil health by trying to minimise practices that damage soils and maximising practices to increase soil health. This focus on soil health has also allowed him to reduce inputs. Andrew hasn't ploughed since 2001 but will occasionally subsoil a compacted headland. The farm has only just started doing organic matter counts in the last five years, but of the eight samples sent off, four were over 6% and even the sand was 3.5%, with the remaining samples at around 5%. This is the first time that Andrew has consistently seen over 6% in samples.

Another aim is to reduce bare soil, so cover crops are established if the ground is going to be bare for more than six weeks. Sheep are brought in to

graze cover crops (providing another source of income) before establishment of the next crop. Direct drilling, use of sheep and growing cover crops have resulted in increased organic matter in his soils.

Andrew uses a Cross slot drill to establish his crops. He acknowledges this is an expensive machine but was able to purchase second hand with the help of a Leader grant. This machine allows Andrew to plant two to three different seeds at the same time at different depths, and currently he plants peas and OSR together. This means he does not need to drill the field twice.

Andrew believes that if he can grow healthy plants they are not as prone to pests and diseases so need fewer interventions. Crop nutrition is important and tissue samples will be taken along with soil samples to ensure his crops have the correct macro and micronutrients they need to thrive.

Intercropping

Alongside Andrew's winter wheat, herbage seed and winter beans in the rotation is a spring-cropping approach with two or three crops grown



together as companion crops known as intercropping.

Intercropping is an ancient art. The best known combination is "The Three Sisters", which was grown by Native Americans over 5000 years ago. This involved growing maize, beans and squash together. The maize would quickly grow tall, allowing the beans to use its stalk as a trellis, while the squash remained at the base shading out weeds. In the UK, "dredge corn" was grown until the 1950s, which was a mixture of oats and barley grown for animal feed.

There are many more examples but intercropping is nothing new. Ideas in agriculture go in circles, going in and out of fashion at different times. In the past they didn't have the modern tools of developed agriculture such as pesticides and fertiliser. Intercropping allowed them to grow crops successfully without such inputs being available. This is also why intercropping is still more prevalent in developing countries as they do not have the access or cash to buy such inputs. Now that weed, insect and disease resistance is becoming more and more prevalent, intercropping is one tool that could help us grow crops with lower inputs.

Andrew believes that there are two crucial rules to abide by with intercropping: choosing crops that

ripen at the same time and that you can physically separate after harvest and currently grows: spring beans with spring oats for a trial with PGRO and peas with oilseed rape and linseed with oats for a trial with Innovative Farmers.

“Mother Nature never has a monoculture, and there's a reason for that.”

“In modern crop production, each plant is often almost genetically identical to its neighbours, allowing insect pests and pathogens to move from plant to plant and decimate crop yields if there is no chemical protection. Increasing plant diversity in agricultural fields may reduce pest abundance and damage, and reduce pesticide use.”

(Tooker and Frank, 2012)

Advantages of intercropping:

- Higher yields (20-30% on average for cereal/legume intercrops) and yield stability leading to higher income and lower risk
- Fewer inputs needed so lower growing costs
- You can produce more income from a smaller farmed area, meaning more small family farmers can possibly survive keeping people in rural communities
- If you lose one crop component during the season you still have one component left to harvest (good risk management)

Disadvantages of intercropping:

- Yields can be decreased if the relationship between intercrops is more competitive rather than facilitative
- Higher risk of failure than a monocrop if the intercrop is not planned thoroughly

Monocultures and poor rotations can also be damaging practices. Andrew now has a diverse rotation and is starting to include companion cropping and intercropping to try and eliminate monocultures from his farm system. This is the topic of Andrew's Nuffield Scholarship, which was sponsored by the Agriculture and Horticulture Development Board (AHDB).

Another practice which improves soil health is livestock integration onto cropped land. The cover crops are grazed by sheep, but livestock are still not integrated anywhere near enough, Andrew feels.

“You're never going to get them fully out unless you have a sterile environment, which we don't want. They're also a food source for the beneficials.”



All the above are great concepts but they are not straight forward to implement on the farm; they involve a lot of management and thought. The farm is changing from an input-intensive farm to a knowledge and management intensive-farm. This can lead to mistakes and Mother Nature throwing a curve ball from time to time. The farm has issues using no-till on heavy ground in wet years but they are working on it. With cover crops there always comes the question of which species to include and there is no simple answer. Companion cropping and intercropping is even more complex than cover cropping and requires research and more experience on UK farms. Livestock integration is an issue because, despite the benefits, Andrew is not a livestock farmer and does not wish to be!

Two things that Andrew would say to people thinking about moving into conservation agriculture is do a lot of research, go and see other farmers who are already practising and join a group like BASE UK where you will meet

like-minded farmers with a wealth of experience and advice. The second point is don't be scared of making mistakes. Andrew says he makes plenty every year.

“You learn the most from your mistakes and they help you to move forward. I don't think I will ever stop learning and improving. Also don't worry what the neighbour thinks!”

FOR FURTHER INFORMATION:

<https://cereals-blog.ahdb.org.uk/tag/intercropping/>

[Nuffield Scholarship](#)

[Cross slot drill](#)

[Leader grant](#)

[PGRO](#)

[Innovative Farmers](#)

[Agriculture and Horticulture Development Board](#)

[BASE UK](#)

POLICY ASKS

- Scientific evidenced based decisions – e.g. glyphosate. Policy makers need to understand that if glyphosate is lost, there is no replacement so there will be more sediment and nitrogen in the rivers and more carbon dioxide in the atmosphere due to extra cultivations.
- More encouragement of innovation
- Encouragement of agroforestry – “I'd like to grow trees and crops but it's difficult to find the markets. Hence why you need the support.”
- Public money to fill the gap that ADAS used to fill
- More on-farm research funded and carried out by farmers, levy boards and governments.