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FOCUS ON MINIMUM-TILLAGE, ADDING MANURE AND COVER CROPS TO RESTORE SOIL PRODUCTIVITY

NameBroachriggRegionMidlothian, South East Scotland, UKFarm typeMixed (arable, sheep, over-<br/>wintered and store cattle)Farm size214ha



#### How long have you been farming?

I have been farming since leaving college in 1999. I first started working on my uncle's farm in East Lothian where we have been practicing minimum tillage as well as running a min-till contracting business. I took up the tenancy of Broachrigg farm two years ago, although I have been farming parts of the farm before that.

#### Why did you decide to implement the practice(s)?

The quality of the soil was very poor when I took on the farm. Much of the land on the farm was restored following open-cast coal mining. Previous tenants knew they would be retiring and that the open-cast mine was coming so had not maintained the soil, for example there was no reincorporation of straw. As a result some fields had very little organic matter. And although new drains had been put into the restored land these were not running well. Also I wanted to bring the sowing dates forward as much as possible and can only do that through using rotation and reduced tillage.

## How have you incorporated the practices into your rotations?

The current rotation includes winter oilseed rape, winter oats, winter wheat, spring barley and spring beans. If there is a second wheat in the rotation this is mixed with triticale to mop up nutrients. Winter rye is planned but with the aim of early harvesting to allow time to incorporate manure into the soil and early planting of the following crop. Cover crops are grown as we aim to have something growing in the soil most of the time, for example the winter oilseed rape is sown with a cover crop of vetch.

Minimum tillage is used on the farm as much as possible. Several years ago I tried to plough to establish a wheat crop but the soil was too fragile and the structure was ruined. Now a combination of seeding approaches is used including direct drill (oilseed rape), harrow and straw rake (oilseed rape), low-disturbance sub-soiler and seed drill (winter crops).



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## How has the soil benefited from this change?

Soil organic matter, soil structure, workability and nutrient availability are all slowly improving.



Estimated impact on soil carbon (tC/ha/yr)

No tillage	0.28
Manure	0.06
Total	0.34

#### What has been the biggest challenge? And how have you overcome it?

From my 15 years' experience I've learned that you need to make sure that the soil is in the right condition before using direct drilling. You need to build up organic matter with a 'deep-till' min-till system to incorporate manures and residues. People who sell their plough and power-harrow and buy a direct drill can 'come a cropper'.

High rainfall has been one of the biggest challenges. In some years we've made the mistake of trying to sow wheat when we shouldn't have gone into the field.

Although some people complain of a large weed burden I think it's OK if you just have a good enough rotation and maybe you have to subsoil now and again. You just have to have better management and understanding of your soils. I think organic matter testing is a great way of seeing what state your soils are in.

Sowing times for winter crops are earlier which is better, however sowing is later for spring crops (as the ground needs to warm up) and this makes

For further information about these practices see the SmartSOIL toolbox: http://smartsoil.eu/smartsoil-toolbox/about/ it difficult. We are also still on a learning curve about how to deal with cover crops before spring crops as leaving these growing can retain too much moisture in the soil.



Residues in a winter oilseed crop (sown with cover crop of vetch)

# How have the yields been affected by this change?

It's too early to see big changes, but yields are starting to increase and they were pretty poor to begin with. We expect yields to pick-up once the rotation is right.

How has the farm business benefited from his change? What are the financial implications of making the change?

The use of organic manures has reduced both mineral fertiliser costs and application rates. The better soil structure (firmer ground) has allowed quicker access for spraying than for neighbouring farms and this should increase yields in the future. Diesel usage has also been reduced by between 10 and 20 thousand litres.

# Where did you get advice and support to make the change?

We have received advice from a variety of sources including BASE UK (base-uk.co.uk), farming forums, our agronomist who is keen on min-till, Nuffield farming scholarships, and talks from other farmers.

## What advice would you give to others thinking about the change

You need to do your homework and be honest about your mistakes. Visit other farms and talk to other farmers about their experience.

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