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Research

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Long Term Results  
Primary Tillage Choice

By Nathan Morris



The NIAB led STAR (Sustainability Trial for Arable Rotations) project in Suffolk and NFS (New Farm Systems) study in Norfolk, established in 2005 and 2007 respectively, feature fully replicated research on large plots using farm scale equipment and include inversion (c. 20 cm plough), non-inversion deep (c. 20 cm) and shallow (c. 10 cm) tillage practices. In both studies rotations are ostensibly based on winter wheat alternating with combinable break crops. While soil types differ (STAR - heavy soil, clay loam; and NFS - medium soil, sandy loam) tillage approaches are common to both studies.

Long term yield and margin summary data for STAR and NFS are outlined in Tables 1 and 2. Yields and margins are expressed as a percentage relative to the plough in each season and the mean figure across seasons is presented. In both STAR and NFS, across 'all crops' the plough resulted in the highest yield with a progressive drop off to deep and shallow non-inversion approaches (Table 1). This drop off was more pronounced on the medium

soil type in NFS compared to the heavy soil type in STAR. This is possibly associated with the lighter soils being more prone to loss of structure where some form of deeper tillage does not take place.

Within both the STAR and NFS rotations, the regular use of winter wheat also allows the impact of tillage on wheat to be evaluated in the context of longer term data sets. In winter wheat, both STAR and NFS demonstrated similar yields for plough and deep non-inversion systems, but lower wheat yields for shallow non-inversion tillage systems (Table 1). Cross-season differences were a 2% yield reduction in yield compared to plough based approaches for STAR and a 4% reduction compared to the plough in the NFS study for the shallow non-inversion system; this difference was statistically significant in NFS but not in STAR.

Regarding the impact of system on rotational margins across all crops or in winter wheat alone (Table 2), despite the high yields associated with the plough

Table 1: Cross season yield (% of plough) with respect to tillage

	Yield relative to plough (%)		Yield relative to plough (%)	
	All crops		Winter wheat	
	NFS	STAR	NFS	STAR
Plough	100	100	100	100
Deep	95	98	101	100
Shallow	89	96	96	98

based system, the deep non-inversion tillage approach has resulted in the highest margins. Interestingly though, in both STAR and NFS the cost saving associated with the shallow non-inversion tillage system compared to the plough based approach tended to balance up; that is, despite the lower yields obtained in the shallow non-inversion tillage system the margins relative to plough were similar.

Findings suggest only small percentage yield reductions with shallow tillage (cf. plough systems) indicating that wheat yields are relatively robust with respect to the tillage approaches assessed on these sites. In addition, it should be noted that speed of working and timeliness of operation to ensure good field conditions should also be considered when

looking at relatively small differences in yield or margin in winter wheat. Further information on long term best practice with respect to tillage, in both cereal and break crop production, will better enable growers to maximise system potential, resilience and environmental security in our farming systems. Further information can be found at [www.niab.com](http://www.niab.com)

Thanks to;

TMAF and JC Mann Trust for support on NIAB NFS programme.

The Felix Thornley Cobbold Agricultural Trust and the Chadacre Agricultural Trust for support on the STAR project.

Table 2: Cross season margin (% of plough) with respect to tillage

	Margin relative to plough (%)		Margin relative to plough (%)	
	All crops		Winter wheat	
	NFS	STAR	NFS	STAR
<b>Plough</b>	100	100	100	100
<b>Deep</b>	106	104	106	107
<b>Shallow</b>	100	99	101	104

## Chairman Thanks Long Service of Board Member

Chairman John Wallace thanked Mike Gamble for his commitment after stepping down from the TMAF board at January's AGM after 12 years but still remains on the Advisory council.

Mike said ' he had been involved with Morley since early 1990's. The organisation has gone through a period of expansion in terms of land and property over his time. We have bought 3 farms plus a further field, sold the Rectory and build Morley Business Centre.'

## A New Trustee Joins TMAF Simon Evans

After Long serving Mike Gamble steps down from the Board of Trustees, we welcome newly elected Simon Evans.

Simon is a Partner of Irelands, Arnolds Keys and heads the specialist agricultural and rural property team. He joined the firm in 1983, straight from the Royal Agricultural College in Cirencester, where he studied Rural Estate Management. He is a member of the Royal Institution of Chartered Surveyors (RICS), and a fellow of the Central Association of Agricultural Valuers (CAAV).



Originally from Hampshire, Simon now lives in North Norfolk. He is the current Chairman of the Aylsham Agricultural Show Association and is a past President of the Norfolk Association of Agricultural Valuers.

Simon has particular interest in the estate and property matters of the Foundation.

# You can't Farm Wet Land

By David Jones



I have worked on farms where land drainage has never been an issue. With limestone, gravel and chalk subsoils water just drains away, although this can also be an issue when it doesn't rain. Many farms like Morley, land drainage is vital to sustain a good profitable crop rotation. We should be grateful to the people who have farmed before us installing ditches and land drains. Some farms could be heading for a perfect storm. A lot of new drainage was installed in the late 70's and 80's helped of course by grants. For the first 15 years, no maintenance is required as drains work well. Now 30 years on the lack of maintenance has become apparent.

At Morley we came across this, we recently bought 60ha of land in the first year we found wet patches. Over grown hedges slowed our progress finding drain outlets. We finally got hold of the drainage plans and started work. We unearthed 15 drain outlets that were either blocked or under the bottom of the ditch. In spring 2016 I remember drilling one evening the tractor got stuck. I left it walked to the roadside and got my wife to collect me. We sorted it out the next day. In this field we found we had small clay pipes but we could not find them in the ditch. A new main was put in that intercepted the clay pipes. The machine had only gone 100m when water started to run and it has done so ever since. Drilling in spring 2017 was no problem, I only wish I had a before and after photo to make this point.

## Save the Dates

### NIAB Morley Open day

22<sup>nd</sup> June 2017, 10am – 1.30pm

For more information [www.niab.com](http://www.niab.com)

### BBRO Summer Open Days

6<sup>th</sup> July Morley, Norfolk

4<sup>th</sup> July Bracebridge Heath, Lincolnshire

For more information [www.bbro.co.uk/events](http://www.bbro.co.uk/events)

Not maintaining drainage is often a false economy the cost can be hidden not just the poor crops on part of a field but often can cause increased weed pressures. The cost of getting a tractor stuck can be as simple as the time involved in getting help, but also the damage caused bending machinery and the classic of blocked drill coulters.

Spring crops are of great help for drainage, because there is time over the winter to identify problems, do remedial work and somewhere to put ditch cleanings.

The cost of new underground drainage is about £1000/acre. For many this is not always an option. What we have found is that often it is just that drains need rodding, jetting or the ditch maintained that can make all the difference.

One of the big barriers is land tenure, drainage is a long-term investment that you can't see. The difficulty is with tenanted land either 3, 5 or 10 years FBT's landlords are reluctant to spend the money. Tenants are loathed to invest, but for owner occupiers it is a different decision to make. There is a need to bring back drainage grants I here you say. We have moved on and for now get BPS payment, if the money was used to install new drains, in the last 10 years you could have re-drained the whole farm.



# TMAF Database Spring Clean

With Spring in the air it is long overdue to update and verify who our members and Friends are on the TMAF database. If you have just 2 minutes to send me an e-mail of any changes over the last 12 months of your details. Or in fact you are reading this for the first time as a paper copy and would like to receive it as our e-Newsletter.

We have very few e-mail addresses for our members and the Board of Trustees feel it's time to be able to update you all with any news by e-mail not snail mail. My e-mail address is [angela.lankfer@tmaf.co.uk](mailto:angela.lankfer@tmaf.co.uk)

Going forward over the coming weeks you will receive a letter from us asking to check, update and return your details we currently hold, but the more updates by e-mail I receive the less I have to post. All your details are safely stored, used to keep you up to date on our work and not shared with anyone else.

## Young Innovator's Forum 'New' One Day Conference Deemed a Great Success!

### Becky Dodds, Agri-Tech East

A day long conference was held at Morley for 40 early career farmers and scientists. It was organised by Agri-Tech East and NIAB and sponsored by TMAF.



The overall aim was to showcase what goes on in the agriculture industry, from blue sky research right through to application on farm, and everything in between, and how we can all work together to improve efficiency and yields.

There's a sense in the industry at large of a knowledge gap; as we discussed during the day, there's a real skill involved for scientists to explain their research and its importance to farmers, as well as farmers being able to communicate their needs effectively. By engaging industry players early on in their career, they'll find it much easier to

overcome this knowledge gap and improve communication later in life – hopefully improving research translation.

I really enjoyed hearing from Alistair Wright, who's doing a PhD in nematode research. What I liked was that he was a farmer by background – he had never intended to go down this route but saw how it could benefit not only his farm at home, but also the farming community at large.

### Emily Borton (NIAB TAG) review of the day

For me, as an agronomist, one of the highlights of the day was seeing our groups getting stuck in with the structural assessment out in the field run by Milly Bowden of ADAS and Nathan Morris of NIAB TAG. Everyone was really engaged with the activity and even those with experience of soil sampling and testing said they'd learnt something from the exercise.



I really enjoyed the talks from our keynote speakers, scientist Bill Clark and farmer Emily Norton, who were dynamic and kicked off the day perfectly and with enthusiasm. Our PhD lightning presentations were snappy and fascinating and gave a great insight into some of the incredible technical research going on in our industry.

Running the event at Morley in conjunction with The Morley Agricultural Foundation was a great opportunity. Becky and I are hugely grateful to them for their support and help running the day plus all the staff at the centre whose day we made a little chaotic! Thankfully everyone believed in the idea of bringing young scientists and agriculturalists together and worked hard to make it a successful day.

