

# SOIL FIRST FARMING



Volume 1 No.5

**Some people say that you cannot change your soil. What you have is what you will always have, which cannot be denied to some extent,**

**However...**

**With detailed soil analysis and precise interpretation Soil First Farming believes and can prove that it can be done. You *can* change the chemical composition of your soil which in turn will affect the biological and physical properties of your soil and the way you soils look, behave and respond.**

Chris Byass in only his fourth year of no-till based on the principles of conservation agriculture has managed to achieve near personal best yields of 10.65 t/ha by following advice given by Soil First Farming. These are corrected weighbridge yields over all first and second wheats, all with the variety Skyfall. In a year when the farming press has been scattered with reports of depressed yields, depressed prices and depressed farmers, one has managed to buck the trend. How did he manage that? Must have good soil I hear you cry! Yes, it's Grade Two land on the edge of the Yorkshire Wolds (clay subsoil, not chalk) but crucially he has focused time and effort into improving his soils by following a simple strategy, the strategy of Conservation Agriculture, attention to detail, and advice on how to change the chemistry in his soil. Soil chemistry is often the overlooked part of the soil management triangle which includes the physical & biological management. Too often this area is not looked into as generally it is assumed, wrongly, that nothing can be done, which can be the case in some situations though unless detailed measurements are made then good management decisions can be over looked

In only his fourth year of no-till (using minimum tillage for 10 years before) Chris is starting to reap the rewards of not deviating from the strategy, and having the mental strength and the conviction to make it work. Even when it looked as though grassweed problems and slightly lower than average yields had been the wrong decision.

Let's take you on a brief journey from then to now, and look at some of the strategy that has made the difference and allowed success to occur, when it might easily not have done.





Firstly, focus on the soil, not on steel or the colour of the paint! Soil samples taken from the same field in 2013 and again in 2017 give a partial insight into not only the positive steps taken but also how easy it would have been to have to have veered off-course.

Below are the results of the standard agricultural test taken in 2013...

<b>pH</b>	<b>5.6</b>	<b>Organic matter</b>	<b>4.00%</b>
<b>Major Nutrients</b>	<b>Index</b>	<b>mg/l</b>	<b>Comments</b>
<b>Phosphorus</b>	<b>3</b>	<b>27</b>	<b>High</b>
<b>Potassium</b>	<b>2+</b>	<b>234</b>	<b>High</b>
<b>Magnesium</b>	<b>2</b>	<b>63</b>	<b>Adequate</b>

Looking at the above you would say (if comparing to RB209 recommendations) no problem with P, K & Mg but needs some lime. The Aglime Association calculator recommends 11 tonnes/ha of calcium carbonate (ground limestone circa 35% calcium, supplying 3850kg of calcium) is necessary to correct the pH back to 6.5. Hopefully no contractor is going to recommend applying that amount in one season because it will temporarily lock-up most other elements!

But if we look at the bigger picture and reveal the 2013 Cation Exchange test undertaken at the same time we can see that the soil is not only low in calcium but also low in magnesium (and very high in potassium which, to be fair, the index test above does reveal). See page 2 for table.


Cation Exchange	meq/100g	Base Saturation	Target
CEC	10.6		
Calcium	4.2	39.62% 	Very Low 68
Magnesium	0.69	6.51% 	Very Low 12
Potassium	0.80	7.55% 	Excessive 2-4
Sodium	0.08	0.75% 	Low 1





Soil First Farming advice was that only 1200kg/ha of calcium was needed to bring calcium up to the target level, AND ALSO 140kg/ha of magnesium was needed. So this was, and still is being addressed steadily by applying 250kg/ha annually of a prilled mag-lime product through his own spreader. Some may argue this was too slow and we should have applied it all in one or two seasons but we also had to focus on farm profitability and a strict budget.

The recent soil analysis, taken in Jan 2017, looks like this;

pH	6.4	Organic matter	4.00%
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Major Nutrients	Index	mg/l	Comments
Phosphorus	2	22.6	Good
Potassium	2+	208	High
Magnesium	2	91.2	Good

Sulphate	23		Low 75
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Cation Exchange	meq/100g	Base Saturation	Target
CEC	11.6		
Calcium	7.5	64.66% 	Adequate 68
Magnesium	0.96	8.28% 	Low 12
Potassium	0.68	5.86% 	High 2-4
Sodium	0.05	0.43% 	Low 1

As you can see the calcium is approaching the target saturation value of 68% as is the magnesium, while the mg/l of available magnesium (index value) is about where we would like it. To that end we have now advised a switch to straight prilled calcium carbonate at a reduced rate. (Calcium is an incredibly important plant element, and also important for the soil physical and biological functions. Calcium also leaches over time and the leaching increases with the use of artificial nitrogen. Research by Rothamsted indicated that 1kg of Ammonium Nitrate can displace 1kg of Ca.) The pH has reached its target value and the indices of phosphorus and potassium are still showing good levels, while the exchangeable potassium is falling towards its target level.

What is the point of all this? Soil First Farming believes that attention to detail in the early years of no-till adoption are critical in enabling the soil health and productivity to stabilise, and not see the resulting dip in yields that is so often cited as a reason to cultivate in years 3 or 4 or stop altogether and revert to a continual tillage regime. This is only part of the answer but is a critical part of the aggregation of marginal improvements necessary during the adoption phase.

Not only does the plant have access to the nutrients it needs to build yield, but these soil chemical elements are also critical for the soil biology to develop and flourish, the physical soil structure including tilth and soil organic matter, and consequently the movement of water and air into and out of the soil.

This is the first in a series of articles looking at building the 'jigsaw' of knowledge to allow farmers a more successful adoption of no-till and Conservation Agriculture practices.

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