Profit from N-Min® sampling from CF Fertilisers
Case Studies
Profit from N-Min Nitrogen sampling from CF Fertilisers

N-Min, the unique, patented soil Nitrogen analysis service. N-Min measures not only the amount of Nitrogen that is present in the soil but also the amount of Nitrogen that will become available to the crop between spring and harvest. Calculating the optimum level of Nitrogen to apply and when to apply it, is not easy. The N-Min Service from CF takes the guesswork out of the calculations.

Recent trials yet again have shown that CF N-Min and N-Calc is the most reliable test available to accurately account the Nitrogen rates. This gives farmers confidence to apply Nitram® at the right rate and right time to achieve optimum yield and quality.

Why use N-Min?

Do you really know how much Nitrogen is present in the soil and available to the crop without measuring it? Over application of Nitrogen not only wastes money but causes crop lodging. Under application of Nitrogen means failure to achieve yield potential and protein levels. You need to measure Nitrogen to be able to effectively manage it.

N-Min measures both soil Nitrogen and the Nitrogen that will become available to the crop during the growing season – Additional Available Nitrogen (AAN).

Do you really know how much Nitrogen is available in your soil?

Only 74% of fields have predicted N levels within 50kg N/ha of Fertiliser Manual

References:
‘Assessment and prediction of Nitrogen mineralisation and its effects on crop productivity’ – M M A Blake-Kalff and L Blake

N-Min testing is particularly recommended in the following conditions:

- New fields
- Fields with unknown history
- Where organic manure has been applied
- High organic matter is present in the soil
- Diverse soil types
- Fields that have grown crops that are known to leave behind large residues of Nitrogen

For more information visit our website:
www.cffertilisers.co.uk/N-Min
Nutrient Use Efficiency is what every farmer is seeking – get more out, for the same or less input and in this eight year case study that is just what has been achieved using the N-Min service.

Soil Nitrogen Supply (SNS) has varied from 70 - 150kg N/ha even though the wheat always followed oilseed rape. The Nitram application could then be confidently adjusted to match soil supply and still produce above average performance in yield and protein level.

In 2015, according to the HGCA survey, milling wheat average proteins reached 11.9%, unlike Mr Brown who followed the N-Min blueprint and achieved 13.5% averaging 13.3% over eight years.

For information/reference: Wheat yields from DEFRA Farming Statistics, Regional wheat yields.

Eight year study...

**Farmer Details**

Farmer: Murray Brown, Aylesbury and Brackley  
Crops Grown: Milling Wheat  
Soil Type: Heavy Clay  
Fertiliser Used: Nitram and DoubleTop®

By knowing the Nitrogen content of his soils, Murray Brown has optimised the amount of Nitram applied to his crops over eight years. This precisely tailored Nitrogen management has paid off:

- On average, 3% less Nitrogen has been applied compared to the Fertiliser Manual
- N-Min recommended rates achieved average wheat yields 9% above the Eastern region Defra recorded performance over the period
- Target protein levels for milling specifications have been achieved every year – nationally, almost 50% of samples for these varieties in the year grown failed to achieve 13% protein. (HGCA wheat quality survey)

<table>
<thead>
<tr>
<th>Year</th>
<th>Fertiliser kg N/ha recommended using N-Min / N-Calc</th>
<th>Standard Industry Recommended kg N/ha</th>
<th>Yield t/ha</th>
<th>Protein %</th>
<th>Variety</th>
<th>Milling Achieved</th>
<th>N difference versus standard industry recommended kg N/ha</th>
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<tbody>
<tr>
<td>2007</td>
<td>196</td>
<td>230</td>
<td>10.5</td>
<td>13</td>
<td>Hereward</td>
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<td>-34</td>
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<td>2008</td>
<td>223</td>
<td>230</td>
<td>8</td>
<td>13</td>
<td>Hereward</td>
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<td>7</td>
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<td>2009</td>
<td>181</td>
<td>230</td>
<td>7.41</td>
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<tr>
<td>2010</td>
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<td>8.8</td>
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<tr>
<td>2011</td>
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<td>9.2</td>
<td>13</td>
<td>Solstice</td>
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<td>16</td>
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<tr>
<td>2012</td>
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<td>230</td>
<td>6</td>
<td>14.5</td>
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<td>-2</td>
</tr>
<tr>
<td>2014</td>
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<td>11.2</td>
<td>12.75</td>
<td>Gallant</td>
<td>Yes</td>
<td>16</td>
</tr>
<tr>
<td>2015</td>
<td>294</td>
<td>280</td>
<td>10.5</td>
<td>13.5</td>
<td>Gallant</td>
<td>Yes</td>
<td>14</td>
</tr>
<tr>
<td>Mean result</td>
<td>235</td>
<td>240</td>
<td>8.9</td>
<td>13.3</td>
<td>Yes</td>
<td>Yes</td>
<td>-3.1</td>
</tr>
</tbody>
</table>

Note: Crops not grown in 2013
**Farmer Details**

**Farmer:** Chris Richardson, Grove Farm, Sleaford, South Lincolnshire  
**Crops Grown:** Oilseed Rape  
**N-Min:** Second year of trials  
**Soil Type:** Sandy Loam, Sandy Clay Loam  
**Fertiliser used:** Nitram and DoubleTop

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**N-Min on Oilseed Rape**

Chris Richardson saved up to 50% of fertiliser spend following recommendations from CF’s N-Min & N-Calc service. All achieved with no yield penalty.

Chris Richardson grows around 70ha of OSR split roughly between HOLL rape and salad rape. In 2014, Chris decided to undertake field-scale trials to test results of CF’s N-Min and N-Calc service against his normal farm practice. Following the results in 2014, Chris is convinced that the N-Min and N-Calc service are significant and definitely improve profitability.

In field 7, the N-Min result was 70kg N/ha and the crop contained 75kg N/ha resulting in a soil Nitrogen supply of 145kg N/ha. Chris targeted a yield of 4.5t/ha. To achieve a yield of 4.5t/ha farm practice was 185kg N/ha however N-Calc system recommended a rate of 150kg N/ha, a saving of 35kg N/ha. Yields from the two showed a significant difference at 4.6t/ha (farm practice) and 5.3t/ha (N-Min).

In 2015, field 13 had an N requirement of 185kg N/ha. Using N-Min, the soil Nitrogen supply was 130kg N/ha with a recommendation to apply 44kg N/ha less than traditional farm practice, worth around £25/ha. By optimising the amount of N Chris saved on fertiliser costs yet gaining higher yield results of 5.4t/ha (N-Min) compared with 4.7t/ha (farm practice).

“The reductions I have seen following the Nitrogen recommendations using CF’s N-Min and N-Calc service are significant and have definitely convinced me to use the N-Min service and CF fertilisers again to improve my profitability.”

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Chris Richardson
Farmer Details

Farmer: Richard Anthony, Cae Pentre, Tythegston, Mid Glamorgan
Crops Grown: Milling Wheat, Oilseed Rape, Maize
N-Min: Has been used for eight years
Soil Type: Ranges from pure sand to heavy clay so it’s very important to look at each individual block of land and work out precisely what Nitrogen is required
Fertiliser used: Nitram and DoubleTop

Get more for less with N-Min on Milling Wheat

High yield of 12t/ha consistently achieving a protein content of 13%.

To manage high yields with top milling specification targets, Richard Anthony uses the N-Min service from CF to ensure Nitrogen is managed well. This blueprint has been used for the last eight years and his milling wheats have consistently hit top specification. N-Min tests are carried out early – mid February – to assess Nitrogen levels in the soil and the Additional Available Nitrogen that will become available to the crop in the growing season. N-Calc is used to produce a fertiliser rate and timing plan and takes into account the variety, previous cropping and target yield and quality. Typically for Richard’s milling wheat, Ross Leadbeater from CF recommends the total Nitrogen required is split into four applications – the first one in March and then at growth stages 30/31, 32/33 and 35/37. The early applications tend to be 50kg N/ha with later applications reaching 100kg N/ha using both Nitram and DoubleTop.

Standard Fertiliser Manual recommendations would have been 280kg N/ha. Following N-Min testing, Nitrogen recommendations ranged from 256kg N/ha to 270kg N/ha in 2015.

“For me it’s very much about putting the soil first and this is why the CF N-Min approach makes so much sense. It adds a level of accuracy and control that we wouldn’t achieve any other way.”

Richard Anthony

<table>
<thead>
<tr>
<th>Year</th>
<th>Fertiliser kg N/ha recommended using N-Min/ N-Calc</th>
<th>Standard Industry Recommended kg N/ha</th>
<th>Yield t/ha</th>
<th>Protein %</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>252 - 298</td>
<td>280</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>2015</td>
<td>256 - 270</td>
<td>280</td>
<td>12</td>
<td>13</td>
</tr>
</tbody>
</table>
Farmer Details

Farmer: Jon Birchall, Consultant for Balfours, Hereford/Shropshire
Crops Grown: Oilseed Rape, Wheat, Forage Rye, Maize, Carrots
N-Min: First year of trials
Soil Type: Sandy Loam
Fertiliser used: Nitram and DoubleTop

N-Min on Oilseed Rape and Wheat

Jon Birchall benefited from increased cost savings by £130/ha in fertiliser use by using the N-Min Nitrogen management system.

Jon Birchall is an agronomist for Balfours and manages a number of farms across Herefordshire and Shropshire. Jon tried the CF N-Min system in a couple of fields in 2015 (one OSR and one milling wheat field) and compared the recommendation to current farm practice which is based on the fertiliser manual. In both cases the N-Min system recommended less fertiliser N than what was usually applied and increased the yield of OSR by 0.5t/ha whilst maintaining his milling wheat yield (10t/ha) and grain protein (13%). By optimising his Nitrogen inputs via the N-Min system Jon earned an additional £130/ha across his OSR and £15/ha across his milling wheat.

“Using the N-Min service for the first time I was interested to learn how it would perform against my current practice. I was pleasantly surprised at the results because we applied much less N overall where we used N-Min and either improved or maintained the yield. I am keen to continue the trials in 2016 to understand how much more I can save.”

Jon Birchall
Farmer Details

Farmer: Drew Smith (A W Smith & Sons), Louth, Lincolnshire
Crops Grown: Winter Malting Barley, Oilseed Rape, Wheat
N-Min: Has been used for two years
Soil Type: Silty Clay Loam
Fertiliser used: SingleTop® applied in two applications

N-Min on Malting Barley (S Y Venture)

N-Min on Malting Barley (S Y Venture) – Higher yield of 8.1t/ha achieved whilst maintaining grain N at 1.6%.

Historically, Drew Smith always applied 130kg N/ha to his winter malting barley achieving 1.6% grain N and yields of 7-7.5t/ha. Dave Towse from CF, convinced Drew two years ago to follow the CF Blueprint and to use the N-Min and by N-Calc to achieve a higher yield and maintain grain N at 1.6%.

In 2014, the N-Min test result showed that 63kg N/ha of Nitrogen was in the soil and available for the crop during the growing season. N-Calc used this figure to calculate a Nitrogen recommendation of 162kg N/ha at a target yield of 8t/ha.

More N was applied earlier in the season to help deliver the target yield and maintain a low grain N %.

SingleTop was used to apply Sulphur little and often throughout spring. A yield of 8.1t/ha (higher that historically achieved) was produced coupled with grain N at 1.6% earning an additional £30/ha premium.

“I have used the N-Min service from CF Fertilisers across five fields growing oilseed rape, wheat and barley for two years and have managed to increase profitability on my farm. Dave Towse from CF has changed my fertiliser rate and timing plan and I have been impressed with the results.”

Drew Smith

Harvest Results - Spring Malting Barley

Yield: 8.1t/ha
Farmer Details

Farmer: Tom Gilman, Rutland
Crops Grown: Grass, Wheat, Winter Barley, Oilseed Rape, Sugar Beet
N-Min: Has been used for 3 years
Soil Type: Limestone Brash, Sandy Loam, Red Ironstone, Ironstone Loam over shale
Fertiliser used: Nitram

N-Min on Winter Wheat

45% less fertiliser used compared to standard farm practice following N-Min testing – both areas yielded 10.25t/ha.

N-Min recommended 120kg N/ha compared to farm practice of 220kg N/ha. Both areas yielded 10.25t/ha. Across the 30 ha that were treated according to CF’s recommendations, Tom Gilman saved six tonnes of Nitram. This underlined the importance of knowing how much Nitrogen is in the soil to begin with and tailoring the rate of applied Nitrogen accordingly, without compromising yield or quality.

“I am of the opinion that if the crop needs Nitrogen, then it gets it. In some senses it might appear difficult to quantify the benefits of N-Min, but it just has to be the right thing to do. It is not just about saving money, it’s more about optimising applications to avoid the unnecessary use of Nitrogen, minimising the environmental impact and having the paperwork to back up what we do. It gives me confidence that what I am doing is correct.”

Tom Gilman
Farmer Details

Farmer: Ben Atkinson, J. E. Atkinson & Sons
Crops Grown: Winter Wheat
N-Min: Used for 5 years
Soil Type: Silty Loam, Sandy Clay Loam, Silty Clay Loam, Clay Loam, Silty Clay
Fertiliser used: Nitram

N-Min on Winter Wheat

Following CF Fertilisers N-Min recommendations meant a 120kg N/ha saving in Nitrogen, worth £80/ha in Nitrogen costs.

Ben Atkinson farms in Bourne, Lincolnshire and has used CF Fertilisers N-Min and N-Calc service to secure and achieve yields across his crops. Over the past 5 years Ben has used the N-Min service and samples 8-10 fields per year to understand the range of soil N supplies across his acreage.

Ben Atkinsons’ results shows an example of how N-Min and N-Calc can increase yields at no extra cost. In 2015, Ben split one field where the N-Min result was very high (144kg N/ha) meaning that only 100kg N/ha was recommended to gain an 11t/ha crop yield. Usually Ben applies 220kg N/ha to his feed wheat, but by following CF Fertilisers N-Min recommendations, Ben had a 120kg N/ha saving in Nitrogen worth £80/ha.

Harvest Results - Winter Wheat

Yield: 11t/ha

“I have used the N-Min system for the past 5 years and trust the CF N-Min systems recommendations. Most of my fields averaged 30-40kg N/ha but on one particular field it was very high at 120kg N/ha but trusting the recommendations gained me a crop yield of 11t/ha with a saving of £80/ha.”

Ben Atkinson
When and how to sample?

- Best time to sample is in the spring before the first fertiliser application and at least six weeks after the last manure application.

- The quality of the soil sample is critical, so plan the sample well:
  - Take 10 to 15 cores (up to 20 cores for fields >20ha) from a ‘W’ shape pattern across the field.
  - Avoid areas such as gateways, headlands, old manure heaps.
  - Do not pick up any crop residue or manure.
  - Soil cores should be taken at a depth of 60cm (or max rooting depth, if less than that).

- Push the auger in firmly and measure how deep it goes:
  - If the field varies, test in a few places and take an average.
  - Make sure you record the actual sample depth.

- Once collected, the cores should be combined together (but not over-mixed):
  - Keep the sample cool with frozen gel packs and send to the lab within 1-2 days.

- Before leaving the field, make an estimate of amount of Nitrogen already in the crop:
  - By counting the tillers in cereals, or
  - Measuring the Green Area Index in oilseed rape.

- Within two weeks, the results will return from the lab:
  - Feed them into CF’s Nitrogen calculator; N-Calc.
  - Add target yield, keeping it realistic.
  - Obtain result – optimum amount of Nitrogen fertiliser to apply with timing guidance on applications.

<table>
<thead>
<tr>
<th>Standard SMN test compared to CF with N-Min &amp; N-Calc service</th>
<th>Practical</th>
<th>How much Nitrogen measured</th>
<th>Minimaliseable</th>
<th>Nitrogen recommendation</th>
<th>Interpretation support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard SMN sampling</td>
<td>Sample down to 90cm</td>
<td></td>
<td>None</td>
<td>Tables in Fertiliser Manual</td>
<td>Minimal</td>
</tr>
<tr>
<td>N-Min &amp; N-Calc</td>
<td>Sample to 60cm or maximum rooting depth if less</td>
<td>Soil N at sampling plus Additionally Available N (AAN)</td>
<td>Field AAN measured in the laboratory</td>
<td>N-Calc tailored software validated and updated by ADAS</td>
<td>FACTS Qualified Adviser</td>
</tr>
</tbody>
</table>

CF Fertilisers’ N-Calc recommendation will:

- Ensure yield and quality aspirations are met.
- Allow changes in economic circumstances to be accounted for.
- Minimise the environmental impact of crop production.
- Ensure that every £ spent on Nitrogen is a £ well spent.
A guide to using The N-Min Service

- Freeze ice sachets in advance
- Book the courier, get the samples ready and ensure the samples are kept cold
- Dispatch must be Monday to Thursday
- Take a representative sample – results are only as good as the sample taken
- Fill in all the details on the Field Data Sheet – they form part of the calculation/results
- Enclose copy of Field Data Sheet in the box. No document – no processing
- Ensure you have completed all your documentation and that the sample bags are labeled with a sample number
Need to know more about Nitrogen rates and timing?

Talk to our Agronomists

Their objective is to be your first choice for specialist help, advice and hands-on support. When it comes to crop nutrition you will not find a more knowledgeable team.

Blue bags grow better crops

For further help and advice, please contact us on: 0151 357 5758 or email: advice@cffertilisers.co.uk

www.cffertilisers.co.uk