PES TECHNOLOGIES
Testing transformed

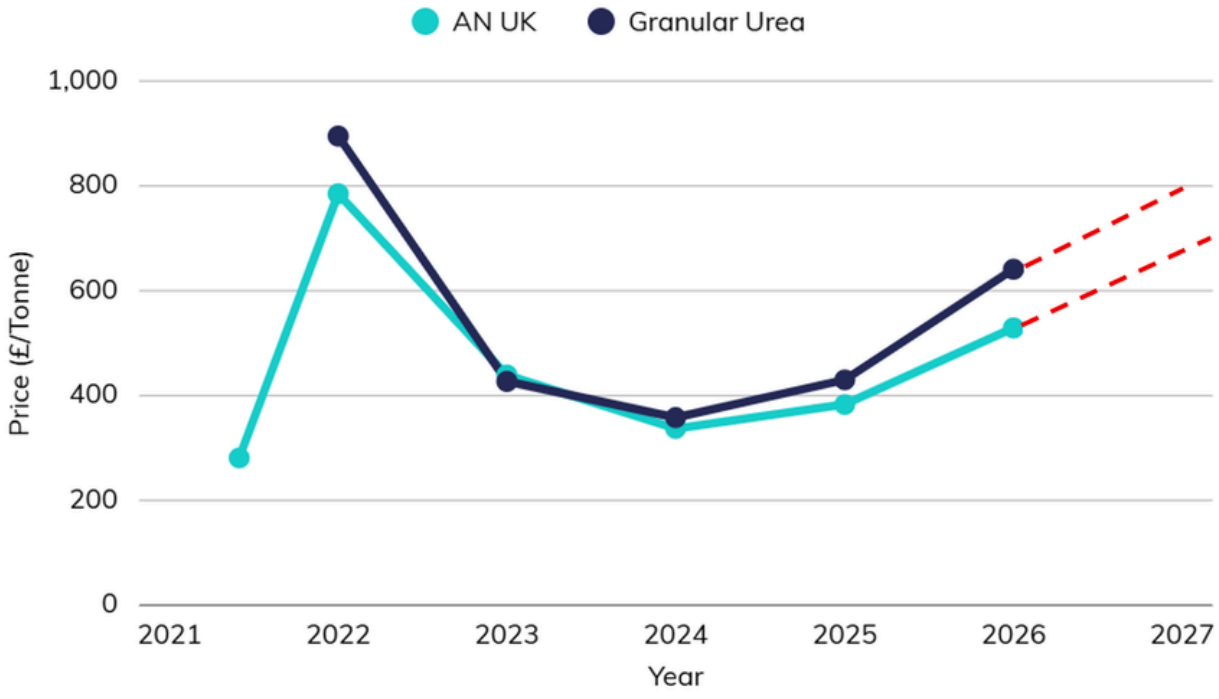
How PES Technologies Makes Your Nitrogen Applications Work Harder - Saving You Money

Executive summary

95% of English farmers use nitrogen fertilisers, most are reliant on their use despite soaring costs. However, many crops receive 50% of their nitrogen from the soil and the biological community within it. On larger wheat areas, by understanding your biology and adjusting nitrogen rates by only 5%, you could save thousands of pounds per year

Introduction

For most farmers, nitrogen fertiliser is a necessity. In the 2024/25 year, **95% of English farms applied fertilisers**, with an AHDB recommendation of 190-220kg/ha for winter wheat on medium soils (DEFRA, 2026). Recently, these fertilisers come with a hefty, profit slashing, price tag, with the price of UK-produced ammonium nitrate sitting at £530 per tonne, reflecting a 31.7% increase since the onset of conflict in the Middle East (AHDB, 2026).



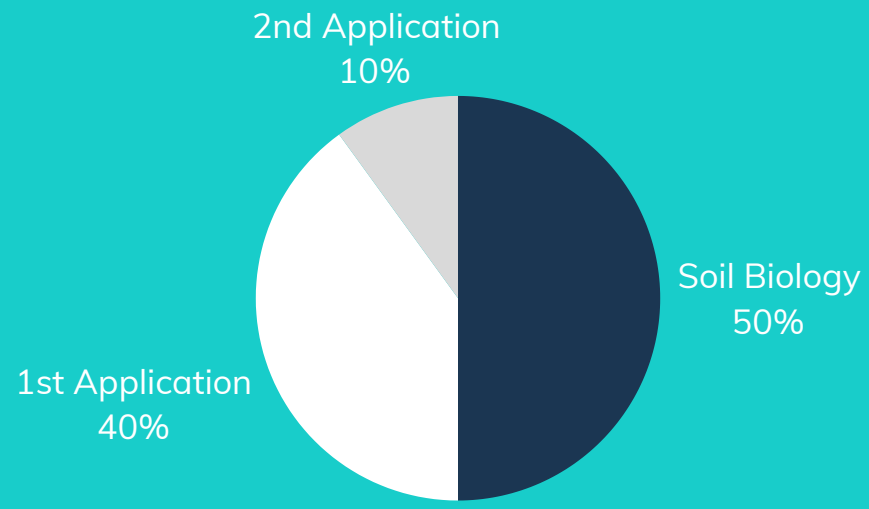
The graph above shows prices in April every year up to 2026, with some projections for 2027 showing up to a 30% increase in fertiliser price. Figures from AHDB.

Are your crops actually benefitting from the fertiliser you apply?

Commercial crops source nitrogen from two main areas: surface applications by the farmer, and existing nitrogen in the soil. Soil nitrogen is derived from plant and animal residues, which are broken down and made available to crops by the soil's biological community.

Soil biology is responsible for releasing half of the nitrogen needed for winter wheat crops with roughly 50% of their nitrogen requirement directly from the soil (AHDB). Typically, a farmer's first and second applications unlock the remaining 40% and 10% needed for maximum yield (AHDB). Because soil biology is responsible for half of a crop's nitrogen needs, failing to measure it creates massive inefficiency.

Sources of N Utilised by Winter Wheat Crops



Strong biology risks over-application and wasted money, while weak biology leads to under-supported crops and missed yield targets. The Nitrogen you apply isn't even guaranteed to make it to your crop. It is estimated that **40% to 70% of applied synthetic nitrogen is lost to the atmosphere** or leached into the environment, making optimising your nitrogen applications even more important and prompting a shift in focus to the soil driven half of the nitrogen equation (UK Parliament POSTnote 710, 2024).

The soil biology is responsible for supplying half of a crops nitrogen needs. Thoroughly measuring and understanding your soil biology could help you reduce the amount of synthetic nitrogen you are applying. Even reducing nitrogen by just 5% has big impacts.

Cutting Costs: What a 5% Reduction Looks Like

By using PES Technologies to accurately analyse your soil biology, you can confidently optimise your input strategy. Even a conservative **5% reduction** in synthetic nitrogen applications yields significant, immediate financial returns.

The table below breaks down the annual savings based on current ammonium nitrate prices April 2026 (£530/t) for a winter wheat crop on medium texture soil, with a Soil Nitrogen Supply Index of 2 (81-100kg/ha). For these conditions, assuming balanced index's of potassium and phosphorous, the AHDB recommendation is 190kg/ha.

Farm Profile	Total Nitrogen required (Tonnes)	Total Ammonium Nitrate Fertiliser needed for 19t of N	Annual Spend on Fertiliser	5% Reduction Saving
100 Hectares *(Average ~190 N kg/ha)*	19 t	55t	£29,150	**£1457.5**
1,000 Hectares *(Average 190 N kg/ha)*	190 t	550t	£291,500	**£14,575**

Making the change - How can PES Technologies inform you to make management decisions?

PES Technologies provides you biological, chemical and physical soil health indicators in-field in 10 mins. Having microbial biomass, microbial respiration and metabolic quotient data at your fingertips allows you to track and baseline your soils biological health. Understanding where half of your crops nitrogen comes from allows you to make adjustments to your additions as well as showing you insights into how your management is affecting your biological life.

What am I looking for?

You can look at the nitrogen in your soil in a few ways; total nitrogen %, as well as extractable nitrate and extractable ammonium. Total nitrogen tells you the overall pool of nitrogen in your soil, but not all of this will be accessible by the crop and is often bound up in organic matter, needing to be 'unlocked' by mineralisation done by the microbial community. Extractable nitrogen and ammonium can be directly used by the crop but is highly mobile and changeable, susceptible to leaching as well as loss to atmosphere in hot conditions. This makes it harder to have accurate measurements, as soon as you take that sample out of the ground, your nitrogen results might not be as accurate as when in-field.

PES Technologies provides the following to help you make informed decisions about nitrogen

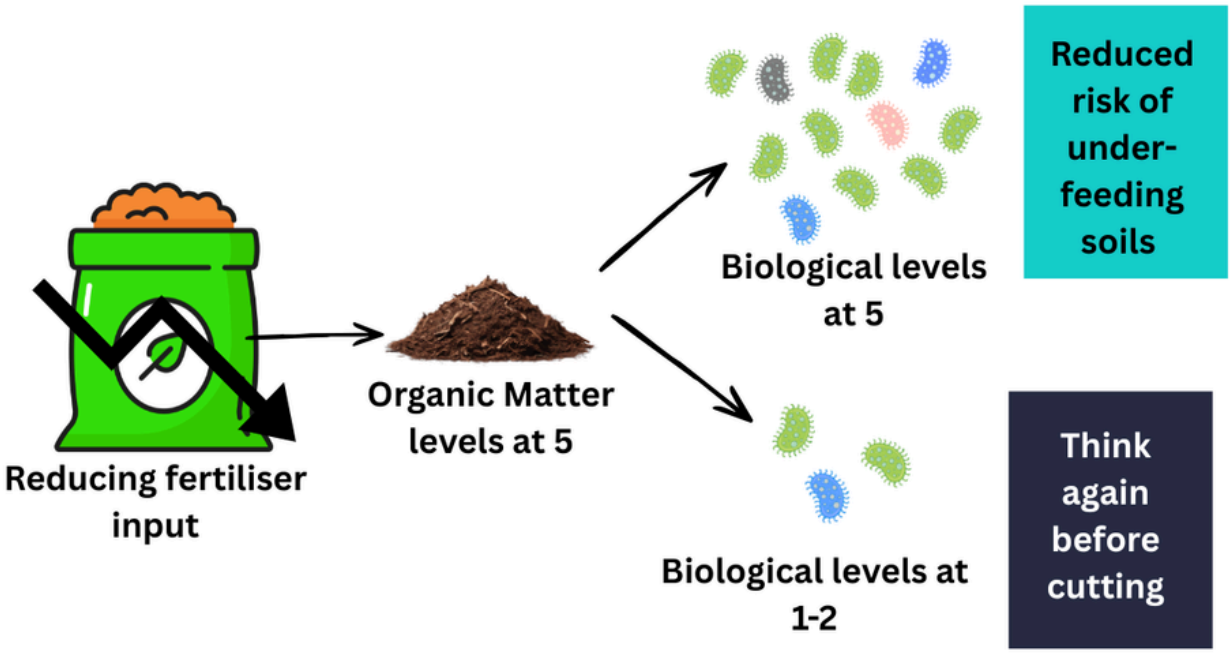
- Total nitrogen %
- Available nitrates and available ammonium
- Organic Matter
- Biologicals: Microbial biomass, microbial respiration, metabolic quotient

PES Technologies provides all these indicators in-field, avoiding any changes to the soil with a change in temperature or environment.

After you know your nitrogen levels and biological levels how can this help inform you on your nitrogen applications?

The PES Technologies results are presented in RB209 indices where possible, helping you to map your existing management plan onto PES Technologies results. However the RB209 does not take into account biological indicators when applying fertiliser.

Understanding your biological levels in the soil gives you more insight into what your plants need. For example if your organic matter (OM) levels are at a 5, you may be tempted to cut your nitrogen applications, as there are nitrogen reserves in the OM. However, if your biological indicators are at levels of 2 or below, that could suggest that there is not enough biological bulk to break down the nitrogen reserves in the OM, making a nitrogen cut much riskier. Think of the biological life in your soil as the conversion engine for all the nitrogen in the soil, if the engines inefficient, you'll have to keep adding more fuel. In contrast, if your biological levels are high, this provides more certainty that cutting nitrogen will not have an effect on the crop as there is enough biological muscle to breakdown reserves.

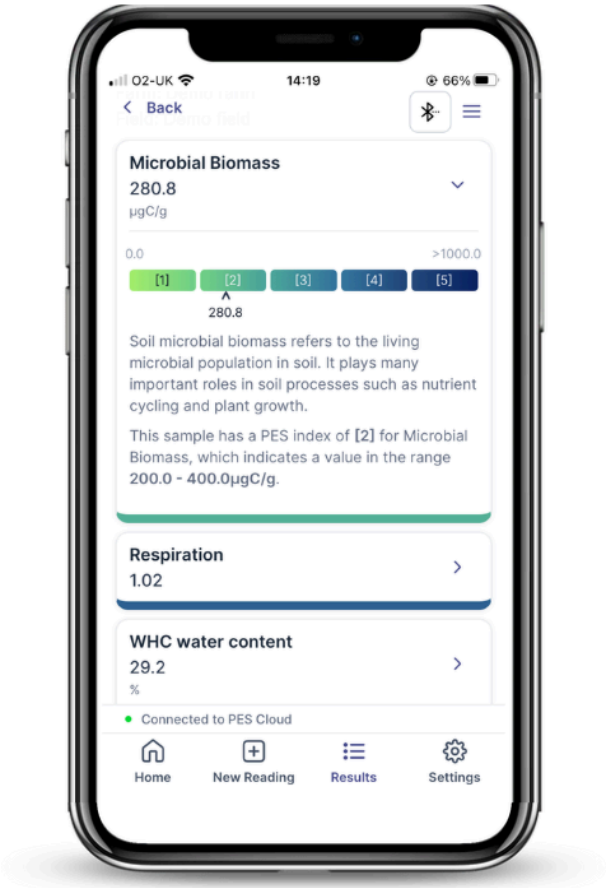


Your Arsenal

- **RB209** - Guiding your application measurements

- **Nitrate and ammonium PES results** from your soil to see what soil supply you already have, and **Organic matter** to see what nitrogen reserves are in the tank.

- **Biological PES indicators** to see how efficiently your nitrogen is being broken down and made available to your crop. Referring to biological indices before cutting or increasing nitrogen gives you confidence in your decision.



Armed with these, you'll be able to make the most informed decision to adjust your nitrogen and make the best decision for your crops.

Long-Term Resilience and Soil Health

While adjusting your nitrogen applications provides an immediate yearly financial return, the long-term agronomic benefits of understanding your soil are even greater.

By using data to foster a healthier soil microbiome, you unlock:

- **Enhanced nutrient cycling** that naturally sustains crop growth.
- **Improved water-holding capacity** to mitigate drought and waterlogging.
- **Reduced dependence** on volatile synthetic fertiliser markets.

Optimising your nitrogen isn't just about immediate cashback; it is about building a holistic, resilient soil system that is less vulnerable to climatic extremes and requires fewer costly synthetic inputs year after year.

References

AHDB,. (2026). GB fertiliser prices | AHDB

AHDB., Nitrogen supply, demand and utilisation in winter wheat | AHDB

AHDB., (2026) RB209 Nutrient Management Guide (RB209) | AHDB

DEFRA., (2026) Fertiliser usage on farm – England - GOV.UK

UK Parliament POSTnote 710., (2024) The future of fertiliser use