The team is focused on postharvest technologies, looking at ways of slowing down the progression of some fungal diseases, such as black dot and silver scurf.

are taking thousands of images of potatoes to train an AI-model that will automatically identify early signs of sprouting using a machine learning approach originally used in medicine."

From a research perspective, an accurate model would help speed up and increase accuracy of assessing potatoes produced during screening of breeding lines, MariCarmen notes.

In addition to visual detection, the project is also examining whether electrical signals – detected by minute electrodes installed in plants in the field or tubers in store can be used to predict dormancy break by detecting changes in electrophysiological measures.

Cranfield University is also one of 18 partners in an EU-funded Horizon project, PataFEST, researching the potential future pests and soil-borne pathogens that might pose a risk to potato production. One such disease is zebra chip, caused by a bacterium, Candidatus Liberibacter solanacearum, which affects potato crops in South America.

Transmitted by plant lice not currently present in Europe, it not only has a big impact on yield but also quality, MariCarmen reports. "The tubers have a discolouration inside that makes them unsuitable for processing."

Part of the research is looking for potential pre-harvest solutions, such as foliar sprays that would prevent the psyllid from feeding on the plant, development of resistant varieties through breeding programmes and real-time diagnosis tools for early disease detection but MariCarmen's team is focused on postharvest technologies.

These look at ways of slowing down the progression of some fungal diseases, such as black dot and silver scurf, which get worse the longer the potato is stored.

Examples of possible solutions include the use of controlled atmosphere environments in store that contain higher levels of carbon dioxide and lower oxygen concentrations, and edible coatings that the potatoes can be dipped in or sprayed with that reduce disease progression.

"We're also looking at tools for early detection, not only for zebra chip, but also other diseases like dry rot. We are trying to identify volatile organic compounds released in the very early stages of the disease, which we can then develop sensors for and further install in stores to detect the disease much earlier."

While this wouldn't stop the disease, early detection would allow timely and informed management decisions that will help reduce storage losses, she concludes. ◆

Half Your Nitrogen Never Reaches the Crop. Does That Bother You?

Nutrient use efficiency and balance in vegetable production
Simon Fox BSc MSc CITP MBCS MiSoilSci CEO
(June 2026)

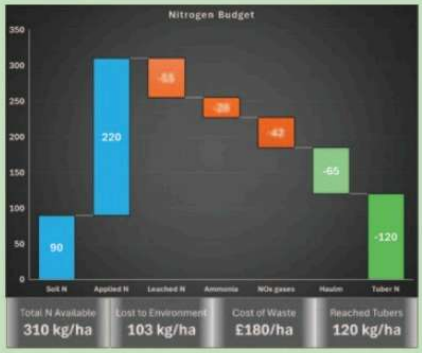
We were going to cover water but it seems to be in abundance at the moment, but with the Middle East conflict continuing - Nitrogen seems a more appropriate topic.

This has happened before. Ukraine in 2022. Iran in 2026. Both times, the same uncomfortable truth: we don't just depend on imported fertiliser — we waste a spectacular amount of what we buy.

Globally, crops recover about half the nitrogen applied to them. For vegetables the figure is often worse — some studies put NUE as low as fourteen per cent. Nitrate leaching accounts for twenty to thirty per cent of applied N. Ammonia volatilisation from surface-applied urea loses another ten to twenty per cent on a warm day. Denitrification takes a further five to fifteen per cent, rising sharply in wet or compacted ground.

When nitrogen was cheap, all of this was an inconvenience. When it doubles in price because someone plays "Top Trumps" with shipping lanes six thousand miles away it becomes a problem you can't afford to ignore.

Add those up on a potato crop at 200 kg N/ha and you're looking at 45 to 120 kilograms going into the air and the water table instead of the tuber. At AN prices north of £600 a tonne, that's £100 to £220 per hectare — wasted. Recent Innovate UK field monitoring suggests these losses may be even higher, particularly at night when N O emissions spike in ways that daytime sampling misses entirely.



But we already know how to fix most of it.

Start with the form: ammonium stays put, nitrate moves with water. Controlled-release formulations and split applications matched to demand keep nitrogen where the crop can reach it. Above the field, canopy sensing from satellites or drones maps crop nitrogen status in real time, enabling variable-rate application instead of spreading uniformly across a field where demand may vary by 80 kg/ha.

Underground, a deeper root system is a more efficient root system. Mycorrhizal fungi extend the functional root network. Free-living nitrogen-fixing bacteria deliver modest but genuinely free nitrogen — no tanker through the Strait of Hormuz required. Above ground, well-timed foliar nitrogen can bridge a gap during rapid canopy growth with near-total uptake — though leaf architecture matters: what works on a potato canopy may burn a lettuce or run straight off an onion.

And here's the point that gets missed most often: nutrient use efficiency is not just about nitrogen. It's about balance. A crop with adequate phosphorus, potassium, magnesium and trace elements converts nitrogen into yield. A crop with a hidden deficiency converts it into pollution — and a greenhouse gas footprint considerably larger than anyone assumed.

The next war, the next pandemic, the next price spike — they're coming. The growers who'll do best are those who've stopped wasting what they buy.