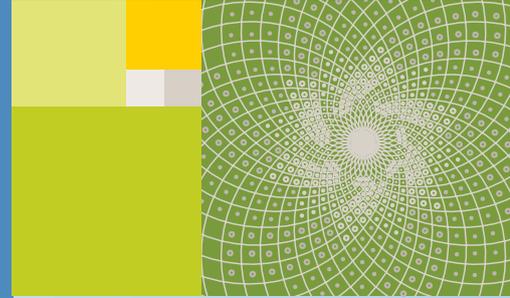




Knowledge grows

Introducing the Yara N-Sensor™



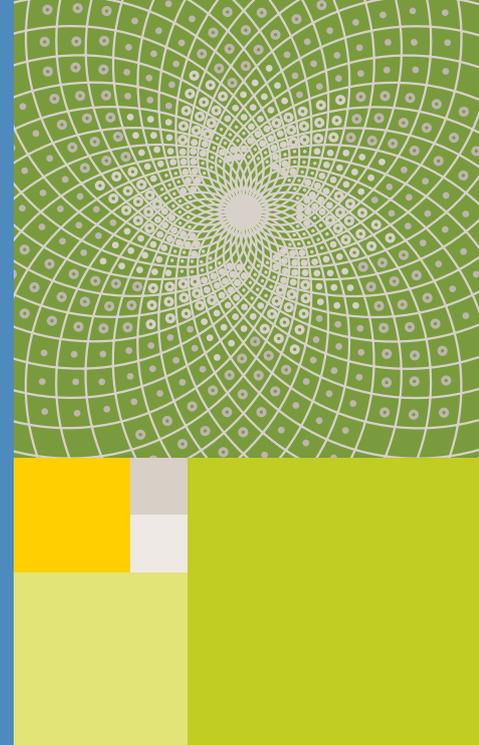
Introducing the Yara N-Sensor™

N-Sensor forms part of the Precision Farming solution offered by Yara alongside N-Plan and N-Tester, as a site-specific management tool for nitrogen applications.

The Yara N-Sensor offer farmers a solution to real-time variable rate nitrogen applications by adjusting rates according to crop growth whilst travelling across a field. As a result, the N-Sensor is designed to deliver precise levels of input according to the crop's requirements, helping to reduce environmental effects whilst maximising potential profit.

A dedicated group of scientists at Yara's R&D base at Hanninghof in Germany carry out trial work annually to improve the crop specific calibrations that exist currently, and increase the range of options for use.

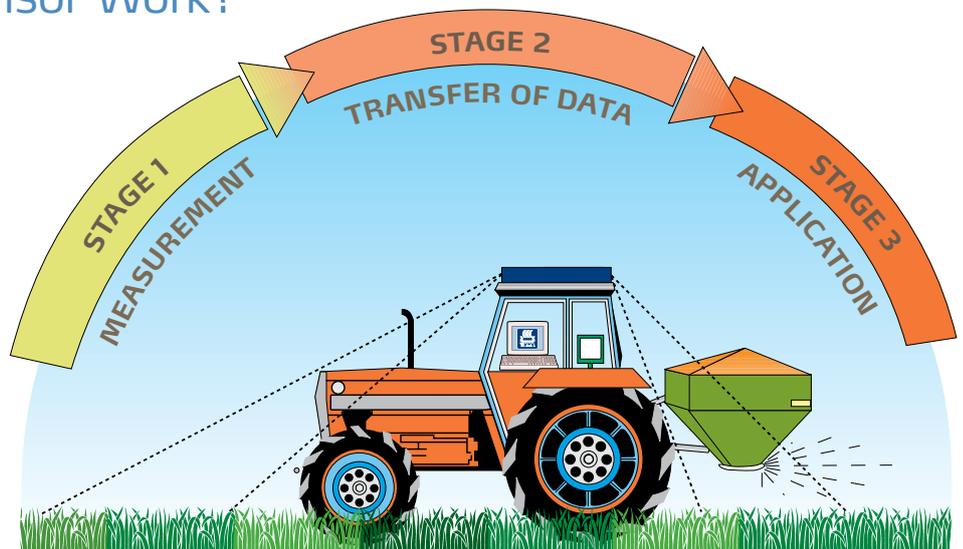
The result? Improved gross margins and greater nitrogen efficiency.



How Does the N-Sensor Work?

The N-Sensor was first developed by Yara's Research & Development team at Hanninghof in Germany following over 10 years of intensive testing and trial work. It was introduced on farm in the 1990's offering a practical solution to farmers for variable rate nitrogen applications as a cab-mounted tool that can easily be transferred between machines on both tractors and self-propelled sprayers.

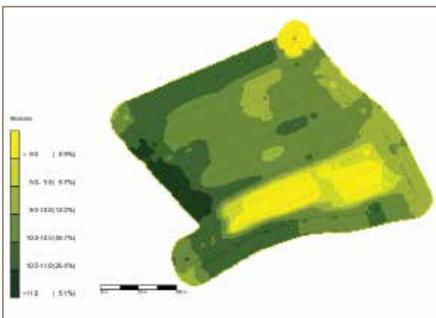
In 2005 the N-Sensor ALS (Active Light Source) was introduced as a solution to restricted working hours due to low light intensity. As the name suggests the ALS contains its own light source to continue operating irrespective of ambient light conditions.



Using an oblique view of the crop, its nitrogen demand is measured by the N-Sensor mounted on top of the cab using crop specific light reflectance. Within a fraction of a second, the data is translated into an application rate which adjusts the sprayer/spreader accordingly.

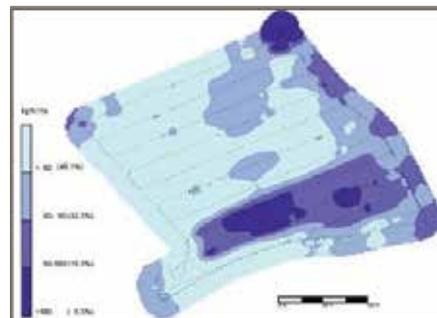
N-Sensor Biomass Map

Showing tramlines which were missed during the first application and therefore received no nitrogen



N-Sensor Application Map

Showing higher nitrogen for the tramlines which were missed during the first application



Crop Coverage

Yara has developed application rate software for:

- Wheat (Winter and Spring)
- Barley (Winter and Spring)
- Winter Oilseed Rape
- Potatoes
- Maize
- Grass (under development)
- Certain field vegetable crops including cauliflower



Benefits

- **3.5% increase in yield**
Based on over 250 fully replicated trials since 1997.
- **More efficient use of nitrogen**
- **12 – 20% improvement in combine efficiency**
 - Decreased lodging risk (avoiding up to 30% yield loss)
 - More even grain quality across the field
 - Average 18.5% reduction in harvest days
- **Enhanced and more even grain protein content**
- **24/7 operation with the N-Sensor ALS**
(Active Light Source)
- **Increased gross margin and profitability**

Example

Based on 8.5t/ha yield, a 3.5% yield increase using N-Sensor and a £110/tonne grain price, farmers could expect to receive:

	200 hectare field	400 hectare field
Value of additional yield	£6,545	£13,090

Therefore, even for a 200 ha farm, N-Sensor would deliver a significant return on investment.

Why Choose Yara N-Sensor?

- 1. N-Sensor uses crop specific algorithms**
 - More accurate than NDVI standard light wavelengths, N-Sensor bases its measurements on specific wavelengths of light to establish exact levels of biomass and colour within the leaf. Application rates are significantly more accurate, delivering better yield and quality.
 - Using the same technology, N-Sensor has the only Absolute-N calibration for oilseed rape, proven to deliver a 3.9% increase in yield.
- 2. N-Sensor is a real time, high resolution device**
 - Nitrogen determination is instantaneous, accurate and unaffected by cloud cover.
- 3. Backed by over 250 trials since 1997**
 - The N-Sensor results quoted by Yara are based on the longest running, most comprehensive set of fully replicated field trials in the industry. Trials continue to determine even more crop specific calibrations.
- 4. Inbuilt agronomic knowledge**
 - Unlike other systems available from machinery manufacturers, the development and performance of the N-Sensor is underpinned by Yara's industry leading agronomic knowledge and insight.
- 5. Not just for nitrogen**
 - Trial work has also confirmed that N-Sensor can be used to reduce the application rates of PGR's, potato haulm desiccants and potentially fungicides.
- 6. In season agronomic and technical support**
 - To help customers get the most from their N-Sensor, Yara provides hands-on agronomic and technical support throughout the season.

Yara UK Limited
Harvest House
Europarc
Grimsby
N. E. Lincolnshire
DN37 9TZ

Yara UK Limited
8 Herdman Channel Road
Belfast
Northern Ireland
BT3 9LG

Precision Decisions Ltd
Station Lane
Shipton by Beningbrough
York
YO30 1BS

01347 844132
info@precisiondecisions.co.uk

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Yara UK Limited
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Yara is able to offer the N-Sensor for purchase or on an annual rental agreement. In season agronomic and technical support for the UK and Ireland is provided by Yara and precision farming specialists, Precision Decisions.

