



# SOIL HEALTH MONITORING

*Unlocking soil insights for better crop management*

## Technology

Soil health can be monitored using LoRaWAN (and 4G/5G where consistent connectivity available) wireless sensors that track nutrient fluxes, such as Nitrous Oxide (N<sub>2</sub>O) emissions, over time. AI-powered analysis transforms raw data into easy-to-understand insights - helping farmers make informed decisions.

## The Need for Farmers

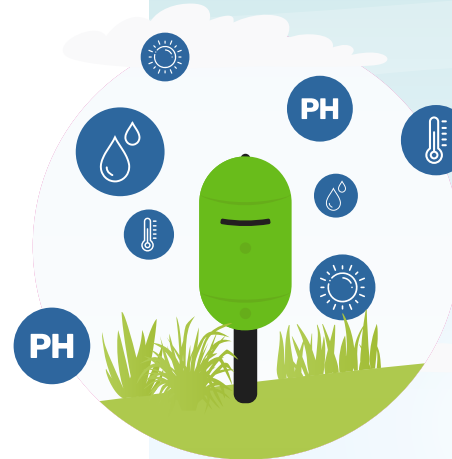
- > Precision nutrient management improves crop growth and sustainability
- > Measuring soil conditions is time-consuming and challenging
- > Many rural farms lack the infrastructure to monitor environmental impact

## Benefits



### Why Rural Connectivity Matters?

*Many farms struggle to collect soil data due to poor network access. 5G and LoRaWAN enable real-time, accurate monitoring - cutting costs and reducing environmental impact.*



**HARTPURY AGRICULTURE**

DIGITAL INNOVATION FARM



Four prototype **Soil Emission Capture** sensor nodes have been deployed across Hartpury Farm, measuring N<sub>2</sub>O emissions from cultivated, grassland, trial plots and uncultivated areas. Previously used as data loggers, these sensors are now transitioning into real-time IoT devices.

Simon Fox - Emerald Research Ltd

