

## Impact story

# The next step in precision agriculture

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Growing enough food for the world's burgeoning population may require smart farms that can sense their crop conditions and feed themselves on demand, and Turing researchers are developing the technology they'll need.

- With the world's growing population there's a major need to sustainably squeeze ever more food out of the world's limited farmland. Precision agriculture (PA) can help.
- PA can use long-range sensor networks to gauge the state of a farm's crops, air, and soil in high resolution, allowing the efficient tailoring of inputs such as water, fertiliser and pesticides.
- The Turing's Data-centric Engineering programme is developing PA technology, led by Julie McCann of Imperial College London.
- Sensors were placed throughout the Ridgeview wine estate. Provide real-time monitoring of, and insights into, microclimate and growing conditions.
- McCann's team has also designed a unique system to use LoRa – low-power, long-range transmission – to control farming processes, such as using actuators to add fertiliser.
- A crucial innovation as it transforms a passive sensing network into a control network.
- Farms that can 'feel' and 'feed' themselves offer hope for a more efficient and sustainable future for farming.

### Impact

- PA minimises harm to soil and biodiversity
- Development of sensor networks to read the state of farms at high resolution will facilitate sustainable practices
- Helps meet Turing's 'infrastructure' focused challenge with respect to two key resources: food and water.

**"We are able to understand the small changes in the vineyard and identify potential disease hotspots."**

Matthew Strugnell, Winery Manager, Ridgeview



General environmental sensor devices such as this one measure light, temperature and humidity, to enable microclimates to be understood.