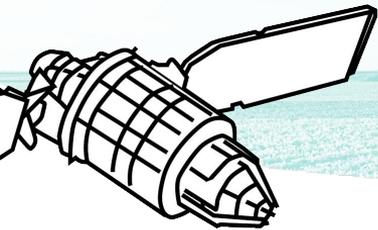


Hummingbird
Technologies

**Cover crop
detection analysis**



Remote sensing detection of cover crops



Using NDVI to detect bare soil vs covered soil throughout the year

to monitor runoff and leaching risk for water resources

What is it?

Cover crops are a key component of regenerative agriculture, protecting soil from erosion and runoff and increasing soil organic matter through root exudates during the non-growing season.

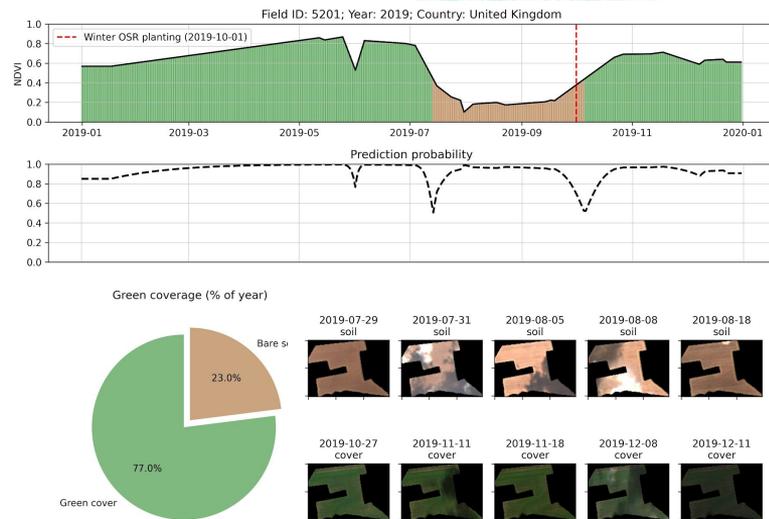
Why it's important

- Reduces soil erosion and runoff
- Maintains soil structure
- Increases soil organic matter
- Improves water quality
- Optimizes soil moisture

How it works

Using a threshold of NDVI as an indicator of green coverage on the soil, we apply an algorithm to detect coverage of the soil during the growing season and the non-growing season.

This enables the model to detect cover crops and count the number of days per year where soil is protected by growing plants. This enables monitoring and verification of regenerative farming practices at large scale and low cost.



Green coverage & Cover crop detection

Remote sensing monitoring of cover crop prevalence offers a low-cost, scalable approach to assessing the risk to water resources of agricultural runoff and leaching.

Methodology

Using Sentinel 2 data and NDVI to detect green coverage in the non-growing season, we can identify fields with and without cover crops in the area of interest.

Using this methodology, Dr. Nick Synes, one of our Data Science Team at Hummingbird, has analysed the prevalence of cover crop practices in proximity to the River Wensum in Norfolk.

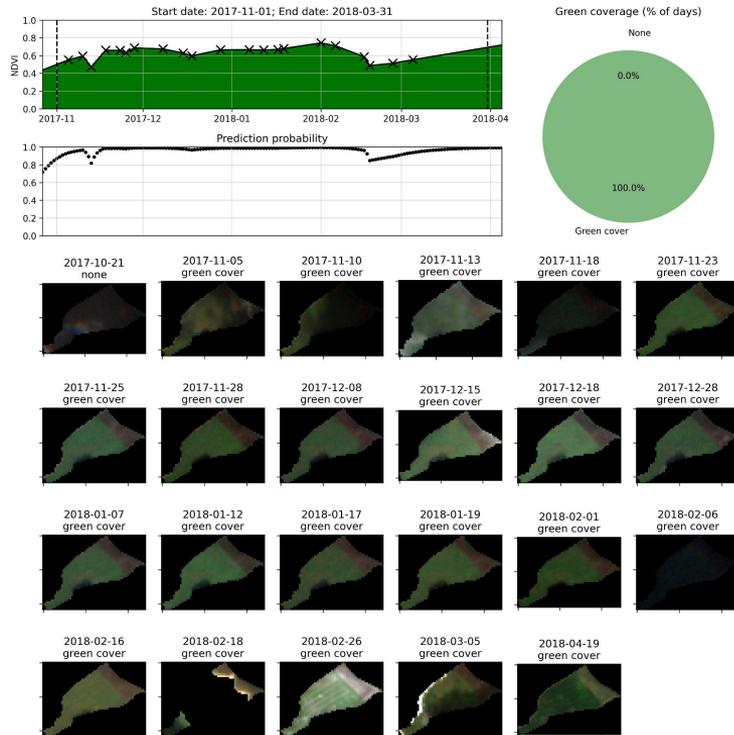
By looking at the number of fields planted with cover crops in each of the last 4 seasons we can see geospatial and temporal trends in cover crop practices by farmers in the region. This data could be used to inform decision-making about water resources and/or engagement with farmers and landowners.

Case study: River Wensum catchment area

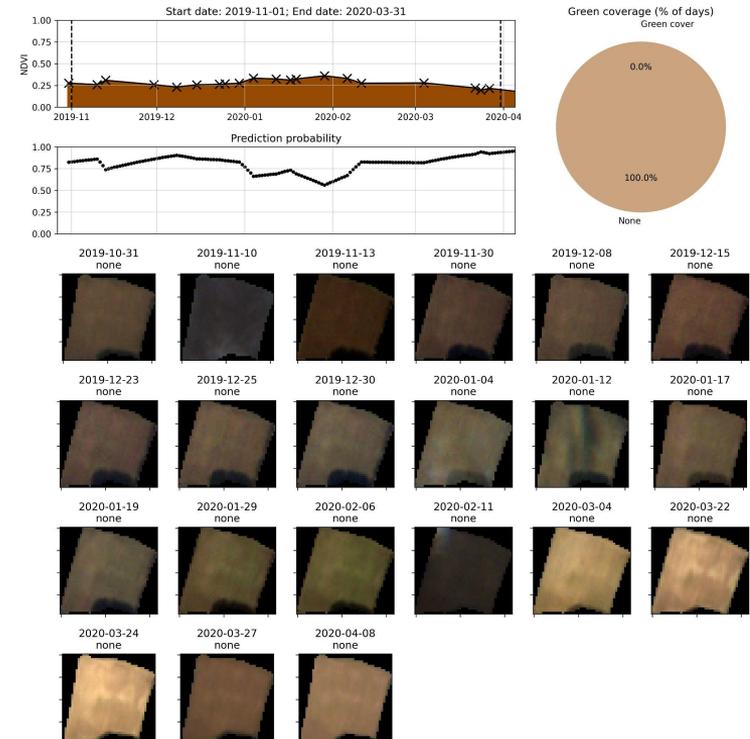


Field level visualisations

Example field with cover crops



Example field without cover crops

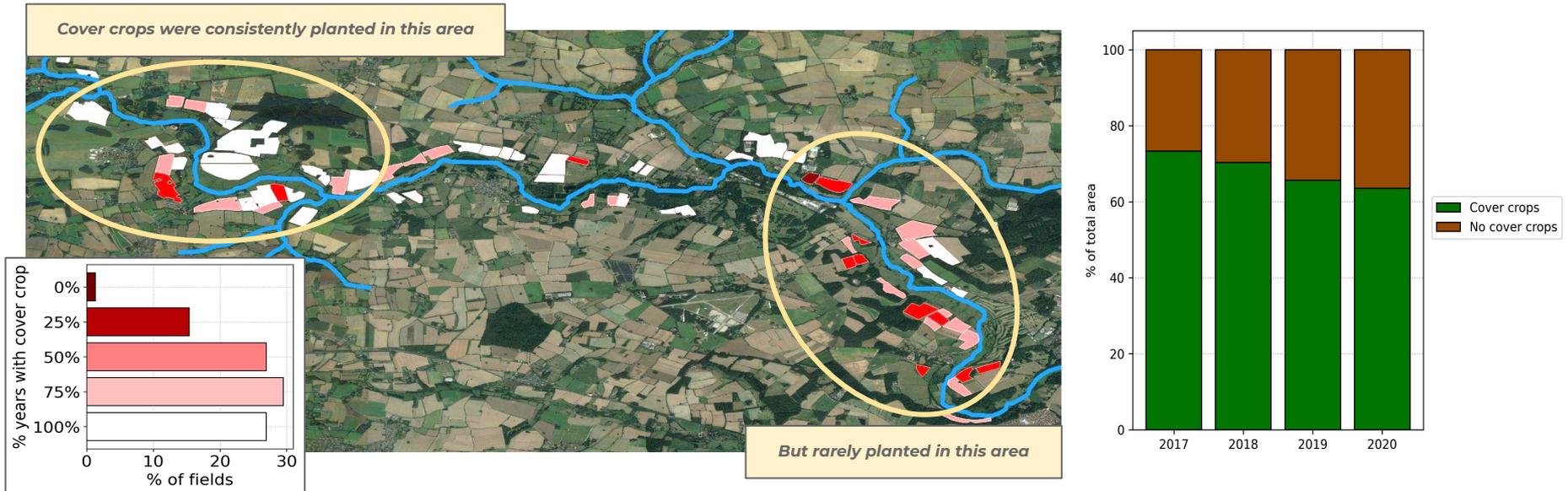


Results

Cover crop usage has become less common in recent years in the area of interest, comprising arable fields in close proximity to the Wensum. The percentage of farmed area protected by cover crops during the winter months fell from 73% to 64% between 2017 and 2020, falling from above to below the UK average of around 66%.

This may be because of a decrease in cover crop uptake incentive schemes or other economic or environmental factors facing farmers in the region. Another notable point is that there is serial correlation in the uptake of cover crop practices across the area of interest, i.e. there is persistent regional variation in the prevalence of cover crops, suggesting that engagement with specific farmers and landowners could generate significant improvements in the runoff risk profile of the catchment area.

This analysis can be replicated in any river basin / area of interest as a scalable decision support tool for water management stakeholders.





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