

MONASH INDUSTRY TEAM INITIATIVE (MITI) 2016-2017

Quantifying the benefits of remotely sensed imagery for use in dairy farm pasture management

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Scope

This project sought to look at the ways in which pasture management on dairy farms could be improved in order to save time, money and resources. Fieldwork was conducted on two farms and each farm had two paddocks which we used for analysis. The accuracy of different methods used to measure pasture were compared.

Platforms/Method

Four different methods of measuring pasture were utilised, two of them more traditional and two remote sensing methods where all data was collected from a distance.

SATELLITE (Pastures from Space)

Data captured by the Landsat 8 and MODIS satellites were used to produce a NDVI image. The processing of the raw data was done by PfS which then produced Feed on Offer, Pasture Growth Rate and Total Dry Mass maps.

DRONES

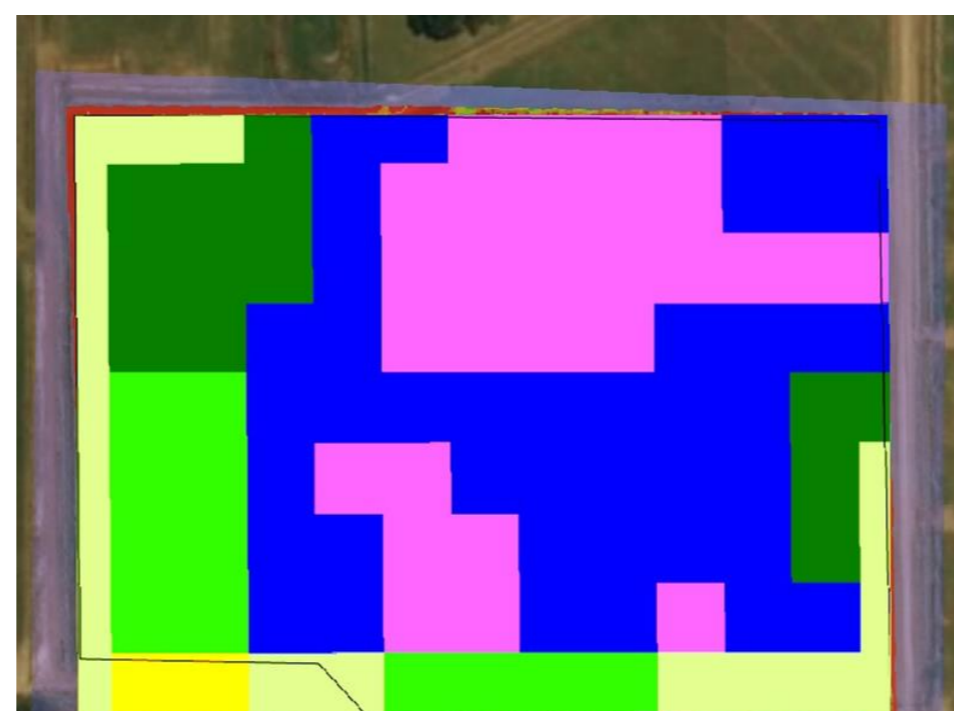
A drone was flown once per month during the duration of the project which enabled the production of a 3 cm resolution NDVI imagery of the target paddocks.

RISING PLATE METER (RPM)

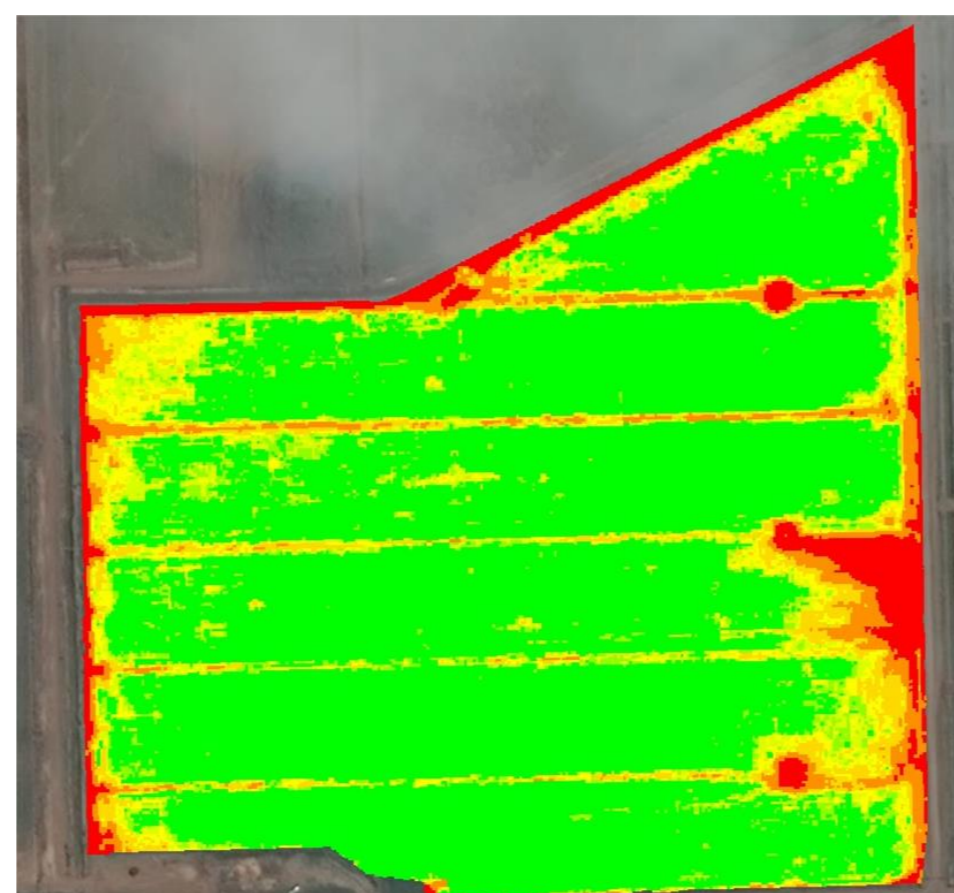
A farming tool which measures the height of pasture via a moving 'plate on stick' which can then be converted into mass per hectare via predetermined calibration equations.

EYE ESTIMATION

The standard and most widely used method in Australia, simply involves visually estimating how much pasture there is.



PfS high resolution image



UAV drone NDVI image



Measuring pasture height with RPM

Outcomes and Recommendations

EYE ESTIMATION AND RPM

Eye estimates closely approximated RPM values, though required a fraction of the time input for RPM estimation.

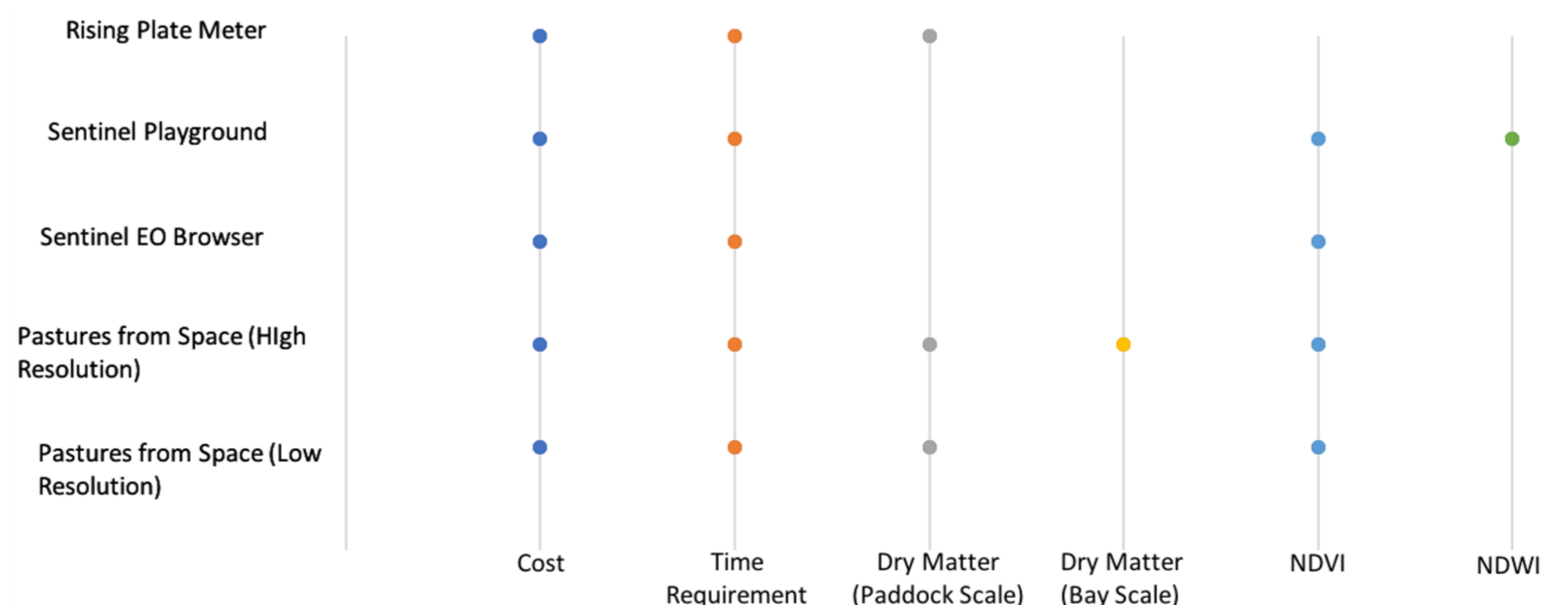
DRONE

Drones offer high resolution and high frequency of observations. Present limitations include being quite expensive when using a contracted service provider and also presents a high upfront cost if the system is to be bought for own use. Future improvements in drone technology will greatly improve automation capacities and the ability to integrate within the precision farming workflow, whilst reducing costs.

SATELLITE

Primary benefits of PfS are only attained where paddock sizes are greater than 25 ha, where coarse resolution is less of an issue and the precision of pasture quality is less vital. Strip grazing typically requires higher resolution which both the Sentinel satellite and drone have.

We recommend that the farms we visited continue using eye estimation as the primary pasture measurement method as the farmers proved to be quite accurate. They should supplement it with Sentinel satellite data as it has a 10 metre resolution which is useful for looking at pasture quality across the paddocks.



Comparisons of different pasture measurement methods