

Data Farming

Background:

NDVI is Normalised Difference Vegetation Index and provides a classic indicator of plant health. Images can be collected by hand using a tool like a Greenseeker [GreenSeeker Handheld Crop Sensor - Trimble Agriculture](#) or from a satellite service like DataFarming, as described in this resource. NDVI images allow farmers to assess crop vigour across a large area, compare it to past images and plan for remediation such as fertiliser application.

From [NDVI Map Information \(bom.gov.au\)](http://bom.gov.au):

What is NDVI?

Live green vegetation absorbs visible light (solar radiation) as part of photosynthesis. At the same time plants scatter (reflect) solar energy in the near infrared. This difference in absorption is quite unique to live vegetation and provides a measure of the greenness of the vegetation.

NDVI is an index which measures this difference, providing a measure of vegetation density and condition. It is influenced by the fractional cover of the ground by vegetation, the vegetation density and the vegetation greenness. It indicates the photosynthetic capacity of the land surface cover.

NDVI is calculated from the red and near-infrared reflectances r_{Red} and r_{NIR} as

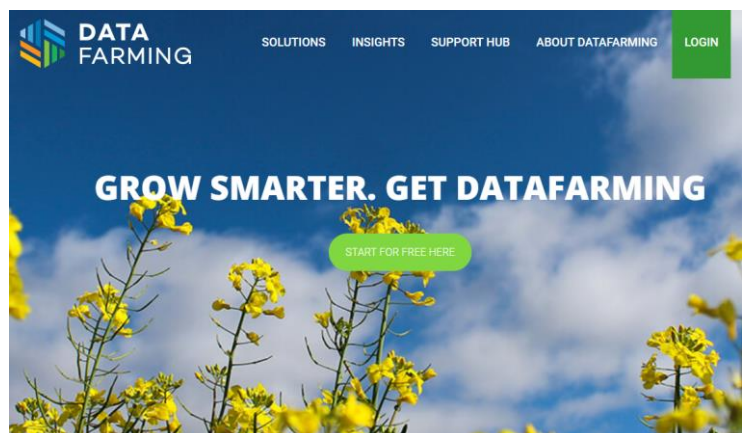
$$NDVI = (r_{NIR} - r_{Red}) / (r_{NIR} + r_{Red})$$

Its value is always between -1 and +1. Vegetation NDVI in Australia typically ranges from 0.1 up to 0.7, with higher values associated with greater density and greenness of the plant canopy. NDVI decreases as leaves come under water stress, become diseased or die. Bare soil and snow values are close to zero, while water bodies have negative values.

How to go “Data Farming”

You can access NDVI images for anywhere in the world for free at www.datafarming.com.au. Your students will enjoy learning how this technology can support farmers with trouble shooting and decision making, in a way that a normal visual assessment of a crop cannot.

1. Watch *Introduction to DataFarming*: <https://youtu.be/DPnu6lD0wcc>
2. Set up your own free account at www.datafarming.com.au by selecting “Start for free here”. You will need an email address to sign up. The basic plan is FREE.



Multiple people can log in to the same account which would work well with a class of students. Please note the email address used for signing up is stored by DataFarming to send occasional emails and newsletters. Students could create their own account but please *check your site's policy on student's use of their email address online to decide the best option.*

- To add your own farm to your account, select "Create New +". You can either "Draw on Map" (usually how a school farm would be added) or "Import farm from file". Follow the prompts to add a farm name and find your farm on the map by scrolling in until you can identify it's location.

- Select the pencil icon at the top to begin drawing your paddock boundary. Use a left mouse click to anchor the drawing tool at each corner of the paddock until it is back to the starting point. Select "finish editing" and enter the paddock name and crop type.

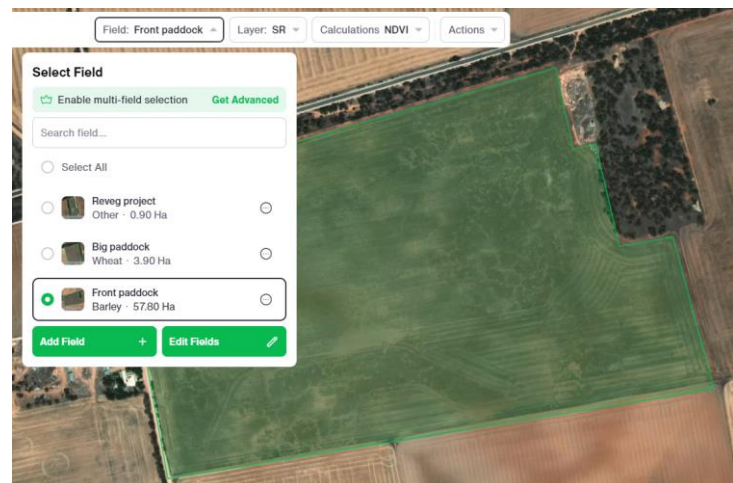


DataFarming will have calculated the paddock area in hectares. Select "Save Field".

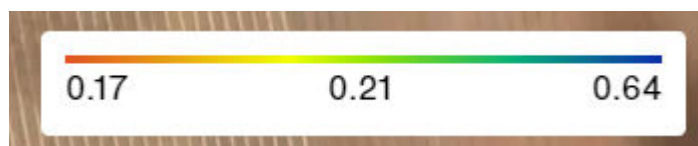
Select the pencil icon again to continue adding more paddocks as needed.

- Select the back arrow next to the Farm name. This will trigger DataFarming to offer you options for each paddock.

Under "Field" select the paddock you want NDVI images for and DataFarming will load available dates at the bottom of the screen.

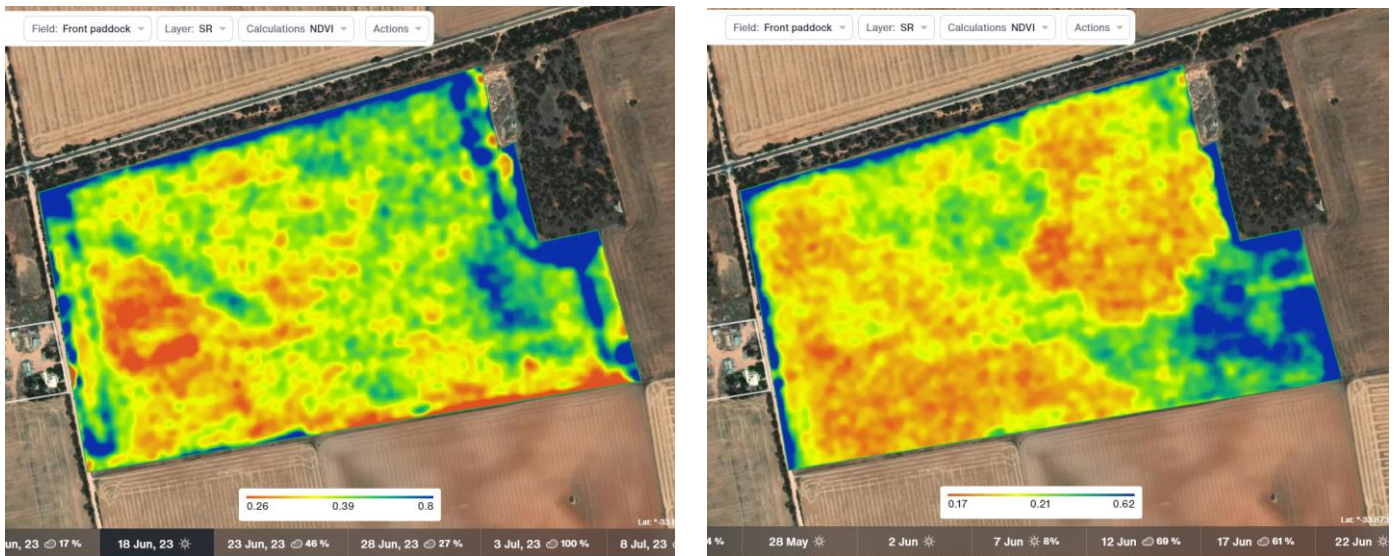


- The best images will be those with 0% cloud cover. The colour scale is provided on the screen, remembering the scale is from 0 (low vigour - red) to 1 (high vigour - blue). Best to stick to the Standard Resolution images. There are options available that require a paid subscription but the standard NDVI images are available for free.



- You can go back in time to find other images of the same paddock, allowing you to track changes in crop vigour across a season. You can also go back several years which allows comparisons for different crop types, seasons, times of year.

The examples below show the same paddock 12 months apart in June 2023 and June 2024. In the first image on the left, you can see an area of low crop vigour in the western section of the paddock. Over the summer, this section was “reefined” to break up the sheet rock and the right-hand image indicates that this has been effective in improving conditions for the crop, even with the very dry start to 2024’s cropping season.



8. Take a screenshot to save an image (or use the snipping tool: Shift, Microsoft, S).
9. Allow your students to explore DataFarming. You can add multiple farms and paddocks.
10. You can use the NDVI-R images to compare paddocks across a region.
11. There are very useful video tutorials on DataFarming’s Youtube channel [DataFarming - YouTube](#) which can show how the images and data can be used for on-farm decision making like fertiliser applications.
12. The website also has a Support Hub with a range of helpful “frequently asked questions” and links to their videos.

Students could use NDVI images to:

- Monitor crop growth as they learn about the grains industry
- Monitor pasture growth and grazing patterns as they learn about extensive livestock enterprises
- Monitor native vegetation as they learn about land management and sustainability
- Monitor vineyards or horticultural crops as they learn about water conservation
- Collect data for crops being used in trials eg fertiliser trials, soil type, seeding conditions, varieties
- Troubleshoot paddocks – topography, soil type, tree lines, sheep camps, frost prone areas, season comparisons, sandhills, compaction etc
- Trigger an investigation deconstruction
- Discuss the role of technology in farm decision making
- Discuss how technology can improve the triple bottom line through variable rate practices for fertiliser application or irrigation
- Plan soil and tissue tests based on identified priority areas

Disclaimer: This curriculum resource is designed to support schools in delivering quality food and fibre content to students. It has been developed by Lead Ag Teacher Sue Pratt, AgCommunicators – a registered teacher with more than 30 years’ experience in teaching agriculture and science. Prior to using this resource, teachers should conduct a risk assessment in line with their site’s curriculum and safety guidelines and check all links are appropriate to the school’s online policies. The risk assessment may include provision of specialised Personal Protective Equipment and review of the school’s policies and procedures on chemical use.