FERTILISER:

Using satellite imagery to achieve more efficient fertiliser use in Central & Southern Tablelands pastures in NSW

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Australian graziers spend some $300M on superphosphate to support the improved pastures that feed almost half the nation's sheep and cattle. As the nutrient status of farm paddocks is not easily seen by walking through the crop, much of this fertiliser is applied with insufficient knowledge of the responsiveness of the improved pastures over which it is spread and on which paddocks fertiliser dollars are best spent.

The project uses satellite imagery in combination with soil and/or tissue tests to identify areas where active pasture growth is limited by nutrients. This enables farmers to concentrate their fertiliser budgets on areas that will benefit most from fertiliser use.

Satellite imagery, suitably processed, can reveal variations in potential pasture growth due to nutrient status (Vickery *et al.*, 1980). Areas of slow pasture growth can be differentiated from actively growing pastures on a map of the property by using different colours. The satellite map is easy to interpret and can be used to plan fertiliser management by identifying areas which will respond to applied fertiliser. In Spring a new map is generated to show the effects of last year's fertiliser strategy and plan the following year's.

This three-year project, in collaboration with CSIRO and Incitec, extends the work of Peter Vickery (CSIRO, Armidale) in the New England area by calibrating it for the Central and Southern Tablelands and Slopes of NSW where the climate and pasture/soil environments are different. It is based on low-cost technology and encourages co-operation between land managers, fertiliser companies and NSW Agriculture. Farmers who already apply the technique find a pasture map prepared using satellite imagery is a valuable management tool. The map provides an up to date summary of farm productivity. Over time, several maps show the history of pasture development.

Method

Discussions with NSW Agriculture agronomists identified areas of elevated, temperate, pastures to which to extend the Vickery work. The areas from which the collaborators were chosen included parts of the Central and Southern Tablelands; approximately from Wellington to Mudgee, stretching south through Bathurst and Orange, to Cowra. An area around Yass was also chosen.

Landsat Thematic Mapper imagery was used, as for our purposes, it offers the best combination of available bands, resolution, archiving, coverage, repeat time and cost.

The 3-band image is classified into about 60 groups using Poldiv. Ordination and bond strengths calculated from nearest neighbours are aids in aggregating the groups into 3 to 4 pasture classes, woodland, forest, sparse vegetation and not recognised classes. The "slow growth" pasture class includes still dormant native pastures.

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Reference

Vickery, P.J., Hedges, D.A. and Duggin, M.J. (1980). Assessment of the Pasture Requirement of Improved Pasture from Remote Sensing Information. *Remote sensing of Environment* **9**: 131-148.