

Northern NSW On-Farm Trial of Soil GRID Mapping & Variable Rate Fertiliser Application



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The Far North Coast Regional Group of Subtropical Dairy in conjunction with Border Ranges - Richmond Valley Landcare Network (BRRVLN) is currently evaluating the cost-benefit of utilising GPS-guided variable rate (VR) fertiliser application and the accuracy of current commercial precision agriculture soil fertility methodologies (Soil GRID Mapping) on dairy forage production and quality.

Soil GRID mapping is based on the development of spatial soil maps based on a combination of the soil analysis of two (2) soil samples per hectare and a proprietary developed algorithm, by GRIDFARM™. This estimates nutrient availability down to a 10m x 10m area (100m²). This data is then used by GIS-guided variable rate fertiliser delivery systems to vary fertiliser or amendment rates at this scale.

Two trial sites in northern New South Wales (NSW) were established in early 2019 to test variable rate fertiliser application on commercial dairy farms over four years. Both farms are pasture-based systems and are located in the Richmond river catchment.

Farm 1 – Paul & Sharon Weir

Paul and Sharon Weir farm at Tuncester via Lismore. They milk 350 mainly Friesian cows producing approximately 2.5 million litres per year. The Weir's milking grazing platform is 115 ha. They have an additional support area of 181 ha where maize is grown for silage and heifers and dry stock are kept. A priority focus of the Weir's farm is pasture production, with seasonal calving from March through to October allowing the cows to peak during the ryegrass season. The Weir's farm has an annual rainfall of 1250 mm with irrigation water being available across 85 ha. Irrigation usually only occurs through spring. The Weir's have historically completed biannual soil testing in identified farm management zones.

The trial on the Weir's farm is being conducted on 32 ha of irrigated loam and clay loam soils. There are two separate farm management zones within Weir's farm that is being used for the trial with the front paddock offering a perennial pasture mix base and the second paddock having kikuyu pastures. Both areas are oversown with ryegrass in winter.

Farm 2 – Lee & Jo Behrens

Lee and Jo Behrens' farm at Ettrick southwest of Kyogle on Eden Creek. The Behrens' milk 170 Jersey cows producing 750,000 litres of milk on their 104 ha farm. The annual rainfall is 1150 mm with their grazing system comprising of ryegrass in the winter and sorghum, setaria and kikuyu through the summer. They have 25 ha under solid set irrigation and 39 ha capable of being irrigated by travelling irrigators. The Behrens' complete annual soil testing, modifying their fertiliser application based on soil test results. The trial on Behrens' farm will be conducted on 16 ha of irrigated cultivation on loam soil. The area has sorghum grown during the summer both for grazing and hay, and ryegrass through the winter.

Approach

Both farms have their experimental farm management zones divided into Control treatments (that is conventional soil testing and fertiliser spreading) and the Variable Rate (VR) fertiliser application treatment. In total, the trial has 54 experimental paddocks (50% Control and 50% VR treatments). Lime application rates are being evaluated in conjunction with major nutrients such as Potassium, Phosphorus and Sulfur.

There are a number of observations and measurements planned over the four year experimental period:

- Soil testing on an annual basis across experimental farm management zones. These results will then determine generic fertiliser application on Control paddocks. GRIDFARM will use these results to determine lime and fertiliser application rates (10 m x 10m grid) in VR paddocks;
- Forage growth rates and utilisation;
- Forage quality.

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