New Horizons; increasing agricultural production by applying organic matter and/or clay to sands in SA

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There are around 2.6 Mha of sandy soils in South Australia under agricultural production. These soils have constraints to production including water repellence, soil compaction, low nutrient and water holding capacity with crop water use efficiency often only 40-60%.
New Horizons is an initiative of the South Australia Government aiming to deliver an additional $800M/annum in agricultural production by addressing soil constraints on these soils. Three trial sites were established in 2014 in the South-East (Cadgee), the Murray Mallee (Karoonda) and Eyre Peninsula (Brimpton Lake). Sites comprised 12 replicated treatments designed to address individual and multiple constraints. Extensive soil data was collected following site establishment with annual measurements of soil water, nitrogen and carbon. Plant analysis included emergence, tissue nutrients, biomass, quantitative root DNA assay and grain yield. Increases in grain production in 2014 and 2015 compared to the unmodified control ranged between 70 and 200%.
Analysis of changes to soil characteristics identified a range of soil constraints have been addressed. However, the impact of individual constraints on production appears variable across sites and that increased benefit is gained by addressing multiple constraints. This research raises a number of questions concerning the individual impact of constraints and the role of organic matter and soil carbon in improving plant growth where soil density has been addressed. Production and soil data will be presented to explore these questions.