Meat and Livestock Australia - Improving Grazing production on Non-Wetting Sands

Project Title	**Improved Grazing Production on Non-Wetting Sands**
Proposed start date	1st November 2020
Proposed end date	15th June 2026
Project Delivery	PIRSA Rural Solutions

Project Background

Sandy dune soils are a common landscape feature in southern South Australia, Victoria and Western Australia. Traits in these sandy soils include low plant available water holding capacity, low organic matter, low nutrient availability, compaction, non-wetting and high risk for wind erosion.

Over the last five years GRDC has demonstrated improved crop biomass at research sites in South Australia by adding clay (spading) or deep ripping and pasture inversion for integration of organic matter and fertilisers to soil profiles. In 2018 Grassgro modelling for Keith-Meningie SA found combined deep ripping with surface applied nutrition (fertiliser, manure or organic matter or chicken litter) delivered increasing organic matter and increased root depth of pastures. Changing soil structure produced an increase in feed production of 1.88T/ha/year (from 3.52T/ha DM/year to 5.4T/ha DM/year) and increase in carrying capacity of 1.8 DSE/ha.

The findings will seek to confirm productivity can be substantially improved on infertile sandy soils when subsoil chemical, physical and biological constraints are treated. This project will test plant growth response, dry matter production, and feed nutrition values using a range of practices and treatments. Results will demonstrate the effectiveness of amelioration techniques in a local context and assess economic return within grazing systems.

Outcomes, Deliverables and Activities

1. Utilise new technologies and techniques being demonstrated to improve productivity in cropping systems on sandy soils and will test them in grazing systems to provide increased feed & livestock production.

2. At Coomandook, Field and Western Flat demonstrate methods of improving the grazing systems feed base to extend the growing season, increase pasture utilisation, optimise fertiliser use, and reduce the overall cost of production per hectare by producing more feed, converting to increased feed, increase carrying capacity & livestock production.

3. Increase producer understanding of opportunities to increase feedbase and red meat production by introducing, and testing the production response and cost effectiveness of the following treatments on sites across the project area.

4. Three demonstration sites will be established with core producers, with a site specific selection of three to five treatments.

EVIDENCE OF PRODUCTION INCREASES

From 2018 Grassgro Modelling for
Keith – Meningie SA in an average rainfall year (Decile 5)
Under a lucerne grass pasture – grasses unimproved grasses eg. barley, brome and silver grass

Sandy soil with low Plant Available Water (38mm)	**SOIL AMENDMENT** Increasing organic matter and / or breaking hard pan to increase root depth	Increased Plant Available Water /'bucket size' to 55mm	**RESULT:** **Increase in feed production of 1.88T/ha/year** **Increase in carrying capacity of 1.8 DSE/ha**
Produced approx 3.52T/ha DM/year		Increased production to 5.4T/ha DM/year	

Assumptions: 70% efficiency in amount consumed = 1316 kg DM/ha/year extra that stock can eat (=3.6kg/day extra). A dry sheep (eg. 65kg) – can eat 3% of its bodyweight = 1.9Kg/day.
Source: Felicity Turner

From 2014 – 2018 GRDC Sandy Soils Project
GRDC Cadgee SA
Under Crop

Unmodified Sandy Soil	**SOIL AMENDMENTS** Clay Spreading	6.4 tonne of grain/ha	**RESULT:** Transferring these techniques to livestock feed production will produce similarly impressive results
Produced 4.77 tonne of grain/hectare	Clay spreading & spading	7.29 tonne of grain/ha	
	Spaded clay & lucerne	9.3 tonne of grain/ha	

Source: Melissa Fraser – Rural Solutions SA, GRDC Sandy Soils Project
See attachment: Clay and hay increases yield on SE Sands

Eckert's clay spread and ripped cropping site 2018
Malinong SA
Under crop, side by side harvesting comparison

Clay Spread Sandy Soil	**SOIL AMENDMENTS** Deep Ripping *to break hard pan and increase rooting depth*	Produced 3.5 tonne of grain/hectare	**RESULT:** Transferring these techniques to livestock feed production will produce similarly impressive results
Produced 1.2 tonne of grain/hectare			

Source: Tim Eckert 2019