sustainable agriculture

Winning the battle against erosion and non-wetting soils without covering the farm in trees

Project Snapshot

Land Manager's Name/s:	Richard and Bill Walker
Property Size:	6,200 ha
Location:	Quairading
Annual Rainfall:	350 mm
Enterprise mix	Wheat, barley, canola, lupins, merino sheep
Soil types/vegetation types:	Vary from Christmas tree sand all the way through to salmon gum and morrell soils

Key Messages

- Spading is a useful farming practice to incorporate shallow clay in the top soil profile.
- Before altering the soil profile with on-farm clay pits, take the time to analyse the clay and consider what other ameliorates may be a useful addition prior to incorporation.
- Electromagnetic (EM) and Gamma-radiometric (GR) are useful techniques to identify the suitability of paddocks to different incorporation methods.
- Crop/pasture productivity can be greatly improved by reducing the non-wetting characteristics of soils. In turn, greater yields also correspond with a reduction in soil erosion due to better retention of plant residues.

This project is supported by Wheatbelt NRM, through funding from the Australian Government's Caring for our Country.

Their story

Third generation Quairading farmers Bill and Richard Walker have been trying to improve Yacklin Farm's soils since they took over the family farm 20 years ago. They have been planting trees since the late 1980's (350,000 since the 1990's), practicing no-till since 1996, and claying since 1999. In recent years they sold off a lot of their sheep and are now seeing even more improvement in their soils. Bill said, "We're seeing a 15 per cent return annually on our investment".

Non-wetting sands, which make up around 15 per cent of the farm, were always an economic and environmental concern to Bill, with low yields and possible soil erosion from strong wind and rain events. "In the early '90's bad wind events caused massive dust storms, but now we aren't seeing this as much—which is great for the soil, and good for your psyche", Bill commented.

The Wheatbelt NRM soil erosion project, which began in 2011, was a way of verifying his belief in clay spreading, rotary spading and clay delving and presented an opportunity to share the knowledge with his neighbours. "I have learnt a lot from trial and error over the years whilst claying our non-wetting soils", Bill recalled. "More recently I've learnt from other farmers like Trevor Syme [Bolgart farmer], who uses clay on his non-wetting soils". "Richard and I wanted to show other people in the area what can improve their non-wetting soils", Bill said.

The project

Before the Wheatbelt NRM claying project could begin the soils had to be tested. Firstly the Walkers had the project areas soils surveyed by Precision Agronomics Australia using Electromagnetic (EM) and Gamma-radiometric (GR). Soil surveying is important when planning to incorporate clay as it measures the depth of clay already in the soil which then determines which incorporation method is best to use. Bill also did some further soil testing with 18 deep core samples over six sites. The Walker's then proceeded to dig deep holes to get a look at the soil profile. This uncovered what they expected: pale non-wetting sands on top of clay, which verified the soil testing.

Tests results showed the plot had low magnesium so they applied dolomite with a multi-spreader instead of lime before the trial at 600 kg per hectare spread over 21 ha in total. They then hired a contractor to spread the clay at 250 t/ha which was dug from a clay pit established on the farm and they modified an old ripper into a small delver to try out the method on some areas as well. "We felt spading was something we could use so we hired a spader and compared them to tandem discs". Bill explained. "Using the spader we were able to mix the top 225 mm of the soil profile". After rolling the spaded area entire trial area was then seeded to Westonia wheat at 65 kg/ha, with 80 kg/ha of K-Till Extra® fertiliser and followed it up with 70 kg of urea.

Lessons Learnt

Bill feels like he can now incorporate clay delving and rotary spading into their soil improvement strategy to improve their non-wetting soils which have shallow clay subsoils, however he will still use clay spreading on the deeper non-wetting sands.

"The response [clay delving combined with rotary spading] was more promising than we thought it would be", Bill mentioned. The Walker's were very pleased with the trial, but if they were to do it again they would try a strip of a higher clay rate (about 400 t/ha) with a deeper rotary incorporation to see if there would be a bigger improvement in soil structure.

Future fit

Looking to the future Bill says they want to keep improving their soils capacity to perform in difficult seasons. "With the variable seasons and influence of climate change, we are trying to adapt now to all situations. The days are gone when you could bank on rain". He added, "We are looking to greater efficiency in water use and keeping more ground cover to reduce wind erosion, increase infiltration and improve our flora and fauna survival rate in different temperatures". The Walkers are seeing the spader being a useful device for deepening some of their soil types to increase the ability to store water and to incorporate clays, lime, dolomite and gypsum for sodic soils.

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