South Australian Soil Carbon Benchmarking

Ag Excellence Forum

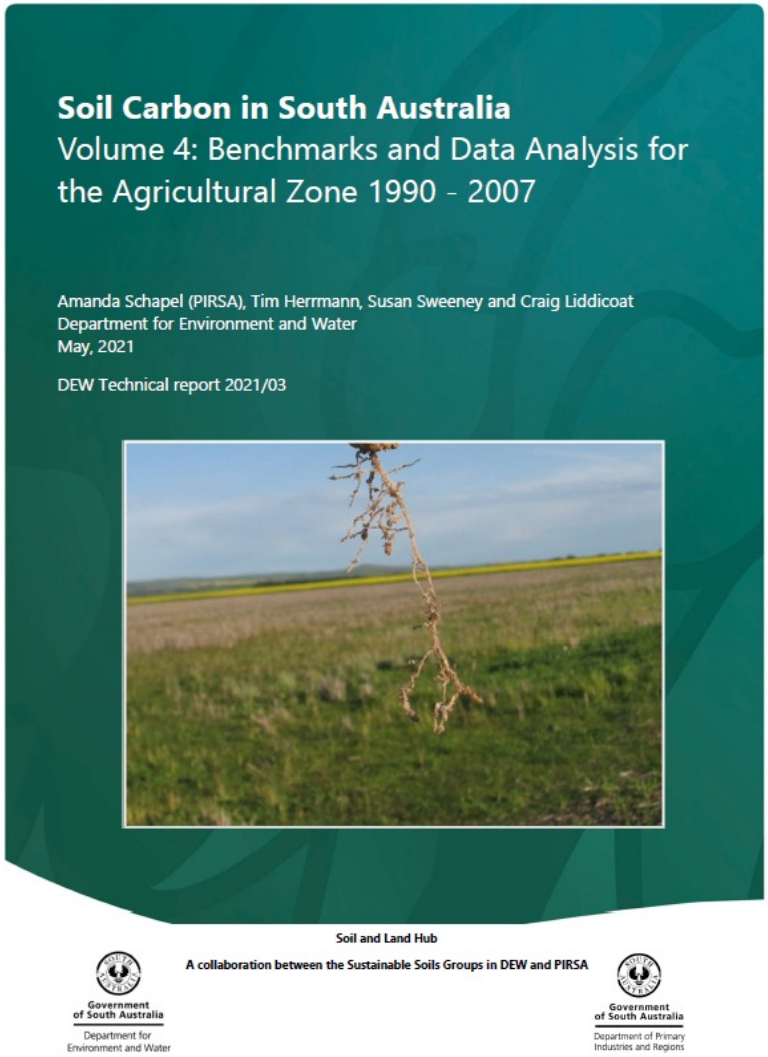
9 August 2021

Amanda.Schapel@sa.gov.au

Soil Carbon Benchmarks for the agricultural zone 1990-2007

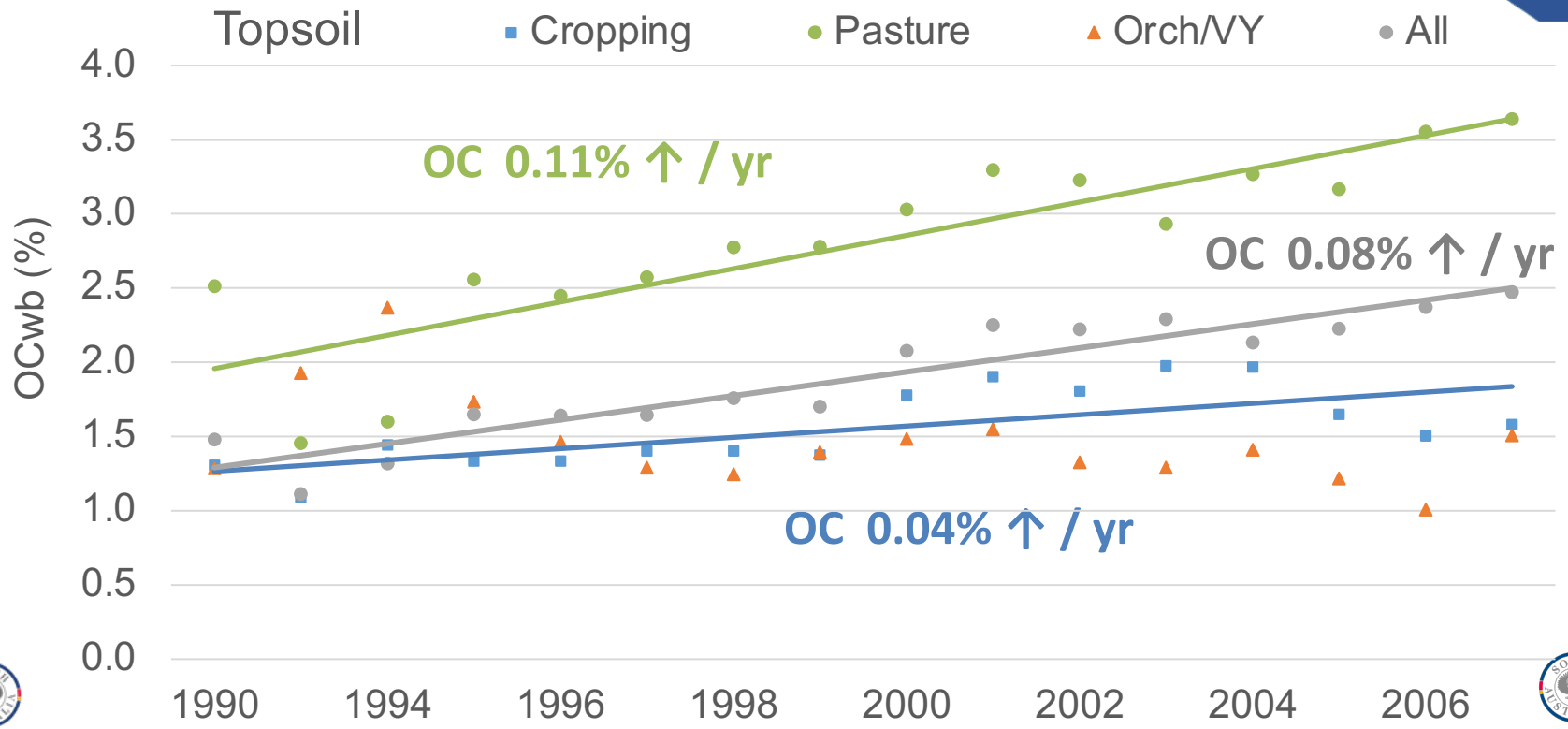
Soil and Land Hub – Collaboration between Sustainable Soils groups in DEW and PIRSA

Land Resources Home (environment.sa.gov.au) under All Reports for Soil C in SA Volume 4



Soil Carbon 1990-2007

36,000 soil tests

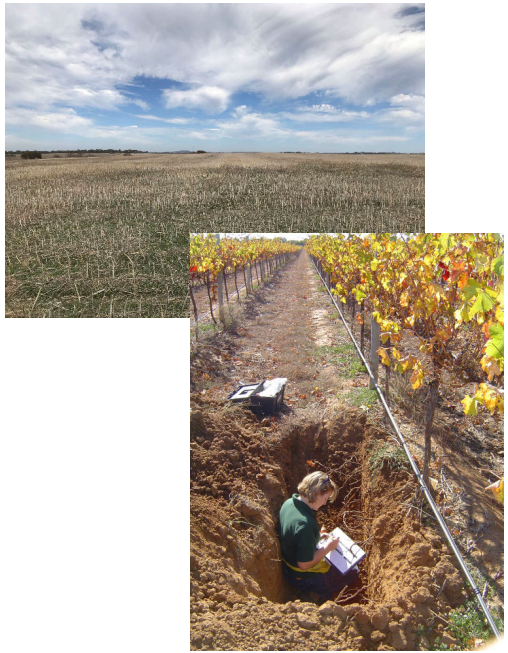


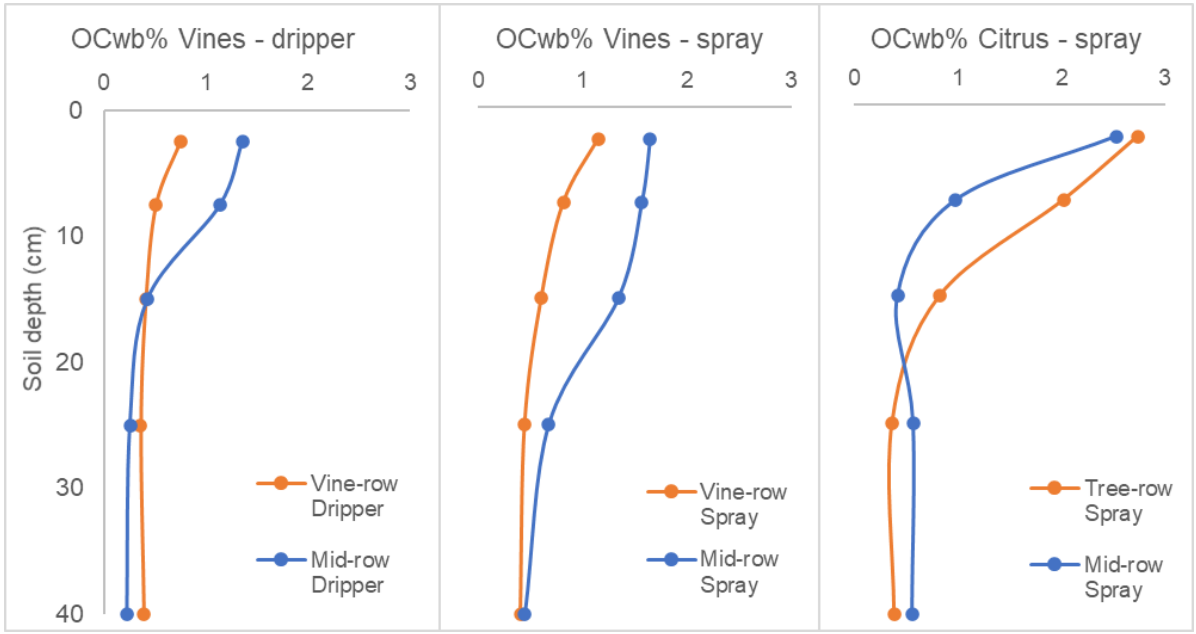
Government of South Australia
Department for Environment and Water

Soil and Land Hub – Collaboration between Sustainable Soils groups in DEW and PIRSA

Government of South Australia
Department of Primary Industries and Regions

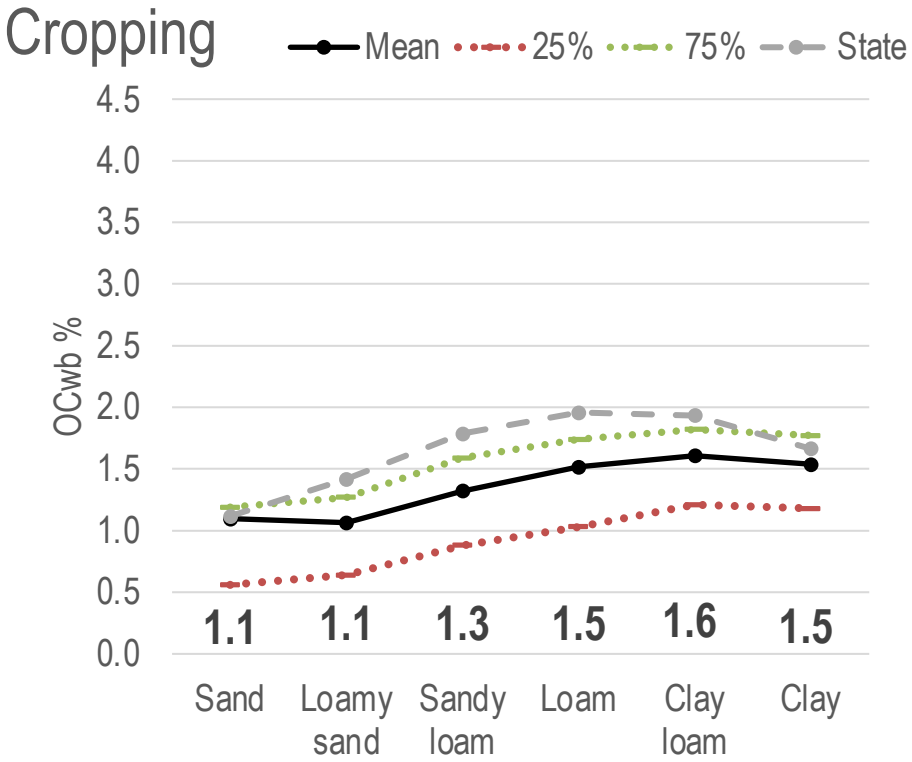
Orchard/Vineyard variation

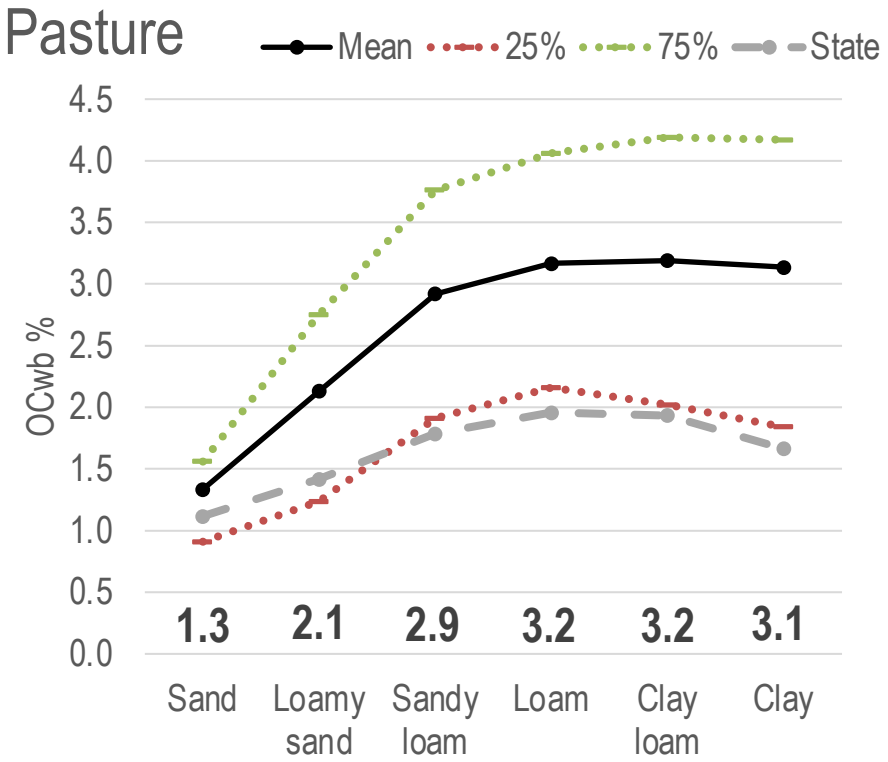




Variation due to development stage, sampling location, irrigation system, floor management and

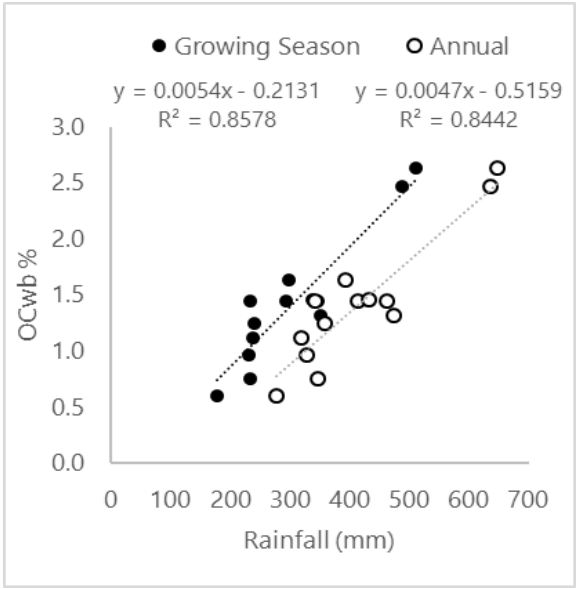
Soil texture x land use

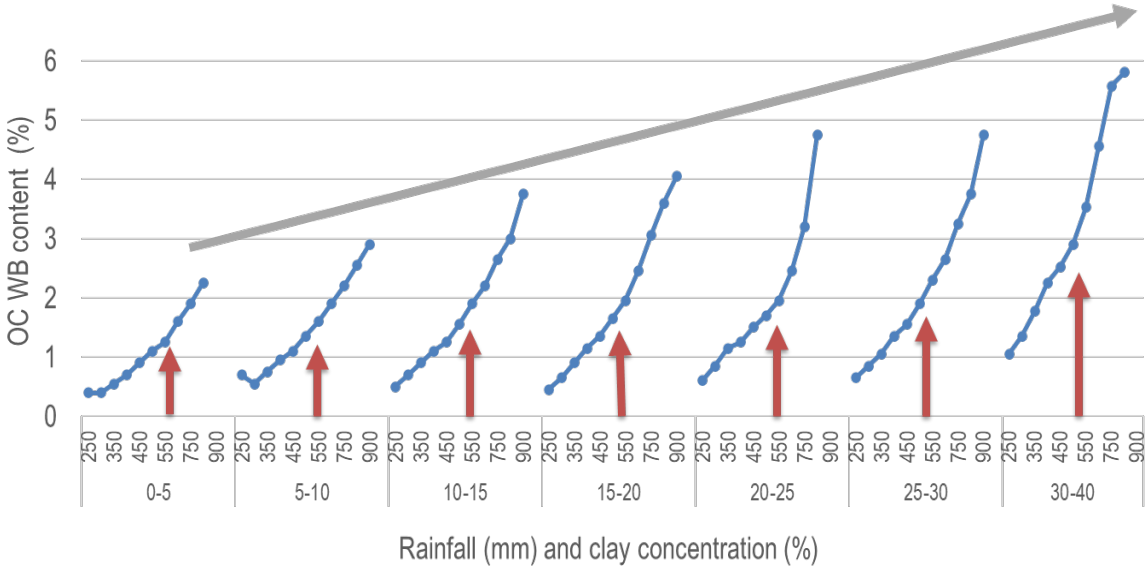




Effect of rainfall on soil OC in SA

Rainfall – sharp increase in OC between 550-600 mm for all soil textures





Ave OC did not > 2% unless rainfall

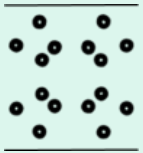
- > 600 mm annual
- > 500 mm growing season

Government of South Australia
Department of Primary Industries and Regions

Mid North 1990-2007

Key Land Use

Mean SOC Conc



Annual change SOC

Cropping: 82%

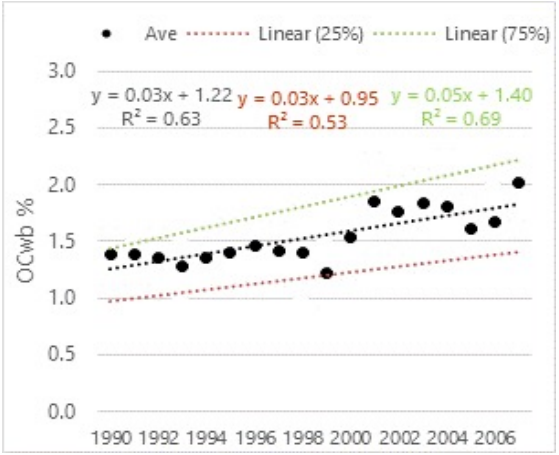
Orchard/Vineyard: 10%

Ag District: 1.45 %

SA Ag Zone: 1.77%

Mean: 0.0349% ↑

25th: 0.03% 75th: 0.05%



OCwb concentration (%)

Target is 75%

	Ag Zone		Ag District Benchmarks					
Texture	Mean	Count	Mean	25%	40%	50%	60%	75%
Sand	1.12							
Loamy sand	1.42	41	0.78	0.51	0.62	0.66	0.85	1.00
Sandy loam	1.79	188	1.25	0.85	1.09	1.21	1.33	1.57
Loam	1.96	539	1.45	1.10	1.27	1.40	1.50	1.70
Clay loam	1.93	1346	1.50	1.18	1.33	1.45	1.54	1.71
Clay	1.66	1005	1.46	1.10	1.30	1.40	1.50	1.72
Weighted Mean (all texture)	1.77	3119	1.45	1.11	1.29	1.40	1.50	1.69

Opportunity to increase 0-10 cm OCwb benchmark target

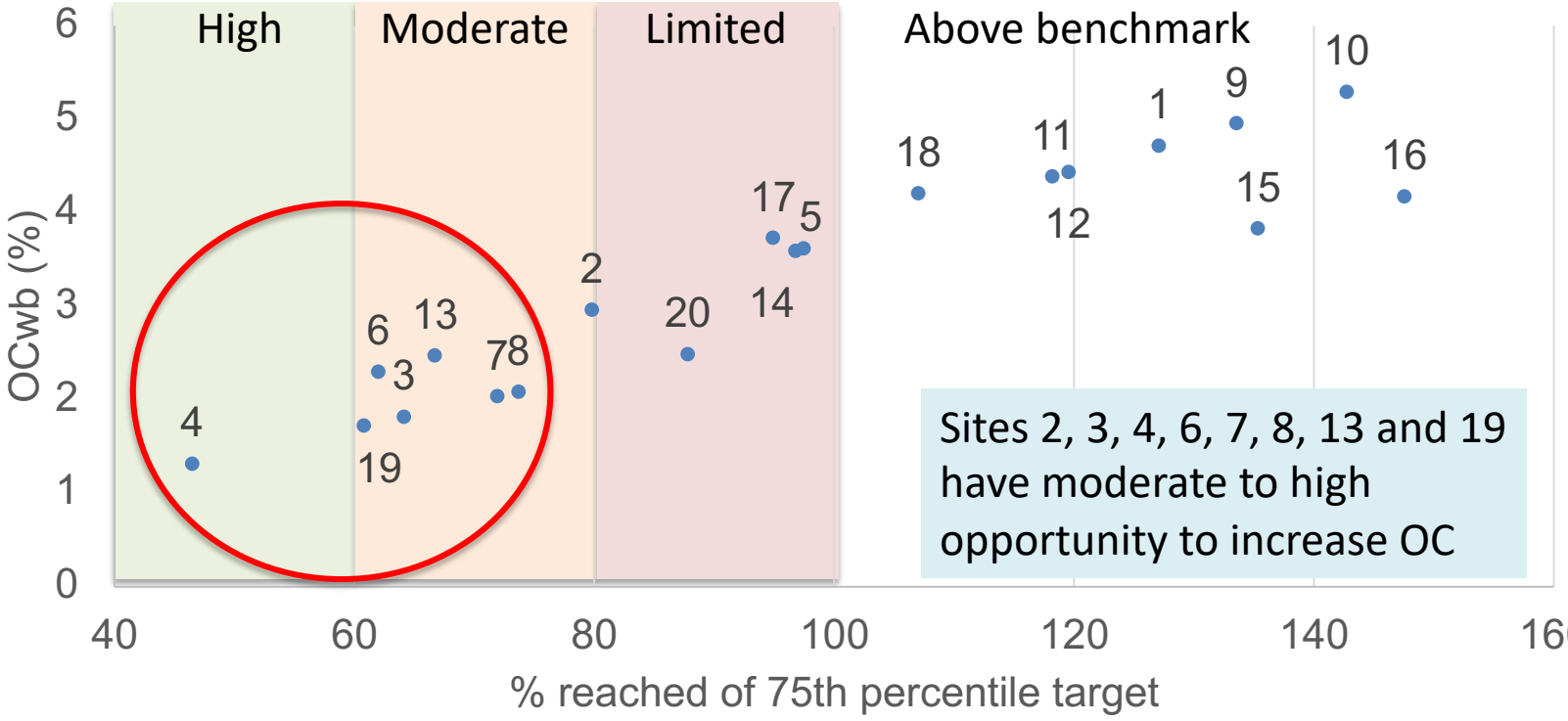
Using the 0-10 cm OCwb benchmark target of 75th percentile for each soil texture, can identify sites with opportunity to increase OC in the topsoil

	Concentration (%)		Compare to benchmarks	
Paddock	OCwb	Benchmark Target	% of 75th target	Carbon Opportunity
House	1.21	1.57	77%	Moderate
Ram	1.63	1.71	95%	Limited
South	0.84	1.57	54%	High

% of 75th target = OCwb / Benchmark target

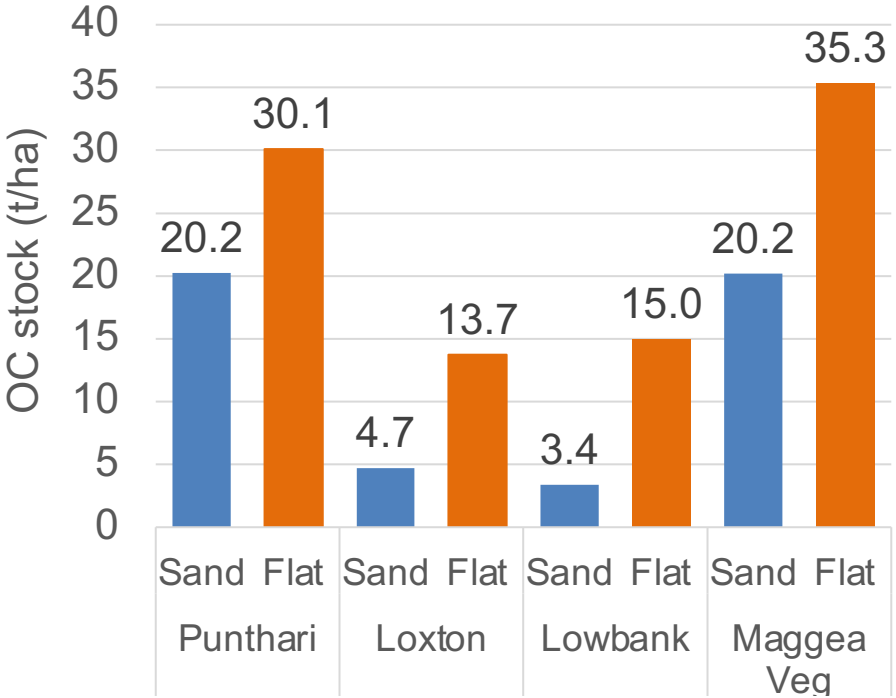
Opportunity to increase 0-10 cm Ocwb benchmark target

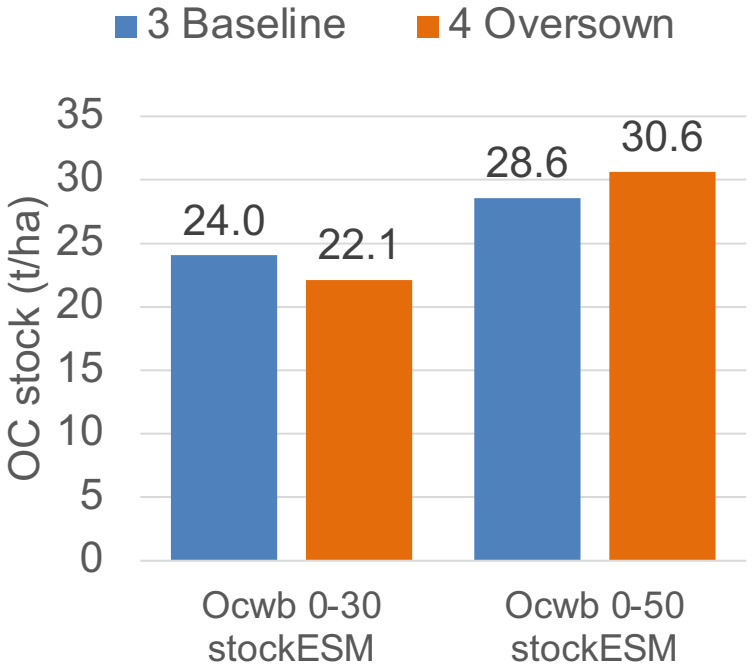
Using the 0-10 cm OCwb benchmark target of 75th percentile for each soil texture, can identify sites with opportunity to increase OC in the topsoil



Government of South Australia
Department of Primary Industries and Regions

What regions are doing





Soil texture in the same paddock strongly affects OC stock

LANDSCAPE SOUTH AUSTRALIA MURRAYLANDS AND RIVERLAND

Management practice can change OC stock at depth

What you can do

- Sample carefully
  - The number of samples and way you collect them will strongly affect the reliability of the result
  - Select areas of similar soil texture
  - Be consistent in the time of year you collect the sample
- If possible, sample below the topsoil (>10 cm)
- Compare to benchmarks for the soil texture x land use or agricultural district
- Assess the C opportunity of your soil

Government of South Australia
Department of Primary Industries and Regions