

A decision tool to estimate the economic benefits from soil amelioration at a paddock and industry scale



Department of
Primary Industries and
Regional Development

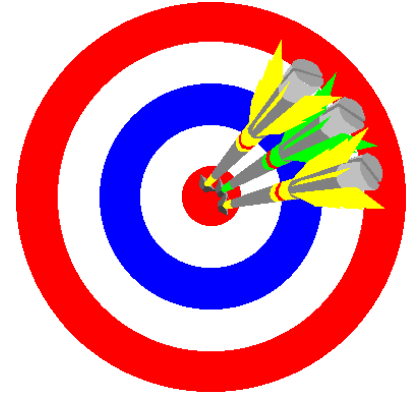


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Presentation Outline

1. Demonstrate use of ROSA (Ranking Options for Soil Amelioration)
2. Provide an estimate of the value of lost grain production due to soil constraints in Western Australia
3. Use ROSA to provide an estimate of the value of soil amelioration in WA.





ROSA



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1. ROSA is intended for use by consultants, agronomists and farmers
2. Provides a return on investment **ranking of soil amelioration options** that address one or more soil constraints within a farm business
3. **Preliminary version** released in December 2017
(Jeremy.Lemon@dpird.wa.gov.au)



- Costs and benefits accrued over 10-year time period
- Return on investment ranking based on the **Benefit Cost Ratio**

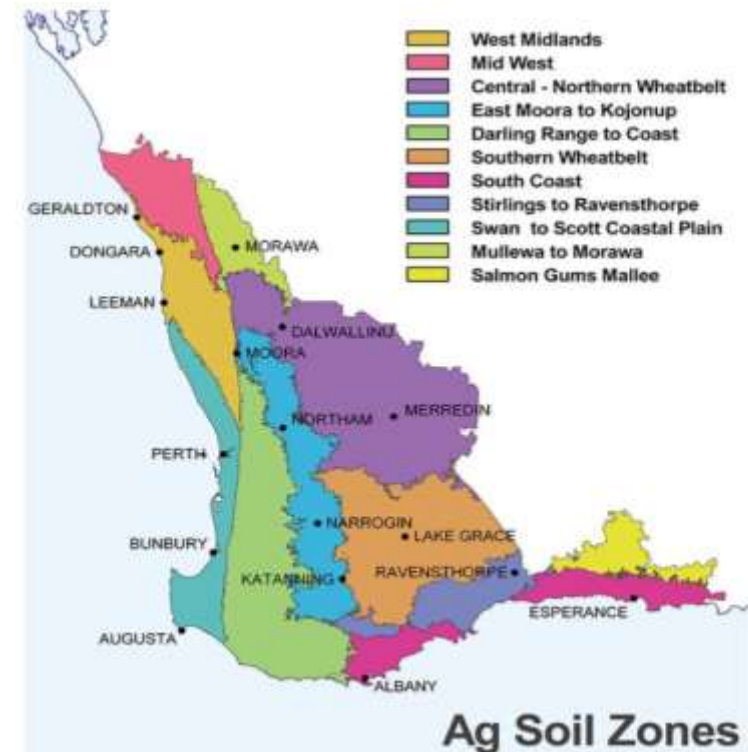


[ROSA Spreadsheet](#)

The indicative value of lost grain production due to soil constraints in WA

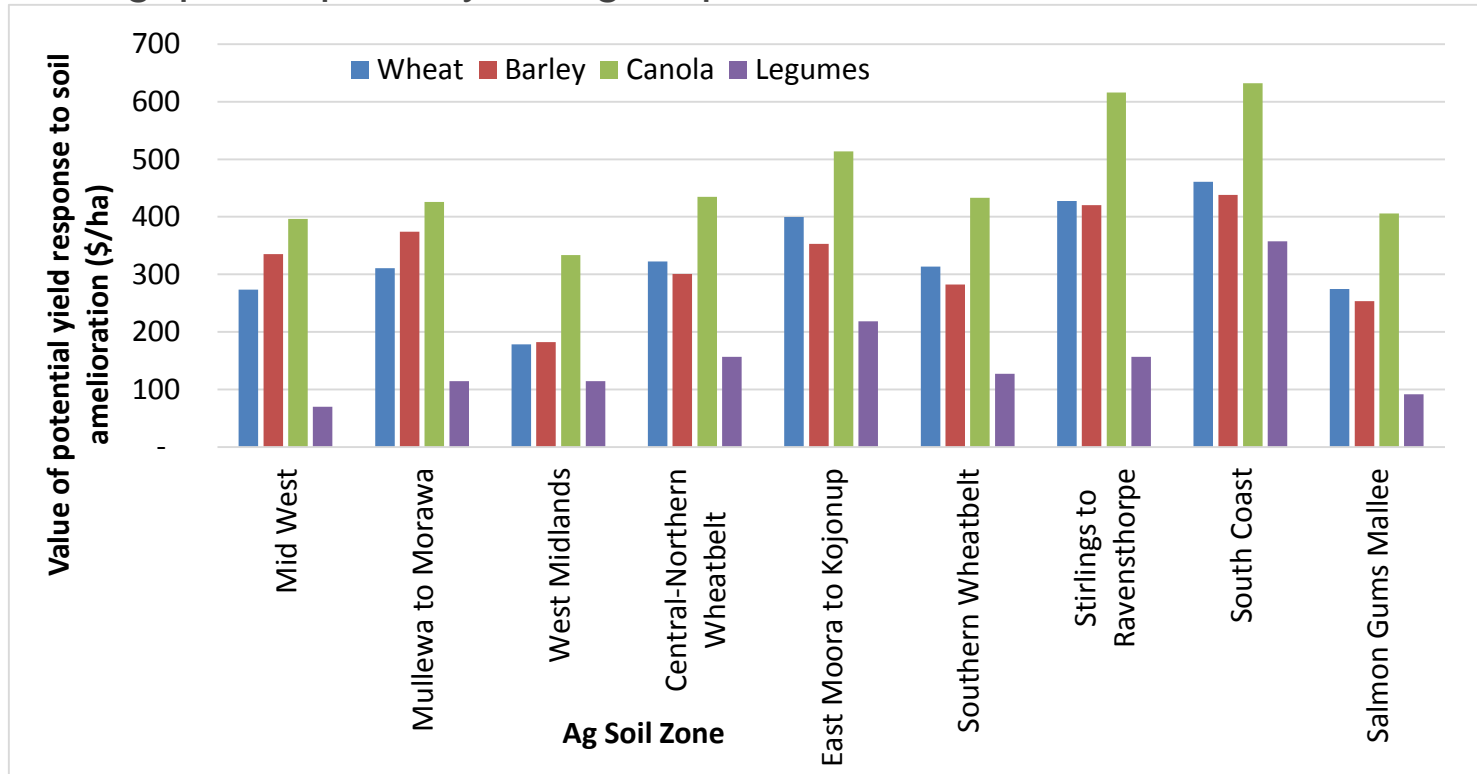
Methodology:

1. We estimated the gap between a constrained potential yield (in the absence of soil constraints) and actual yield (in the presence of soil constraints)
2. Then multiplied this gap by farm-gate price and average area sown to each crop by Ag Soil Zone



Estimated value of potential yield response (\$/ha) to soil amelioration addressing soil constraints

Yield gap multiplied by farmgate price



Estimated value of losses from soil constraints by Ag Soil Zone

Ag Soil Zone	Value of losses due to soil constraints (\$billion/year)	% of loss by Ag Soil Zone	Weighted average loss (\$/ha)
Mid West	0.3	7	250
Mullewa to Morawa	0.2	5	300
West Midlands	0.1	3	200
Central-Northern Wheatbelt	1.3	31	320
East Moora to Kojonup	0.7	15	400
Southern Wheatbelt	0.7	17	310
Stirlings to Ravensthorpe	0.2	5	450
South Coast	0.5	12	490
Salmon Gums Mallee	0.2	4	280
Total	4.3	100	330 (weighted average)

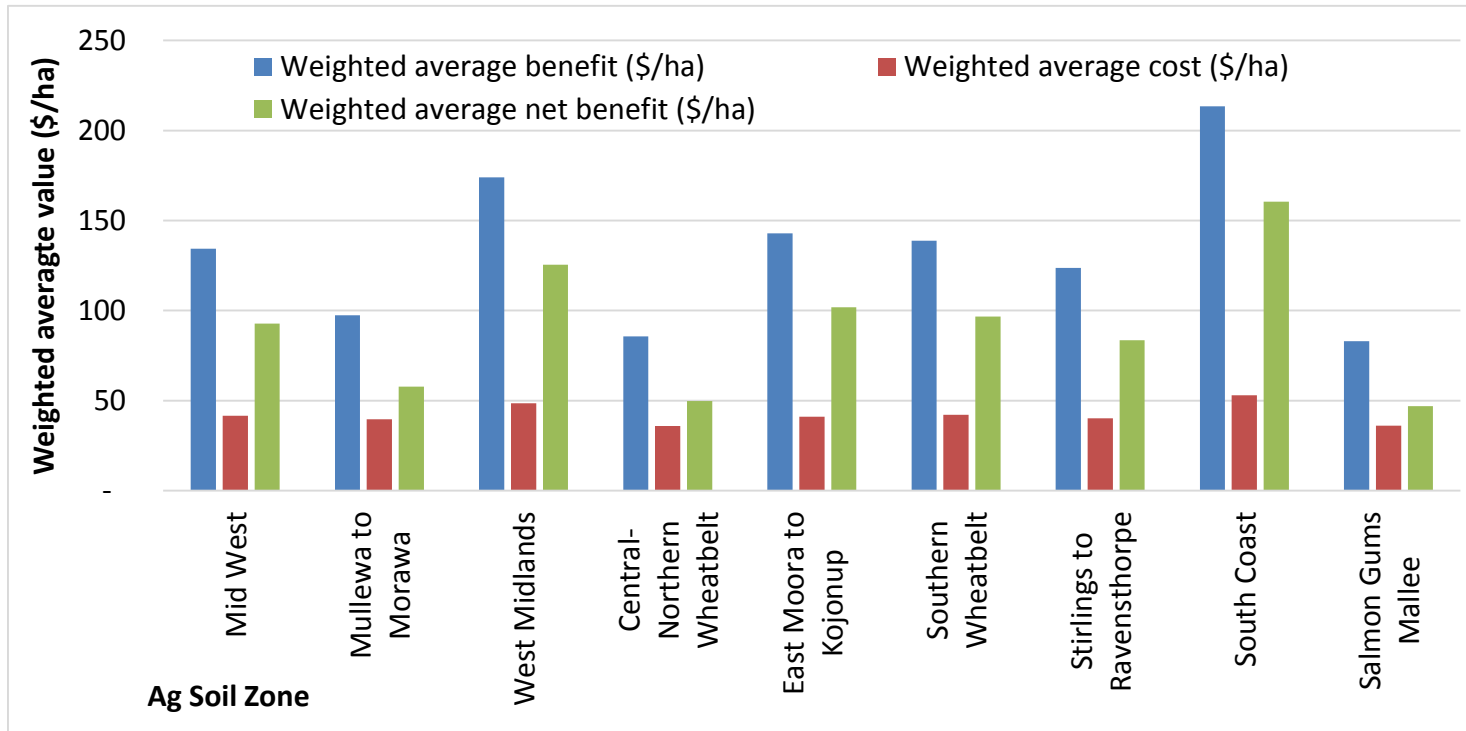
The indicative value of soil amelioration in WA

1. ROSA is used to:
 - identify the amelioration option, or set of options, that addresses all soil constraints for a given crop type and soil type, and
 - estimate the associated gross benefit, cost and net benefit.
2. Results are weighted by soil and crop type and multiplied by the cropping area of each Zone.



Indicative weighted average value of amelioration of soil constraints

Source: ROSA modelling results



Benefits and costs of the most profitable soil amelioration options(s)

Weighted by crop, soil type and Ag Soil Zone

Weighted average benefit (\$/ha/year)	124
Weighted average cost (\$/ha/year)	41
Weighted average net benefit (\$/ha/year)	84
Weighted average benefit cost ratio	3.0
Weighted average benefit (\$million/year)	1,594
Weighted average cost (\$million/year)	521
Weighted average net benefit (\$million/year)	1,073

Key message 1



A new decision tool called ROSA (Ranking Options for Soil Amelioration) can be used to help understand the most cost-effective way to spend a limited budget on soil amelioration.

Key message 2

The estimated value of lost grain production due to soil constraints is, on average, **\$330/ha** costing the grain industry approximately **\$4.3 billion/year**.

This equates to approximately half the medium-term gross average annual value of grain production in Western Australia.



Key message 3

Net benefit of ameliorating these soil constraints (weighted by soil type, Ag Soils Zone, crop type):

- **\$84/ha/year**
- **\$1billion/year** across the grain-growing regions of Western Australia.



Acknowledgments

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Thank you

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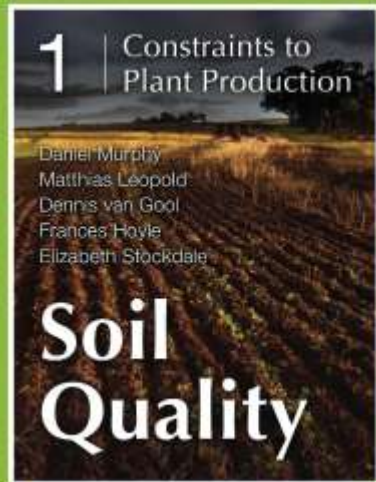
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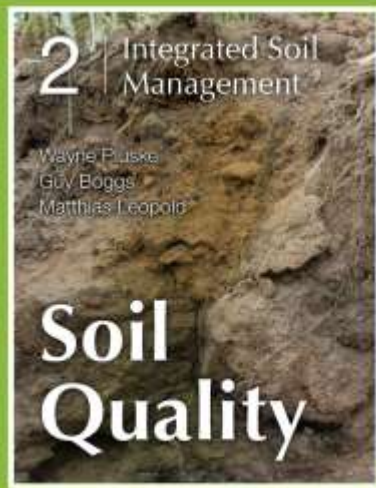




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