

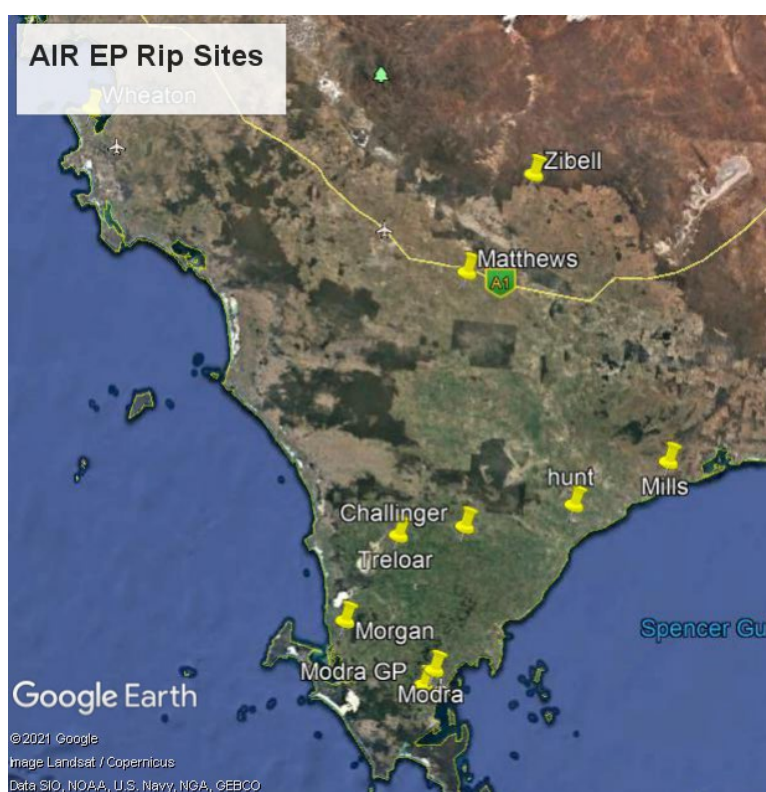


National Landcare Program – Small Farms Small Grants Round 2 Project Summary

Please send completed Project Summary to:
DAWR.Manage@communitygrants.gov.au

1. In your own words please describe “what was the problem/issue for this project and how did you identify the issue?”.

Most of the agricultural area of Eyre Peninsula has subsoil constraints that limit root growth and restrict plant access to soil water and nutrients. This reduces pasture production and crop yield with the greatest impacts occurring in adverse seasons. The project used existing soil mapping supported by landholder input to identify 10 sites on different soil types distributed across Eyre Peninsula (figure 1). Subsoil constraints were identified through soil sampling and a range of amendments including carbon based and commercial mineral fertiliser products were incorporated to 30-40 cm with equipment that is readily available to farmers.



Left: Figure 1. Eyre Peninsula sites.

Above: Figure 2. Modra Greenpatch site.

2. In your own words please describe what you did,

A trial plan with three replicates of randomised plots was developed for each site. Up to seven amendments (Table 1) were applied to the surface (Figure 3) and then were incorporated up to 40 cm depth. Incorporation on nine sites was undertaken with a ripper with inclusion plates (Figure 4) and with a rotary spader on one site.

Table 1. Treatments (All treatments except the nil ripped with “deep” inclusion plates or spaded)

Treatment	Detail	Comment
Nil	Control	
Rip only	Rip with inclusion plates to 35-40 cm	
Nutrients*	UAN (N 42 kg/ha), Phosacid (P 26.9 kg/ha), Cu (2 kg/ha), Zn (5 kg/ha), Mn (7 kg/ha)	Macro-nutrients and trace elements matched across the trial
Biochar HR + Nutrients**	Biochar @ 680kg/ha	Nutrients applied as T3
Biochar LR + Nutrients**	Biochar @ 200 kg/ha	Nutrients applied as T3
Biochar	Biochar @ 680kg/ha	
Cereal straw + Nutrients**	Cereal straw pellets @ 1000 kg/ha	Nutrients applied to match T3

*Nutrients only applied as a surface spray and then ripped

**Nutrients sorbed to product prior to product spread on the surface and then ripped



Figure 3. Amendments on the surface at the Mills site.



Figure 4. Ripping with inclusion plates.

Field days were held at most sites in September to October 2020. Presentations were delivered at the AIR EP Farm Expo in February 2021 and at workshops and farmer meetings. Project outcomes were shared with the AIR EP Low and Medium Rainfall trial committees. A summary of the project was also published in the Eyre Peninsula Farming Systems Summary 2020.

3. How did you measure/record your project activities?

Plant production data including plant numbers, biomass at flowering and yield (Figure 5) was collected for all sites. Grain size and protein levels were also collected for relevant sites.

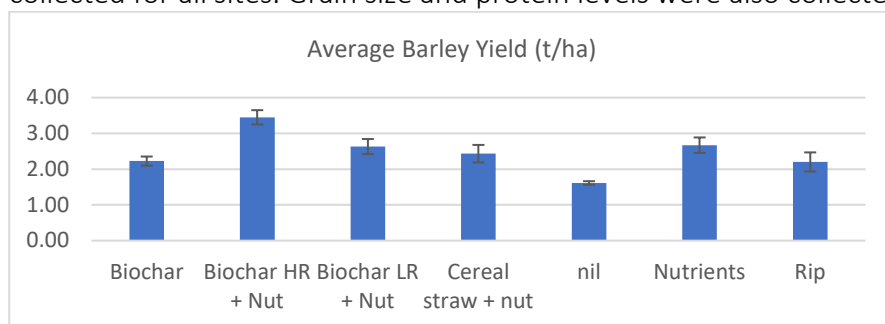


Figure 5. Grain yield at Hunt site.

Targeted treatments had soil moisture, mineralised nitrogen and bioassays of soil enzymes measured at germination (Figure 6). Soil bulk density and soil chemistry was also collected on targeted treatments post-harvest.

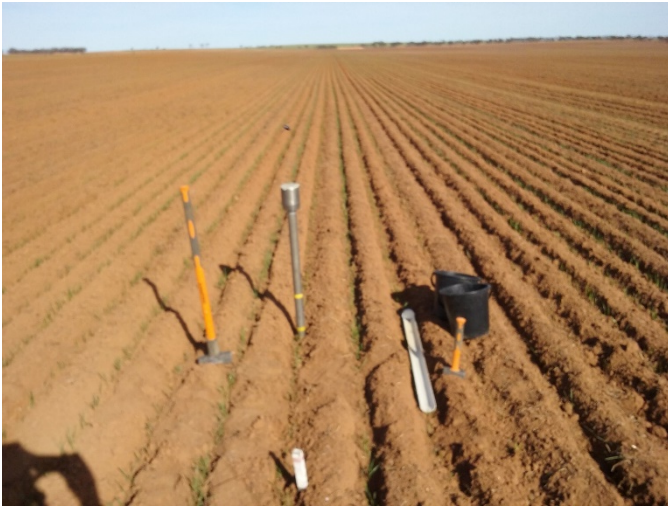


Figure 6. Soil sampling at germination Zibell site. differences in treatments.



Figure 7. Matthews' site showing growth

Photo records of treatments and plant responses were collected at several stages during the growth cycle (Figure 7).

Site information including site details and results were provided to attendees at field days. Attendance records were kept for all field days and workshops and feedback was obtained for the project presentation at the AIR EP Farm Expo.

4. What do you think was the most significant outcome of your project?

Incorporating organic material and topsoil has mainly been used in sandy soils with compacted A2 horizons. This project has extended the technology to other soil types including calcareous soils that do not have a physical constraint. Gains observed in crop growth on these soils have created considerable interest and led to several landholders conducted larger paddock scale demonstrations in 2021. The other major outcome from this project has been the strong correlation between higher levels of phosphatase enzyme and Colwell phosphorus in the biochar + phosphorus treatment. This relationship is being explored further in other projects.

5. In your own words please describe any unexpected outcomes of the project. *Please include any photographs that either show before and after progress or show the finish of the project.*

The most surprising outcome of the project was the plant growth response to deep ripping with inclusion plates on the two most highly calcareous soils of the project. Although a very dry winter and early spring restricted yield gains, the early growth differences on both sites were obvious. Landholders in the region have undertaken further demonstrations including ripping with inclusion plates on these soils in 2021. Early results are promising with ripping treatments showing greater above ground biomass and better root mass than the unripped treatments (Figure 8).



Figure 8. Plant growth – 2 plants on the right ripped + biochar+ nutrients, 2 plants on the left unripped