Building Resilient Agricultural Systems on Kangaroo Island

Background

In March 2020 Nicole Masters from Integrity Soils delivered a 3-day regenerative agriculture workshop on Kangaroo Island. Following this workshop, a 'community of practice' comprising over 20 farmers from Kangaroo Island, interested in implementing regenerative agricultural practices was created. Since the initial workshop this group have been supported by Kim Deans, a regenerative agriculture coach from Integrity Soils through webinars, group coaching calls and question and answer sessions to provide the opportunity for group accountability, interaction and support as participants implement what they are learning. Having a local, supportive network of farmers to learn with and from is a key aspect of a successful transition to regenerative agriculture systems.

What was done

Four demonstration sites have been established on Wheaton (DW1, DW2, DW3), Jenny Stanton (JS1, JS2, JS3, JS4), Carly Bussenschutt (CB1) and Venetia Bolwell (VB1, VB2, VB3, VB4) properties. These sites will be used to explore how biological approaches to restoring soil health and holistic grazing practices lead to improved soil health, increased soil carbon, increased soil water holding capacity, improved plant health, improved production, increased on farm diversity and a reduced need for synthetic inputs.

Demonstration site participants have had access to individual coaching calls with Kim Deans. There is no one-size-fits-all approach to regenerative agriculture and the Integrity Soils coaching process supports participants to put together a strategy that is relevant for their unique situation. The coaching process empowers participants to deepen their observational skills and understanding of soil processes to find points of leverage that provide the greatest return on investment in quality, production, and performance.

Monitoring is the foundation of a successful transition to a regenerative system. Soil health monitoring has been undertaken on all demo sites with the assistance of Damon Cusack (Regional Agricultural Landcare Facilitator). Monitoring transects have been established at the demonstration sites to monitor physical, biological, and mineral aspects of soil health over the course of the project.

Soil physical health assessments have been carried out, in line with the Integrity Soils process, which measures several soil and plant health indicators along with recording photographic records of the sites. Soil biological health has been monitored using laboratory testing from Microbe Labs. Soil mineral analysis has been undertaken on each site with samples analysed by Environmental Analysis Laboratory (EAL). This data completes the whole picture of soil health and is viewed alongside soil physical and biological health indicators.

Results

The monitoring data collected is also used to guide the development of the strategy employed at each demonstration site. Monitoring data provides a baseline and is used to

indicate if the system is going forwards or backwards. This data will become more valuable over time as the project progresses and trends become obvious.

Table 1: Key aspects of soil physical health assessment

	Water Infiltration(mm/min)			Visual Soil Assessment Score
	Ist 25mm	2nd 25mm	3rd 25mm	
CB1	2	1.3	-	17
DW1	-	-	-	14
DW2	1	-	-	18
DW3	12.5	2	1.6	14
JS1	2.7	2.2	1.9	17
JS2	30	1.2	-	17
JS3	<0.8	-	-	18
JS4	0.5	1.7	1.7	16
VB1	2.5	0.9	-	15
VB2	6.5	1.8	1	15
VB3	2.7	0.7	-	12
VB4	3.6	1.4	1.2	12

Assessing water infiltration rate				
Results mm/min	0 – 0.5	0.5 - 2	2 - 4	>4
Guide	Poor	Moderate	Good	Very good

Visual soil assessment score	**Assessment**
<10	Poor
10-20	Moderate
>20	Good

Table 2: Key aspects of soil biological laboratory testing

	Total micro-organisms	Bacteria	Fungi	AMF	Protozoa	Anaerobes	Diversity
CB1							
DW1							
DW2							
DW3							
JS1							
JS2							
JS3							
JS4							
VB1							
VB2							
VB3							
VB4							

Low	Fair	Good	High

Actions being undertaken on demo sites have been prioritised in line with the Integrity Soils, soil health triage process outlined below:

1. **Solar energy**: Maximizing the use of the free solar energy, that drives the production system and sequesters carbon in the soil, is the first foundational step in a regenerative program. Practices that build this foundation include, keeping living ground cover and living plant roots in the soil, fine-tuning grazing management to allow for adequate rest and recovery of plants between grazing and increasing the diversity of plant species through seeding and grazing management.
2. **Air**: High anaerobes in microbe labs tests at all sites are an indicator of poor soil function, poor aggregation and low gas exchange. Improving stable soil carbon levels will improve soil structure and porosity, providing aeration required by soil microbes to cycle nutrients in the soil. Improving gas exchange reduces GHG losses and the proliferation of anaerobic bacteria. This porosity also reduces evaporation.
3. **Water**: Improving stable soil carbon reserves will also improve water infiltration and storage in the soil. Maximising rainfall use efficiency is a requirement for maximising profitability in a farming system.
4. **Decomposition**: Boosting aeration and the water cycle in the soil will facilitate decomposition processes necessary for mineral cycling.
5. **Biology**: In addition to doing less harm to soil biology, actively feeding and stimulating soil microbial populations will restore biological health in the soil. Practices being undertaken on demo sites to restore soil biological function include applying biological stimulants in spring and autumn when there is good soil moisture and applying a seed coating of worm or compost extracts.
6. **Minerals:** Mineral analysis indicates that foliar applications of nutrients in particular nitrogen, phosphorus and trace elements (noting that exact requirements vary from site to site) could be beneficial across the demo sites and participants will be encouraged to take leaf tests during the growing season to monitor plant nutrient needs. The carbon: nitrogen ratio is high across all demo sites which indicates that decomposition processes are not functioning, due to low aeration, low bacteria levels and low nitrogen.

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For further information
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