

# Progressing pasture biodiversity through innovative grazing-cropping practices

<b>Location</b>	<b>Gimlet Ridge, 19km NNE of Perenjori</b>
<b>Soil type</b>	Pindar South Subsystem soils – undulating sandplain of red and yellow deep sands with sandy and loamy earths.  Noolagabbi East Subsystem soils – are level to very gently inclined valley flats with sandy loam over red-brown hard pans.
<b>Total annual rainfall</b>	325 mm average with a range of 190-500 mm

## Why do the trial

There are a few things which Rod and Katrina wanted to address in this demonstration:

**Soil capping** – there are a number of areas on the property which are capped which are impermeable

**Soil health and nutrient management** – aims to achieve low-input farming system that will increase soil health and productivity by taking advantage of the nutrients available in livestock excrement to enhance primary production

**Increased ground cover** – maintaining and increasing ground cover. This should also contribute to an increase in soil health.

**Improved livestock nutrition** – higher pasture diversity and availability

**Improved ecosystem health/biodiversity** – increasing agricultural productivity in a sustainable manner whilst providing benefits to and enhancing the local biodiversity.

## What was involved:

No-kill cropping: sowing crops without eliminating any other plants. A K-Hart triple disc assembly with a tyne at 2 spacings with an inverted T-point were used to open the ground, expose the soil and hold moisture. No chemicals were used to kill pasture/annual volunteers before the process. Where the sites were sown they were all sown with the same mixture of – oats, wheat and barley, and seconds grain mix including radish and ryegrass.

High density short duration grazing: aims to mimic nature and the way large animal herds move over large areas as packs flattening the grass, to break the soil capping, covering the soil surface with mulch and dung, thus allowing biological decay before the next growing season and the affected area to rest during long durations (Chaplot, Dlamini & Chivende, 2016).

Traditional free grazing: when the animals were allowed to graze the paddock at their own free will. There was no shepherding. For this particular demonstration they were only free grazed for a couple of days.

**Site 1:**

Soil type - gravelly/loamy clay and quite capped. Using no-kill cropping it was sown with the above mentioned mix

There was germination but not as much as anticipated. This was not surprising given the season and as it was badly capped it couldn't utilise the moisture. The aim is for 7-8 plant/m<sup>2</sup>, but there was only about 2-3 plant/m<sup>2</sup>. One of the biggest problems with this site was that it has lack of cover due to soil type and it being a previous sheep camping area. This resulted in there being limited biology.

**Site 2:**

Soil type – sandy gravel. The GPS point for this site was mislaid however high density grazing definitely promoted higher density of cover and more species than similar areas not grazed with this technique.

**Site 3:**

Soil type – red clay/loam. This site is located near the homestead. It has poor coverage, capped soils and due to its proximity to the house it was a paddock that Rod and Katrina felt was important to get right as they were looking at it each day. The paddock was grazed using very heavy shepherding. Basically the sheep were moved around to such a degree it was like them being in a holding pen. This meant that their hooves were digging/imprinting the soil in all different directions. After grazing this paddock was no-kill cropped.

The paddock doesn't look too bad now and has between 7-8 plants/m<sup>2</sup>.

**Site 4:**

Soil type – red clay/loam. A similar soil type to that of Site 3. This site was traditionally free grazed. Once the stock were removed it was no-kill cropped.

There is basically no coverage on this area of the paddock. It was selected because it is a difficult, heavily capped site.

**Site 5:**

Soil type – gravelly/loamy clay. This is where there was only traditional free grazing. It was done on another farm a short distance from the Butler's. This was a control site and has remained patchy plant cover, bare soil and capping.

## **So where to from here?**

Rod's ultimate paddock would be 40% Mulla mulla/Saltbush/shrubs and 60% grasses. It is the grasses that breathe life into a paddock. They live and die, live and die. They use the water when it comes, set seed, die and do it all again. Mulla mulla and those kinds of plants are more longer term.

Unlike the sandplain country it is essential to get in before it rains. It takes too much rain to wet the soil up if it has not been disturbed. By the time it's wet you have lost half of your growing season.

By getting in dry any seeds – whether the ones you have cultivated or the naturally occurring ones have the whole season to use the rain and grow.

The no-kill machine used was not ideal. It lacked penetration in some of the tighter capped soils and didn't crack the capping enough to allow seeds to germinate. 'I should have rebuilt it before I began but hindsight is a wonderful thing. I used a different machine on a neighbouring property but it was still not perfect although it was a lot better.' Rod explained

Other things that Rod has observed are

- Not all seeds come up at once
- Use a variety of seeds. Doesn't have to be cereals. Seeds which include ryegrass and radish are great
- Growing plants creates pathways for other plants to grow.
- Some areas may need additional inputs to support biological activity (such as the addition of things like fish emulsion).

In the future Rod and Katrina may look into the possibility of growing crops for harvest. This will still be done in the no-kill cropping style and they will be of organic nature. However, this is not the end goal, it is something that will be opportunistic and definitely not at the expense of the land or biology.

Despite some of the sites showing disappointing results during this project, Rod has confidence in the techniques to support soil health, increase ground cover and improve production. Rod believes examples such as Site 3 demonstrate the potential for more sustainable and productive farming into the future.

Rod and Katrina's goal has been to have 100% cover, 100% of the time with green and growing plants. Therefore utilising rain that falls outside the May – Sept rainfall.

## **Acknowledgments**

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