

## An insight into graze and grain systems in a high rainfall zone environment

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**Abstract:** *Cate and I have been grazing pastures and crops for the past 13 years. In that time, we have learnt that the system makes large returns in good seasons and is still profitable in the poor ones. The aim of this document is to give an insight into what is required to undertake a change in management to produce forage crops that can also deliver a grain yield. We have seen two large farms completely changed in their weed profile, soil health and financial output.*

### Introduction

Merreworth and Evandale aggregation is located at Berrima NSW (GPS co-ordinates 34.51858, 150.28483). It is intersected by the Freeway and Old Hume Hwy. There are three permanent waterways through the property.

The crops are grown under graze and grain principles with grazing commencing in February and locked up for harvest in August. Canola is grazed by lambs and a wheat and ryegrass system by both sheep and cattle and consists of:

- 360ha of annual ryegrass pasture
- 330 ha of late summer sown hybrid winter canola
- 320 ha of winter wheat
- 230 ha millet and brassica summer crop.

### Farming description

#### Staff and Equipment

- 1.5 permanent staff
- Self-propelled sprayer
- 230 hp tractor
- 200 hp tractor
- 5 tonne fertilizer spreader
- 24m<sup>3</sup> feed mixer
- Front end loader
- Seedhawk 8 m seeder.

#### Fertiliser

- MAP – 100 kg/ha at Sowing
- Urea – 200 kg to 500 kg /ha per annum depend-ing on in crop rainfall.
- Chicken manure – 12 m<sup>3</sup>/ha in 2016

- Lime – 3000 kg/ha in 2016

#### Soils and landscape

The farm has predominately basalt soils and has a volcanic crater on it. The farm as it moves to the west encounters a sandstone shelf.

#### Climate

The average annual rainfall is 760 mm per annum. However this is misleading as it often gets massive east coast falls of more than 200 mm in an event. Managing wet is a large part of the management plan.

The farm endured a cruel drought from June 2017 until February 2020 that saw two years of the lowest rainfall on record.

#### Livestock

- All animals are bought in.
- Annual turnover of lambs is market driven but typically 6000 per annum
- Cattle numbers are usually 3000 plus.
- We currently supply Woolworths with a grass fed MSA product that av 270 kg dressed weight.
- All animals undergo an induction protocol with a broad-spectrum drench, clostridial vaccine and ear tag.
- Cattle have individual details in a Gallagher TSI computer.
- Detailed profit and loss is calculated on each animal once slaughter results are received.
- A detailed audit of operations is undertaken half yearly by Woolworths.
- Lambs typically grow at 270 grms a day average.

- Cattle typically grow at 1.2 kg/day average.

### ***Cropping***

Preparation of the farming process starts with the end of the previous year. Typically, wheat or canola crop would follow these basic timelines:

- November – spray fallow ryegrass, grazing wheat
- December – harvest canola, wheat spray fallow stubble
- January – spray fallow
- February – sow on first available moisture usually on the calendar as there is sufficient stored moisture
- March – sow ryegrass
- April – commence grazing
- May – fertilizing with nitrogen
- June – Selective weed spraying and Nitrogen application
- July – UAN and Giberalic application to stimulate plant growth.
- August – Selective weed spraying, nitrogen application
- September – Decision on whether to lock up crops for harvest of graze out.
- October – Fungicide and insecticide on harvest crops. Sowing of summer forages.

### ***Canola***

- 330 ha of canola was sown between January and March.
- 2.5 kg/ha seed
- 100 kg MAP
- 100 kg urea
- Another 400 kg of urea added depending on soil moisture levels.
- This was grazed by lambs from March onwards.
- Liveweight gains of 300 grams/day are common.
- Locked up in July
- Harvested in December/January.

### ***Winter Wheat***

- 320 ha of wheat was sown between January and March.

- 80 kg/ha seed
- 100 kg MAP
- 100 kg urea
- Another 300 kg of urea added depending on soil moisture levels.
- This was grazed by cattle from March onwards.
- Liveweight gains of 1.5 kg/hd/per day are common.
- Locked up in late August
- Supplemented with oaten hay and Na Ca Mg mineral mix
- Harvested in December/January.

### ***Ryegrass***

- 300 ha of annual ryegrass was sown in March.
- 20 kg/ha seed
- 100 kg/ha MAP
- 100kg/ha urea
- Another 200 kg of urea added depending on soil moisture levels.
- 60 litres of UAN in two applications over winter.
- This was grazed by cattle from April onwards.
- Liveweight gains of 1.5 kg/hd/day are common.
- Grazed until January
- Supplemented with oaten hay and Na Ca Mg mineral mix

### ***Weeds, pests and diseases***

This property was covered in serrated tussock. We have found that annual cropping removes the tussock. If this country were to go back to pasture it would be covered in tussock within 5 years.

### ***Drought strategies***

- Every drought is different.
- Make decisions on hand feeding on a case by case basis.
- There is nothing wrong with reducing stocking and letting mother nature take her course.

We use soil water storage (fallows and keeping them clean) to harvest water in summer and

then using the stored moisture to grow forage in the autumn.

Biggest lesson don't punt on mother nature relenting.

Keep ground cover. We use short term paddock feeding to finish stock.

### Goals or business objectives

1. 800 kg of liveweight gain per ha
2. Optimum sales price.

### Pathway to Pasture Production

#### *Graze and Grain system*

Since 2008 we have been involved in growing dual purpose crops at Goulburn and now Berrima. These properties were both terribly infested with serrated tussock and hawthorns.

Graze and grain is now a well established system in the high and medium rainfall regions. The basic system is sowing canola and wheat onto clean fallowed land from January until March. This produces a large amount of forage for autumn, winter and potentially spring and early summer.

In August we make calculations on whether to graze the crop out or lock up for harvest.

I am not going to preach but rather let you know what we have found in restoring over 5000 ha of land in the past 10 years using cropping for forage and grain.

- Identifying the best of the land and implementing a cropping phase has had the following results:
  - ▶ Increased stocking rates from the start base by 500%.
  - ▶ "Tirranna" Goulburn had 200 merino ewes and 120 cows and calves in 2008. 2020 saw some 12,000 prime lambs, 3000 trade cattle, 1100 tonnes of Canola and 1200 tonnes of wheat produced off the same land.
  - ▶ Merreworth had 300 ewes and 200 cattle. It now turns off 3000 plus cattle and 6000 lambs with 400 tonnes of canola.
  - ▶ Huge reduction in invasive weed species. As well as giving a mental feeling of winning the battle.

- ▶ Lift in soil nutrients from 12 Colwell P to 39 Colwell P.
- ▶ Lift in soil organic carbon from 1.3% to 1.9% at "Tirranna"
- ▶ Resilience during drought. The grazing crops allowed rainfall to be harnessed to be ensure some revenue. In 2017, 2018 and 2019 we grazed canola and wheat from early storm rains to achieve excellent lamb and cattle trades and then basically shut down the farm during spring to keep groundcover and get ready for the next year.

- The system requires \$600 to \$700 worth of inputs per ha per annum and delivers revenues of between \$1000 and \$3000 depending on the season. A huge plus is that if done correctly you do not go backwards.
- The main drivers of the system are:
  - ▶ Fallow spraying of paddocks with autumn paddocks being sprayed out in September.
  - ▶ Soil testing to establish deficiencies and addressing the main ones.
  - ▶ Early sowing of crops
  - ▶ Sowing of crops with appropriate equipment (knife press wheel minimum)
  - ▶ Adequate nitrogen
- Being Nimble – We often change our strategy from more lambs to more cattle etc.

#### *Stocking rates*

- Canola is between 30 and 45 dse for 8 to 10 weeks
- Winter wheat is generally 30 to 40 dse in Autumn and then 20 dse over winter and then rising to 50 dse in the Spring early summer.
- I rate a crossbred lamb gaining 300 grms per day at 2 dse
- I rate a 400 kg steer gaining 1.3 kg per day at 15 dse.

We measure available forage with a pasture probe and visual experience.

We also temper our stocking rates with a seasonal outlook. If we feel it is getting dry and cold, we reduce our expectations and if it's warm and wet we lift them.

### Knowing your numbers

We run a comprehensive budget process that covers the year, month and the individual trades we undertake.

The point is that with knowing what our fixed and variable expenses are, we can see if there is a future profit or that we need to change tactics to achieve a profit. We then measure the results through an accounting package to see how we are tracking.

### The future

The red meat industry and protein in general is in for a solid rise in pricing (some has already been achieved). Producing what customers want is paramount to achieving our goals.

I believe our next stage will be partnering with capital investment to transpose what we have learnt (good and bad) into larger systems where we can greatly improve turnoff of quality stock.

### Conclusions

- Done properly, adding a grazing crop can greatly improve the supply of high-quality forage at times in the year when there are deficits.
- It delivers high number of high-quality sale stock into the winter markets that is simply not able to be done on improved pastures in most years.
- Weed and soil profiles can be improved greatly with the use of cropping protocols.
- However, using good advice on agronomy is paramount. Done poorly you will lose money and done well you profit greatly.
- It also requires preparation and willingness to seize opportunity of rainfall events.
- Undertaking this type of operation is a commitment financially and mentally.

### Acknowledgements

Gibson Family, "Tirranna," Goulburn.  
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