COLLECTION, ANALYSIS AND USE OF INFORMATION ON FARM

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Introduction

"You can't manage what you don't monitor". This cliché is a good summary of how we have approached our first 18 months as dairy farmers.

This paper outlines the approach my partner Ruth and I have taken to improve the understanding of our farm business, particularly in regard to pasture management. I have drawn on a theme presented at last year's SIDE Conference by Adrian van Bysterveldt: the use of information and modern tools to help make proactive rather than reactive decisions.

Adrian's paper used examples from the Lincoln University Dairy Farm (LUDF) to highlight the value of proactive decision making in harvesting high quality pasture to maximise profitability.

Ruth and I have set out to apply these same principles to our own business, one that operates in a very different climate and with different infrastructure to LUDF.

Background

Ruth and I have been managing my parent's dairy farm for the last 18 months. We both came into the role relatively "green" from a practical perspective. Ruth has an academic background in ecology, recently submitting her PhD at Lincoln University, while I had worked for Dexcel as a Consulting Officer, and then more recently for FarmRight Limited in a consulting role. While at Dexcel, I had the opportunity to work closely with Adrian at LUDF. During this time I saw the value that focused pasture management brought to the LUDF business. I also observed many other Canterbury farmers adopting similar practices and seeing immediate improvements in productivity.

Our farm

Our family dairy farming business consists of a 265 ha effective milking platform and 130 ha of support land. We milk a crossbred herd of 930 cows in a seasonal system with young stock, and maize silage grown on our support land

Our soils are predominantly free-draining alluvial gravels overlaid with silt. Typically the farm experiences dry summers, and for the last 6 years has been irrigated with K-line irrigation. This system irrigates 275ha with water that is sourced from the neighbouring Takaka River.

Like LUDF we share the opportunities of:

- Scale

- Water for irrigation
- Highly fertile soils

- High genetic merit crossbred cows
- However, unlike LUDF we have:
- 2100mm of annual rainfall, the majority falling between April and October (Figure 1)
- 1300mm of this rainfall draining away rapidly after high rainfall events (Figure 2)
- Higher night time temperatures and humidity influencing pasture growth

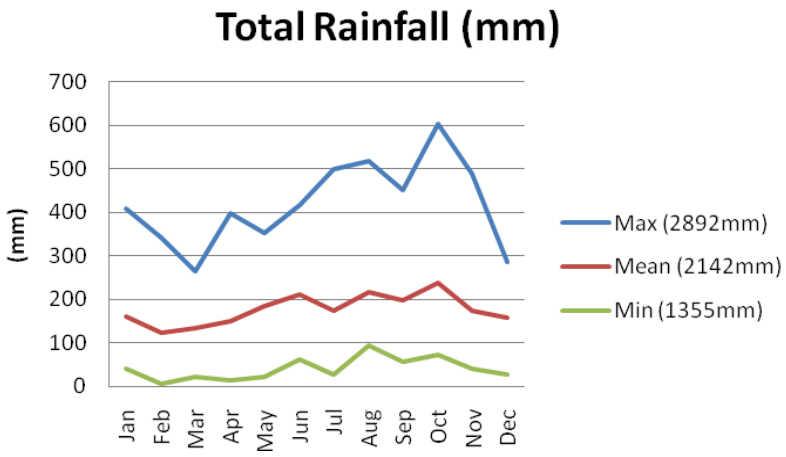

Figure 1. Annual rainfall (mm) measured at Kotinga, Golden Bay. Source: NIWA

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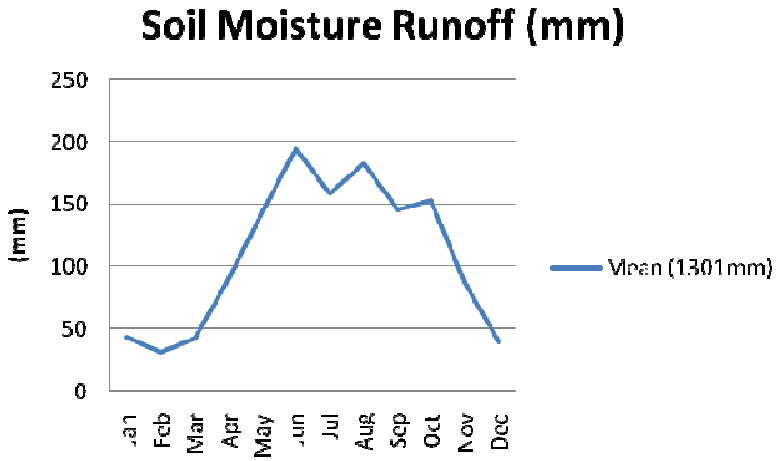

Figure 2. Annual soil moisture runoff (mm) measured at Kotinga, Golden Bay. Source: NIWA

Applying LUDF principles in Golden Bay

There is a large body of evidence which shows that maximum profitability in New Zealand pasture-based systems is achieved by maximising pasture harvested at low cost. Farms such as LUDF clearly demonstrate this. Our challenge, like all New Zealand dairy farmers, is to achieve this with our own unique set of resources.

While production is enticing and easy to measure, many farmers find measuring pastures time-consuming, inaccurate, and of limited use, without the tools to turn this information into a form they can make decisions with.

Ruth and I took the view that without developing a good system to measure and react to our pasture resource, we were unlikely to improve the performance of our business. Our goal was to lift performance through growing and harvesting more pasture per ha, with less reliance on supplementary feed.

Our interpretation of how LUDF has succeeded in its pasture management principles is:

- Correct pre-grazing height and area allocation results in the correct residual being achieved. In turn:
- Achieving the correct residual results in: a) light into the base of the sward aiding clover growth, b) prevents feed being left behind which will be of lower quality by the next grazing, and c) improves pasture density (tillers) and therefore total feed production/ha.

Observations of pastures on our farm when we started in early 2008 showed dead matter in the base of many of our paddocks, large variation in the mix of pasture species in many of the paddocks, large fluctuations in daily milk production, and real difficulty getting post grazing residuals below 1700 kgDM/ha.

Our firm view in the first 12 months on the farm was not to change any major component of the farm system, but instead, to focus on achieving better residuals and build up a good picture of our system through the collection of information. The first thing we set out to achieve was to understand our pastures. We began this process by buying a plate meter and walking the farm once a week on a predetermined route. While this presented some challenges, such as 6 hours of walking and the impact of giant buttercup weed and uneven soils influencing the plate reading, we quickly began to understand the resource we had.

We have used a computer programme called Pasture Coach (Version 4.0.1.0, AgSoft Solutions) to record and store our farm walk data. This brilliant and simple to use programme has made creating a feed wedge after each farm walk a 5 minute job. The most valuable aspect of this programme however, is its ability to predict a future wedge. We have found this to be a powerful tool for decisions around feed allocation, rotation speed and the use or conservation of supplementary feeds.

The next aspect in improving our pasture management was to better understand individual paddocks. The nature of the river valley where we farm means there are areas in all our paddocks that are ineffective for growing grass. We purchased a farm mapping programme that allowed us to develop a detailed and accurate farm map. This programme, called FarmKeeper (Version 3.0.9, Overland Corner Holdings Pty Ltd) also allowed us to record each grazing that occurred in each paddock, the number of cows that grazed the paddock, and the period of time they spent grazing. This has been very useful, along with our paddock growth rate information, in determining the poorest producing paddocks to target for pasture improvement through more efficient irrigation or regrassing. Figure 3 shows the range of total annual yield (kgDM/ha) for each paddock on our farm. The black line represents the average annual growth for the farm and highlights the opportunity for improved performance of the poorer-performing paddocks.

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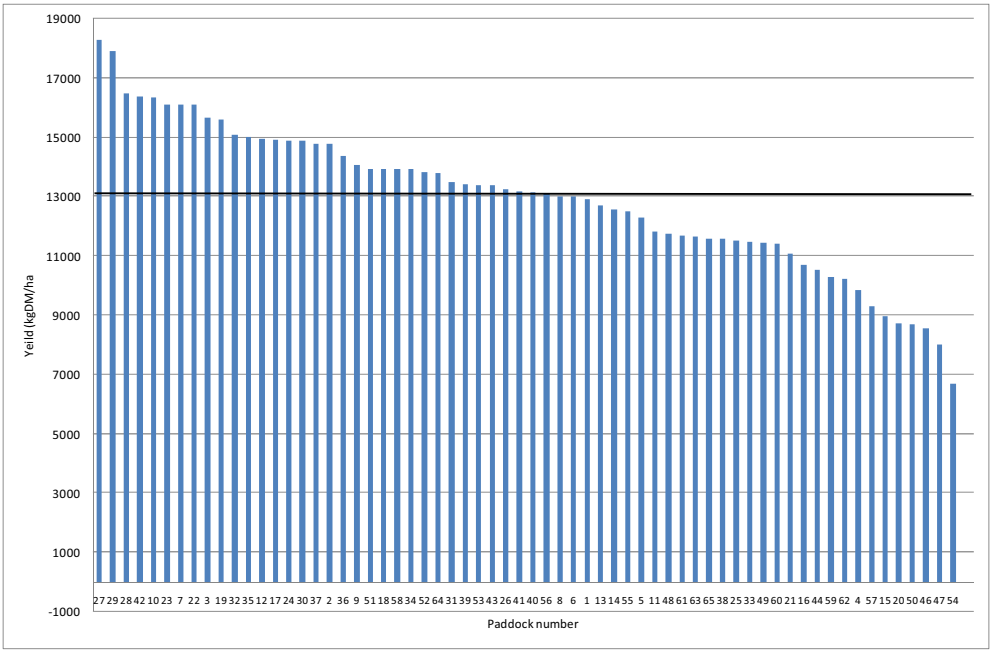

Figure 3. Comparison of total yield (kgDM/ha) for each paddock over 12 months of monitoring

As the monitoring program progressed, we began to question how effective our irrigation was in the poorer performing paddocks. To better understand the situation, we installed three Aquaflex soil moisture probes in different soil types around the property. The information gathered over 12 months has given us the power to make prudent and cost-effective use of our irrigation water. We can see when soils are at field capacity (saturation point), and when moisture levels are at plant wilt-point. This tool has given us real power to decide when and how long to irrigate, rather than relying on guess work, or our rain gauge. The overall picture obtained from an entire summer's data has also shown us that in order to improve our pasture growth in poorer performing paddocks; we need to reduce our return interval significantly.

Other challenges to maximising pasture harvested

Pasture species

Unlike LUDF that had an opportunity to update pasture cultivars at conversion, our dairy farm has been an amalgamation of smaller farms over many years. This haphazard growth has limited large scale regrassing. Over the last 6 years approximately 70% of the farm has been regrassed or oversown with modern cultivars. Observation of these pastures shows that many had been invaded by volunteer cultivars (old traditionally established grasses) establishing in the sward. The invasion of these cultivars is driven by inconsistent grazing residuals, inconsistent irrigation, and the incorrect choice of cultivar for our climate. The resulting mix of old and new cultivars results in variable growth rates across the sward, which in turn results in clumpy pastures with often up to 1000kgDM/ha more in the clumps. At higher pre-grazing covers (<3000 kgDM/ha), as rotation speed lengthens, residuals are difficult to achieve in these paddocks because clumps are not eaten out hard due to the accumulation of dead matter. Topping is occasionally required to achieve consistent residuals in these paddocks and to help the persistence of new cultivars.

Paddock size/Subdivision

The farms haphazard growth has also resulted in a variety of paddock shapes and sizes further challenging consistent feed allocation; residuals are difficult to achieve when area cannot be consistently allocated.

Information gained

The last 18months of monitoring has provided us with valuable information which we can use to make decisions about our future farm system. We now understand that:

- Total pasture yield is just over 13,000kgDM/ha/year. Range is 8,000kgDM/ha/yr to 18,000kgDM/ha/yr across our paddocks
- Pasture harvested at the current stocking rate was approximately 10,500kgDM/ha/year.
- While we have efficiently harvested pasture grown (80% was eaten) production has been limited by too many cows requiring maintenance feed that could have been used for milk production

Notes:

- There is large variation in annual paddock yield. Our best paddocks are providing 1100 cow grazing days/ha, our worst paddocks 350 cow grazing days/ ha

The future

The information we have collected to date has helped us to identify:

- Our stocking rate is too high for the feed supply
- Our irrigation return interval is too long for our soil moisture holding capacity, evaporation and plant transpiration rates
- A different cultivar choice and grazing management approach will improve the persistence of our new pastures
- We need to build a cost structure and business approach around a realistic production level based on the pasture that we grow

In order to maximise profitability in our grass-based system we must maximise the amount of pasture we harvest. There is immense opportunity within our farming business to grow more grass and turn more of this grass in to milk.