

Collection, analysis, and use of information on farm.

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Introduction

There is a long held truism that the difference between an average farmer and a really good farmer is two weeks. This is the difference between proactive management and reactive management and in the past, the skills of these top farmers were held in awe. This level of top management is now able to be achieved by all farmers through new methods of data collection and analysis.

Data collection on dairy farms has evolved and intensified over time and to date there have been two big drivers, increasing regulatory demands (eg for GST, or resource consents) and farmer passion for their livestock or the weather. In response to these financial firms, milking machine companies, breed societies and livestock associations have developed a host of data gathering and analysis tools, and farmer adoption has been widespread.

Sadly the collection of the most valuable information sets on farm are often overlooked, those about farm infrastructure and pasture. Often the collection of these data sets has been seen as unnecessary or in the case of pastures, simply too time consuming, and farmers have resorted to either farming by recipes or by reacting to changes in that feed supply.

This paper will touch on the issue of knowledge of farm infrastructure but principally will concentrate on the collection of data about pasture and will suggest some of the characteristics of data gathering that encourage farmer adoption of data collection and analysis practices in this area.

Farm Infrastructure

The increasing occurrence of multiple farm ownership, and the resultant frequent changes in manager, has resulted in a new drive to develop systems of retaining essential farm knowledge and not have it walk off the farm with each change over. Owners of multiple farms frequently comment that when they have experienced this loss that they commonly see an initial drop in production or profit by up to 10% before the new manager gets to grips with the farm.

This essential farm knowledge is of two types, a) the location of infrastructure and control points, b) operational knowledge of particular key systems on farm like effluent, cowshed, irrigation, water pumps, soil fertility etc.

With the advent of GPS there are now excellent farm mapping software and data base programs eg FarmKeeper that allow accurate recording and updating of all the infrastructure

and control points on farm. It is my view that the provision of this fundamental data in either paper or computer data form, should be a condition of every land sale and purchase agreement, in the same way as we accept that the transfer of herd records are essential in stock purchases.

On many farms, operational knowledge of systems like cowshed, effluent, irrigation are increasingly contained in operational manuals with the icing on the cake being problem solving flow charts for each of these systems. These problem solving charts not only make for an easier transition from one manager to the next but also free up the current manager to manage rather than to be fixing problems with these systems. This is because this type of diagnostic resources captures all the history of experience of operating these systems on this particular farm and formalise this in a way that allows the rest of the farm staff to sort out most problems.

Pasture Supply

How much grass have I got, how much will I have next week, when does it grow, on which paddocks, at what quality, at what soil temperature, what was the soil moisture deficit, what as the rotation length and how much was left behind when the cows left the paddock. Answers to all these questions provide fundamental information about the food supply that is the raw material for our grass to milk business, and in the past its collection has often been put into the too hard basket.

How much grass have I got today, how much will I have next week?

These are the two most fundamental feed supply questions a farmer has. They are then closely followed by two more, how big is the deficit or how big is the surplus? All these questions are easily answered by measuring the cover in each paddock on the farm and plotting it on a bar graph called a Pasture Wedge or by putting the data in a table.

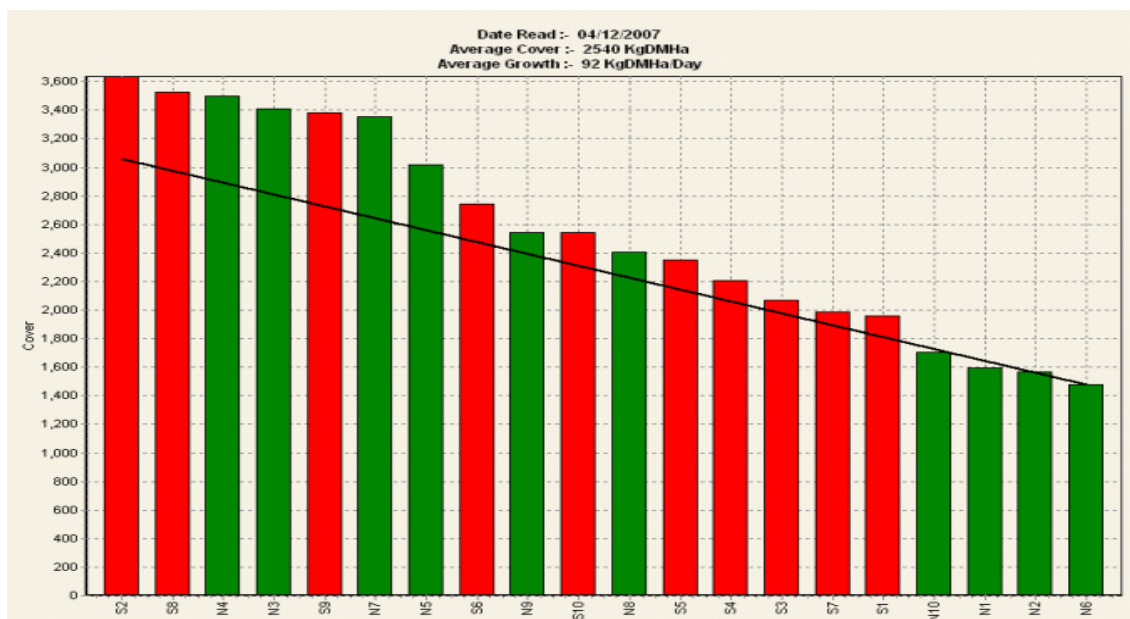


Figure 1: Typical Pasture wedge from a farm with a surplus.

The target line cutting across the wedge is used to show if the farm has enough pasture or is in a deficit or has more pasture than it needs to feed the stock. The bottom of the target line is set at the pasture residual that the farmer is wanting his stock to graze down to and the top of the target line is calculated using the formula;

$((\text{Cow number/ha}) \times \text{pasture eaten per cow} \times \text{rotation length}) + \text{residual DM} = \text{Target Pre-grazing height}$

In the graph above this was; $((680/161) \times 17 \times 22) + 1480 = 3060$

The data can also be presented in the form of a table and many farmers use both the graph and the table. This is because each offers a different perspective on the situation and while the graph is particularly useful to “see” the overall picture of what is happening the table provides the detail needed to help make the correct allocation decisions. People also have different ways of processing data and those that are visually orientated will prefer the graphs while others will prefer the table.

Table 1: Pasture Wedge Report for the same data as in Figure 1.

Feed Wedge Report

Farm Name: LUDF

<u>Paddock Name</u>	<u>Area</u>	<u>Date Read</u>	<u>Cover</u>	<u>Growth</u>	<u>Total Available Feed</u>
S2	8.41	4/12/2007	3636	152	18131
S8	7.38	4/12/2007	3524	120	15084
N4	7.2	4/12/2007	3496	138	14515
N3	7.24	4/12/2007	3412	142	13987
S9	7.09	4/12/2007	3384	108	13499
N7	7.83	4/12/2007	3356	104	14689
N5	8.13	4/12/2007	3020	134	12520
S6	7.27	4/12/2007	2740	52	9160

There are many ways to measure the amount of pasture in a paddock. Each has its advantages and its failings but when done properly and regularly the time spent doing this is worth over \$1000/hr and gives the single highest \$ payback for any time used by a farm manager.

The use of machines like platimeters, probes, or the Rapid Pasture Meter has the advantage that they are not influenced by emotion. However they need to be properly used and maintained and the operator has to have confidence in the calibration equations used by the machine. The operator also

has to be able to identify when the machine has made an erroneous measurement, so that they can re-measure the paddock. Visual assessment is much faster and not reliant on a piece of equipment functioning properly but the value given to each paddock can be greatly influenced by the mood of the observer, unless they spend the time to calibrate their eye against the readings of a properly functioning machine.

Measurement by machine or by calibrated visual assessment, is not particularly accurate, however these measurements have been found to be more than accurate enough for management purposes, especially when done each week and at each grazing verified by observation of the time taken for the cows to graze to the target residual. When this is done the growing body of data has tremendous management value in both the short and long term.

Pasture measurements done only at a few critical times in the year provide a limited amount of information. It will provide a Pasture wedge to allow better decisions for the next week or two, will provide an average cover for the farm which can give important information to update a seasonal feed budget or can be used to work out the current pasture surplus or deficit.

If pasture measurements are done regularly throughout the year and entered into a suitable computer program or spreadsheet then the amount of information increases greatly. As well as the pasture wedge to help make better immediate decisions, whole farm average cover, growth rates for paddocks as well as the whole farm can be calculated and if recorded these can then be used to provide accurate growth rates and critical pasture covers for seasonal feed budgets, as well as being able to be used to calculate annual pasture yield for each paddock. Farmers frequently find that some paddocks will grow up to 100% more than the paddock across the fence.

If management decisions are recorded with the pasture wedge and kept for reference, then a simple review each week of last weeks pasture wedge and management decisions will show how they may have impacted on this weeks pasture situation and the shape of the wedge. Farmers report that this activity has proven to be one of the most successful learning activities for themselves and their staff.

When this weekly “walk” to collect pasture information has become the central focus of farm management farm managers begin to find that they have a very strong ability to be proactive with their decision making. As the data from many years builds up strategic planning can then be done because the farmer not only knows what an average winter, spring summer or autumn looks like in terms of pasture growth rates but they will also know what can happen in a good year and also in a bad year. This is very powerful information and allows proactive planning to occur to mitigate the impact of poor growth season as well as being able to capture the potential of the good growth years.

The value of the pasture data can be enhanced even more if each week soil temperature and soil moisture information is also collected. The latter is essential for farmers who irrigate their land and there are cheap fully automated systems (eg Aquaflex) which provide continuous real time information

via a wireless connection directly to your farm computer. For most other farmers there is an even cheaper option which is the information on Niwa's Climate Explorer website, which for an annual subscription of under \$200 provides unlimited downloads of rainfall, soil temperature, soil moisture deficit and other weather information from 119 sites around the country.

Conclusion - Some beneficial characteristics of data for collection.

- 1) Only collect data about things that you can turn into good management information.
- 2) Use objective systems to collect data and understand the strengths and limitations of the system so that you have confidence that the data is accurate enough for management purposes.
- 3) Start by collecting data that allows you to make better decisions each day – to give you that immediate reward.
- 4) Once you decide what information to collect do it regularly – to give you more powerful information and even bigger long term reward.
- 5) It is a big bonus when data is automatically collected and downloaded to your computer.
- 6) The data should be presented as graphs (or tables) that help you to understand the farm situation. Computer technology is a great help.
- 7) Have a set “management time” in your week and involve others in the discussion of the data. A meeting after the weekly farm walk is an excellent time for this.