The Evolution of Drought Management on “Eastlake”.

From discussion with my late father, John, after the 1965 drought and leading into the 1980s drought we knew we had to learn from past mistakes.

There were three main areas of concern which stemmed from the 1965 drought:

1. Water shortages in most areas of the farm, particularly for cattle;
2. How we could fine tune feeding or fodder conservation for best advantage;
3. The need to be more aware of emerging conditions and the necessity to destock earlier to match projected feed availability with stock numbers.

With pasture improvement, my observation is that we now have less average rainfall run off because of better ground cover, as well as having better growth in cooler months, due to fertility and plant species, including natives. I am not sure what the situation was prior to European settlement. Grasses and legumes are transpiring and growing longer throughout the season now, thus drying out the soil more continuously. Therefore, with extra livestock numbers, as well as this reduced run off, there is a need for more efficient water storage and distribution.

Since 1980, in dry times or prolonged droughts, there has never been an occasion when I decided to sell livestock early, that in hindsight was an incorrect decision. My conclusion from that is to be conservative in those decisions; by selling livestock early, any upside due to better than expected feed availability or more favourable seasonal conditions will be well and truly repaid later in better lambing, wool cuts or calves. As well, the recovery of pastures for even better returns in the medium to longer term and the myriad of better environmental outcomes will be a positive, rather than entering a downward spiral of degradation of the base asset of the farm.

A very early piece of advice I was given by an old school friend’s father (who worked for the Queensland DPI) when I was around 19 years old in 1970, was to always work through management

scenarios or issues with a pencil and paper. Today we might have computers, spreadsheets, grazing plans or computerised grazing management planning software to enhance our decision-making process. However, it all really comes back to the pieces of information we put down on paper in 1970, or what we enter into the computer now. The value of our decision outcomes either then or now will only be as good as the information we put in and how well we, or the computer programme, critically analyses that data, so we can act upon it. This was the best advice I ever received regarding farm business management, but it did take a few years to realise and implement it in various ways in what has been a rapidly changing rural business environment over the last nearly 50 years of my involvement in grazing.

Analyse the situation, plan, execute, evaluate and adapt as time progresses. We must keep making considered decisions in droughts as well as good times.

On the critical issue of water, my father decided in 1968 to build a 500 ML dam on a creek to ensure at least a permanent water supply for livestock and possibly some irrigation. Over the last 40 years we have developed and extended a reticulation system of three elevated storage dams, pipes, troughs and header tanks that can deliver water to most of the farm to supplement unreliable water supply from ephemeral creeks and small farm dams. Other larger dams service parts that are not readily accessible. There is a current fuel cost of around $3000 pa for pumping to the elevated storage dams/turkey's nests, but this cost is far less than building and maintaining dams and delivers clean and safe water access. Eventually we will change over to solar pumping when the pump needs upgrading.

In the 1965 drought we were in early stages of pasture improvement with many clover dominant pastures, either sown or aerially improved native pastures, but these folded quickly leaving little remaining feed and bare ground. We had not encountered a drought like this with our changed pastures and management decisions were made with little experience behind us. Cattle were sold too late and grain feeding of sheep was more aimed at survival than having some productive outcome.

In the autumn leading into the 1980 drought we made a conscious decision to sell at least half of our cattle, (from a total of 350 head) only retaining 140 cows and 35 heifers which were fed for 6 months on conserved hay made on the farm. The plan was always that if the drought had not broken in the spring , we would then sell the remainder of the cattle, which we did. The fine wool sheep flock was reduced by around 15% in early autumn, retaining most of the ewes but reducing older wool cutting wethers, which were further reduced in number in spring to allow the ewes extra feed for lambing. We also used the strategy of full feeding in 'sacrifice' paddocks to remove pressure from other pastures, but this feeding regime was never open ended, with some stock then sold in good condition or returned to spelled paddocks if possible. Our overall strategy was not perfect, but we emerged from that period in a sound financial position (in the black) and with pastures in reasonable order considering the situation and with a core of breeding sheep from which to continue.

The drought of the early 90s was equally challenging, particularly after the crash of the wool market, and we emerged with a yearly financial loss of $20k in 1992. This was largely due to not having as many cattle to sell off early and low sheep and wool prices. We quickly returned to surplus though, as the farm had not been too heavily grazed due to early numbers reductions, allowing the pasture to

recover quickly, as well as very importantly, targeting the supplementary feeding of breeding ewes for productive purposes and not just survival.

In 2001 we decided to lease the farm to pursue other endeavours for 5 years and have continued to lease to this time. We currently lease to a neighbour to grass fatten, or background, weaner and yearling steers and heifers. We have always had limitations on stocking numbers for "Eastlake" under these leases to four different lessees over time and all have worked well bar one, with a good mutual understanding of what each party needs to achieve. As a lessee, I need a fair return on my capital investment with the farm's natural capital of soils and pastures maintained or improved, and the lessee needs also a fair return for their working capital investment and time and effort.

Managing stock numbers and grazing has been very challenging over the past five seasons due to an average of 70% of annual rainfall and a run of poor springs and autumns and very hot summers, as well as one of the driest winters on record in 2018. In close consultation with our lessee we have navigated these seasons well, with no hand feeding and by adjusting stock numbers at crucial times of the year, particularly autumn, to suit current and projected pasture availability. Over the last 4 ½ years our average stocking rate has been 6100 dse, which is around 67% of a "normal" season 9000 DSE to 10,000 DSE, and ties in closely with the average rainfall during that time. Management is obviously easier with dry stock, but the same principles apply to matching feed availability to stock numbers. There is no profit in having stock eventually destined for slaughter in poor condition, so it is about managing their growth as best as possible. The result has been at least two thirds of the heifers and one third of the steers have been sold directly for slaughter, grass fed to Coles , JBS or Wingham Abattoir. Most of the remaining steers have reached weights suitable for entry to feedlots for a 60–100 day feeding regime. The small number of steers and heifers that have not quite reached specifications, have been topped up for 6–8 weeks on an oat crop on another of their local properties, or some have received a supplementary feedlot ration for 60–100 days on their home farm to then go for slaughter for another grain assisted market.

Over the last 35 to 40 years we have developed more subdivision fencing on "Eastlake". This is to better manage different pastures, both improved exotic and improved native pastures (improved natives still comprise 70% of the farm). On average we set stock for around 80% of the time with strategic spelling or heavier grazing at times to suit the seasonal growth stages of particular pastures. These subdivisions are based as much as possible on slope, aspect and soil type, with some limitations regarding water, access or other practicalities. These features relate well to the type of pastures present and how they respond to rainfall, seasonal conditions and time of year. We now have around 40 main paddocks over the 1200 ha, as well as some smaller paddocks for holding areas etc. This set up can allow, for example, heavier grazing of native pastures dominated by warm season native perennials (e.g. Red grass or Paramatta grass) in wet seasons over summer, to keep them vegetative, palatable and productive. At the same time, we can rest improved exotic pastures to bulk up and regenerate for autumn/winter grazing.

For a month to 6 weeks in autumn and late spring some of these native pastures can also be strategically spelled to allow cool season perennials, such as Weeping Rice grass, Wallaby grass, and Elymus to seed or regenerate.

In addition, with this subdivision of paddocks we have incorporated shelter belts and regenerated remaining native timber stands by fencing off, direct seeding and/or plantings. This improves production of both pastures and livestock from positive shelter effects, as well as adding biodiversity for improved resilience of the overall landscape. We have recently set aside 75 ha into a Biodiversity Conservation Trust (BCT) 15-year agreement. This arrangement is a way of diversifying income and gives more profit than running sheep or cattle on that area, and as an added bonus we still have some grazing rights. We now have about 9% of "Eastlake" under destocked shelter areas and windbreaks, and another 6% under a native BCT timber area which can be used for occasional stocking. There is another 4% under woodland or scattered trees.

This system we have developed has suited us, and our farm, but may not suit others. With this arrangement we have been able to run a profitable farm business, over a variety of seasons, either running it ourselves or leasing. We have pastures that were sown between 1958 and 1987 that are still productive despite at least three severe drought periods. The farm infrastructure has been greatly improved and pastures and soil fertility has been maintained or improved. Over the last 18 years with more cattle and less sheep, and only cattle since 2010, I have observed a continual improvement in quality (certainly less thistle) and diversity of pastures.

So, what do I think are the key strategies we have used to achieve this?

1) Always being a bit conservative on stocking rates – I think higher production through higher inputs and/or higher stocking rates, will not over time lead to the best nett income. In the short and long term, financial, environmental and operational costs and issues must be balanced. It is about optimising production to suit our farm - finding the "sweet spot" which I believe is around 10–20% below maximum production or stocking rate.
2) Taking a longer-term view of all aspects of farm management.
3) Plan, prepare, act and review, but be adaptive and flexible.
4) Being as **proactive** as possible in all aspects of management rather than **reactive.**
5) A sustainable farm must be profitable (financial management), must not degrade the landscape (environmental management) and the overall management must be realistically achievable given any restraints of labour, landscape or personal goals etc. (operational management). All

three of these areas are linked and interrelated, so I try look at the big picture when making decisions.

6) At the end of March each year it is highly improbable that my farm will have any more feed on the ground until late September, given lower winter growth rates at 1100 m altitude and summer-dominated rainfall. Therefore, the need for any early autumn adjustment of stock numbers is paramount, particularly in bad seasons. This is even more so if the previous spring has been bad, (we have had five bad springs in a row to 2017, and 2018 has also been late) as there is a need to have breeding stock in good condition so they can live reasonably well with projected feed and the fat on their backs. If they are in reasonable condition, they can also be efficiently given supplementary feed at critical times, for example, to ensure a good lambing in the spring. Dry stock can afford to lose some weight, but if over-grazing of pastures occurs, starting from a poor position in spring with recovering pastures will take more time to fatten animals.
7) We have continued to work with the view, based on sound evidence, that the particular stock management system that is used (i.e. variations of rotational, set stocking with strategic spelling etc. and a myriad of other systems that farmers employ) is not the dominant factor, but how well any system is managed that really matters. I believe it is fundamental to match pasture production with stock numbers and thereby managing both the groundcover and retained herbage mass. Strategic fencing and water infrastructure gives me (the grazing manager) the control we require to monitor pastures and manage stock numbers accordingly. I have observed different systems fail because of the belief, or just hoping, that they would grow feed even when it did not rain, and stock numbers were not reduced when there was little prospect of feed ahead due to lack of rain or time of growing season.
8) We have always matched our annual average stock numbers with approximately 1 kg of Phosphorus per dse per year. We usually use superphosphate that adds Sulphur as well, to match the losses of those critical elements out the farm gate in meat and bone and wool, as well as other losses from some leaching and tie up in the soil. By doing this, when it rains during or after a drought, grass responds well and has good feed value, if reasonable ground cover has been maintained prior. We have light metasedimentary 'Trap' soils and some fine monzo-granite soils. We have also recently applied lime, on agronomic advice, to the monzo-granite soils to remove an aluminium toxicity issue.
9) After storing farm made fodder for feeding 140 cows in 1980 and having to sell them when we ran low anyway, we then took the attitude that it was better to store money in some sort of investment, rather than have a deteriorating asset of hay or grain stored on farm for droughts. We invested some on-farm profits during the 80s and 90s off-farm, and this gave us an income buffer when farm profits were down, as well as cash to buy grain if needed for short term feeding of sheep breeding stock. It did not however, change our attitude to lowering stock numbers at critical times.

While there is discussion around the pros and cons of rotational grazing versus set stocking, and the different variations in between, I think that if the goal of managing ground cover and pasture herbage mass is always kept at the forefront of the mind, no matter which system is used, and stock numbers managed to suit feed availability, then this is likely to produce the best long-term outcome. If some pastures, for whatever reason, are over-grazed, then it is even more important to allow them to recover after the drought is broken, less you risk continued degradation of the farms core assets.

Improved fencing and water infrastructure also critically allows control over the distribution of grazing animals in the landscape and therefore this is a sound investment no matter what stocking system is used. It has been about finding and developing a system for **our** farm, in good seasons and bad, that fulfils the base criteria of financial prosperity, environmental stewardship and operational feasibility. We have managed droughts and good seasons incrementally better since 1965, but there will always be room for improvement. The key is to analyse the situation, plan, execute, evaluate and adapt.

This has been our journey and if even one idea that has worked for us can fit into someone else's farm management situation it has been worth sharing.

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