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A Case Study of Drought Management Glen Elgin Angus, Henty, New South Wales

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1. Introduction

Droughts are very much a part of farming in Australia, and with the increasing spectre of climate change, may become more frequent and harsher in impact. Periods of drought require landholders to make important decisions that will have short and long term impacts on the farming enterprise.



The objective of this study is to evaluate the impacts of drought on a stud cattle operation owned and operated by Steven and Cindy Scott, 'Glen Elgin' Henty NSW.

An explanation of what a drought strategy is, and why developing one is important will be discussed. A key component of most, if not all drought strategies, is the desire to maintain 'ground cover'. Exactly what this is and why it's considered an important consideration in a drought strategy will also be discussed.

Various options of managing livestock prior, during and post drought will be canvassed with implications for cash flow, feed requirements and recovery to full production discussed.

Finally, the management 'Glen Elgin' over the drought years 2006 – 2010 will be investigated. This investigation will include a detailed investigation of the aims and aspirations of the owners and how these have impacted on the development of the drought strategy that has operated in the past, and will operate during the next dry period.

A conclusion will be drawn that determines the appropriateness or otherwise of the current drought strategy that applies on 'Glen Elgin'.

2. Preparing for a drought

It is considered sound business for all properties to have a drought management plan or strategy. All state government agricultural organisations in Australia are active in providing literature and other information on drought management. The literature referenced in this case study is mainly sourced from Victoria and New South Wales. Both New South Wales DPI and Victorian Department of Environment and Primary Industries devote time, resources and reference material into many topics associated with, and relating to, drought management. The key activity of both professional organisations is the need for landholders to develop a 'drought strategy'.

It is important that a full evaluation be undertaken of all drought strategies available. The overriding objective of drought management, whilst always taking into account the welfare of the livestock, should be to ensure that the farm business survives and that the productive resources of the farm, the soil, capital and the genetic merit of the stock are managed in such a manner as to allow production to recommence as soon as possible after the drought (New South Wales DPI 2007).

Objectives should be clearly defined for both the period of the drought, and for post drought recovery. Objectives should be clear and stated in terms of numbers, dollars and dates (New South Wales DPI 2007).

No two periods of feed shortage are the same, so there is no single catch all recipe on how to best manage beef cattle in a drought. There is however, some accepted practice that needs to be considered when planning for any extended period of dry weather.

There are four main courses of action recommended to producers when planning for drought;

- (a) Agistment of stock
- (b) Selling of stock
- (c) Feeding of stock
- (d) A combination of all of the above (Department of Primary Industries Victoria, 2007)

It should be noted that the option of 'doing nothing' is not an action that should be considered. Cattle must not be left to starve or die of thirst.

2.1 Agistment

Sending cattle away on agistment can be a cheap solution to the drought. Various aspects of agistment make the proposition more or less appealing. These include the quality of the infrastructure like yards, fencing, and access to the area and distance from base. An attractive area for agistment that is in the next state or a remote area may prove to have many issues that diminish the value of the opportunity. Other issues like availability of water, location to markets so that agisted cattle do not necessarily have to return home, and ability for onsite supervision of the stock need to be considered.

Assessing potential agistment opportunities can be summarised into the following key considerations;

- (a) Inspection of agistment site
- (b) Cost of transport
- (c) Stock handling facilities
- (d) Period of agistment and fees
- (e) Available stock numbers
- (f) Water availability
- (g) Quality of fences to confine stock (New South Wales DPI 2007).

The main economic determination is assessing the agistment option is the break even period for the cost of the agistment against the cost of hand feeding at home.

New South Wales DPI (2007) uses the following calculation to determining the break even period.

The main economic determinant in assessing whether the agistment option is to be taken up is the break even time period for costs of having stock on agistment compared with the cost of hand feeding at home (New South Wales DPI 2007).

The break even period can be calculated as follows;

No. of weeks for agistment to break even = transport cost to and from agistment per head / cost of hand feeding per head per week *minus* cost of agistment per week *plus* inspection costs per head per week.

This can be represented as; No Wks =
$$\frac{T_c}{Chf - (Cag + C)}$$

- So for a dry cow example with the following costs;
- \$8 / head / week to feed at home
- \$1 / head / week for labour and fuel
- \$5 / head / week agistment
- \$30 head / transport to and from agistment
- \$1 / head / week inspection costs

$$\text{No Wks} = \frac{T_c}{Chf - (Cag + C)}$$

$$\text{No Wks} = \frac{30}{8 - (5 + 1)}$$

$$\text{No Wks} = \frac{30}{2}$$

Number of weeks for agistment to break even = 15

2.2 Sell Stock

This can be an attractive option if well planned and considered early or when incremental trigger points have been tripped. Selling cattle provides cash flow as well as the ability to manage ground cover at adequate levels in remaining paddocks (Department of Primary Industries Victoria, 2007). When selling, the best policy is to sell less productive animals so that a core of high producing or breeding stock can remain. The decision to sell should be made decisively, as drought inevitably has a period of intense selling and depressed prices. Feed costs, saleyard prices, and expected water supplies are key factors that need to be assessed each time the decision to sell is taken. With a longer drought and a higher percentage of stock sold, the critical factor becomes the ability to purchase replacement stock at a reasonable price when conditions improve. Generally, the wider the expected gap between drought sale revenues and repurchase costs, the greater incentive there is to feed (New South Wales DPI 2007). The old adage of 'when a drought breaks it doesn't rain money' is considered an industry standard in this case (Scott, S., personal communication July 27, 2014).

2.3 Feed Stock

It is most likely that the decision to feed some stock will be taken. This decision will be influenced by factors including facilities available to feed small or large numbers of stock, amount or availability of stored feed or grain, water availability and quality and classes and numbers of livestock that can be managed (Department of Primary Industries Victoria, 2007).

Maintenance feeding is generally a low cost strategy in a short term drought but, as this period of time is a great unknown, it can be a very expensive operation if continued to the point where resources are exhausted and feed costs continue to escalate. It is considered essential then to feed only stock considered necessary to meet the planned objectives. As the drought progresses stock should be sold class by class until the owner is left with a nucleus of young breeding stock likely to be most valuable when the drought breaks, not for potential sale but for potential to quickly step back into breeding and production (New South Wales DPI 2007).

Table 1. Feed options when hand feeding cattle (New South Wales DPI 2007)

Class of stock (bodyweight)	Grain (12 ME)	Hav (8.5 ME)	50:50 grain: hay mix	80:20 grain: hay mix or	Silage (30% dry matter and 9 ME)	Expected weight gain/day
Weaners (200 kg)	2.5	3.5	3.0	2.5	12.0	0.2 kg
Yearlings (250 kg)	3.0	4.0	3.5	3.0	15.0	0.1kg
Adult dry stock (400 kg)	4.0	6.0	5.0	4.5	20.0	nil

During periods of cold weather, these levels should be increased by 20% using hay if possible (3 kg hay is equivalent to 2 kg grain). For young stock, protein levels should be at least 9% for them to continue growing. It would be better to feed these cattle for production.

Table 1 outlines feeding requirements for various classes of livestock. When the decision to feed has been taken it is essential that a feed budget is developed to ensure adequate amounts are on hand or are able to be purchased, given that supplies may become scarce or feed prices may increase dramatically during the period of feeding required.

2.4 Sell / Agistment / Feed combination

The computer based **Feed, Sell Agist (FSA)** (Figure 1), tool has been developed by the New South Wales DPI and provides the user with estimates of the costs of the feeding, selling and agistment options in short, medium, long and worst case drought scenarios.

Generally, for a short period, (less than 10 weeks) feeding can be the most economic option. As the length of the drought increases, the agistment and selling options become the more attractive options. Under most environmental conditions experienced in the Southern Riverina, 10 weeks could be considered a routine feeding period through autumn and early winter in most years. Recent droughts have started with reduced or completely failed spring rainfall period and therefore the dry period has extended through to between 26 and 40 weeks.

The FSA software is only available for those that attend the Stockplan training workshops. Those that attend should come away with an understanding of the following;

- (a) How much will it cost to feed livestock for a specified time?
- (b) Is breeding replacements or buying replacements the best drought recovery strategy?
- (c) Is it better to feed, sell or agist livestock?
- (d) Is agistment an option for certain classes of livestock (New South Wales DPI, nd)

3. Environmental considerations when managing drought

Soil degradation and low pasture productivity post drought are a common cost resulting from periods of drought for cattle producers. One of the major consequences of drought is the degradation of pastures as a result of overgrazing and management practices which involve leaving stock on pastures where they are supplementary fed (New South Wales DPI 2007).

Figure 2 shows the difference land management decisions can make to ground cover and loss to wind erosion. Land management choices such as overgrazing can lead to decreased levels of ground cover, contribute to wind erosion and increased dust level. As the area of bare ground increases, there is a greater risk of wind removing soil particles, including soil carbon and nutrients, as dust. The loss of these soil particles contributes to the decrease in soil resource condition by reducing topsoil depth and removing lighter particles which can include nutrients and soil carbon, as well as reducing air and water quality as lost soil particles contaminate these systems. In contrast, management practices that contribute to the retention of ground cover will lessen the risk of wind and water erosion, whilst maintaining or improving overall resource condition (DAFF 2013).

Figure1. Stockplan main page detailing options for drought management NSW DPI, (nd) Stockplan, Producer Manual and Home Study Guide.

StockPlan Switchboard

Click a button to start a program

[Drought Pack](#) [Feed Sell Agist](#) [ImPack](#)

StockPlan
StockPlan is a suite of programs that help with drought management.
It consists of three components: Drought Pack, Feed Sell Agist (FSA) and ImPack.

[Introduction](#) [Go to NSW DPI Drought Web page](#)

[Drought Decision Making Process](#)

[Drought and Overgrazing](#) [Managing sheep in Droughtlots](#)

[Animal Health and Welfare](#) [Confinement feeding of Cattle](#)

[Climate](#)

[Bob's Story](#)

[Where to get Help](#) [More Information](#) [? Help](#)

Therefore, as a routine agricultural practice, it makes good sense for grazing operations to:

- Ensure ground cover does not decline below desirable levels, a minimum target of 70% is recommended, and
- Protect perennial pastures

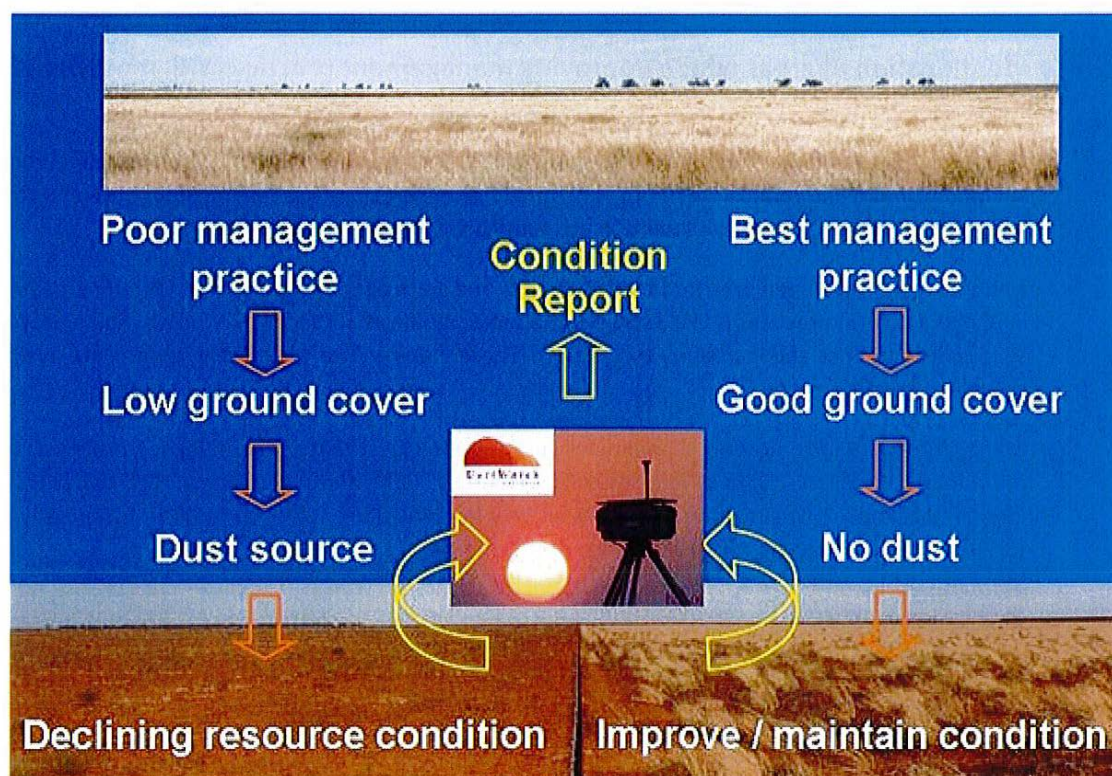
3.1 Groundcover

Groundcover is any material on or near the soil surface that protects the soil against the erosive action of raindrops, surface water flow and wind. It can be living or dead plant material, compost, mulch, dung, stones, and even snow. On large land areas the most efficient groundcovers are living plants as they are not carried away by runoff and their roots help hold the soil. Groundcover is measured as the percentage of plant material covering the ground, including crops, stubble, pasture plants and their residues, leaf litter, bark and twigs (New South Wales DPI 2009).

Groundcover is vital for soil. Without cover to protect it, soil is vulnerable to raindrop impact, surface runoff and wind. Unprotected soil can lose up to 100t/ha a year (1mm depth of soil over one hectare weighs around 10t) (New South Wales DPI 2009).

Plants protect the soil by providing canopy cover (more than 5cm above the soil surface) and contact cover (up to 5cm above the soil surface). Canopy and contact cover both protect the soil against raindrop impact. Contact cover slows runoff so that water infiltrates the soil and deposits any sediment around the plants (Figure 4). Without groundcover up to 85% of rainfall from storms can run off into creeks and streams rather than soak into the soil and be available for plant growth. Figure 3 below demonstrates that when groundcover is thin, patches of bare soil connect and provide a path for runoff to build up speed and erode the unprotected soil (New South Wales DPI 2009).

Figure 2. Effect of land management decisions on ground cover and soil loss through erosion (DAFF 2013).



3.2 Confinement feeding of cattle

One method of protecting ground cover is to manage stock in a restricted area when feeding through a drought. The aim is to reduce grazing pressure and environmental damage to the majority of the property. The term used for feeding stock under such conditions is referred to as 'confinement or containment feeding'. It differs from feedlotting as the cattle are fed for maintenance rather than production.

By containing stock to a small area there is a subsequent faster recovery of the unstocked areas once the drought breaks and potentially less expense involved in considering costs of pasture renovation can be as high as \$230/ha - \$270/ha (New South Wales DPI 2014).

Table 2 summarises the main issues surrounding the establishment of stock containment areas. A number of small paddocks may need to be established to enable management and feeding of different classes of stock.

Figure 3. Typical relationship between annual run-off of surface water, annual soil loss through erosion and ground cover (New South Wales DPI 2009; derived from Holmes and Lang 1995)

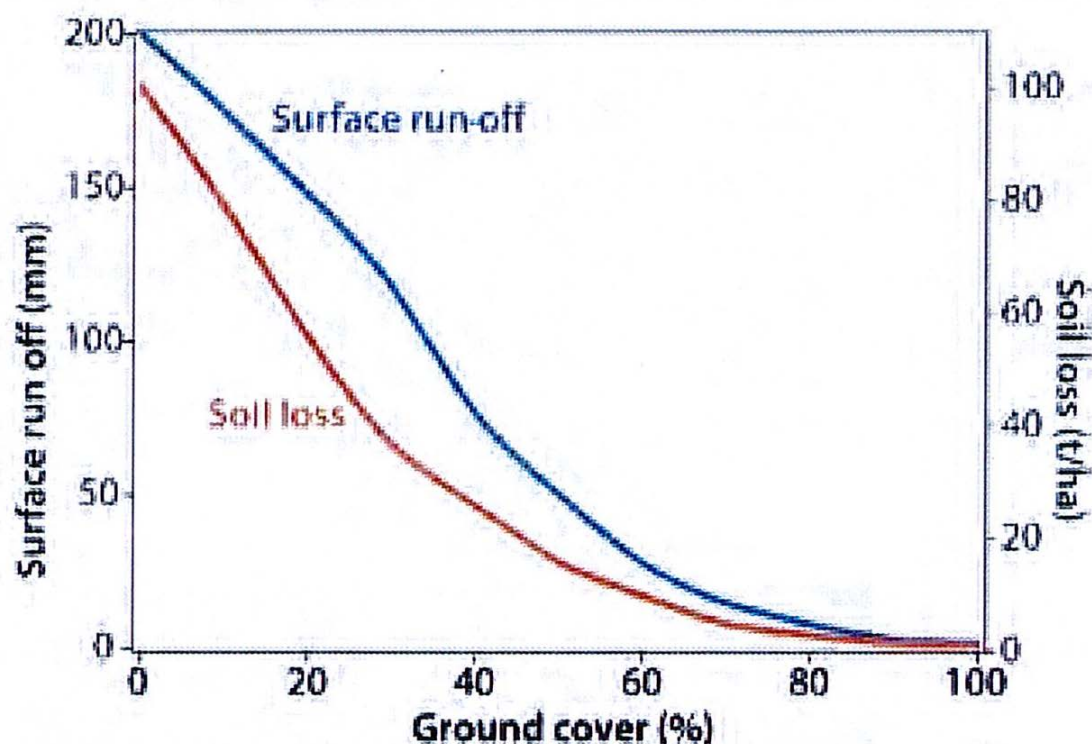


Table 2. Main considerations when establishing stock containment areas (Victorian DEPI 2009)

Stock Containment Areas

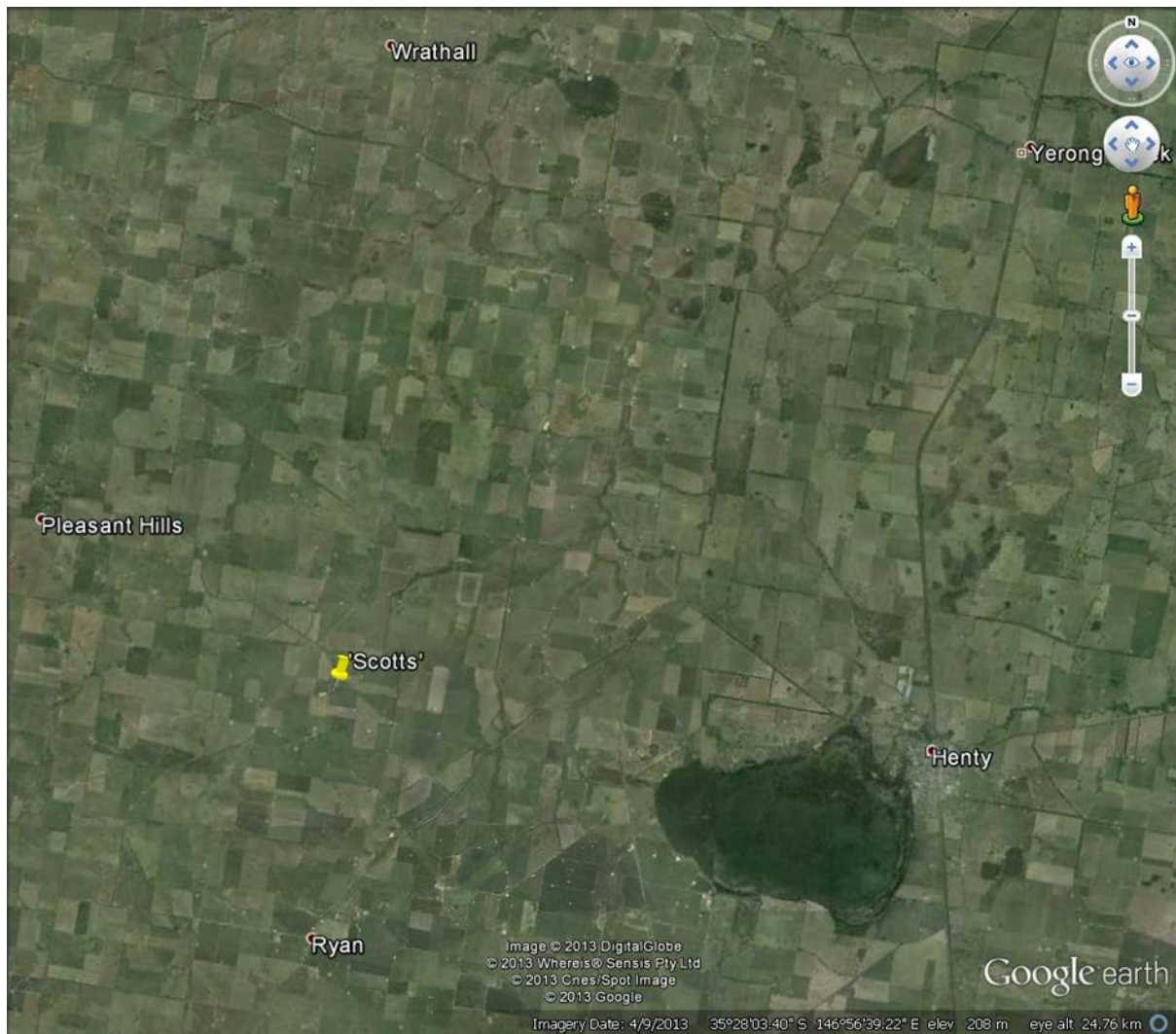
- A containment area will help prevent destruction of the remaining ground cover, and thus reduce the potential for erosion.
- Select a site that is on heavy soil (less likely to erode) or stony ground.
- Select an area close to the homestead or an existing water supply where water can be reticulated by pipeline to a trough.
- Stone may need to be dumped around the watering point to prevent erosion and subsequent undermining of the trough.
- The size of the containment area will depend on the number of stock to be fed. No more than 500 sheep per area, allowing 5 square meters per sheep.
- The containment area should be located downwind of shelter. Some shade in the holding area is desirable.
- The watering point should be located furthest from the shelter so that the main stock camp is not at the same location as the watering point.
- For shy feeders, ideally the water point and feeders should be at opposite ends of the stock containment area or as far apart as possible. Bullies go for a drink at some time and give the shy feeders free go at feed.
- Use of temporary fencing and/or incorporation of an existing corner of a paddock will reduce costs. A permanent purpose built stock containment area is desirable.

When establishing an area for feeding, aim to use existing facilities where possible. On most properties the feeding area could be incorporated into existing infrastructure to reduce costs. It is anticipated that the feeding area become a permanent fixture to be used to protect ground cover, not necessarily during periods of drought only.

4. The Case Study Farm: 'Glen Elgin'

The case study farm is owned by Steven and Cindy Scott and located approximately 20km west of Henty in Southern New South Wales (Figure 4).

Figure 4. Location map of the case study property (Google Maps 2013)



Steve and Cindy are significant producers in the Angus seed stock field; significant cattle producers located in a region that is historically nominated as a mixed farming zone dominated by sheep and cropping systems. It is unusual to have a very large predominantly stud cattle production system in the district, therefore 'district average' information is not entirely relevant when attempting to quantify any activities or industry standards that may otherwise be used to describe the management systems.

The system is based on a large, stable female breeding herd of 450 cows, breeding 120 bulls per year and 200 heifers. These bulls are sold at between 12 and 20 months with a draft of joined heifers and feeder steers sold each year.

The nature of the breeding enterprise makes it essential to maintain stock numbers at a consistent level from year to year. Supply of sale bulls and females is required for continuity to clients, cash flow and long term planning (Scott, S., personal communication July 27, 2014).

The Scots have a smaller, almost opportunistic, cropping enterprise that produces oil seeds and domestic grain, mainly wheat, each year. This cropping is associated with a pasture renovation phase and is secondary to the main cattle enterprise managed on the property.

An interesting aspect of this cropping programme is that, during recent drought years, failed crops have been utilised as conserved fodder for livestock feed during the subsequent feeding period

4.1 History of Drought Management on 'Glen Elgin'

Steven and Cindy have dealt with drought conditions on at 'Glen Elgin' on four separate occasions since 2006.

The drought management strategy was implemented during the following periods;

2006 / 2007.	Between November 2006 and May 2007.
2008.	January 2008 till May 2008.
2009.	February 2009 till July 2009.
2010.	January 2010 and April 2010.

Table 3. Stock Summary during drought years at 'Glen Elgin'

	Joined cows	Weaned heifer calves	Weaned steer calves	Pregnant Heifers	Bulls
2006/07 November - May	Fed at home	Fed at home	Fed at home	Fed at home	Fed at home
2008 January - May	Fed at home	Fed at home	Weaned and sold	Fed at home	Fed at home
2009 February - July	Agistment in Northern NSW	Fed at home	Fed at home	Fed at home	Agistment at commercial feedlot
2010 January - April	Fed at home	Agistment at Yarrowonga Victoria	Agistment at Yarrowonga Victoria	Agistment at Mountain Creek NSW	Weaned bulls Agistment at Yarrowonga

As Table 3 suggests, Steve and Cindy have explored various options when dealing with the management of their herd over the course of the 4 years of drought.

The main aim in the years 2006 – 2008 was to maintain numbers at home and feed as required. In 2006, in a particularly 'early' drought that commenced with a failed spring in 2006, all calves were weaned in mid-November between 6 and 12 weeks and fed pellets for 12 weeks, and then went onto a silage ration until May 2007 (Scott, S., *pers. comm.* 2014). The mature cows were placed onto cereal stubble for the remainder of the drought until May 2007. Pregnant heifers and bulls were fed a silage ration and also grazed paddock feed and stubble whilst it was available. This year also saw the feeding of conserved fodder in the form of baled canola from crops that had failed in the previous spring.

In 2008, all calves were weaned between 3 and 5 months, with the steer portion sold immediately. Once again, heifers and bulls were fed a silage ration as required, with cows also following the previous year and grazing remaining dry paddock feed for the next 5 months. Once again conserved fodder in the form of baled canola from crops that had failed in the previous spring was feed.

2009 saw a significant change of plans with all cows, approximately 400, away on agistment in Northern NSW from February until July of that year, just prior to calving. This had its own difficulty with feed at the agistment property best described as marginal and a number of the breeding herd failing

to make the trip home for a variety of reasons, none of which was planned or desired (Scott, S., pers. comm. 2014). All bull calves were also sent away on feed. The heifer calves were retained at home and fed a silage / hay ration as required.

2010 saw a further change of plan by Steven and Cindy, with the cows remaining at home whilst all the calves were sent on agistment to Yarrowonga in Victoria from January until May. All pregnant heifers were placed on agistment at Mountain Creek, whilst weaned bull calves were sent to on agistment to Yarrowonga until May. The cows were grazed on remaining dry paddock feed, surrounding roadsides and reserves and supplemented with hay (Scott, S., pers. comm. 2014).

4.2 Owners' observations of the four year feeding period

During the course of my conversations with Steven Scott there were many observations and reflections made in relation to the various options chosen over the 4 year, almost constant, feeding period and drought management strategy implementation.

A consistent theme that Steve maintained was that his business circumstances made drought management a difficult task when compared to a more commercially orientated beef producer. Steve and Cindy are unable to manipulate stock numbers as many drought management strategies would suggest should happen. Steve and Cindy are in the business of seedstock production, therefore their corporate wealth lies in the genetics that have been built up over the previous 60 years of breeding. So, breeder numbers in particular need to be maintained, replacement heifers are genetically the most valuable cattle in the herd and bull numbers need to be maintained to keep supply to clients new and old alike. Stock numbers are unlikely to be subject to a hard cull unless no other options exist.

Conserved fodder plays an enormously important role in the farming operation. Currently two years' worth of silage is stored for feeding all animals on the property, notwithstanding the fact that some may be placed on agistment during the next dry phase. This comes at a high cost with the growing, conserving, storage and feeding costs that are associated with this activity. The opportunity costs that exist with the silage basically quarantined for drought use only, and therefore not used for any other activity, needs to be considered.

Steve and Cindy have also settled on a strategy for herd structure and a selling strategy when the next dry spell occurs. All steer calves will be weaned and sold immediately, with cows and heifers subject to a rigorous classing regime focused on fertility. All empty cows and heifers will be identified early and sold to reduce feed costs and potentially numbers away on agistment.

Steve believes it is far more manageable to have young stock away from home rather than his cow herd. Unless there is a dramatic drought event of unprecedented strength, all heifer calves will be agisted, with all cows maintained at home and fed a maintenance ration and grazed on remaining stubble and dry feed. Steer calves will be sold at weaning.

In an interesting observation, Steve acknowledges that ground cover maintenance is a vital aspect of current and future farm productivity, but concedes that during periods of dry weather requiring the implementation of the drought management plans, ground cover maintenance at 'Glen Elgin' is an unfortunate low priority. Steve understands that having the cows at home, rather than on agistment, reduces ground cover levels to more extreme low levels when compared to having all the young stock at home. Cows, heavier and with much bigger feet, destroy ground cover at a faster rate and open the door for potential landscape damage through wind and water erosion. This needs to be considered against the lower numbers lost through various aspects of misadventure, stolen and strayed, and other unaccounted activity. Steve is also of the opinion that, if the worst happens when stock are agisted and feed and or water fails, then younger stock are more easily managed should the 'emergency' situation arise and they are required to be shifted in a hurry.

An easily forgotten issue with agistment is the health status of a stud breeding operation. Steve and Cindy must maintain their current free status in relation to Bovine Johne's Disease (BJD) therefore agistment options in some cases can be restricted.

Steve and Cindy have constructed a confinement feeding area at 'Glen Elgin' for drought management purposes but are more likely to let cows have a run across the property when they are being fed at home. This enables cows to be grazed on roadsides and reserves as required, and graze remaining dry paddock feed if available.

Steve also commented that his perennial Phalaris based pastures have recovered exceptionally well post drought since 2010, even though ground cover maintenance was a very low priority over the 4

year dry spell. He sees no reason to alter the current strategy in this respect. I believe that the very wet years 2010 – 2012 following the drought has assisted with perennial pasture recovery, particularly grass species, and this recovery may not always be the case should years post drought be not as kind for pasture growth as those since 2010 have been.

5. Conclusion

Steve and Cindy Scott have developed a workable drought strategy to manage livestock despite the fact that they are faced with constraints not generally affecting more commercially orientated cattle producers.

Steve believes the current strategy of cows fed at home, all young stock and bulls agisted, with steers being sold as weaners off the cows is the most appropriate plan for their individual circumstances. Females will be subject to harsh culling based on fertility and type to ensure time and money are spent on productive animals rather than every animal.

As seedstock producers it is virtually impossible for them to implement the traditional destock theory as their corporate wealth exists in the genetic material developed over 60 years and expressed in the female herd. This genetic capacity cannot be sold and purchased again when the drought breaks. It must be maintained at all costs if possible.

Their significant bull numbers cannot be manipulated as the clients require a steady supply of bulls from one year to the next, and any break with supply will force potential customers to an alternative source and destroy the client relationship.

Heifers in the herd are arguably the most important livestock class that Steve and Cindy have. This class has the latest genetic material and is the future of the next 10 years breeding. These also are unable to be culled, and also come with the additional responsibility of needing to maintain growth rates for fertility and calving capacity.

Bulls are similar to heifers in this respect as they are the primary economic source, therefore growth and ascetics are paramount areas of importance.

The drought management strategy relies on large amounts of conserved fodder in the form of hay and silage. As mentioned previously, Steve and Cindy aim to maintain enough silage to feed stock that remain at home for two years. This comes at a considerable cost, as feeding conserved fodder to dry stock is an opportunity cost in all livestock systems. The cost of making and storing this fodder needs to be weighed against the potential value as a commodity during the drought, which in every case, would be considerable, and growing, as the drought lengthens.

However, as already discussed, Steve and Cindy have indicated that they are unable to destock due to their inability to recover the genetic information contained in the female herd.

In summary, the ability to locate reliable agistment as near to home as possible, whilst minimizing the biosecurity risk with disease, (potentially a difficult task in a drought of any significant strength), is the cornerstone of the current drought strategy employed on 'Glen Elgin'. This occupies the younger female stock, plus all the bulls, and leaves older cows at home. The break-even point for the economics of agistment can be calculated using the appropriate formula if required, although I believe that this is a moot point in the current strategy; not all cattle can be fed at home as Steve and Cindy found out in the early years of managing drought.

An interesting point in this situation is the stress that Steve mentioned that is associated with feeding all stock; the fact that no matter what feed was given, he would find the stock in the same spot in the paddock waiting for feed the following day. This point is largely neglected in current literature. This critical aspect is better managed if some stock is on agistment, regardless of the cost.

Ground cover management, the basis for much of the commentary from both Victorian and New South Wales Agricultural departments, assumes a low priority in the mind of Steve and Cindy Scott. This is one of the compromises that they are prepared to make. Although they have a purpose built containment site, Steve is happier to have his cows rotate through paddocks and nearby roadsides and reserves. Again, Steve considers this to be a less stressful regime on the operators, as large numbers of stock don't require such constant attention as they would in a confined feeding area (Scott, S., *pers. comm.* 2014).

A drought management strategy is essential for all livestock production systems; the basis and mechanisms employed by operators relies on individual circumstances and desired outcomes. Steve and Cindy Scott are classic examples of this approach.

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