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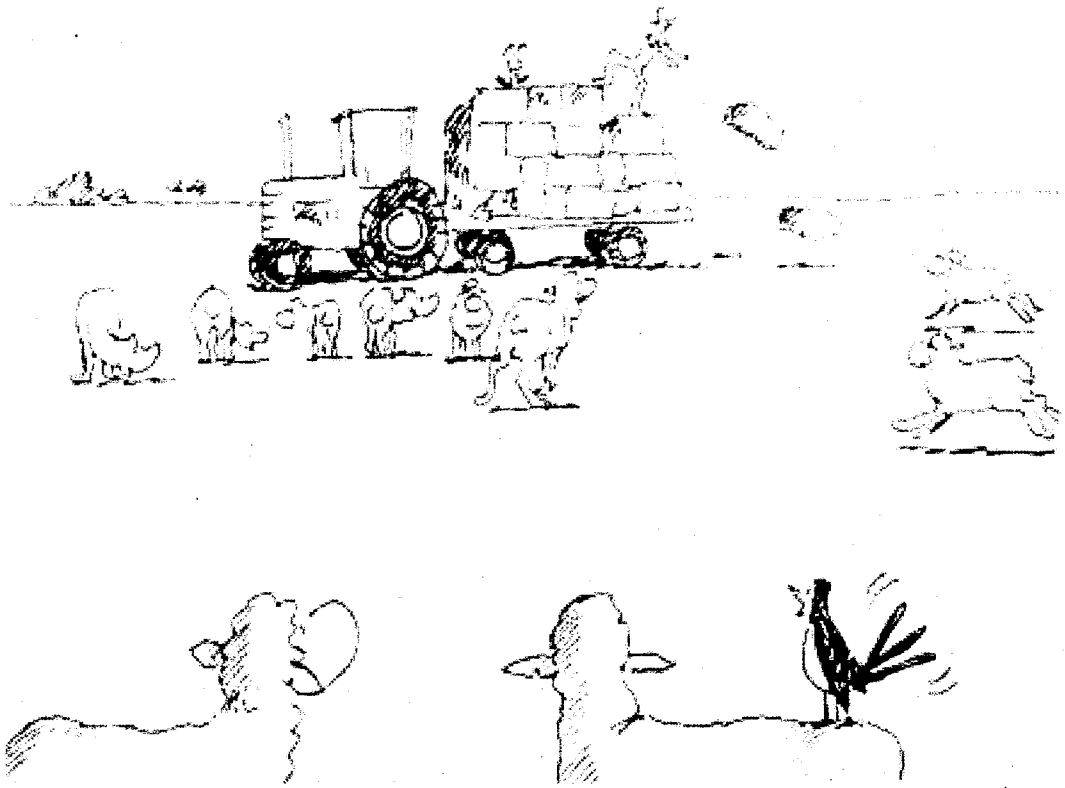

Drought Feeding and Management of Sheep

A guide for farmers and land managers

Victoria
The Place To Be

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Glossary of abbreviations

kg	kilograms
g	grams
mm	millimetres
cm	centimetres
l	litres
m^2	square metres
MJ	megajoules
T	tonnes
ME	metabolisable energy (energy units)
ppm	parts per million
DM	dry matter
CP	crude protein
N/kTex	Newtons per kilotex (a measure of staple strength)
EC	electrical conductivity

Chapter 1

Preparing a Drought Action Plan

Introduction

Droughts are part of life for sheep farmers in Victoria, so producers generally make provision for them by storing fodder and improving water supplies during good seasons.

However, each drought brings its own set of difficulties. How well you survive the drought will depend on the initial plan of action and the modifications undertaken to the strategy as the drought progresses.

Planning and decision making must be done as soon as you recognise the possibility that the poor season may progress to a drought. If you leave the decisions until the drought worsens, many of the management options available early may be closed to you. Prices for sale stock usually drop dramatically, agistment dries up, fodder prices generally soar and off-farm employment becomes difficult to find.

The first step is to list the farm's financial and physical resources so that the effects of various strategies, both short and long term, can be calculated. Water is probably the first thing to consider, because if this resource is inadequate it will be difficult to retain large numbers of stock.

The next step in choosing a drought action plan is to estimate when you think the drought will break. This will affect your calculations on how long you will be feeding sheep, how much it will cost and whether you will decide to sell stock or not. It is best to over estimate the time you expect to hand-feed your sheep to be on the safe side.

You will need to address the list of questions below on your action plan when deciding what to do.

Important questions to ask

- What is my current financial situation?
- Do I need to see a financial counsellor?
- Have I the time and equipment to feed sheep?
- How long will I have to feed for?
- Am I aiming at maintenance or production targets?
- What are the feeding needs of the various classes of sheep?
- What fodder will I use and what will they cost at various stages of the drought?
- Have I adequate water supplies to survive the drought?
- How widespread is the drought?
- Is suitable agistment available?
- Is droving an option? Regulations on droving differ between shires and in some shires droving is not an option
- What prices are sheep now?
- What prices will sheep be after the drought?
- What effect will reduced stock numbers have on my overall feeding costs?
- What effect will my strategy have on my pastures and soils?
- What effect will my action plan have on my long-term viability?
- Should I see my bank manager now?

Allowing stock to starve is not an option and is an offence under Victorian law.

The plan does not need to be implemented all at once and should be flexible to allow for chances in circumstances. For example you may only sell a certain class of stock or buy some fodder if conditions do not improve by a certain date.

You will find that having a plan of action will greatly reduce the amount of stress on you and family members. Though the plan may need continual modification as the drought progresses, each family member will be working towards specific aims, especially if you have discussed the plan with them beforehand.

Droving

Another method of finding off-farm feed resources is by droving stock along roadsides. This is allowable in only some shires. There are legal restrictions and local environmental considerations which apply to this practise and which vary between shires and may change. The risk of disease spread also needs to be considered. Check with the shires involved before starting this option.

Selling

Early planning and action improves the options for selling sheep. In particular, selling decisions need to be made before stock have lost too much condition to be saleable and market prices have started to drop.

When deciding what stock to sell and when, the following factors should be considered:

- present value of stock (including the wool value)
- the quality of stock
- capacity to carry stock through
- taxation effects
- likely demand for the stock at the end of the drought
- likely length of the drought
- possibility of improving the quality of the sheep.

In general, a sound policy is to sell some stock and feed the rest. Cast for age and cull sheep will normally be the first to go.

Further sales should be planned, keeping two general aims in mind. One is to maintain as many breeders as possible to assist in building up stock numbers quickly after the drought breaks. The second is to keep the most productive sheep. Wethers would generally be sold before ewes and older sheep sold before the 2- to 4-year-old groups (1 - 3 years for wethers).

Better grown ewe weaners should be given preference for available feed over other weaners. Given a suitable ration, weaners may be carried through a drought, but they are more susceptible to nutritional stress and disease than mature sheep.

Finally, taxation can have an important bearing on selling policy during a drought. Its effects, especially if a large part of the flock is to be sold, need to be worked out before the stock are sold, particularly where low 'cost price' valuations are used for taxation purposes.

Identifying livestock leaving the farm - NLIS requirements for sheep and goats

Sheep and goats born before January 2006 have no National Livestock Identification System (NLIS) requirements until 2009.

Sheep and goats born after 1 January 2006 must be tagged with an NLIS Sheep tag before leaving their property of birth.

Sheep or goats born after 1 January 2006 sent on agistment, on return must be accompanied by a completed National Vendor Declaration form (NVD – see Appendix 1) or be tagged with an NLIS Sheep Post-Breeder tag printed with the property identification codes (PICs) of the agistment properties. In some cases agistment properties can be linked to the PIC of the home property, which would eliminate the need to use an NVD or attach an NLIS Post-Breeder tag.

For more information contact the DPI Helpline on 1800 678 779.

Purchasing sheep after the drought

Sheep and goats born after 1 January 2006 must be tagged with an NLIS sheep tag before leaving their property of birth.

To minimise the risk of introducing disease, sheep must be accompanied with a completed animal health statement (Appendix 2).

Humane Destruction

If some classes of stock are unsaleable, and no other option is feasible, then these animals should be humanely destroyed. In past droughts, shires have made facilities available to dispose of carcases after destruction. Information on appropriate methods of destruction can be obtained from animal health staff from your local DPI office.

Chapter 2

Setting targets

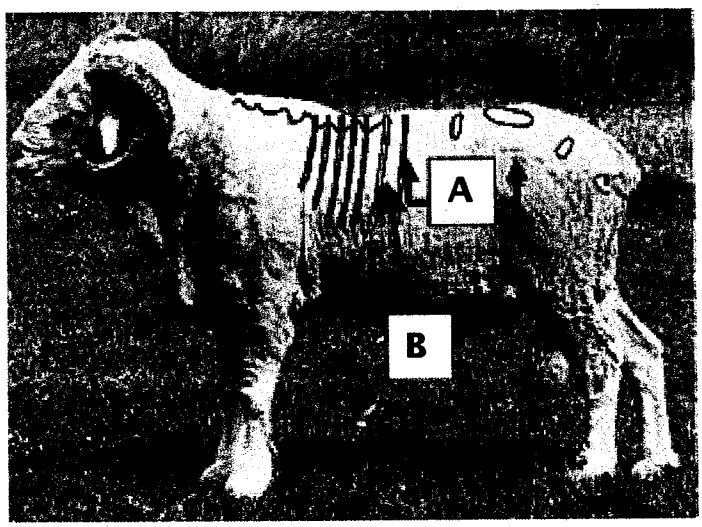
Before choosing a drought feed and deciding on quantities, it is important to set targets for feeding each class of stock. The targets for the feeding program may be, for example, to maintain ewes in a suitable condition for joining, or to hold weaners at their present weight and body condition for the next 3 months. Different targets will impose a different feeding regime, and cost, on the producer. In addition, the targets set may affect the most economical choice of feed.

Assessing fat reserves of sheep

Assessing the amount of fat that an animal has on reserve is a very useful tool for monitoring the stock and assessing the needs of animals to either gain weight or even to lose weight. It is very quick, cheap and easy to do, while remembering that monitoring liveweight is a must for young animals (lambs) that have little fat reserve and need to gain weight.

Fat cover in sheep is measured either at the short ribs (condition score) or the long ribs (fat score).

Figure 1. Picture of the sites on the sheep for assessing fat reserves



A) Site for assessing condition scores.
B) Site for assessing fat scores – 10 cm down the second last long rib is the GR site and the site for measuring fat depth in slaughter lambs.

Condition scoring is more sensitive for merinos in monitoring their condition and guidelines on what to feel is outlined in the table below.

Liveweight

Measuring liveweight, for most of us, is more sensitive for monitoring changes in animals. A drop in a fat or condition score is equivalent to a loss of about 7 kg. Therefore if you don't have the skill to distinguish animals less than a condition score apart, weight loss may be too great before you pick it up. A set of scales can pay for itself if used to assess feed requirements through animal weight change.

Liveweight can be misleading for assessing ewes in late pregnancy as they will be putting on considerable weight associated with the lamb and may be losing some of their own fat reserves to do this.

Weaners need to be monitored by weight as fat reserves are usually low in young animals and they have a requirement to grow. The table below shows some critical weights to aim for to increase survival.

Targets for sheep

Lambs

Early weaning can reduce feed costs and simplify management of both ewes and lambs. One of the main advantages is to wean before ewes lose too much condition so they can be maintained at a weight for getting back into lamb at joining. The important factors for the lambs are an absolute minimum age of 6 weeks, a minimum liveweight of 9 kg, and the use of high quality rations and good management. For merino breeders that wean at 12 - 14 weeks anyway, there are not a lot of opportunities to wean much earlier.

Weaners

In a "normal" season, the growth target for weaners would be to achieve 50 per cent of their mature (4-year-old) weight by the autumn break. Some later compensation for poor growth during drought months could be included as part of the target drought-feeding strategy. However, severe under-nutrition of ewe weaners in their first year can reduce lifetime reproduction by up to 20 per cent. Table 2 shows target weights for young sheep from birth to first joining.

Table 2 - Target weights for weaners

Mature weights	Target weights (kg)				
	Birth	Pasture drying off	Autumn break	Late winter	Joining
45 kg	4	20	22.5	27	24-36
50 kg	4.5	22.5	25	30	37.5-40
55 kg	5	25	27.5	33	41-44
60 kg	5	27	30	36	45-48
70 kg	5.5	31.5	33.5	42	52.5-56
% Mature weight	8-9%	45%	50%	30%	75-80%

Finishing prime lambs

If the season is such that lambs are not finished before feed limits production, then finishing lambs on full grain diets must be costed carefully. There are a number of good sources of information and feed budgets available through DPI offices and Meat and Livestock Australia (MLA).

Ewes and reproduction

The cost of full drought feeding for a breeding ewe for 6 months during late pregnancy and lactation is 50 per cent more than for a dry ewe. Considerable cost savings can be made by not joining, or by delaying joining.

In this example, at a cost of grain at $300 per tonne and feeding is for 6 months, the extra cost per lamb born is between $20 and $33. The cost will be higher per lamb for survival to weaning and beyond weaning. At a weaning survival rate of 80 per cent the cost per lamb in this example is between $25 and $42. This survival rate also will vary widely and this is an example only.

You need to do your own sums and expectations on responses, but this will give you a guide to balancing feed costs and reproduction.

The outcome will vary depending on:

- The cost of grain
- If roughage is added to the diet and similarly increase, the cost will be higher
- The response in conception, as this has been found to be quite variable on different farms
- Length of maintenance feeding (6 months used in this example)
- Lamb survival. The example has used 80 per cent survival to weaning but this will vary widely.

There may be additional benefits of having heavier ewes such as fewer deaths and more wool to help offset these costs. The cost will also be higher if money is borrowed.

While nutrition and condition of ewes have the most impact on conception and lambing percentages, there may be other contributing factors. Rams should not be ignored and need to be on the same level and type of rations as the ewes well before joining.

Maiden ewes

Maiden ewes need to be about 75 per cent of their mature weight at joining. If maiden ewes are well below this you may consider not joining.

Table 4 - Total drought rations for sheep

Weekly energy requirements for maintenance and minimum dietary protein concentrations for different classes of sheep, assuming no paddock feed is available. Check adjustments to rations for allowances needed for larger breeds, and setting your own rations for more detail.

Class of stock	Energy requirement MJ/week	Minimum crude protein % DM		Feed	Ration kg per head per week	Remarks*
1. Adult dry sheep, ewes in early stages of pregnancy in store condition				Wheat	3.5	
			or	Oats	4	
			or	Hay (good)	5	
▪ 40 kg liveweight – medium framed	42	6	or	Hay (poor)	7	
▪ large framed, or crossbred ewe at 60 kg liveweight	57	6		Wheat	4.75	
			or	Oats	5.7	
			or	Hay (good)	7	
			or	Hay (poor)	10	
2. Pregnant ewes, last 4-6 weeks before lambing				Wheat	5	
			or	Oats	5.6	
			plus	Hay (good to av.)	1	Some hay (or dry paddock feed) is desirable but, if in short supply save until after lambing and increase grain ration by 0.5 kg as a substitute.
▪ medium framed	62	8	or	Hay (good) alone	7	
▪ Large framed, or crossbred – 60 kg liveweight	84	8		Wheat	5.5	
			or	Oats	6	
			plus	Hay (good to av.)	1.5	
			or	Hay (good) alone	10	
3. Ewes with lambs at foot*	84	10		Wheat	7	Rates apply to mobs with normal lambing patterns from start of lambing. If lambing is concentrated, increase Rations by 1 kg grain plus 1 kg hay for first 3-4 weeks following the lambing peak, for full milk production.
			or	Oats	9	
▪ Medium framed			plus	Hay (good)	1.5	
			or	Hay (average)	2	
			or	Hay (good) alone	10	
▪ Large framed	120	10		Wheat	8.5	
			or	Oats	10	Wheat alone is not a satisfactory feed for lactating ewes.
			plus	Hay (good)	2	
			or	Hay (average)	2.8	
			or	Hay (good) alone	14	
4. Lambs						
▪ Early-weaned lambs up to 15 kg liveweight gaining 1 to 2 kg per hd/wk	35	12	plus	Mixed cereal grain (3 parts) and lupins (1 part) Hay (good) at 10%	Feed to appetite (3.5)	Combine the mixed grain feed with hay and feed the combined ration.
▪ Weaned lambs greater than 15 kg liveweight	35	10	or	Wheat	2	Give access to the best grazing at all times. If no useful grazing is available, give extra 1.5 kg good hay (or 2 kg average hay).
			or	Oats	2.3	
			plus	Hay (good) plus grazing (about ⅓ ration)	3	
			or	Hay (good) alone	4.5	If hay is very scarce, reduce to 0.3 kg and increase grain by 0.8 kg (per week).

* Energy requirements for lactating ewes assume that ewes maintain body condition. If lambs are kept on the ewes longer than 6 - 8 weeks, requirements will increase as the lamb requirements increase.

However when grain is no longer available, weight changes have been reported from minus 176 grams per head per day to gains of 65 grams per head per day (when summer rains produced growth of green feed).

In a separate cereal grazing trial in the Horsham district, wethers on weed free wheat stubble lost 4 kg over a 12-week period. In the same trial, the addition of molasses and urea blocks resulted in a live weight loss of 1.5 kg where as the addition of 100 grams of lupins per head per day gave a 0.5 kg gain over the same period.

Lupin and legume stubbles provide a higher value grain and stubble. Lupin stubbles can be toxic to sheep when infected with a fungus, which causes lupinosis.

Protein and roughage
It is usually safe to say that where stock are receiving sufficient energy from pasture then for dry stock at least, protein will not be limiting. Where some green is available, energy may be limiting but the green pick will still provide protein requirements to stock.

Where stock are fed in paddocks where there is some dry feed, roughage or fibre is unlikely to be limiting.

Choosing a supplementary feed

Feed resources held on the farm are often the most obvious choice for a drought ration, but may not necessarily match the feeding targets. If the farm feed resources are in demand commercially, it may even pay to sell them and buy in something else at a cheaper price, provided that the feeding targets can still be met with the bought supplement.

Feed values rise as drought progresses, so do not be too anxious to sell off surplus feed, only to discover that it is needed later on.

Energy is one of the most important requirements for animals in a drought. Common energy supplements for sheep also usually provide enough protein, vitamins and minerals. Unless your stock have a special need for protein, vitamins or minerals, choose the drought feed that provides energy at the lowest cost.

Energy values of feeds differ (see Table 6), as does the relative cost of the energy they contain.

Feed values (energy and protein) can be highly variable. Variations are due to district, variety, season and growing conditions. Table 6 shows the energy and protein ranges commonly found in feeds in Victoria. However, having the feed tested by a registered laboratory such as FeedTest® is the best way of being confident about the quality of purchased or home grown feed.

The feed values in Table 6 are 'as fed' which means dry matter has been taken into account. For example, wheat may have a FeedTest, energy value of 13 MJ per kg of dry matter so for every kilogram of wheat fed to sheep, they will get 12MJ (13MJ x 90÷100), if wheat has 90 per cent dry matter. (See the section on calculating the cheapest source of energy to do your own calculations).

Sodium is deficient in most grains. Common salt can be provided at 0.5 per cent if needed, but often water supplies have sufficient salt to alleviate the need to supplement.

Alternatively, both salt and calcium can be provided in a salt lick. The percentage of each mineral can vary, but calcium levels above 30 per cent start to limit uptake. You can mix your own licks cheaply or take the more expensive option of buying commercial blocks. One difficulty with licks is that some sheep in the mob do not partake and the intake of the others can be highly variable. There have been reports of calcium deficiency in young animals that have been lot fed with calcium supplied via licks.

Only two vitamins, A and E, are likely to be deficient as a direct result of drought feeding, and are rare in adult sheep.

Vitamin A is obtained from green pasture, hay with a good green colour and yellow maize. Even a short green pick will supply adequate quantities of the vitamin. Vitamin A is stored in the liver. Young sheep usually experience deficiencies when they have been without green pasture, green hay or yellow maize for 6 months, but deficiency is very rare in adult sheep.

Symptoms include night blindness, eye discharges and illthrift. Treat with a Vitamin A drench if lambs and adult sheep have been without a source of the vitamin for 3 - 4 months and 9 - 10 months respectively. A single drench protects the sheep for about 6 months. An inter-relationship exists between Vitamin E and selenium. Grains and hays are fair to good sources of Vitamin E, although considerable variation does occur.

Vitamin E deficiency induces symptoms similar to selenium deficiency (that is, still born lambs and older lambs that suffer from a stiff, stilted gait, lameness and illthrift). The deficiency is usually treated with a water-soluble drench.

If you suspect these or other vitamin deficiencies, seek veterinary advice for confirmation and dose rate instructions.

Fat

Some feed sources have a higher concentration of fat than others. Although fat represents a concentrated form of energy, levels greater than 5 per cent fat in a sheep diet will decrease intake. (For example, the fat levels in maize can vary from 4 - 8 per cent). This is important when considering some alternative feed sources and how much needs to be incorporated into a ration.

Calculating the cheapest source of energy

The units used to describe the energy content of a diet are megajoules (MJ) of metabolisable energy. Table 7 calculates some of the relative prices of feed energy, over a range of prices. It can be used to compare the purchase of feeds with different energy levels.

Example: Comparing the energy cost of different feeds.

If you can buy wheat for $210 per tonne, you are paying a unit energy cost of 1.8 cents per MJ. This would be the same value as oats at $180 per tonne, or lucerne hay at $150 per tonne. If oats or lucerne hay were selling for less than these prices, they would be better value on an energy basis.

Table 7- Comparing the cost of energy in different feeds over a range of feed prices

Feed	Energy value (MJ/kg as fed)*	Cost per unit of energy (cents/MJ) Feed cost ($/tonne):							
		120	150	180	210	240	270	300	350
Wheat, Triticale, Lupins, Peas	12	1.0	1.3	1.5	1.8	2.0	2.3	2.6	3.0
Oats	10	1.2	1.5	1.8	2.1	2.4	2.7	3.0	3.5
Lucerne, Early Clover hay	8.5	1.4	1.8	2.1	2.5	2.8	3.2	3.5	4.1
Oaten, mid-season pasture hay	7	1.7	2.1	2.6	3.0	3,4	3.7	4.2	4.8
Late grass hay, Cereal straw	6	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.9

* Approx. 90 per cent dry matter, except hay or straw at 85 per cent DM

To calculate the total feed needed, simply divide the number of energy units (ME) in your chosen feed into the energy units required for each class of stock.

Example 1

45 kg wether requires
46 MJME per week
Feeding wheat 12 MJME per kg

Full ration = 3.8 kg wheat per week

Example 2

50 kg ewe with lamb at foot
104 MJME per week (1 week old)
Feeding maize at 13 MJME per kg

Full ration = 8 kg maize per week (protein may be limiting)

Proportion of a full ration to feed

It is relatively easy to estimate a fully supplementary ration for a particular class and weight of sheep but it is very difficult to estimate what proportion of this ration to feed if stock have access to pasture or stubble. The simple answer is to start with approximately one third to a half of a full ration and monitor the sheep for weight gain or loss. The ration can then be altered appropriately. Of course, this starting proportion can depend on what fodder is being fed, the condition of the sheep, the aims of feeding and how much paddock feed is available.

Adjustments to rations

In cold conditions, the energy requirements of the sheep increase and the rations will need to be increased by 20 per cent or even more under severe conditions. If cold conditions occur when sheep have just been shorn, provide whatever shelter is available and boost rations at least twofold.

Hay is the safest for such a sudden increase in the ration, but it can be gradually replaced by grain if the increase has to be sustained. If grain alone is to be fed, then the frequency of feeding rather than the amount offered at each feed should be increased.

On muddy ground, increase rations by about 0.5 kg per head if grain is trailed to make up for wastage caused by trampling.

Total feeding costs

The information found in Tables 4, 7 and 8 in this chapter can be used to calculate the amount and the cost of the total ration for different classes of sheep. This figure then needs to be adjusted for the proportion of the total ration being feed eg. one third during the early part of the drought up to one half for most of the remainder.

Example: Cost of fully drought-feeding dry adult sheep.

If a 40 kg wether or dry ewe requires 42 MJ of energy per week for maintenance, the cost is calculated by using the energy cost from Table 7 multiplied by the weekly energy requirement.

For example:
For wheat at $210 per tonne
42 MJ per week at 1.8 cents per MJ = 76 cents per week

For oaten hay at $90 per tonne
42 MJ per week at 1.3 cents per MJ = 55 cents per week

Example 2

Assumptions: The drought will break in June.

1,000 wethers (40 kg) fed wheat in the paddock at a half ration and then put in a stock containment area in January. A full ration of wheat at 12 MJME per kg is 3.5 kg per head per week. Wheat price = $310 per tonne

	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
kg/head/week	1.5	1.5	3.5	3.5	3.5	3.5	3.5	3.5	2
Monthly kg required for the mob	6,000	6,000	14,000	14,000	14,000	14,000	14,000	14,000	8,000
Cumulative grain requirement	6,000	12,000	26,000	40,000	54,000	68,000	82,000	96,000	104,000
Cost per head	$1.86	$1.86	$4.34	$4.34	$4.34	$4.34	$4.34	$4.34	$2.48
Cumulative cost per head	$1.86	$3.72	$8.06	$12.40	$16.74	$21.08	$25.42	$29.76	$32.24
Cumulative cost per mob	$1,860	$3,720	$8,060	$12,400	$16,740	$21,080	$25,420	$29,760	$32,240

In this example, you will require 104 tonnes of wheat at a total cost of $32,240 or $32.24 per head.

Other considerations

The cost of feeding sheep is not just the feed purchase price. Labour costs, freight costs, extra storage and handling costs, and the likely amount of wastage have all to be taken into account when calculating the relative costs of feed on your farm.

The introduction of weeds can be a problem with buying in feed, and samples should be inspected carefully for weed seeds. However, it is not always possible to detect a potential problem, or even to refuse a feed on these grounds.

One way to minimise a potential weed problem is to restrict feeding out of any suspect fodder to a limited number of paddocks. There are several issues regarding feeding and management of sheep during drought which significantly increases the risk of importing new weeds onto farms. DPI's Landscape Protection portfolio has produced a brochure on this topic which can be accessed from the DPI website at www.dpi.vic.gov.au/weeds 'Weed Warning - Drought, Fire & Flood'.

Stock must be boxed together in large mobs on the most stable soils, but this can have the added advantage of preserving some vegetation on destocked areas of the farm, reducing the likelihood of severe erosion.

The holding periods of chemicals used before harvest is an important consideration when purchasing fodder from crops or failed crops.

Water requirements

Quality and quantity of water is often a major concern during a drought. Sheep drink about 3 - 5 litres of water during hot weather but this can climb to 9 litres in extreme heat. Often of greater concern is the evaporation of water from dams. About 1.5 - 2 m of depth is evaporated from a dam each year although this can vary with the depth and orientation of the dam. Measuring the depth of water in each dam early in the drought helps to assess whether your supplies will last until at least next winter or, preferably, the one following. You may need to box some mobs later in the drought when the more shallow dams dry up.

Chapter 4

Managing sheep during a drought

The start and finish of feeding, level of supplementation and introduction strategy are all important components of drought management. Feeding too early or too long can waste feed, while starting too late or stopping too soon can result in stock illness or deaths. Often the largest stock losses occur after the drought has broken, especially if the weather turns cold.

Unlike fire or flood, when sheep may have to suddenly rely on hand feeding alone, the onset of a drought is usually gradual. Drought conditions rarely deteriorate to the stage where no grazing is available and sheep have to rely solely on hand feeding.

Experience from previous droughts indicates that more paddock feed is available than would first appear. Sheep can scavenge quite a bit of feed from sparse, dry pasture and buried clover or medic burr. The presence of paddock feed early in a drought makes it easier to get the sheep accustomed to the drought rations before they have to be fed close to full rations.

On the other hand, the presence of paddock feed can have its down side.The gradual onset of drought can mean that producers do not notice that stock have lost so much condition that they are disadvantaged right through the drought.

From a wool quality aspect, relatively hunger fine wool can have very good tensile strength, provided that sudden feed changes are avoided. This requires vigilance in feeding and disease avoidance.

When to start

Feeding should start well before sheep become weak. It may take some time before they become accustomed to hand feeding and begin eating their ration. If sheep have lost too much condition before feeding has begun, or before they readily accept grain, it may be hard to lift their liveweight back to desirable levels. This is particularly applicable to lambs or weaners that were not fed supplements when grazing with their mothers.

One rule of thumb used by scientists at DPI Hamilton is: Feed a half ration, normally of grain, when half the sheep in a flock have fallen to a Condition Score of low 2 (lean or backward store) or below. If condition still falls, lift the feeding rate to a full ration, preferably using some hay. Stop feeding when only a quarter of the stock remain at a Condition Score 2 or less after the drought breaks.

Another criterion often used is a weight 3 kg above the critical weight for survival. If you start feeding at that stage, the sheep can lose weight during the introductory period without drastically altering their chances of survival.

Table 9 - Suitable weights for starting to feed sheep

	Average kg	Bottom ¼ of mob kg
Small-framed Merino	35	32
Medium-framed Merino/ Polwarth	40	37
Large-framed Merino	45	42
Corriedale	45	42
Border Leicester-Merino cross	50-55	48

The above comments apply to wheat, barley, maize, sorghum and sheep nuts, or rations with a high starch and low fibre content. Oats and lupins have a higher fibre content than the other grains and the full rations recommended may therefore be built up more quickly over a period of from 14 - 21 days, with little risk of causing digestive upsets.

A guide to the initial amount of feed you will use in the first few weeks for a flock of 1,000 sheep is provided in Table 11.

Feeding frequency

Frequency of feeding is determined by the state of the sheep, type of feed, availability and capacity of troughs, and risk of feed losses through rain, birds and other animals.

Feed dry sheep, and ewes up to the last 6 weeks of pregnancy, 3 days apart or twice weekly for best results. However, ewes in late pregnancy or during lactation and young weaners require daily feeding. This can be achieved with a self-feeder or by feeding hay and grain on alternate days.

Table 11 - Feed consumption in the first month of a drought*

Week	Tonnes per 1,000 sheep
1	0.8
2	1.9
3	2.9
4	3.0
(Full feeding)**	(3 to 5)

* based on table10

** will depend on type of sheep and feed

Managing and monitoring

The management of sheep during this period and throughout the drought depends on knowing how the animals are faring.

Recommendations in this book are only guidelines, because the amount of pasture, size of sheep, value of grain and amount of energy required for walking around will vary from farm to farm. The only real way to know how they are going is to weigh them. Tag or brand 25 - 30 sheep from each mob and weigh them regularly throughout the drought. Individual tagging will give you a more accurate estimate of weight gain and loss. However, if it is easier to randomly draft sheep each time, you will need to weigh more – 10 per cent of the mob or a maximum of 80 would give you a good estimate. Knowing weight changes can save you the cost of unnecessary feeding as well as prevent deaths of sheep that slip too far before being fed or are not getting enough to eat.

A variable proportion of sheep and lambs will not adapt to drought feeding. The proportion of shy feeders depends on age, previous feeding history, ration, mob size (the proportion rises steeply once the mob size is above 400), but up to 10 per cent is not uncommon. Remove shy feeders from the mob and feed them separately. Some will eventually eat the ration. Those that don't can be fed good quality hay, or sold.

Breaking routine or changing feed

If a break in the normal 2 - 3 day feeding routine occurs through delay in the availability of supplies, do not resume feeding the full ration when supplies become available. Begin feeding again daily, on about half-rations, and build up to the full ration over a few days before returning to every third day.

It is especially important to avoid sudden changes in the ration. Sheep which have become accustomed to one type of grain cannot immediately adjust to another. Deaths and a high incidence of tender wool can result from a sudden switch of feed. Even the same grain type obtained from a different source has caused losses. It is desirable to estimate early in the program how long supplies will last. This will allow time for planning of a gradual changeover from one feed to another.

Chapter 5

Feeding in stock containment areas

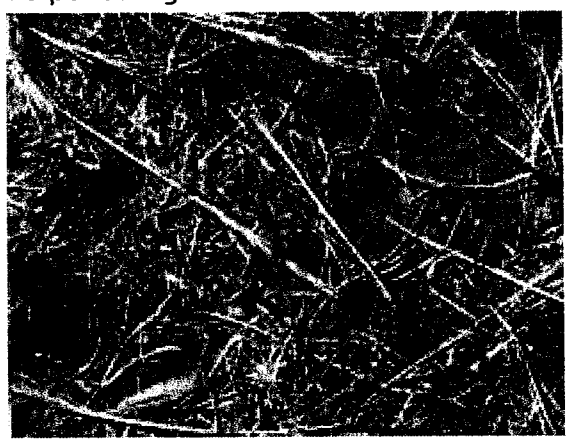
The risk of losing valuable soil during a drought increases because ground cover is reduced. If cover is reduced below about 30 per cent wind will start to blow soil particles away causing erosion and loss of valuable nutrients and topsoil. Bare areas will also be more prone to washing once the break does come.

Another potential loss is newly-improved pastures, which may be vulnerable to overgrazing. Pastures that you have invested money and time in establishing can be lost if continuously overgrazed and should be among the first paddocks to consider destocking.

The pictures (right) illustrate various levels of ground cover to show that as ground cover starts to drop below about 70 per cent, the bare patches are quite large and are starting to join and so create opportunities for soil movement. Slope of the land and stability of the soil type will effect the critical level of cover.

80 per cent ground cover

70 per cent ground cover



< 50 per cent ground cover

When budgeting on a water allowance you can plan for average daily consumption of 4 L per head per day, however this can change dramatically with the weather. On very hot days, intake will be greatly increased so you need to be able to supply the maximum rate of up to 9 L per head per day. Trough space is less important than flow rate. Water trough allowance does not need to be more than required in a paddock, sheep will adjust and take turns to drink at the trough. A good rule of thumb is that the flow rate should pump enough water for the mob in 2 or 3 hours.

Troughs need to be checked daily and cleaned regularly.

Feed

Allow 15 - 20 metres of double-sided trough for 100 sheep. Use the bigger area for large or full woolled sheep.

Feed troughs can be bought or made cheaply from materials like roof capping, folded roofing iron and suspended cloth.

Full rations for different classes of stock are given in Chapter 3. If you wish to keep stock in better-than-store condition you could increase rations 20 - 30 per cent. As stock will not have access to any pasture, inclusion of roughage is important. Ideally 30 per cent hay should be included but as hay is very expensive during droughts the proportion can be reduced to 10 per cent. Hay in the diet is likely to cause less problems with grain poisoning and is the safest to increase quickly in cold conditions and with shorn sheep.

As outlined in Chapter 3, the deficiencies likely to occur with high grain diets as in a drought or lot feeding are sodium, calcium, fibre and Vitamins A, E and B1. Adding a 50:50 mixture of limestone and salt at two per cent to the grain will fulfil sodium and calcium requirements. Roughage will be adequate with some hay or straw in the diet, especially with grains of low fibre content. Oats has about 12 per cent fibre, compared to barley at 5 per cent and wheat at only 2 per cent.

Management

Adult sheep are the easiest to manage in a feedlot. Feedlotting ewes and lambs should be avoided if possible. Adult sheep, weaners and hoggets should be yarded separately. Sheep must be vaccinated against enterotoxaemia (pulpy kidney) if the ration is high in grain. They should be drenched into the area, worm tested regularly, and ideally drenched before being released.

It is better to start sheep on grain in the paddock before introducing them to a feedlot situation (two weeks). If you can't do this, make sure that most of the diet in the first two weeks is hay and then increase the grain ration gradually. Start at 50 g per head per day grain and make up the rest with grain building up to the desired ration over two weeks. Feed your best hay first and feed hay before grain. Start off feeding daily for the first two weeks and then cut down to two to three times a week. You can then feed hay one day and grain the next.

It may take a while to get the ration right and, as the cost of feed is especially high during a drought, consider weighing 20 - 50 sheep regularly. Over and under feeding is costly. Aim to keep older stock at a minimum of Condition Score 2.

There will always be a number of sheep that do not take to a lot feeding situation and should be identified regularly and removed to pasture, smaller yards or sold.

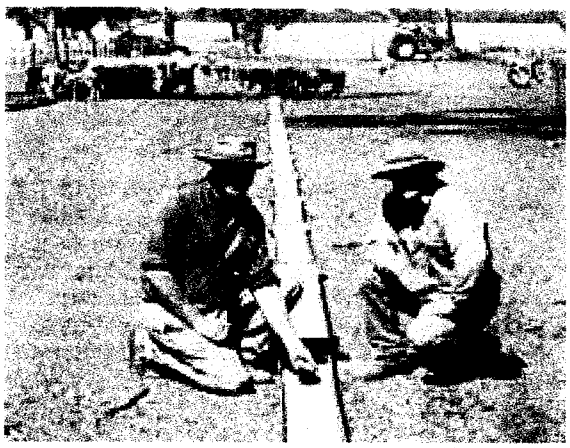
In cold, wet and windy weather, increase the feed by 30 per cent, preferably by feeding more hay. With recently shorn sheep, increase the feed by 50 per cent. If extra hay is not available, give one extra feed during the week. Replace any feed wasted, as a result of rain damage, with new feed.

Releasing sheep

When the break does come, the change in feed can be quite sudden and may cause digestive problems. Therefore, when you are considering releasing the sheep from the containment area, do it when sheep have a full stomach and continue to feed hay for a few days. Ewes that are lambing may need the full ration for a few weeks.

Case Studies – Stock containment areas

1. NEIL, SUE, DAVID AND JACQUI ALLEN

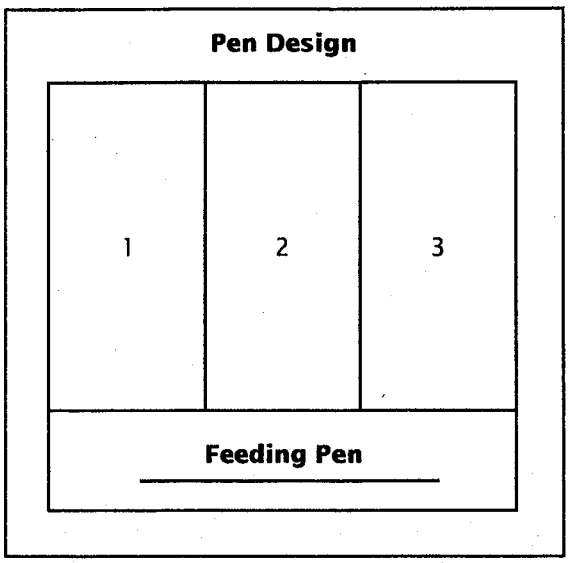


The Allens farm wool and crops near Mitiamo in North-Central Victoria. In 1995 they put 1,500 merino ewes in stock containment areas from January to mid-April. They found the ewes adapted well in the containment areas and repeated this in 2002. The site was chosen because it has a gentle slope, trees for shade and water access close by.

Stock management

The sheep are stocked at 1 sheep per 5 metres (or lower density depending on mob size). They are in mobs of approximately 300 - 500 (so three pens) but also have a separate pen for feeding which covers the length of the pens, as shown in the diagram (top right). This allows the troughs to be cleaned out easily and also to feed out without having to get in and around the sheep. This design has also reduced the trough space required as the mobs alternate every day into the troughs for grain. Troughing is steel railway sleepers upside down

Ewes are joined in the containment areas in January. In 1995, ewes lambed in May–June in the paddock with 80 per cent lambing. In 2002, maiden ewes were released onto stubbles for joining and adult ewes joined at fatscore three in the containment areas at 0.5 to 1 per cent rams.



In 1995, the Allens fed oats and hay and had no problems with acidosis. In 2002, sheep were fed pellets and hay but they experienced problems when the pellets were fed after a day of no feed. The program was changed so that pellets were fed after hay.

Feeding program:

Day 1 – hay in pens (2 kg per head per week)
Day 2 – pellets in feed pen
(2.8 kg per head per week)
Day 3 – nothing

The grain is fed in the separate feeding pen and the sheep are given access for 24 hours and then go back into the stock containment areas. At this feeding rate, the ewes lifted in condition for joining (these are ewes at about 60 kg in Fat Score 2.5 - 3). The hay was very good quality – 9.6 MJME per kg.

2. CHARLIE CROCKER

Charlie and Marie Crocker run a wool producing enterprise near Violet Town. In 1994, Charlie decided to put adult sheep into stock containment areas to retain the high investment in improved and fertile pastures. Pens were set up to hold mobs of 1000 sheep stocked at roughly 1 sheep per 2.5 m^2. Pen design was a simple, 6-line ringlock with one plain wire and no stay assemblies.

Location was along an unused roadside that provided afternoon shade and had easy access to water. Soil type is a sandy loam.

Stock management

Sheep were vaccinated and drenched into the sites in January 1995. Tail enders were taken off. For example, in the wether mob about 100 were taken out over two drafts and remaining sheep maintained condition well on the ration provided.

The ewes were joined in the feedlot at 2 per cent. Lambing percentage was 50 per cent – given they were maiden ewes in a drought, this was not too bad.

Feeding

Feeding in the containment areas was pretty easy. Once the sheep were used to the routine, the tractor could be driven in to fill the troughs without sheep running round the vehicle. The troughs were placed near the fence which also helped. After a while they didn't need to shut the gate while feeding.

The sheep were fed three times a week, Monday, Wednesday and Friday and the Crockers had the weekend off. They were fed 3 kg wheat per head per week plus hay on Friday. When the break came and it got wet and cold, the area was very wet so they increased the hay feeding. Limestone and salt were added, using a bucket, directly into the feeder.

They started feeding on sawdust, but due to some concern about salmonellosis, used troughs which could be cleaned out. They got some decking iron from a yard in Melbourne, which meant the tractor could easily straddle the troughs for ease of feeding. The hay rolls were fed out on the sawdust.

Wool quality

The wethers were shorn in late January and the ewes were May shorn. The wool was tender – either because of acidosis getting the sheep onto grain quickly or when they were let out onto green feed. They tried feeding hay to reduce the changing feed but it is hard to stop the wool breaking with these feed changes.

Dust wasn't a problem. The sheep were stocked at this density to increase compaction in the pens.

Chapter 6

Sheep health

Past experience indicates that if sheep remain in good store condition during the drought then they will experience very little disease – in fact, less than in a normal season. However, if the stock are stressed, then diseases are much more likely to occur.

Regardless of the care you take, there are a number of conditions that may occur in drought-feeding situations, especially when sheep are congregated onto small areas for feeding. You do need to keep an eye on the health of your sheep. In addition, the type of disease likely to occur will change as the drought progresses. You should contact your animal health adviser about recommendations for prevention and control if you have any concerns.

Most common diseases

Pregnancy Toxaemia (twin lamb disease) and Hypocalcaemia

Pregnancy toxaemia is a metabolic disorder of ewes that may occur in the last six weeks of pregnancy. It is caused by a lack of energy in a period when there is a high demand causing a rapid breakdown of body tissue. Therefore mature pregnant ewes with inadequate nutrition are susceptible and those in poor condition, or over-fat or with twin or multiple lambs are most at risk. Pregnancy toxaemia can be induced by stress or other conditions causing low intake (eg. worms, foot abscess and yarding).

The disease usually appears over several weeks with a few ewes showing signs of standing alone or lagging behind, unsteady walk and apparent blindness. Clinical signs may progress over a number of days. Ewes that are down become very dull and finally may go into a coma. Occasionally the foetus dies and the ewe recovers, though often with difficulty during lambing. Clinical signs of Pregnancy Toxaemia are the 'tip of the iceberg' and are a sign that the mob is underfed. Severe under-nutrition in late pregnancy and lactation will have other production impacts on poor lamb growth, survival and long-term production.

Treatment with registered products containing propylene glycol may be successful in the early stages, especially if ewes are still able to stand. Ewes that are down or in a coma usually die despite treatment. Good quality supplementary feed should be provided to, at least, those ewes most at risk. Prevention involves close observation, supplementary feed and careful management during the last weeks of pregnancy.

This disease should be differentiated from **Hypocalcaemia**, which is also seen in late pregnancy and early lactation but caused by metabolic calcium deficiency. The disease occurs over a short time frame and usually affects more ewes in the flock. Stock that have been held in yards overnight prior to transport or shearing may also develop hypocalcaemia. The only clinical sign may be sudden death during or after transport. Grain diets can predispose stock to this condition and prevention relies on the addition of 1 - 2 per cent ground limestone to the ration.

There have been reported cases of hypocalcaemia in late pregnant ewes, despite being fed sufficient limestone. Removing ewes in late pregnancy from access to feed, such as by mustering or crutching has been the most common cause. Hypocalcaemia may also occur due to a reduced ability to maintain calcium balance with limestone supplemented diets and/or poor absorption of calcium from green pastures post the drought breaking.

Strategies to prevent this may include ensuring that ewes are not stressed or off feed for long periods. Restricting limestone in the diet for 2-3 weeks pre-lambing may assist in the ewes' ability to mobilise and absorb calcium. Feeding of roughage on short lush pastures may increase calcium absorption. Older ewes are more susceptible. Animals with hypocalcaemia may respond to treatment with calcium solution.

Grain poisoning (Acidosis)

Grains are carbohydrate rich foods and if excessive quantities are eaten, there is a sudden change in the microbe population in the rumen. This leads to the formation of large amounts of lactic acid which causes grain poisoning. The same effect may occur with a change in grain types.

In practice the condition commonly occurs:

- when sheep are introduced to grain to quickly
- when there is a sudden increase in the amount of grain being fed

The introduction of hungry stock onto any new feed sources (eg. failed crops or even young rapidly growing pasture following rain) may cause stock losses so it is important to introduce sheep gradually to new diets. If sheep are kept in containment areas over a drought, ensure they have ready access to hay and other supplements during the first few days of release into a paddock.

Urea poisoning

This problem can be caused by intake of excess amounts of urea from blocks or in mixed feed. Another possibility of urea poisoning is when sheep drink pools of water on the top of urea blocks after rain. Try to ensure that urea is mixed thoroughly with feed when used as a supplement. Keep urea blocks out of the rain in sheltered areas.

Salmonellosis

Faecal contamination of feed and water supplied with Salmonella organisms can cause an outbreak in stressed sheep. It is more likely to be a problem when the area becomes wet or muddy following heavy rain or from overflowing water troughs and large mobs are feeding from the same area. Symptoms are fever, scouring and sudden death. Treatment requires antibiotic treatment and advice should be sought from your vet. Try to reduce the risk by feeding on new trails or clean troughs, if possible.

Urinary Calculi (bladder stones)

The common predisposing cause is a limited water intake. This can occur as a result of faecal contamination of water, stagnant water or a high salt content in the water. Losses can also occur when sheep are fed on grain rations for over three months without a calcium supplement. It is usually only a problem in rams and wethers. Affected sheep may be dull and down or found after sudden death. There may be a grossly enlarged or even ruptured bladder caused by obstruction to urine outflow, or 'water belly' due to urine straining. Treatment is rarely successful. The disease is best avoided by providing the sheep with the highest quality water possible at all times and adding ground limestone when feeding grain.

Pneumonia

Pneumonia is caused by bacterial infections aggravated by dry dusty conditions. It is more common with lambs being fed on dry, dusty feeds in troughs, especially finely hammer milled hay. Symptoms are nasal discharge, coughing, illthrift and sudden death. To lower the risk of this disease, avoid feeding dry and dusty feeds. This may require some damping down of the feed in troughs.

Vitamin A deficiency

Vitamin A deficiency can occur in lambs born to grain fed ewes in drought. Grain and most hays are low in Vitamin A. Lambs must be completely off green feed for some months before clinical signs will occur. For further details, see the section on Minerals and Vitamins (Chapter 3).

Vitamin E deficiency

Vitamin E deficiency is often associated with feeding weaners on hay or grain over extended periods, especially young weaners. Affected animals appear bright and alert but they are reluctant to stand. In other cases there is sudden death. Examination of dead animals reveals pale muscles.

Vitamin E and selenium deficiency may have an interrelationship and present with identical signs. Again see the section on Minerals and Vitamins (Chapter 3) for further details.

Polioencephalomalacia (PEM)

PEM occurs due to a deficiency in thiamine (vitamin B1). It can occur in feedlot animals due to reduced intake or destruction of thiamine as a sequel to acidosis. Sulphur toxicity may also lead to PEM. Typical signs include blindness, aimless wandering and a 'star gazing' appearance.

Coccidiosis

Stress and overstocking of lambs and weaners under warm, moist conditions can precipitate this disease. The clinical effects are aggravated by concurrent worm infestations. Signs are scouring with watery faeces which may contain blood, lack of appetite, and dehydration, with anaemia and illthrift in some cases. Consider a faecal worm test to differentiate from worms and fluke and consult a veterinarian for treatment and management advice.

Chapter 7

The feed value of unusual feedstuffs

There is a wide range of unusual feedstuffs that can be safely and effectively fed to livestock.

Although such feedstuffs are commonly available in a fairly regular supply, inquiries about their value for feeding to livestock increase when feed for grazing livestock is short, such as during droughts.

Apart from these unusual feedstuffs generally being of poor nutritional value, they can also contain chemical residues that can cause contamination of meat and animal products when used as livestock feed.

All supplementary feeds may contain chemical residues. However, unusual feedstuffs not normally used for feeding livestock pose a much greater risk, because residue transfer assessments are unlikely. The same applies to imported feedstuffs, which may have high feed value to stock, but have an unknown history of chemical usage.

Agricultural chemicals used on fruit and vegetable crops are typically designed to be eliminated from the edible parts of the plant at harvesting, however some residues may still be present and in some cases concentrated, in the waste plant material after processing. It is when this waste plant material is fed to stock that problems can occur.

Agricultural chemicals are not designed to be ingested by livestock. Unless animal residue studies have been conducted, little is known about the effect of these chemicals on stock and about the persistence of residues of these chemicals in animal tissue.

There is a very real possibility that the meat and animal products from stock fed unusual feedstuffs containing chemical contaminants will themselves become contaminated with these chemicals. This can impact severely on trade and market access as well as animal and human health.

For this reason, the best policy is to not feed unusual feedstuffs to stock without first establishing that the material is suitable. Producers should ask the supplier of unusual feedstuffs to certify that the material they are supplying is suitable for the purpose for which it will be used. A by-product vendor declaration should also be requested to verify this information. This will allow the producer to see the full chemical use history of the potential feed.

Ideally, unusual feedstuffs should be tested for chemical contamination by an accredited testing laboratory before being used as drought feed, although this in itself may not provide a satisfactory guarantee of suitability as analytical tests typically only screen for a narrow range of chemicals. It should also be noted that the chemical content of unusual feedstuffs may vary from batch to batch.

It should also be realised the composition of many feedstuffs varies widely because of differences in climate, soil conditions, maturity, variety, management and processing factors.

Therefore, the data presented in this chapter should be considered as a guide rather than a precise statement of nutrient composition. Before finalising plans to feed any by-product or unusual feedstuff to livestock, it is advisable to have a sample analysed by a feed analysis service, such as FeedTest® at DPI Hamilton.

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Most by-products and unusual feedstuffs should be used with caution and introduced into rations gradually, even when low prices favour their use. Factors to consider about unusual feedstuffs are: their nutritive value, palatability, possible toxicity or contamination with pesticides or heavy metals and the effects upon digestion and utilisation of the total ration. The use of by-product stockfeed needs to be declared when completing National Vendor Declaration form (see Appendix 1).

Brewers' grains

Brewers' grains have 20 - 25 per cent crude protein (on a dry matter basis), making them a good protein source in addition to their energy value.

The brewing process makes this protein less soluble than that from many protein supplements. This could be valuable in rations, such as silage supplement with non-protein nitrogen, which contain large amounts of soluble protein.

Brewers' grains are fed both wet and dried. In the dry form they have about 80 per cent of the energy value of barley grain (the energy value varies depending on the brewery and additives used in the brewing process). They are not as palatable in the dried form as the original grain and usually are included as 25 per cent or less of a dairy concentrate mix, and 1 - 20 per cent in feedlot rations.

Citrus pulp

Citrus pulp is classified as a concentrate but is also valuable as a partial roughage replacement because of its high level of digestible fibre.

It commonly contains about 15 per cent crude fibre in the dry matter. Its energy value is about 94 per cent the value of barley grain. It has only about 7 per cent crude protein in the dry matter.

Citrus pulp is usually fed dehydrated. It must be introduced gradually into a ration to let stock get accustomed to its distinctive smell and taste. Levels up to 15-20 per cent are acceptable in feedlot rations.

Citrus pulps can also be fed fresh or as silage. Both are very acceptable to stock but pulp and peels from lemons are somewhat more acceptable than those from oranges and grapefruit. Transportation costs preclude the wet pulp from being fed very far from processing plants.

Citrus pulps are high in calcium and low in phosphorus, and aggravate the high calcium-to-phosphorus ratio in a ration when fed with legumes such as lucerne. Unless counter-balanced by other feeds low in calcium and high in phosphorus, citrus pulps can result in higher incidences of milk fever in cattle at, or soon after, parturition.

Fat

Fats and oils have an energy value about 2.25 times that of carbohydrates. Fats are also used to settle the dust and as a lubricant for feed processing. About 2 - 5 per cent fat is an acceptable level in commercial feedlot rations. Care must be taken to ensure the fats and oils are not contaminated with extraneous chemical during collection, storage and use. Tallow and used cooking oil may only be used when in accordance with Ruminant Feed Ban Regulations.

Grain screenings

Grain screenings result from the cleaning of small grains before they are milled for human consumption. The best grade of screenings consists primarily of broken and shrunken kernels of grain, wild oats and other palatable weed seeds. When ground, good screenings approach grain in feeding value and have been used as 25 per cent or more of concentrate mixed and 15 - 20 per cent in feed rations. However, light, chaffy screenings are much higher in fibre and resemble straw more than grain in feeding value. Such screenings should be restricted to 10 per cent.

Grape pomace or marc

Grape pomace or marc is the refuse in the production of grape juice and wine. It consists mainly of some combination of grape seeds, stems and skins. It has little feeding value, being very variable in both energy and protein and highly variable in dry matter. When included in a concentrate mix, it can be considered only as a filler to reduce the price of the mix. With new harvesting and winery techniques, grape pomace containing few or no stems can be produced. This waste feed has been fed successfully to a 15 - 20 per cent level in complete feedlot rations.

Grape marc has been found to be extremely palatable to sheep and lambs in pen trials have consumed 350 grams per head per day when fed with straw. This diet was effective in reducing weight loss only.

Studies have found partitioning of oil soluble chemicals in grape seeds at violative levels, which would readily transfer to animal fat upon ingestion. There are also concerns regarding residual levels of copper, which can be toxic to stock, used in fungicides on grapes.

However, energy levels are somewhat lower than those found in some other protein supplements such as coconut meal, soybean meal and linseed meal.

Linseed meal

Linseed meal, the by-product of the extraction of linseed oil from flaxseed, is an excellent protein supplement for livestock. Protein content varies from about 30 - 38 per cent depending on the source of processing method. When reasonably priced, it can be used as the only protein supplement in livestock rations because it is very palatable.

Poultry litter and manure

Poultry waste (litter and or manure) has been included in the diets of sheep and cattle but is now prohibited under the Ruminant Feed Ban.

Safflower meal

Safflower meal has increased in availability and importance as a protein supplement in recent years because of the popularity of safflower oil in human diets. Safflower meal from unhulled seeds, has about 20 per cent protein, is high in fibre and is relatively low in energy. Meal made from well-hulled seeds has about 40 per cent protein and is much higher in energy.

However, safflower meal from either source is not as palatable to livestock as the more common protein supplements and is usually restricted to 20 per cent or less of concentrate mix.

Soybean meal

Soybean meal contains from 40 - 50 per cent protein, is high in energy and is highly palatable to livestock.

Sunflower meal

Protein levels vary from 20 - 25 per cent, depending on the processing method and whether the seed is hulled or not. It is roughly equivalent to cottonseed meal as a protein supplement for livestock.

By-product roughage

Canola hay and silage

Canola hay and silage are likely to available as a fodder source in droughts where frost damage has occurred. Both hay and silage can be of good quality but this can vary and there are some livestock considerations. The table below is a summary of sample results conducted by FeedTest® in Victoria on canola hay and silage samples submitted during 2002–05.

Canola hay that has not been aggressively conditioned may have sharp stalk ends and these can pose a problem to animals by piercing the rumen. There have been reported instances of nitrate poisoning from canola products and it is recommended that canola hay or silage is not fed as a sole ration or to starving animals.

Table 12 - Canola hay and silage FeedTest® results

	Digestibility DDM%		Crude protein CP%		Energy ME MJ/kg		Fibre Neutral digestive fibre %	
	Mean	Range	Mean	Range	Mean	Range	Mean	Range
Silage (21 samples)	60.5	44.3-71.4	17.4	6.6 - 25.5	8.8	6.1 – 10.4	46.9	33.3 – 58.2
Hay (79 samples)	59.2	41.7-82.1	13.9	5.5 - 22.9	8.4	3.6-12.1	49.0	26.9 – 68.6

Table 13 – Energy and protein compositions of unusual feedstuffs

If known, ranges in feed values are given in brackets. It is likely that most of these feedstuffs will vary and values are a guide only.

Feed	Approx. dry matter (DM)%	Metabolisable energy (ME) (MJ/kg DM)	Crude protein % dry matter
Acorns	70	7	5
Almond hulls, 15% CF	90	8	2
Almond hulls and shells, 20% CF	90	7	2
Apple pomace, dried	89	10	5
Apple pulp silage	21	11	8
Apples	17	10	3
Apricots, dried	90	12	6
Bakery waste, dried	92	13	11
Banana skins, dried, ground	88	9	8
Bananas	24	13	4
Bread, dried	92	13	13
Brewers dried grains	92	9	22
Brewers dried grains, 25% protein	92	10	25
Brewers grains, wet (range)	28 (14-61)	11 (8-14)	22 (10-29)
Broccoli	11	10	33
Brussel sprouts	15	11	33
Buckwheat	87	11	12
Cabbage	9	13	25
Cabbage leaves	15	10	14
Canola meal (range)	91	12 (10-16)	38 (27-42)
Carrot pulp (range)	10 (8-16)	13 (9-14)	10 (6-15)
Carrots	13	12	10
Cauliflower	9	10	30
Citrus pulp (range)	14 (11-17)	13 (10-15)	9 (6-12)
Copra (coconut) meal	90	11	21
Corn cobs, ground	90	7	3
Cottonseed meal, 41% protein mech-extd	93	3	44
Cottonseed meal, 41% protein, solv-extd	91	11	46
Cottonseed, whole	92	14	23
Grape marc or pomace (range)	55 (20-94)	6 (2-12)	12 (5-17)
Grape/pear/apple pomace, dried	92	6	7
Grapefruit	14	13	8
Kelp, dried	91	5	7
Lemon pulp, dried	93	12	7
Lettuce	5	8	22
Linseed meal, 36% protein, solv-extd	90	12	38
Linseed meal, 37% protein, mech-extd	91	12	38
Melons	4	11	11
Milk, cattle, skim, dried	94	13	36
Milk, cattle, whole, dried	94	15	27
Milk, colostrum	25	15	46
Molasses, cane	75	11	6
Oat hulls	93	5	4
Oat straw	92	7	4
Oats, sprouted 5 days	13	10	18
Onions	11	13	10
Orange pulp, dried	88	12	8
Orange pulp, wet	25	12	9
Oranges	13	12	7
Palm kernal meal	88	11	17
Pea hay	88	9	14
Peaches	10	12	9
Peanut meal, mech-extd	93	12	52
Peanut meal, solv-extd	92	12	52
Peanut skins	94	10	17
Pears	17	13	6
Pineapples	15	12	3
Potato meal, dried	91	12	11
Potatoes	23	12	9
Pumpkins	9	13	16
Raisin pulp, dried	89	8	11
Raisins, cull	85	7	4
Rice bran	90	14 (9-15)	16 (13-20)
Soyabean meal	85 (12-94)	15 (13-16)	44 (30-54)
Sunflower meal	91	10 (8-14)	34 (20-39)
Whey	8 (2-27)	14 (12-14)	30 (20-40)

It is important to assess the risk of these feedstuffs and take appropriate precautions to ensure the quality and integrity of the meat or other end product is not jeopardised.

Appendix 2 – Victorian Sheep Health Statement

SHEEP HEALTH STATEMENT VICTORIA

CONSIGNMENT DETAILS

I ..... of .....

.....

..... PIC .....

am the person with day to day responsibility for the husbandry of the sheep described below

DESCRIPTION OF CONSIGNMENT SHEEP

Number	Year born (drop)	Breed, Sex and Type (eg: cross-breed wether lambs)	Identification (eg: PIC on ear tag, brand)

HISTORY OF CONSIGNMENT SHEEP

Sheep born on above property: Yes ☐ No ☐

If no, date introduced: .....

Former owner (if known): .....

Former property address: .....

..... PIC: .....

ABC Score (when purchased): .....

DECLARATION

As the seller and / or person responsible for the husbandry of the sheep in this consignment I declare that the information in this declaration is true and correct and, where applicable, I hold supporting documentation.

Signature: ..... Date: .....

Name (Print): .....

Contact phone number/s: .....

NOTE: PERSONS MAKING FALSE STATEMENTS MAY BE LIABLE UNDER FAIR TRADING LEGISLATION AND THE STOCK(SELLER LIABILITY AND DECLARATIONS) ACT 1993

This consignment has an ABC SCORE of (refer and complete overleaf)

Category A (Area credits)	Category B (Test Credits)	Category C (Vaccine credits)	Category D (Low risk credits)
☐	☐	☐	☐

TOTAL ABC SCORE (UP TO A MAXIMUM OF 10) ☐

	Tick where applicable
• The Sheep in this consignment are terminal 'T' tag lambs	☐
• Sheep that are of a lower score than the sheep in this consignment have been introduced into the flock in the last two years	☐

The flock of origin (tick where applicable):

1. Has been examined and is NOT known or suspected to be infected with **VIRULENT FOOTROT** ☐
2. Was examined and showed NO evidence of sheep LICE at the last shearing ☐
3. Is **OVINE BRUCELLOSIS ACCREDITED FREE**. Flock Accreditation No .....
4. Had all rams test negative for **OVINE BRUCELLOSIS** within the last 30 days (Veterinary Certificate attached) ☐

OTHER CONSIGNMENT HISTORY (eg lice treatments, last drench type, 5 in 1 vacc.)

Treatment	Date(s)
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....

Notes: