



NSW DEPARTMENT OF  
PRIMARY INDUSTRIES

# THE DROUGHT RECOVERY GUIDE

**Third Edition**

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**Compiled by  
Bruce I Mackay,  
Formerly Technical Specialist  
(Beef Grazing Systems)  
Orange**

**NSW Rural Assistance Authority**

**1800 678 593**

**Contact: 8.30 am–5.00 pm,**

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NSW DEPARTMENT OF  
PRIMARY INDUSTRIES

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# Contents

Foreword	v
Acknowledgments	vi
<b>Section 1 – Planning</b>	
Planning for drought recovery	2
Drought recovery for intensive livestock industries	4
<b>Section 2 – Pastures, crops and soils</b>	
Grazing management following drought	8
Managing pastures after drought	10
Soil management following drought	15
Weeds – a threat to drought recovery	17
Weed strategies following drought, fire and flood	19
Preparing for cropping after drought – removing pastures	20
Dryland winter crop opportunities	21
Winter cropping following drought	23
Cereals for grazing	24
Sourcing cereal seed	28
Dryland summer grain and forage crop opportunities	29
Tree management after drought	30
Controlling vertebrate pests after a drought	33
<b>Section 3 – Animal health</b>	
Animal health following drought	38
Bloat	42
Enterotoxaemia in cattle	46
Prussic acid poisoning	48
Nitrate and nitrite poisoning of livestock	51
<b>Section 4 – Restocking</b>	
Restocking after a drought	56
How much can you afford to pay when restocking?	57
Buying sheep can be a health hazard	60
OJD and sheep movement	65
Bovine Johne’s disease zoning	67
Reassessing water requirements after a drought	69
<b>Section 5 – Financial management</b>	
Financial management during drought recovery	72
Tax issues for livestock producers during and after drought	79
Sources of market information	86
Planning for future droughts	89
<b>Appendixes</b>	
Appendix 1. Current drought publications	91
Appendix 2. NSW DPI offices	92
Appendix 3. NSW Guide to Drought Support Services	93
Appendix 4. StockPlan	96
Appendix 5. Restocking after drought	97



# Foreword

The Drought recovery guide has been prepared by NSW Department of Primary Industries to assist producers in drought recovery strategies and in making other important management decisions.

Severe drought has a significant long-term impact on livestock numbers, including breeding stock. The cropping sector may also be significantly affected. As a result, farmers have to make difficult financial and management decisions as they prepare to move into drought recovery.

Although it includes a wide range of information regarding cropping and livestock issues, this guide is not intended to be a complete manual on managing the farm in the wake of a serious drought. Nor will it apply to all NSW producers at any point in time, with drought affecting different parts of the state in different ways.

However, the Drought recovery guide does include a range of important information about restocking, cropping and the protection of plant and animal health. This information is designed to help producers who are moving into drought recovery, as well as those who hope to do so in the near future.

More detailed information on other aspects of drought recovery management is available from the NSW Department of Primary Industries web site at [www.dpi.nsw.gov.au/drought](http://www.dpi.nsw.gov.au/drought) and from NSW Department of Primary Industries offices. Assistance is also available from the NSW Department of Primary Industries drought hotline on 1800 814 647.

I trust that you will find this document valuable as you move to meet the challenges of resuming normal operations following a difficult time.

BD BUFFIER  
DIRECTOR-GENERAL

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Program Leader Northern Farming Systems, Tamworth

*Controlling vertebrate pests after a drought –* David Croft, Agricultural  
Protection Officer, Wagga Wagga

*Animal health following drought – bloat –* Sarah Robson, Veterinary  
Officer, Wagga Wagga

*Enterotoxaemia in cattle –* Dr Steve Dunn, Senior Field Veterinary Officer,  
Gunnedah

*Animal health following drought – prussic acid poisoning –*  
Sarah Robson, Veterinary Officer, Wagga Wagga

*Animal health following drought – nitrate and nitrite poisoning –*  
Sarah Robson, Veterinary Officer, Wagga Wagga

*Buying sheep can be a health hazard –* John Seaman Program Leader  
Flock Health, Orange

*Bovine Johne's disease zoning –* Tim Jessep, formerly Technical Specialist  
Bovine Johne's Disease, Goulburn

*Tax issues for livestock producers during and after drought –*  
Lloyd Davies, Agricultural Economist, Paterson

*Sources of market information –* Fiona Scott, Agricultural Economist,  
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Agricultural Economist, Paterson and Karina Wood, formerly Livestock  
Officer (Business Skills), Cowra.



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# Section 1

## Planning

- **Planning for drought recovery**
- **Drought recovery for intensive livestock industries**

# Planning for drought recovery

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Good rainfall can be the trigger to resume cropping, grazing and restocking, but it may also create short-term difficulties including:

- flooding following heavy storms;
- death of weak animals due to flooding, bogging, low feed-quality, and exposure;
- soil erosion and loss of nutrients and seed reserves from the soil;
- germination of weed seeds brought in with fodder and grain;
- additional cash requirements for crop and pasture sowing and for livestock replacement and farm repairs, in addition to continuing family living requirements.

## THE NEED FOR PLANNING

After drought, it is vitally important to rebuild a farm's productive capacity as quickly as possible. **Ideally, farmers should have a plan in place – even before drought conditions set in.** The drought and recovery should then be managed according to these plans. After drought, the aim should be to re-establish the pre-drought pattern of production and cash flow as quickly as possible – the 'drought recovery plan' should determine how these patterns are re-established.

If such a plan was not in place before the drought set in, then it is important to be aware that decisions made now will have long-term implications for the farm's natural resource base and future earning capacity. Farmers need to plan carefully during this drought recovery period. This is best done by involving all those directly affected (including your family and farm staff).

## STEPS IN PLANNING

### Signs of initial farm recovery

The signs that will trigger drought recovery planning and activity include:

- adequate pasture growth to warrant grazing with reduced supplementary feeding;
- sufficient soil moisture for pasture or crop establishment;
- adequate water for stock and domestic use.

### Stocktake of farm resources

The next step in planning is to assess the condition of the farm – especially following a prolonged drought – as farm resources may be in a different condition to that normally experienced. A comprehensive stocktake will make planning easier and more reliable and should include:

- the recent history of each paddock to determine its short-term and long-term capacity;
- soil structure and fertility;
- erosion damage;
- vegetation remaining and germinating (including pastures, weeds and crop stubbles);
- condition of paddock trees, shelter belts and areas of native bushland;
- water quality and quantity in the soil, in the dams or tanks, and in the streams, and for domestic supplies and irrigation;
- farm infrastructure including fences, contour banks, buildings, machinery, and roads;
- the numbers, types, ages and health of all livestock;
- seed supplies for crop or pasture sowings;
- financial resources;
- human resources;
- other physical attributes or limitations.

The capability of individual paddocks should be considered as components of the overall farm so that the management of each paddock can suit its capability and be coordinated into a whole-farm plan.

A realistic assessment of the overall financial capacity to remain in farming should be part of the stocktake. In many cases, professional advice

will be needed to assess assets, liabilities, equity, availability of credit, cash flow opportunities and ongoing commitments. A financial assessment will unfortunately, show that for some farmers, leaving the farm is an option that should be considered seriously.

### Setting farm goals

A management plan should be developed to achieve the goals of the farm family and its business partners. Goals may include 'maximum profit', 'better lifestyle', 'returning the farm to a better condition', 'establishing the children in new ventures', 'increased equity', and other topics. The various goals should have differing time frames – some will be short-term (within a year), while others will be long-term (up to 10 years or longer).

Devise some time indicators which will be used to measure the success or failure in achieving these goals; for example:

Year 1 Farm cash flow re-established.

Year 5 Conservation works installed.

Year 10 Sufficient fodder in storage to manage the impact of the next drought on your property.

Don't be too ambitious in your goal-setting. Break the goals down into 'bite-sized' pieces which can be checked off, for instance, every three months, on a wall planner that you can have on display in the farm office or house. Record your successful programs.

The capacity of the farm to meet goals may be analysed by:

- listing the opportunities provided by the farm resources, the drought, and the recent rains;
- listing the problems that have arisen during the drought;
- assessing the strengths of the farm business (for instance, equity, breeding stock, the management plan) which enables problems to be overcome and opportunities to be capitalised on;
- assessing the weaknesses in the farm business (for instance, repairs needed, debts, land degradation) which may restrict the farm's capacity to recover sustainably from the drought.

These assessments enable a re-examination of your goals and help you to decide whether they are achievable in the context of the farm's resources.

## YOUR MANAGEMENT PLAN – TYING IT TOGETHER

Using the stocktake of farm resources and the farm goals, you can now develop a property management plan to achieve the goals for your farm business. Your management plan should include broad decisions on enterprises (as well as detailed individual paddock plans), and may relate to local LandCare and catchment planning.

Publications on NSW Department of Primary Industries website [Drought recovery](#) page provide more details to help in drought recovery planning as well as reference material and contacts for more specific information.

Drought recovery planning is an integral part of long-term property management planning and should ideally fit in with the needs and capacity of the surrounding catchment.

A key point to remember is that recovery from drought and establishing your farm on a sound footing to survive future droughts, will not necessarily be achieved by more of the same. **Sound physical and financial planning is the cornerstone of recovery, survival and development, and is the very first thing that needs to be done.**

### Further Information

- *Natural Resource Management Guide – A practical guide for detecting changes occurring at the property or catchment level.* Department of Natural Resources, Queensland Department of Primary Industry. (Available from NSW Department of Primary Industries through the Continuing Education Unit, CB Alexander Agricultural College 'Tocal', Paterson, phone 1800 025 520.)

# Drought recovery for intensive livestock industries

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Drought recovery for intensive livestock industries is usually dependent on the use of cash and capital reserves to supplement a return to normal seasonal conditions and feed prices.

## DAIRYING

While milking cows have often been sustained in reasonable condition during drought, dry cattle and replacement heifers usually suffer by comparison.

The following strategies will, therefore, assist in bridging the gaps to help return to an abundant paddock feed supply:

- The use of fodder reserves still available to feed stock that have suffered the most (these are often the replacement heifers, from weaning to mating), while maintaining the milking herd on a high nutrition level.
- The development of a 'feed plan' which includes provision for a large fodder reserve – whether it is silage or hay – for future paddock feed shortages.
- An assessment of the possible availability of reasonably-priced grain or supplements, either from existing reserves or from summer-grown grass. **The autumn and winter periods are critical for this, particularly as this is the time when costs of producing milk are the greatest.**
- Consideration of agistment if it becomes available, particularly for young stock.
- Re-establishment of contacts with contract rearers, many of whom will have suffered during the drought and who could now be looking for stock.

Dairy farmers should also prepare for the next drought by seeking the following information:

- Advice on financial assistance (see *Financial management during drought recovery*).
- Advice from dairy processors on changes to milk supply systems and options available to increase production flexibility.

- Advice from NSW Department of Primary Industries on management skills or systems relating to farm, stock and financial management, including advice on the economics of installing an irrigation system on non-irrigated farms to increase feed security.
- Advice from bank managers or other lenders of funds concerning arrangements that may have been amended during the drought.

See sections on: *Restocking after a drought*, *Animal health following drought*, and *Grazing management following drought*.

## PIGS

In past droughts, pig producers have been adversely affected by high feed prices and some have ceased production for the duration of a drought. Grain may continue to be in short supply and at a high price until the new season harvest replenishes stocks, although summer grain crops such as sorghum may alleviate existing grain shortages.

If pig prices remain at or below the cost of production for many piggeries, there is therefore little incentive to restock closed piggeries and, in fact, more piggeries may destock. Some producers will, in these circumstances, take the opportunity to destock their piggeries for renovation. Producers intending to refurbish their piggery should, however, consider the latest information on piggery design. There is also the added opportunity to restock with pigs which are free of diseases such as pneumonia and dysentery. Markets need to be followed closely so that opportunities for restocking with the best stock available can be identified and used.

### Further information

*Approval process for development or expansion of a piggery in NSW*

## BEEF FEEDLOTS

Feedlotters have to make some hard decisions in a post-drought period to ensure they stay in business, maintain market share, and meet market requirements. These producers are likely to be faced with higher input costs without any improvement in returns. Small operators and opportunity feedlotters are most at risk in these circumstances if they make the wrong decisions. Feedlotters must therefore pay constant

attention: to market prices of feeder stock; to feed costs; and to beef prices.

### **Issues of concern**

- Anticipated shortage and high-cost of feeder steers. Operators may therefore need to restructure in order to use available classes of stock or may need to take on other farm enterprises in the interim.
- Anticipated high feed costs for the next 3–6 months or longer, depending on the next winter cereal crop. Cash flow budgets need to take account of expected – not past – feed prices.
- Consumers have changed their eating patterns and are buying less beef. This means that there is unlikely to be sufficient increase in beef prices on the domestic market to compensate for higher input costs. Marketing strategies will, in this circumstance, be important.
- International and domestic market approaches need careful consideration.
- It is believed that large feedlots, feeding 80 per cent or more for export, are likely to feed at a loss for 6–12 months after the end of a drought in order to maintain market share. This strategy needs to be costed out so that the value of maintaining market share is not eroded completely by losses.
- All of the above could make feedlotting uneconomic, especially for smaller operators and opportunity feedlotters for at least 12 months after a drought breaks, so operators must carefully consider opportunities for other enterprises.

Further information:

*The New South Wales Feedlot Manual.*

*Opportunity Lotfeeding of Beef Cattle*

### **Further assistance**

- NSW Department of Primary Industries  
Livestock Officers (Beef)
- Australian Lotfeeders Association





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## Section 2

# Pastures, crops and soils

- **Grazing management following drought**
- **Managing pastures after drought**
- **Soil management following drought**
- **Weeds – a threat to drought recovery**
- **Weed strategies following drought, fire and flood**
- **Preparing for cropping after drought – removing pastures**
- **Dryland winter crop opportunities**
- **Winter cropping following drought**
- **Cereals for grazing**
- **Sourcing cereal seed**
- **Dryland summer grain and forage crop opportunities**
- **Tree management after drought**
- **Controlling vertebrate pests after a drought**

# Grazing management following drought

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Livestock need particular attention following drought-breaking rain. This period brings its own specific problems, not the least of which are those brought about by the change in diet arising from the new pasture growth.

Stress due to wet conditions, and what can be a period of low nutrient intake, needs to be managed carefully if the transition to normal pasture conditions is to be successful.

## RAIN – THE IMMEDIATE EFFECT

Prolonged wet conditions will often cause stock to limit their intake, that is, 'to go off their feed'. Where stock are being fed on the ground, much of this feed can be lost in wet conditions through trampling (especially if the feed is grain). When feeding directly onto the ground, select well-drained areas and increase the feeding rates, ideally with hay, which is less prone to loss through trampling.

If rain is coupled with windy conditions, stock will need sheltered areas – particularly if the stock are in poor condition. Low temperatures will compound this problem with the nutritional stress experienced by stock in cold, wet, windy conditions likely to increase substantially. An increase in feeding rates, preferably with hay is, therefore, likely to be required in order to prevent stock losses. Keep in mind that sudden dietary changes can severely disrupt the rumen. One negative effect of this can be tender wool in sheep.

## THE GREEN PICK

The early pasture growth following rain, called 'green pick' is high in water content and low in dry matter content. It is the dry matter, however that contains the nutrients required by livestock. Dry sheep need about 400 kg of pasture dry matter per hectare (400 kg DM/ha) to maintain their weight each year. This is equivalent to an average pasture height of 1.5–2 cm. For dry cattle, the availability for maintenance is about 900 kg DM/ha (3–4 cm pasture height) per year.

A particular problem with this 'green pick' phase following drought is that animals will normally stop eating the supplied feed and will prefer the green pick. Generally the green pick, though, is not sufficient to sustain stock early after rain, and stock can actually die from starvation! It is therefore important to keep livestock restricted to paddocks where they will continue to eat supplied feed until sufficient paddock feed is available. It is also important not to stop hand feeding too early following the availability of paddock feed. Grain and/or hay feeding should be reduced slowly over 2–3 weeks (see *Animal health following drought*).

Where stock have been confined for feeding, access to pasture will need to be restricted. While still keeping stock confined mainly to the feeding area, provide a limited amount of grazing on pasture. This will not only benefit the stock but aid in the rehabilitation of the valuable pasture resource. The time spent each day should increase slowly until full-grazing is provided after about one week.

## ANIMAL HEALTH

When making grazing management decisions after drought, you need to consider the types of pastures being grazed and the implications of this for stock health.

Due to a lack of competition during drought, new pastures can often be dominated by plants that can affect livestock health. Some pasture species are also toxic in their early growth phase. For example:

- rapidly-growing phalaris can induce phalaris staggers;
- rapid growth of improved grasses, cereals and broadleaf weeds such as variegated thistle can lead to nitrate/nitrite poisoning;
- legume-dominant pastures provide a bloat risk; and
- sorghum grazed too early can cause prussic acid poisoning.

**It is therefore important that stock never be allowed to go onto these types of pastures when they are hungry. Maintain a careful watch and, at any sign of abnormal behaviour, remove stock from the paddock. Unfortunately, with nitrate/nitrite poisoning you may not see abnormal behaviour before deaths occur.**

The rapid movement of digestible young pasture growth through the gut can also trigger the

onset of **pulpy kidney**. Therefore, ensure that vaccination programs are maintained. Boosters may be needed every three months for cattle. Also follow a sound management program to ensure effective worm control.

See *Animal health following drought* and *Managing pastures after drought*.

## PASTURE MANAGEMENT

Grazing management decisions after drought cannot be divorced from the general management requirements of pastures (see *Managing pastures after drought*). The sooner your farm returns to a highly-productive pasture base, the more viable it will be into the future.

Generally, the lower stocking rates from destocking through the drought will normally ensure rehabilitation. Keep this in mind if you are considering a rapid restocking program.

A grazing plan based on pasture type, pasture condition and stock requirements should be developed as part of your property management plan. Pasture considerations in such a plan are discussed more fully in the section *Managing pastures after drought*.

Livestock components of the plan may include the following:

- assessing the condition of all stock classes;
- setting short-term and medium-term objectives for these classes, with particular emphasis on the fertility of breeders and finishing stock within critical time periods;
- interlinking these livestock objectives with the need to rehabilitate pastures;
- considering accepting stock on agistment to control excessive pasture growth or, alternatively, seeking agistment if drought recovery is slow;
- if pasture growth rates are high, concentrating stock on a smaller number of paddocks to ensure pastures remain vegetative (that is, leafy, and not rank and running to head) for as long as possible. A vegetative pasture with a minimum of 1500 kg DM/ha for sheep and 2500 kg DM/ha for cattle should maximise growth rates and production
- consider conserving pastures that are likely to become rank and thereby replenish depleted hay or silage reserves. These pastures can be used as a low-quality feed source through winter. The hay/silage option may also be an important strategy for weed control.

# Managing pastures after drought

## CAUTION

### Livestock health disorders

Pasture improvement may be associated with an increase in the incidence of certain livestock health disorders. Livestock and production losses from some disorders are possible. Management may therefore need to be modified to minimise risk. Consult your veterinarian or adviser when planning pasture improvement.

It is vitally important for our grazing industry to quickly rebuild the State's stock numbers and also to improve each producer's earning capacity as quickly as possible after a period of drought. For this reason, the potential from reviving pastures must be realised as soon as possible.

## EFFECTS OF DROUGHT ON PASTURES

The effects of drought on pastures are extremely variable and subject to a large number of factors.

**Research and observations based on past droughts are outlined below.** In a very severe and prolonged drought, the loss of pasture species may be greater than losses experienced in previous droughts when these observations were made.

### Perennial pastures

Large areas of perennial pastures will have thinned out, depending on: the severity of drought; stock pressure; the species involved; and soil fertility.

### Research on drought survival of species

Research undertaken on the Northern Tablelands by the University of New England and the CSIRO looked at survival of perennial grasses during drought. It showed the following:

- Where stubble was retained (more than 1000 kg of dry matter per hectare), the survival of perennial grasses was significantly better than where feed was grazed out completely.

- Losses following prolonged dry conditions (where some green feed may be available) were actually greater than the losses from severe droughts such as those experienced about one year in ten. Researchers concluded that, in longer-term droughts, plants are more likely to cease growth altogether, whereas in prolonged dry spells, the plants continue to grow and the feed is grazed-off, gradually debilitating the plants' energy reserves and resulting in the death of weak plants.
- Under Tablelands conditions and on good-fertility soil, shallower-rooted species such as perennial ryegrass and cocksfoot were lost in significant numbers, whereas phalaris, fescue, and the native grasses wallaby grass (*Austrodanthonia richardsonii*) and weeping rice grass (*Microlaena stipoides*), survived.

Each drought is different. When looking at what is likely to have survived the drought and what may need to be resown, we can be guided by these research results and by observations of the survival levels of major pasture species in previous droughts.

### Introduced temperate perennial grasses

#### Phalaris

Experience has shown that, of the introduced major perennial grasses, phalaris has been the outstanding survivor, followed by cocksfoot, fescue and then ryegrass.

Provided fertility is good, and particularly on the heavier soil types, phalaris persists well, even under heavy, prolonged grazing pressure. The more erect varieties, typified by Siroso and Sirolan, have been less-persistent than the old prostrate Australian variety.

#### Tall fescue

The combined effect of dry, hot summer and heavy stocking, particularly with sheep, caused a widespread failure of fescue. This was more apparent in areas receiving less than 650 mm rainfall (Northern Tablelands) and 750 mm (Southern-Central Tablelands). These experiences serve to emphasise the need to exercise more careful grazing management of fescue-based pastures, especially under a sheep enterprise during summer, and to employ some form of rotational grazing to reduce stress on individual plants.

#### Cocksfoot and ryegrass

These species have exhibited poorer survival compared with phalaris and, in many situations, compared with fescue, although survival has

been better on heavier soils and where pastures were stocked with cattle rather than sheep.

Mediterranean cocksfoots (like Currie) have survived better than European types, although cocksfoot failed eventually under the combined effect of drought and consistent heavy stocking pressure, with most perennial ryegrass dying before cocksfoot.

In some situations, regeneration of ryegrass and cocksfoot from soil seed reserves was surprisingly good in the higher-rainfall areas (> 800 mm) following the drought of the early 1980s.

## Introduced temperate perennial legumes

### Lucerne

Lucerne also has a good track record of drought-hardiness, but this depends on the intensity of grazing pressure. Semi-dormant and selected winter active varieties appear to survive better than highly winter-active varieties – unless strict rotational grazing has been practised.

### White clover

Shallow-rooted perennial legumes such as white clover generally do not survive as perennial plants, although varieties such as Haifa have good potential to recover from soil seed reserves. This is assuming that the pasture has been well-established and has had a good opportunity to set adequate seed.

## Subtropical grasses

Of the more commonly-grown grasses – Bambatsi panic, Premier digit grass, Consol lovegrass, Forest bluegrass and Buffel grass – have survived better than Purple pigeon grass or Rhodes grass in recent droughts.

## Native perennial grasses

Experience has shown that native perennial grasses survive well, although the pressure on some paddocks has been so extreme in some areas that losses inevitably occur. Survival and the potential for quick regeneration from seed is, however, very dependent on the species involved, the management applied, and on the recruitment opportunities.

## Annual pastures

Well-established introduced annual pastures have the advantage of generally good soil seed reserves and the ability to respond rapidly when conditions allow. However, annual pasture paddocks have the disadvantage of having very

little ground cover left and may be very prone to erosion. Seed reserves may also be depleted in heavily-grazed sheep pastures but, in long-term pastures, there is normally adequate seed left to enable reasonable regeneration to occur.

In recently-sown pastures (especially if sown with relatively soft-seeded varieties of sub clover – Woogenellup, Denmark), resowing may be necessary.

## EFFECTS OF DROUGHT ON SOIL FERTILITY

While individual soils react differently to weather changes, there are some general principles that can help when recovering from a prolonged drought:

- Nitrogen (N), phosphorus (P) and sulphur (S) are major nutrients required for plant growth and these tend to be at slightly higher levels in soils recovering from drought. These higher levels will assist production in the short term (3–4 months) but where pre-drought levels were markedly deficient, growth will still be checked by nutrient deficiency.
- P and S fertilisers applied just prior to the drought can be assumed to be still available, although if resowing pastures, a small amount (for instance, 5 kg P/ha) should be sown with the seed.
- Where improved pastures were maintained at critical levels of P and S pre-drought, fertilising could be withheld for about six months, unless a soil test indicates otherwise.
- If you are not sure of specific paddock fertiliser needs, do a soil test or apply fertiliser strips.
- The drought is unlikely to have any significant long-term effects on soil pH.

## FIRST, ASSESS WHAT HAS SURVIVED

Before working out a strategy, consider the needs of the pasture and how the drought has affected it. The survival of both perennial grasses and legumes will have been variable and influenced by:

- total rainfall and rainfall incidence

- pasture composition
- soil type, slope and aspect
- type of stock and stocking rate
- grazing management
- pasture pests, such as wingless grasshoppers, pasture scarabs, lucerne aphids and earth mites
- health of pastures before the drought.

The first task after drought should be to check paddocks after growth has recommenced, ascertain what is left, and determine what the potential of the remaining pasture is, given a reasonable chance of recovery and reasonable seasonal conditions. For annuals you may have to wait until spring (for warm-season annuals) or autumn (for cool-season annuals). If you need help to determine what species are regrowing, seek advice from your district agronomist, consultant or commercial representative. When checking pastures, keep in mind that the density of perennial species is more important than that of annual species.

### Density of surviving pasture

How dense a pasture should be in order for it to be retained depends on many factors and will vary from district to district. For example, at Wagga Wagga or Tamworth, lucerne densities of 15 plants/m<sup>2</sup> are relatively thick, but 9 plants/m<sup>2</sup> would be acceptable; however, at Trangie, 8 plants/m<sup>2</sup> is thick and 5–6 plants/m<sup>2</sup> is acceptable.

Remember that the remaining perennial plants in a drought-affected pasture (especially lucerne) have the ability to compensate so that as stands thin out, remaining plants take advantage of the additional space, nutrients, and moisture, and may still produce reasonable yields.

### Erosion potential

The erosion potential of all paddocks also needs assessing. Adequate ground cover is the key to this. This will vary with the situation (slope, soil, likely rainfall intensity); for example, 70 per cent ground cover is considered adequate for gently sloping red soils on the Northern and Central Slopes.

### Value of surviving pasture

Consider also the composition of the surviving pasture in relation to its value to the enterprise following the drought. Perennial pastures are very expensive to resow, and native grass

pastures in most cases cannot readily be resown. These high-value pastures must then be given priority for rest if it is apparent that further grazing may threaten their survival.

After checking the potential of pastures for survival and for future production, rank your pastures according to their potential value after the drought, as follows:

- List paddocks that have a moderate-to-good density of desirable species but have been under severe stress from drought and grazing pressure. Maintaining a grazing regime that continually removes regrowth is likely to threaten survival further.
- List paddocks that have moderate-to-good density of desirable species but have not been under severe stress from drought and heavy grazing. These paddocks offer the possibility of some grazing as conditions improve but will need management to allow full recovery in the short-term.
- List paddocks where the pasture density is too thin in order for it to become worthwhile pasture after a return to more normal conditions. This last group can be considered for immediate grazing ('sacrifice paddocks'), cropping possibilities, resowing or pasture renovation treatment.

## HOW TO MANAGE WHAT'S LEFT

In practice, pastures are under a great deal of pressure after the drought breaks. Feed is expensive, and it is tempting to continue grazing paddocks in the hope that the growth will improve dramatically and gradually meet stock needs. This is very damaging to pastures. It is important to develop a strategy where:

- the high-potential paddocks, identified as A above, are given priority for rest;
- the second group, B, are scheduled for rest as soon as practicable;
- paddocks in the last group, C, can be used as sacrifice paddocks where drought feeding can continue until growth on better paddocks improves; importantly, these paddocks are suitable for resowing, renovation or being sown down to forage/fodder crops.

'Ideal' post-drought management procedures are not well-understood for many commonly-used species, so we can only base guidelines on limited research and observations made following previous droughts.

## During drought, pasture management is compromised if:

- Pastures are rested less (if at all).
- Pastures are grazed harder for longer periods and are grazed lower than normal.
- Energy reserves are depleted and the plant is weakened, often to the point of death.

Where pastures are compromised in this fashion, they need to be compensated. A good fall of rain in itself does not overcome drought-stress. The plant has to be allowed a period of recovery to build-up energy reserves so that it is capable of reaching its full production potential. The time required to reach this stage depends very much on the degree of rest or compensation.

**Lucerne** is particularly responsive to resting. Ideally, after drought, it should be allowed to reach full-flower, at which stage, with good growing conditions, it will have replenished its root reserves fully, and normal grazing practice can resume. Research has shown that energy reserves in lucerne roots are at their lowest level two weeks after regrowth commences. Grazing the green pick shortly after rain can, therefore, weaken a plant significantly. The more regrowth that is allowed before grazing, the better the chance that plants have for a complete recovery.

### When to graze

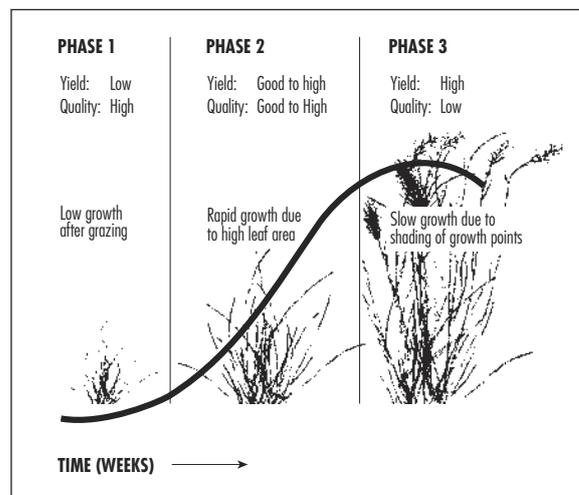
The simplified growth curve shown in Figure 1 can be used to indicate when pastures should normally be grazed. Generally, avoid grazing pastures while the important perennial components are in Phase 1. At this stage, they are weak and have insufficient leaf area to produce feed quickly. Ideally, pastures should be allowed to reach Phase 3 (flowering) after a long, severe stress period. At this stage, the plant's energy reserves have been replenished – this is assuming that flowering has not been premature (that is, forced by dry conditions).

At the very least after drought, delay grazing until pastures are into Phase 2, at which stage they are growing actively and have sufficient leaf area to produce feed efficiently. Where you are forced to graze paddocks early, plan to rest them, and preferably, allow perennial grasses to seed down as soon as conditions permit. Also, rotate livestock quickly.

Pasture height at these growth stages will vary considerably, depending on species, density, and growing conditions. As a guide, a typical, healthy, dense perennial grass/legume pasture would be in Phase 2 when it is between 3–11 cm in height (1000–2500 kg dry matter/ha). The

pasture may take 4–6 weeks to reach this stage – assuming that responsive plants are present.

**Figure 1. Simplified growth curve of pastures**



Source: *The PROGRAZE Manual*

## RESOWING/CROPPING/ RENOVATION OPTIONS

Where paddocks are identified as having low recovery potential, **resowing**, **cropping** or **renovation** are options that need to be considered. Such options include a full seed-bed preparation for a forage or cash crop, or direct drilling to re-establish a permanent pasture. Some annuals, such as sub clover, can also be surface-applied in higher-rainfall areas.

Table 1 summarises the options for typical paddock situations following the break of the drought.

### Forage crop selection

Fast-growing forage crops fit in well to a pasture regeneration program after drought. Once established, they can take the pressure off the high-potential pastures, thereby allowing them to recover. These species are also useful for cleaning paddocks of weeds prior to resowing pasture and for replenishing hay and fodder reserves quickly.

The most suitable forage crop will depend on:

- when the feed is required
- what quality of feed is needed
- sowing conditions, including soil temperatures
- suitability of the soil type.

Often after a drought, feed is required as soon as possible, and Japanese millet or early-maturing cereals are, in these circumstances, recommended.

Where crops are required to provide feed over a longer period, forage sorghums or hybrid millets are ideal for the Slopes and Plains as are brassica forages on the Tablelands.

## STOCK HEALTH

With the return of good growing conditions, watch for bloat in stock grazing clover-dominant pastures, and ensure that livestock vaccinations, for conditions such as enterotoxaemia,

are up-to-date. Also, stock grazing on actively-growing lucerne need close monitoring. Lucerne growth can be rapid after a drought, increasing the risk of bloat and red gut.

Following drought, the 'sudden death' form of phalaris poisoning can occur, especially where pastures are growing rapidly following a break. This is because phalaris is more persistent than other grass species and can therefore dominate. This form of phalaris poisoning is

associated with short, actively-growing phalaris-dominant pastures in autumn or late winter-spring, and is more prevalent where hungry sheep are involved.

Similarly, other pasture plants may dominate during the recovery period. The intake of plant toxins may, therefore, form an unusually high proportion of the diet and be a cause for concern (such as photosensitisation with panic grass species).

Nitrate poisoning can also occur with grass on high-fertility soils growing quickly following the break. Improved grasses, cereals and broadleaved weeds, such as variegated thistles, have also caused poisoning in the past.

The incidence of worm and fluke problems can also increase because stock concentrate on new, fresh growth in areas such as valley floors.

## WEEDS – EXTRA CARE NEEDED

One of the unfortunate consequences of droughts is the spread of new and existing weeds into pastures – dramatic spread occurred following the 1982 drought. Seeds would have

**Table 1. Options for pasture renovation**

Paddock situation	Options
Totally degraded. Substantial loss of introduced perennial grasses. Heavy weed invasion.	<ul style="list-style-type: none"> <li>• Annual forage crop (for instance, Japanese millet, cereals).</li> <li>• Short-term pasture (Italian ryegrass/red clover).</li> <li>• Cash crop (cereals, oilseeds, ryegrass, coarse grains to allow selective weed control).</li> <li>• Select the most arable and fertile paddocks first.</li> <li>• High priority.</li> </ul>
Partial loss of introduced perennials. Some weed invasion. Reasonable legume recovery likely.	<ul style="list-style-type: none"> <li>• Weed control and direct drill to re-establish perennial pastures.</li> <li>• Seasonal weed control (winter clean spray-graze).</li> <li>• Moderate priority.</li> </ul>
Survival of perennials more than 70 per cent. Poor legume survival. Some weed invasion.	<ul style="list-style-type: none"> <li>• Reintroduce legume by sod-seeding or broadcasting.</li> <li>• Resume fertiliser applications to lift P and S, or when cash flow allows.</li> <li>• Selective broadleaf weed or annual grass removal, or use of 'weed wiper' equipment.</li> <li>• Moderate priority.</li> </ul>
Fair to good survival of native perennial grasses. Poor legume survival. Some weed invasion.	<ul style="list-style-type: none"> <li>• Low priority for early action.</li> <li>• Add legume seed and P and S fertiliser when cash flow improves.</li> </ul>

been introduced through brought-in feed and by stock movements.

Also, following the break, pastures are weakened and less able to compete with vigorous weeds, especially annual species. Therefore, be prepared for several years of vigilance. Do not delay checking the identification of any strange weeds you find, especially if they are found where you may have fed-out fodder.

## FODDER CONSERVATION

While the most recent drought is still fresh in your mind, build-in to your program a 'fodder conservation' strategy to reduce the effects of the next drought.

Remember that silage and hay can be made from a wide range of pasture and crop materials.

### USEFUL REFERENCES

- Agfact P2.5.41 – *Forage sorghum and millet*
- Agnote DPI-367 – *Cereals for grazing*
- *Pasture grass, legume and herb varieties used in NSW*
- Agfact P4.2.16 – *Summer legume forage crops: Cowpeas, lablab, soybeans*

## Soil management following drought

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The principle aim for farmers after rain has broken a drought should be to get pasture or crop cover established on bare paddocks as soon as possible. This principle applies especially to red soil areas but is also important for clays.

Many soils will not be in their 'normal' condition following drought. Some will be bare and powdery on the surface, some will be further eroded by wind or water, and some will have higher levels of nitrogen (N) and phosphorus (P) than expected.

Loss of effective ground cover (due to grazing or cultivation) generally leaves soil prone to erosion by wind and water. Research by the Department of Sustainable Natural Resources' *Soil Services* has shown that erosion due to drought-breaking rain can make up 90 per cent of the total soil loss in a 20–30-year cycle.

Available N and P levels in the soil are generally higher following a drought than in a normal season. However, most of the N and P are in the topsoil so, if erosion strips the topsoil, much of this benefit is lost.

## SOIL STRUCTURE AND EROSION

Cracking black, grey and brown clays can develop wide and deep cracks during drought. Generally speaking though, their structure is as good as it is ever likely to be.

On the other hand, the structure of non-cracking red loam soils generally deteriorates during drought. Topsoils can become very dry and powdery, and are highly-vulnerable to erosion.

A useful first strategy is to sow your most-vulnerable paddocks early to make use of available nutrients. Planting grazing oats provides good surface cover quickly. Reserve your less vulnerable paddocks for your main winter crop. (See *Grazing management following drought* and *Managing pastures after drought*.)

Also consider the benefits of pasture retention, rather than cropping, for those paddocks in reasonable condition. The strategy should be in line with your property management plan.

Controlling weeds by spraying, rather than cultivation, will help retain some surface ground cover. However, you may need to cultivate bare soils initially to create some surface roughness to improve infiltration of water and to reduce wind and water erosion. If this is the case, do this as early as you can when the soil is moist but not too wet or too dry. Use a ripper or chisel plough and cultivate on the contour to catch maximum rainfall and reduce run-off.

Try to confine machinery traffic to narrow laneways and keep stock off wet soils.

Uncontrolled machinery traffic and stock trampling are major factors causing structural degradation, and subsequent erosion, of soils.

A good time to apply gypsum to sodic clay soils is when the soil is cracked. When rain falls, this will move the gypsum into the strongly-cracked soil to maintain good infiltration after the cracks have closed.

To reclaim eroded areas or prevent further erosion, consider the construction of contour furrows or soil conservation earthworks. These reduce and slow run-off, limit the movement of soil and organic matter, and decrease the sedimentation and nutrient contamination of dams and waterways. (Refer to *Soil Services*, from the Department of Lands.)

Low-interest loans are available for soil conservation works. See the section on *Soil Nutrition*.

In paddocks that were sown during the drought but which failed to produce a crop, soil nitrogen levels are likely to be higher than usual for two reasons. The first is that most of the nitrogen incorporated before sowing the crop that failed will still be available, provided the crop was not grazed or cut for hay. The second reason is that mineralisation of nitrogen (conversion to plant-available forms) increases markedly once it rains.

As a consequence, weeds are likely to grow rapidly after rain and need to be controlled, preferably by spraying. If cultivation is used, soils are more exposed to erosion. For further information, see *Weeds – a threat to drought recovery*.

Despite high soil N levels, starter fertiliser and some side dressings may still be required; consult your agronomist, and refer to Agnote DPI-356 *Winter cropping following drought* for more information.

Higher soil temperatures and a longer growing season result in greater root exploration and, hence, the need for less fertiliser.

As with a 'normal' season, soil testing for plant-available phosphorus is advisable to help you decide how much phosphate fertiliser you need. This is an important decision: too little reduces plant growth and yields, too much wastes your money and may have damaging effects on the environment.

## LONG-TERM SOIL MANAGEMENT

Conservation farming practices and the efficient management of fertilisers are two important ingredients for long-term, sustainable, profitable production. Such measures help you prevent or slow soil erosion and other soil-degrading processes and should be part of your defence against drought.

### Some important conservation farming practices

- Use minimum tillage or no tillage and direct drilling.
- Retain stubble on the surface for as long as is practicable; if burning is necessary, wait until the main period of high-erosion risk has passed.
- Use herbicides, rather than tillage, to control weeds during fallows.
- Use crop/pasture rotations that include well-managed perennial pastures and legumes.
- For irrigated row cropping, use permanent, raised beds.
- Confine machinery traffic as much as possible.
- Improve grazing management to minimise soil compaction and maintain adequate surface cover, particularly during droughts.
- Increase topsoil organic matter levels by stubble incorporation, mulching, and the including of pastures in crop rotations.
- Judiciously apply lime and/or gypsum to acid soils and sodic clay soils.
- Promote vigorous plant growth through sound soil, crop and water management practices.

## Guidelines for efficient fertiliser management

As far as possible, match the supply of nutrients, principally nitrogen and phosphorus, to the needs of the plant, through soil and/or plant tissue testing and improved timing of fertiliser application.

- Incorporate (rather than broadcast) fertiliser wherever possible.
- Do not broadcast fertiliser on bare soil, especially when storms are likely.
- Do not fertilise close to or across dams or waterways.
- Store fertiliser under cover on impervious or compacted soil away from dams and waterways and divert run-off from higher ground around and away from the fertiliser stockpiles.
- Keep records of fertiliser usage and calibrate spreading equipment to reduce the likelihood of overuse.

## Weeds – a threat to drought recovery

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Drought provides the ideal environment for weeds to demonstrate their competitive ability. It is therefore important to maintain vigilance once rain arrives so that weeds do not become a serious threat to drought recovery on your farm.

Weeds are a major form of land degradation and are a high cost to the community in both environmental damage and lost production for the farming and grazing industries.

### LIKELIHOOD OF WEEDS

The weed situation in cropping and pastoral areas varies. In cropping areas, the immediate problem is fallow weeds, which quickly rob the soil of both valuable nutrients and moisture. Fallow weeds can be controlled by a combination of cultivation and herbicide spraying (see *Soil management following drought*). The weed species likely to cause most concern are:

- common heliotrope (*Heliotropium europaeum*)
- summer burrs – Bathurst and noogoora burrs (*Xanthium* spp.)
- caltrops (*Tribulus terrestris*)
- *Amaranthus* spp.
- thistles
- panic grasses (*Panicum* spp.)
- mintweed (*Salvia reflexa*)
- Johnson grass (*Sorghum halepense*)
- wireweed (*Polygonum aviculare*).

In **pastoral and Tablelands areas**, noxious weeds that quickly recover and spread include:

- serrated tussock
- blackberry
- blue heliotrope (*Heliotropium amplexicaule*)
- nodding thistle (*Carduus nutans*)
- Scotch thistle (*Onopordum* spp.)
- St John's wort (*Hypericum perforatum*).

Weeds provide an additional financial burden in both lost production and cost of control after a long period of low farm productivity.

## GENERAL PROBLEMS

Summer burrs (both Bathurst and noogoora burrs) pose immense problems, as does the potential spread of the perennial weed, silverleaf nightshade (*Solanum elaeagnifolium*) – a serious, long-term threat to farming and pastoral areas.

## WEEDS FROM INTRODUCED FODDER AND GRAIN

Weeds currently present and new introductions are highly-likely to appear as a consequence of feeding drought fodder and grain.

Major weeds of concern in NSW that originate in other States are parthenium weed from Queensland and bifora (*Bifora testiculata*) and bedstraw/cleavers (*Galium tricornutum*) from South Australia. These latter two plants are already widespread in the South Australian wheat belt. If purchased grain has originated from these areas, it is therefore important to check for any weed emergences, especially in areas where stock have been fed.

Other likely weed contaminants of both grain and fodder are silverleaf nightshade (mentioned earlier), wild radish (*Raphanus raphanistrum*) and spiny emex (*Emex australis*). These species are already major weeds in NSW but will probably be further spread as a consequence of drought-feeding.

Imported grain from overseas sources provides a huge potential for introducing new/exotic weeds such as kochia (*Kochia scoparia*) from the United States.

The procedures for feeding introduced fodder and grain are well-publicised (see *Weed strategies following drought, fire and flood*), and producers are encouraged to adopt a program to minimise the spread of weeds from contaminated fodder and grain.

## POISONOUS PLANTS

Following summer rains, there can often be an increase in livestock weed poisoning. Stock losses in these circumstances can be attributed to both direct plant poisoning and photosensitisation with:

- *Panic* spp. causing photosensitisation, mainly in sheep;

- *Amaranthus* spp. causing kidney failure in sheep and cattle;
- thistles causing nitrate poisoning in sheep and cattle.

With an increase in the presence of useful grazing species, the poisoning situation will normally only be short-lived.

See also *Animal health following drought* and *Grazing management following drought*.

## PLANT IDENTIFICATION

Early identification and control are the first and most important steps in weed control and eradication. District extension officers can provide identification and technical information on new weed species, such as bifora and bedstraw/cleavers.

## HERBICIDE RESISTANCE

Fodder and grain contamination with herbicide-resistant weed seeds, mainly annual ryegrass, is the quickest means of introducing herbicide-resistant weeds onto farms where, perhaps, herbicides have never been used. Good farm hygiene and the rational feeding of introduced fodder and grains are the best avoidance procedures for keeping out weeds.

Herbicide resistance is widespread in the grain belts of South Australia and Western Australia – large quantities of grain are often obtained from these areas when there are drought conditions in NSW. The manner of drought feeding, particularly of grain, will determine the spread of herbicide-resistant weeds on individual farms.

## CONTROL STRATEGIES

Control strategies in both cropping and pastoral situations are generally adequate. Pesticide orders are in place to control such weeds as blue heliotrope. The most important aspect of control of newly-introduced weeds is early identification, detection, and immediate control.

Drought conditions will often result in a serious setback for a producer's long-term strategy and program for controlling pastoral and cropping weeds. An accurate assessment of this situation and a well-planned long-term strategy form the basis of an effective weed control program.

# Weed strategies following drought, fire and flood

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Because of their competitiveness, weed species readily invade bare areas of ground denuded of vegetation. Drought, fire, and even floods can create these conditions by devastating existing ground cover and, thereby, removing the competition for light, nutrients, moisture and space. This allows quick weed establishment when more favourable conditions arrive. Weeds already on a property can also quickly spread to new areas with weed densities increasing.

The two classes of land most at risk of weed invasion are cropping and grazing land. Cropping land is most at risk through weed imports in contaminated seed at sowing time and weed seed being spread from contract machinery – especially harvesters. Grazing land is at risk of weed importation through the contamination of fodder. Weed seed may also be inadvertently spread around a property at the time of feeding or in dung, days after the contaminated fodder has been eaten. Animals introduced onto a property, either in a restocking program or returning from agistment, can also introduce weeds.

The presence of livestock on a property will usually benefit the spread of weeds as these plants are generally unpalatable and are therefore not readily grazed.

It is important to avoid importing new weeds but also to avoid introducing strains of common weeds which are resistant to herbicides. Ryegrass is particularly prone to resistance, especially on land which is sown to crops.

It is important to have a strategy in place for combating potential weed problems before, not after, they occur.

## LIVESTOCK OWNERS

- Obtain as much detail as possible about the source of the fodder or grain that is being brought onto your property.
- Consider carefully where the grain and fodder are to be fed. In considering herbicide resistance, it is best to avoid cropping paddocks.

- Restrict the feeding area as much as possible. A small 'sacrifice paddock' may be the best option, preferably located where regular checks can be made after rain. Flat, arable areas are the best selection as these usually allow easy access and the opportunity for many options for control (mechanical, chemical, biological, or grazing management).
- Feed in areas where there is the basis of a good, strong perennial grass pasture, as this provides quicker competition against establishing weeds.
- Livestock are, unfortunately, excellent distributors of weed seeds. For many weeds, therefore, a livestock quarantine period of at least two weeks is recommended. This includes for livestock returning from agistment.
- Restrict the movement of livestock. Fortunately, annual ryegrass seed is normally digested by sheep, and very little viable seed passes through the digestive tract.
- Keep a close watch for unknown plants and have them identified early. Don't let them establish and set seed.

## COUNCIL STAFF

- A general weed alert should be publicised by councils in all areas at risk.
- All council weeds officers should identify the properties in their areas most at risk. These are normally properties which have imported fodder from areas of known weed infestations, such as parthenium weed areas of Queensland.
- When rains return, roadsides should be inspected every four weeks.
- All properties considered at risk should be inspected as soon as possible after first sightings of weeds.
- Council staff should familiarise themselves with weeds which grow in areas that supply emergency fodder.

## INFORMATION AND PLANT IDENTIFICATION

A list of potential weeds from the southern States of Australia can be obtained by referring to the following publications:

- *Crop Weeds*, by JL Wilding, AG Barnett and RL Amor, Inkata Press, Melbourne and Sydney 1986.
- *Weeds – An illustrated botanical guide to the weeds of Australia*, by BA Auld and RW Medd, Inkata Press, Melbourne 1987.
- *Noxious Weeds of Australia*, by WT Parsons and EG Cuthbertson, Inkata Press, Melbourne and Sydney, revised edition November 2000.

For information on paddock management or weed control options, consult your district agronomist. These officers can also assist with the identification of unknown plants. Alternatively, you can contact your local council weeds officer.

Plant specimens which are not identifiable locally can be pressed in dry newspaper for a few days and then forwarded by mail, along with the details of where the plant was growing, to the National Herbarium of NSW Botanical Information Service at the following address:

Botanical Information Service  
National Herbarium of NSW  
Royal Botanic Gardens  
Mrs Macquaries Road  
Sydney NSW 2000

## Preparing for cropping after drought – removing pastures

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### SHOULD I REMOVE PASTURE TO PLANT A CROP

Many mixed farming enterprises may consider planting additional crop areas to help generate quick cash flow and on condition that the season permits it. However, before removing pastures for cropping, risk management options and livestock requirements should be weighed up carefully. Dramatically increasing your cropping area following a year when crops made slim or negative profits can quickly erode equity unless the season is favourable.

Pasture paddocks with reasonable densities of perennial species (for example, 8–10 lucerne plants per square metre) should recover well and could be utilised for grazing. These pastures can also be used as a low-risk source of feed for fattening stock, rebuilding strength in drought-weary breeding stock, or rebuilding stock numbers.

The most suitable paddocks for cropping, other than long-fallowed paddocks, are failed crop paddocks from the previous year. Important considerations should be residual herbicides, disease pressure, and nitrogen levels. There is well-documented evidence from previous droughts that much of the fertiliser applied to badly drought-affected crops, along with any mineralisation of nitrogen, is available for the next crop.

### Removing pastures

Removing pastures following a drought can be a different proposition than it is for normal seasons.

Continuous heavy grazing tends to run down a plant's root reserve, thereby weakening the plant. Following rain, pastures can also take longer to respond and to produce leaf than they normally would. In this circumstance, removing pastures with herbicides may not be effective. Removal with tillage may be more effective as there will be less surface trash to cause blockages and the plant will be already partly weakened.

Following significant rain, perennial pastures can be removed with herbicides, however, fresh growth is required for plants to take up chemicals properly. Be aware that good falls of rain will be required following pasture removal to wet the soil profile. Unless there is a metre of wet soil, planting a winter crop may be too great a risk.

### Seed survival of annuals

Seed reserves of hard-seeded annuals such as sub clovers (as well as weeds) may well have survived from previous years and could become a pest in very early sown crops.

Paddocks which should have been spray-topped or fallowed last winter/spring but missed out, may be carrying higher than normal weed burdens.

Species and grazing management will have partly determined if this will be an issue. For example, sub-clover paddocks which have been heavily stocked with sheep will have much of the seed containing burr cleaned up, whereas barley grass which seeded down last year could be a particular pest this season.

In other situations, allowing these pastures as well as weeds to germinate and utilising a pre-plant knockdown spray or cultivation would be beneficial.

Consider also paddocks which were used to feed stock with introduced feed stuffs.

These paddocks should be monitored for new and/or higher than normal numbers of weeds. Some paddocks may be too dirty to consider cropping this year and may be better left out to control weeds.

The soil profile in many perennial pasture paddocks will likely be very dry and could take considerable 'wetting up' to allow for lower risk cropping. Usual guidelines should be adhered to – 1 m of wet soil for many crops in northern environments.

## Dryland winter crop opportunities

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NSW Department of Primary Industries has, over the years, published series of summary sheets which list the major considerations when choosing a winter crop for a given paddock. These summaries are a guide to help prompt questions rather than provide all the answers. It is therefore important to remember that each paddock is different. The information on these sheets can be found at the NSW DPI website or from your local district agronomist.

A similar set of summer crop information is also available from these sources.

The information below is a summary only. More detailed information is available from the '*Winter crop variety sowing guide*' and the '*Productive dual-purpose winter wheats*' (available free from all NSW DPI offices). The winter crop budgets can be found on the NSW DPI web page and information is also available from NSW DPI district offices.

Given the variable nature of rainfall it is vital that any planting decision be based on good information about stored soil moisture and soil fertility levels.

Concentrate on cropping the best paddocks that are most likely to give good returns per hectare. Generally, inputs should be targeted to make the most of available soil moisture. Yield targets should match soil moisture profiles and soil fertility levels.

If sowing a dual-purpose crop, pasture and grazing management will be important. Seek advice from your local district agronomist.

As with any season, successful winter crops will depend on good agronomic management. The following are some of the considerations this season.

### Stored soil moisture

Carefully check the level of stored soil moisture. It may be better to fallow the paddock through to a summer crop, rather than risk planting on marginal moisture. Total moisture requirements are greater than a grain crop because they are sown very early for grazing and grain purposes.

## Seed supplies

Seed supplies for winter crops will be very tight. Obtain seed supplies as early as possible. If using seed retained on-farm from previous seasons, a germination test is essential.

## Level of experience

There are considerable risks associated with growing a crop for the first time. Do not grow large areas unless you have previous experience with the winter crop selected. New crops can be risky and have large variable costs. Another consideration is how the crop fits your current rotation. Consider joining a TOPCROP group or developing a learning partnership with an agronomist and increase the area grown over time.

## Markets and prices

An evaluation of market prospects is a key part of the crop selection strategy as crop prices can fluctuate dramatically.

## Residual herbicides

Carefully check paddock spray records. Paddocks may have had pre-sowing residual herbicides applied (such as Group B sulfonyl ureas) which will, unfortunately, prevent the sowing of some winter crops.

## Soil nitrate

Crops such as canola, wheat and barley require significant levels of available N. Winter pulses, however, do not. Winter pulses planted into paddocks with high available N (for example, where N was applied but not used by a winter crop) will have reduced N fixation. Dual purpose crops do require high soil fertility, particularly nitrogen.

## Insect control

Monitoring of winter crops for insects, particularly in winter pulses is vital.

## Overall rotation

Although there is pressure to generate cash flow by planting winter crops, maintaining a balance of winter and summer crops in the rotation is the key to risk management in northern NSW.

## Level of risk

Winter cropping can be risky in some parts of the state. This risk can be partly compensated by good levels of stored soil water.

## Gross Margin Budgets

Cropping gross margin budgets are a guide to the costs and returns associated with major broadacre summer and winter crop enterprises in northern, central and southern NSW. They include all the major broadacre crops as well as specialist crops such as dual purpose oats and wheat. There are also budgets available for cattle, sheep and vegetables.

Economic considerations are just as important as the agronomic considerations when it comes to deciding which crop enterprise gives the 'best' return. One of the best ways to make economic decisions is to do a gross margin budget. A gross margin is the gross income from an enterprise less the variable costs like seed, fertiliser, pesticides, fuel, oil, harvesting costs, freight and insurance. Fixed or overhead costs such as depreciation, interest payments, rates, or permanent labour are not included because these costs have to be met regardless of the enterprise mix.

Gross margins can be used to directly compare similar enterprises within and between years. They can also be used to analyse actual enterprise performance by monitoring costs and returns. These are available from NSW DPI offices and via the internet at: [www.dpi.nsw.gov.au/agriculture/budgets](http://www.dpi.nsw.gov.au/agriculture/budgets)

Gross margins should not be used if major changes are being considered as more comprehensive budgeting techniques would be required to account for changes in resource use. Other budgeting techniques include a partial budget, whole farm budget, cash flow budget and development budget.

# Winter cropping following drought

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Winter cropping is a traditional investment following a drought that is aimed at generating cash flow into the farm business.

The potential for a good season following drought is an opportunity for recovery which should be taken to best advantage. The following points will assist in making decisions on winter cropping.

## MARKETING

Markets for all grades and types of grains may not follow traditional relationships. This is because specific market needs, such as local intensive livestock industries, need to replenish or increase grain reserves. It will therefore be important to watch market trends.

## ROTATIONS

Follow planned rotations and aim to get paddocks back into sound agronomic rotations as quickly as possible, in line with your property management plan. Taking shortcuts by sowing successive winter cereal crops may well prove costly because of a build-up of diseases and weeds and an increased risk of erosion.

## YIELD MAXIMISATION

Give your crop the best chance, with careful attention to weed control (see *Weeds – a threat to drought recovery*), phosphorus applications, timely sowing, and choice of variety.

## SOIL

See *Soil management following drought*.

### Soil phosphate

Soil phosphate levels usually increase only slightly during droughts due to low utilisation and, possibly, unused phosphorus from previous failed crops. Soil phosphorus testing is therefore useful in this situation.

### Soil nitrogen

During droughts, soil nitrate nitrogen increases by mineralisation and may be quite high. In addition, most of the fertiliser nitrogen applied to the previous year's failed crops should be available in the current year. However, prolonged heavy rains will move this soil nitrogen down the soil profile where it may not be readily available to young winter crops.

If weeds are allowed to grow abundantly, they may well use the available soil nitrogen, leaving little for winter crops.

Consider deep (rooting-depth) soil tests to assess the available nitrate.

### Acid soils

Soil manganese is likely to increase following droughts, so avoid sowing susceptible crops like canola on problem acid soil paddocks.

## SOWING TIME

Aim to optimise yield and capitalise on accumulated soil nitrogen by sowing as early as possible within the recommended sowing period for the particular variety. Of course, you must pay special attention to possible take-all infections in early-sown wheat by maintaining sound rotations.

## VARIETIES

Ensure that purchased seed is true to the variety claimed by the vendor so that the variety can be sown within the sowing time available. Select only those varieties suited to your area.

## DISEASES

Select varieties with good disease resistance. Diseases, particularly leaf diseases like stripe rust in wheat, are usually more prevalent and may even be devastating in good seasons which commonly follow drought.

## SEED QUALITY

All grain legume seed and all cereal seed from previous harvests should be germination-tested to ensure that it is satisfactory.

## CROP ESTABLISHMENT

There may be opportunities to establish crops with minimum tillage. However, to ensure successful crop establishment, plan to carry out weed control before sowing. (See Soil management following drought.)

## FURTHER INFORMATION

Publications:

- *Weed Control in Winter Crops*
- *Winter Crop Variety Sowing Guide*
- Agfact P1.3.3 *Tractor fuel savings*
- Agfact P3.E.1 *Cereal seed treatment equipment*
- Agfact P5.2.7 *Linseed growing*

## FURTHER ASSISTANCE

Contact your local NSW DPI District Agronomist for further assistance.

# Cereals for grazing

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## THE ROLE OF CEREALS IN GRAZING

Forage cereals play an important role in grazing enterprises. They do this by helping to overcome winter feed shortages. They also have higher winter growth rates than most pastures (see Figure 2 for a typical example) and, with their higher carrying capacity, are able to ease the grazing pressure on pasture paddocks. All cereals can be grazed, but some have been specifically-bred for this with an emphasis on dry matter (feed) recovery after grazing and, in many cases, also for grain recovery. Saving autumn growth from early-sown crops, particularly in high Tablelands areas, can be used to carry feed through into winter. Forage cereals can also play an important role prior to sowing a pasture by conditioning the soil and by aiding in weed control.

## CHOOSING A CEREAL

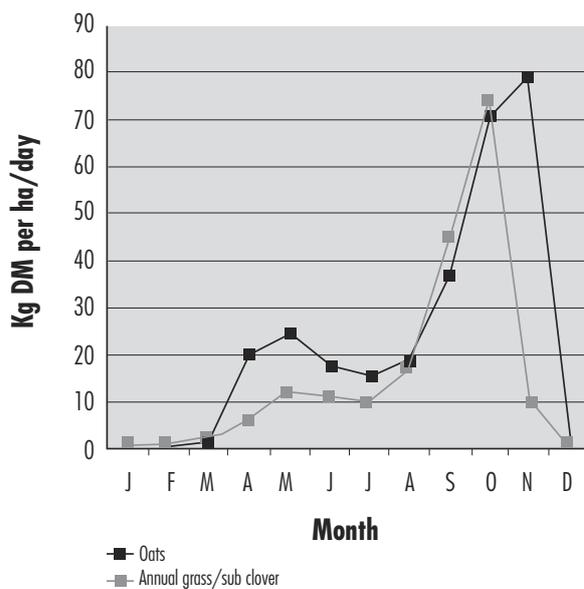
For overall forage production, oats will generally produce more than wheat, barley, cereal rye or triticale. The total amount of feed available will be influenced by the type of crop, variety, disease resistance and sowing time. Grain recovery though, is not so clear-cut, with winter wheats and triticale often having yields comparable to oats. Where a grain harvest following grazing is required, specific, dual-purpose varieties should be chosen. Cereals that produce large awns can cause mouth injuries to livestock and should be avoided for hay production or where head emergence under grazing cannot be controlled. These cereals include barley, triticale, cereal rye, and some wheats.

Selecting crop types or varieties tolerant to root and/or leaf diseases will lessen the disease impact in susceptible situations (see the *Winter crop variety sowing guide*). Where annual grass control (vulpia, soft brome, barley grass and ryegrass) has been poor in the winter/spring prior to sowing, cereal root diseases are likely to cause serious production losses. Highly-susceptible crops such as wheat and barley should be avoided; cereal rye has good tolerance, with oats the next best, followed by triticale.

Barley yellow dwarf virus is a disease on the Slopes and Tablelands causing serious losses in both dry matter and grain production in susceptible crops – particularly oats and barley when sown in early autumn. Tolerance to barley yellow dwarf virus will, therefore, influence crop and variety choice.

Quality tests on the forage of oats, wheat, barley, cereal rye, and triticale, when they are all grown under similar conditions, show no significant differences in levels of protein, energy and digestibility. The decision to sow an alternative cereal to oats is, therefore, mostly made when grain recovery is sought with higher returns. Soil acidity will also influence cereal choice as species and varieties vary in their tolerances. Even when highly-acid soils are limed, acid-tolerant types may still need to be considered where the subsoil remains acidic.

**Figure 2 compares the estimated growth rates of oats and of annual grass/sub clover on the Central Tablelands (from the PROGRAZE® manual)**



## Growth habits

A knowledge of the winter habit and maturing time of varieties (see the *Winter crop variety sowing guide*) will influence the choice of variety, sowing time and expected grazing performance.

**Winter habit.** Varieties with a strong winter habit (Brennan wheat, Blackbutt oats) are suitable for early sowing as head initiation does not occur until there has been exposure to periods of cold temperature. This requirement

is called ‘vernalisation’ and exposure can be cumulative. Once these requirements have been met, head emergence begins as temperatures rise and day length increases. The degree of winter habit will depend on the genetics of the varieties. Varieties described as semi-winter types have a shorter vernalisation requirement to initiate heading.

**Late maturing.** Late maturing cereals do not necessarily have a strong winter habit. Without the requirement for vernalisation, these types, when sown early in warm or long day conditions, will quickly initiate heads. These immature heads are concealed in the tiller and removing them by grazing or cutting results in the death of the tiller. Re-growth is then significantly delayed and total forage production reduced as plants are forced into producing new tillers, a slow process that can take weeks. Late maturing types without a winter habit, when sown early, often require quick and early grazings to retard early growth and head emergence. This earlier-than-normal grazing assists subsequent future regrowth.

## PLANT MANAGEMENT

### Sowing

Cereals used for either grazing or grain production will only attain maximum production if seed rates are kept high and crop nutrition is adequate. Optimum seed rates vary with climate and area of the State. Local advice should therefore be sought. Optimum nutrition requirements will, likewise, vary according to climate, soil type and paddock history. Wide row sowings should be avoided if maximum dry matter and grain yields are to be achieved. (In a recent experiment at Gulgong, in the lower Central Tablelands, on a light granite soil, a 25 cm row spacing compared with the normal 17.5 cm row spacing resulted in a reduction of nearly 12 per cent in early dry matter yields of Coolabah Oats). Wide rows, however, whilst reducing potential yield and increasing the risk of weed invasion, may aid in the reduction of leaf diseases by allowing better air movement through the crop.

Early sowings, particularly on the Tablelands, will allow good growth before cold winter temperatures restrict growth.

## Fertiliser

Fertiliser rates for grazing crops should generally be higher than for grain-only crops owing to the longer growing season.

Phosphorus rates in the range of 15–20 kg/ha should be considered, but this will depend on soil tests, paddock history, anticipated yield and soil type.

Nitrogen application requires particular attention unless there has been a recent history of good legume growth. A good oat crop used for grazing and grain could be expected to use up to 100 kg/ha of nitrogen. The contribution of pulse crops and legume pasture to soil nitrogen depends on the amount of plant material produced and/or subsequent grain yield.

## Insects

Red-legged earth mites and blue oat mites are the most widely-occurring insects attacking grazing crops. Their chlorophyll-destroying effect is worse in moisture-stressed crops and, in these situations, may require treatment.

Adding an insecticide to the spring fallow herbicide can, however, aid in their suppression.

Army worms can also attack crops; usually grain crops as they ripen. Chewed leaf margins and spikelets on the ground indicate their presence.

If insecticides have been used for insect control, the withholding periods must be observed before introducing grazing stock.

## Weeds

Planning in the previous season to prevent annual weeds from seeding helps to reduce in-crop weeds and improves crop production. This is especially the case for grass weeds. Control can be through pasture cleaning, topping or early fallow.

Herbicide usage can depend on crop type. Herbicides can be registered for use on some crops but not others or the rates specified on the label may also be different. For example, the maximum label rate for 2,4-D amine (500 g/L) on wheat is 2.1 L/ha, whilst on oats it is 1 L/ha.

If herbicides are used for weed control, withholding periods must be observed before introducing grazing stock. Some grass herbicides have withholding periods of up to 60 days that may affect grazing strategies.

Higher seeding rates help to compete against weeds and maintaining crop canopy (bulk) will also help discourage weed recovery.

## GRAZING MANAGEMENT

### Grazing time

The earliest time to start grazing is when the plants are well-anchored and reach the tillering stage (growth stage 21–29). For most grazing types under good growing conditions, this will occur 6–8 weeks from plant emergence, depending on the variety. With winter types, by deferring early grazing, more feed can be accumulated and saved for winter. For erect types, crops will usually be 20–25 cm high and, for prostrate types, 10–15 cm high. Varieties that do not have a strong winter habit but are sown in early autumn should be grazed even before tillering to retard growth and subsequent premature stem elongation and head initiation. When stem elongation occurs, immature heads are located just above the highest node (joint). If these are removed, tiller death occurs. While the plant is usually able to produce more tillers, forage production (and grain production) is severely reduced under these conditions.

The latest time and severity of grazing of crops intended for grain recovery or hay production should be governed by the position of the immature head in the stem. Some growers opt to graze late and remove these heads, particularly if the crop or variety is prone to lodging. These growers choose to accept lower grain or hay yields as a trade-off for having a standing crop at harvest. Late grazing of semi-dwarf types can also greatly reduce crop height, causing subsequent harvesting problems in rocky or uneven paddocks.

### Frost

Frost injury to grazed crops can be severe, particularly if crops are only a few centimetres high and the soil is loose and dry. Under severe frosty conditions, stock should be removed nightly. This is because damage can occur through the trampling of frost-covered leaves and the plants' growing points. Some crop varieties, particularly the oat varieties Blackbutt and Nile, have very low growing points and this type of damage is minimal.

### Diseases

Diseases such as leaf rust on oats or powdery mildew on barley may also influence the timing and severity of grazing. By removing the canopy and opening up the crop, the incidence and severity of leaf diseases can be greatly reduced. Barley yellow dwarf virus, sometimes a

serious disease of early-sown susceptible crops, especially oats and barley, is best controlled by choosing tolerant varieties. When this is not possible, sowing in late autumn when aphid activity is lower will reduce the risk of infection.

### Loose faeces

All cereals in the vegetative stage under good growing conditions are highly digestible for stock and often contain 80–85 per cent moisture (15–20 per cent dry matter). The resultant loose faeces is normal on highly-digestible, high-moisture green feed. Adding hay or roughage to the diet will slow down animal performance as the animal substitutes the hay or roughage for the higher-quality forage. In some cases, this may be of benefit by extending the grazing life of the paddock. Veterinary advice should be sought if abnormal scouring occurs, as this may be the result of internal parasites.

### Stocking densities

Stocking densities will depend on specific animal production targets. Research has shown that continuous grazing of winter forage cereals gives better animal performance, as the best feed on offer will always be selected. This will only be achieved if stocking rates are balanced with crop growth rates and the feed on offer is not being significantly depleted (see Table 2).

High stocking densities are used under rotational grazing but lower animal performances can be expected than from continuous grazing. With continuous grazing, stock densities should be determined so as to leave plants with enough residual leaf material to enable both good regrowth and animal performance. Benchmarks exist for both instances. Residual plant heights of around 5–10 cm for prostrate types and 10–20 cm for upright types will correspond fairly closely to benchmarks of around 1000 to 1500 kg/ha for lactating ewes and fattening steers.

Rotational grazing can, however, be used to maximise the grazing value of a crop, by reducing wastage from trampling and/or frost damage or by the restriction of intake per head. Techniques such as strip grazing or limiting access times to the crop can be used for rationing feed.

## ANIMAL HEALTH DISORDERS

Disorders can occur under certain growing conditions and veterinary advice should be sought for animal treatment. The most likely disorders are enterotoxaemia (pulpy kidney), hypomagnesaemia (grass tetany), hypocalcaemia (milk fever) and nitrate/nitrite poisoning. The possibility of these occurring should be considered when planning the grazing operation.

**Table 2. Sustainable continuous stocking rate for oats**

Stock class	Kg of forage dry matter removed per head*	Sustained stocking rate/ha**
Ewe & lamb (six weeks)	3.2	9.3
Weaned lamb (30 kg)	2.0	15
350 kg steer	12.4	2.4
450 kg steer	13.9	2.1
Cow & calf (three months)	19.1	1.5

\* calculated using GrazFeed™ for green oats at 2000 kg DM / ha, 20 cm tall, 73% DDM (digestible dry matter) assuming 25% spoilage rate.

\*\* assuming 30 kg DM/ha/day crop growth.

# Sourcing cereal seed

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Seed is the most important single input into a farming system. When drought has dominated for more than one season and over a broad area of the cropping belt, farmers will be faced with the dilemma of finding a reliable seed source in order to sow the winter crop when the drought finally breaks.

As a grower you therefore need to assess your situation and look at all the options. Ideally, good-quality seed from the latest harvest would be preferable. However, if you don't think you have good seed from that year but have some stored from the previous year, you need to weigh up the odds of using the available seed or buying fresh seed. Seed prices may be significantly higher following a severe drought. So the challenge for those farmers with no seed reserves is finding quality seed, of the preferred variety, at a reasonable price.

## Seed quality fundamentals

Following the basic guidelines set out below is essential for maintaining the farming system.

- Choose seed of the highest-possible germination percentage.
- Vigour test seed to assess potential field performance.
- Check for freedom from weed seeds that will be a problem on your farm (especially prohibited weeds).
- Ensure the seed lot has not been contaminated with seeds of other cereal species.
- Ensure you choose a current recommended variety suited to your area.

## Inferior quality seed

Using inferior seed can result in:

- bringing problem weeds (especially herbicide-resistant weeds) onto your farm
- having to re-sow paddocks
- unthrifty crops with low yield potential
- inefficient use of fertiliser
- poor competition with weeds
- dockages for contaminated grain.

## Seed quality testing

While germination tests can be performed at home, these tests will not pick up weak or slightly-damaged seedlings. It is strongly advisable, therefore, to have seed germination and vigour tested through an ISTA-accredited laboratory. If the decision is made to sow seed that is not of the highest quality, be careful not to plant too deep, particularly on hard-setting soils where sowing rates may need to be increased to help compensate. Also avoid seed dressings that may reduce coleoptile length. It is important to remember that, in even the best management systems, a poor seed source will result in a poor crop.

The ability of a seed to germinate can be affected by disease, weather damage, length of storage, storage conditions and insect damage. Good-quality cereal seed should have a germination percentage greater than 90 per cent. In times of drought, frost or flood, this number can be as low as 15–20 per cent. Small and shrivelled seed is most likely to exhibit poor germination and vigour rates, while seed stored incorrectly over time, no matter the condition, can also display severely-reduced germination rates. Grading to preclude smaller seed can improve the germination and vigour capacity of the seed batch significantly.

## Plant Breeders Rights (PBR)

It is important to remember the laws surrounding the sale of PBR-protected varieties. Although growers are allowed to retain PBR-protected seed for their own use in subsequent sowings, they are not permitted to sell the seed for sowing without the breeders' or agents' permission. Growers are, however, able to freely buy PBR-protected varieties and freely sell the produce from them. PBR protection on a cultivar confers ownership of that variety giving the owner exclusive rights to market the variety. Either seed royalties or end-point royalties are then collected to contribute to the cost of the breeding program.

A full list of PBR-protected varieties is available from the PBR office website at [www.affa.gov.au](http://www.affa.gov.au)

Further information is available from Agnote DPI-312 *PBR – What it means to you*.

## SUMMARY

- Seed is the most important single input.
- Always choose seed of the highest possible germination.
- Get your seed tested for germination and vigour.

# Dryland summer grain and forage crop opportunities

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Depending on the longevity of the drought, many growers may be looking for summer grain or forage crop options for cash and to maintain animal performance and replenish fodder supplies. This article highlights the major considerations when choosing a summer crop for a given paddock. It is designed to prompt questions rather than provide all the answers. Each paddock will be different.

This information is a summary only. More detailed information is available from [www.dpi.nsw.gov.au/agriculture](http://www.dpi.nsw.gov.au/agriculture). The summer crop budgets can be found on the NSW Department of Primary Industries web page ([www.dpi.nsw.gov.au/agriculture/budgets](http://www.dpi.nsw.gov.au/agriculture/budgets)) and information is also available from NSW DPI district offices.

As with any season, successful summer crops will depend on good agronomic management. The following are some of the considerations:

- **Stored soil moisture** – carefully check the level of stored soil moisture. It may be better to fallow the paddock through to a winter crop, rather than risk planting on marginal moisture.
- **Level of experience** – there are considerable risks associated with growing a crop for the first time. Do not grow large areas unless you have previous experience with the summer crop selected. New crops can be risky and have large variable costs. Another consideration is how the crop fits your current rotation. Consider joining a farmer group or developing a learning partnership with an agronomist and increase the area grown over time.
- **Markets and prices** – an evaluation of the market prospects is a key part of the crop selection strategy. Crop prices can fluctuate dramatically.
- **Residual herbicides** – many paddocks that were aimed for winter crop this year will have had pre-sowing residual herbicides applied (such as Group B sulfonyl ureas) which will prevent the sowing of most summer crops.
- **Soil nitrate** – crops such as maize, cotton and sorghum require significant levels of available N. Summer legume crops, however, do not. Summer legumes planted into paddocks with high available N (for example, where N was applied but not used by a winter crop) will have reduced N fixation.
- **Insect Control** – for most summer crops, insect control is vital and requires a significant level of monitoring.
- **Overall rotation** – although there is pressure to generate cash flow by planting summer crops, maintaining a balance of winter and summer crops in the rotation is the key to risk management in the north.
- **Level of Risk** – summer cropping is considered riskier in western (especially south western) parts of the region. This risk can be partly compensated by good levels of stored soil water.

## SUMMER FORAGE CROPS

- **Forage sorghum** – the most productive and fast growing forages for grazing, hay and silage, particularly for large animals. Check sowing guides for agronomy but sowing can take place in most districts when the threat of frost has gone and soil temperatures have reached at least 16°C at seeding depth at 9 am. Careful grazing rules should apply as stressed crops or rapid regrowth can produce prussic acid and/or high nitrate levels, leading to animal fatality.
- **Millet** – has less dry matter production than forage sorghum but higher quality feed for smaller animals such as sheep. It can be more difficult to establish than the larger seeded sorghums. Fewer herbicide options are available for weed control.
- **Cowpeas** – high quality forage, particularly suited to lighter textured soils. As a legume cowpea has an advantage over the grass forages for nitrogen requirements.

## SUMMER CASH CROPS

- **Grain sorghum** – the most diverse and productive summer grain crop provided soil, water and nutritional requirements are met. Grain sorghum performs particularly well on the heavier clay soils with high moisture storing capacity. Nitrogen fertiliser and weed control management are very important.

Grain sorghum is well suited to no-till technology. Stubble also has some grazing value.

- **Sunflower** – oilseed sunflower is a more specialised crop requiring more detail to both marketing and agronomy. Prior to planting consult local grain traders for contractual advice. Precision planting equipment is almost essential. Sunflowers have no grazing value.
- **Maize** – a much more specialised grain crop for the higher rainfall areas of the slopes and tablelands. A productive and high feed value crop for both grain and silage under irrigation.
- **Cowpea, mungbean, soybean** – as grain crops these legumes are for specialised high quality markets. Obtain marketing advice before growing these crops as a quick cash alternative. Attention to detail is required in planting, weed control, harvesting and marketing.

Seed supplies of many of these crops are often in short supply following drought. It is wise to order seed promptly once you have made a decision.

## Tree management after drought

### ALWAYS READ THE LABEL

Users of agricultural (or veterinary) chemical products must always read the label and any Permit before using the product, and strictly comply with the directions on the label and the conditions of the Permit. Users are not absolved from compliance with the directions on the label or the conditions of the Permit by reason of any statement made or not made in this publication.

Strategically-located farm trees and native vegetation improves agricultural production, protects soils, water and wildlife, and improves the capital value of rural properties. Droughts generally have the effect of favouring some trees and shrubs while adversely affecting others. Landholders can then observe which trees have performed best in their areas and incorporate good tree management practices into their property management plan and drought-managing strategy.

### RECOVERY OF MATURE Paddock TREES

In many areas, mature paddock trees will have suffered in the drought due to increased pest attack and moisture stress. To promote recovery of these trees:

- avoid cultivation close to the root zone;
- avoid fertiliser application close to the root zone;
- observe trees for subsequent pest damage and control, where necessary.

Mature trees can be adversely-affected by repeated pest damage, particularly where one-third or more of the leaf area is reduced. Injection of insecticide may be warranted when pest attack is severe. Easing the conditions that lead to tree stress (high nutrient levels, damage to roots, soil compaction, and over-clearing) is the most effective way of improving tree vigour and health.

## RECOVERY OF TREES AND SHRUBS LOPPED FOR FODDER

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### NOTE

Landholders are advised to contact their local relevant government department for the latest regulations concerning the lopping of trees.

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Where trees and shrubs have been lopped for fodder, it is vital to allow their full recovery before subsequent lopping. For some trees, such as kurrajongs, this may take 4–5 years.

For scrub areas, reduce or eliminate grazing to allow scrub to grow back

Continued lopping can reduce the lifespan of a tree. When planning for future farm tree plantings, aim to replace or increase the number of fodder trees.

## MANAGEMENT OF EXISTING NATIVE VEGETATION AREAS

### Establishing native tree seedlings by natural regeneration

Many native plants respond to drought by flowering and setting seed. A break in the drought will often favour establishment of trees and shrubs by natural regeneration. This provides a very low-cost method of increasing and maintaining native vegetation areas. For best results use the following guidelines.

- Exclude grazing from native vegetation areas, especially while young plants are getting established.
- Fence-out areas around clumps or individual trees. Seed will fall up to 50 m from the trunk of large trees, falling mostly in the direction opposite prevailing winds. Orientate the fenced area to coincide with this pattern.
- Develop natural regeneration areas where they provide the best shade and shelter advantages.
- Control feral and pest animals, such as rabbits, which typically graze on young seedlings.
- Monitor native vegetation areas for weed growth. Exotic pasture and weeds can out-compete native plants, especially at the seedling stage. Reduce the weed seed bank in the soil – this can be achieved by spot-spraying with a knockdown herbicide.

- Be patient. Some trees require months or even years to set seed after flowering.

Following the establishment of native trees and shrubs, continue to restrict or eliminate grazing until they are above browsing height and the stems are sufficiently thick to withstand rubbing by livestock.

### Maintenance of young trees and existing plantings

Where young trees and existing plantings have suffered during the drought:

- Replace losses while the surrounding trees are still small – establishing seedlings among semi-mature trees is difficult due to competition for moisture and nutrients.
- Ensure good weed control.
- Monitor pest damage and control as required.



*Fencing off areas of regenerating bushland on your farm will allow trees and shrubs to grow to their full potential, which will benefit livestock, soils and wildlife.*

## PLANNING FOR NEW PLANTINGS

Identify which trees and shrubs, and which layouts of trees and shrubs, have survived in the drought. For example, choose the trees that have maintained a full canopy and resisted pest attack, the blocks or belts of trees that have given good wind protection, and the trees that have provided the best fodder reserve.

- Aim to include these findings in your farm tree plan.
- Keep a record of the trees and shrubs which survived best in the drought. Collect seed from trees and shrubs which have shown

superior vigour under drought conditions. Of particular value for windbreak plantings are tall trees with low foliage, and small-to-medium dense shrubs.

- Consider how new plantings can link with existing plantings or bushland areas to provide wildlife corridors.
- When redesigning or maintaining farm infrastructure (farm access tracks, fences), include opportunities for planting farm trees.
- For grazing enterprises, increase perennial fodder sources such as saltbush, fodder trees and tree lucerne.
- Prepare for future droughts by maintaining and increasing windbreaks orientated against the worst prevailing winds.

## ASSISTING RECOVERY OF NATIVE WILDLIFE

To foster the recovery of native wildlife on the farm:

- retain and manage native vegetation areas, particularly near watering points;
- retain dead or dying trees for native wildlife habitats;
- control pests and feral animals such as foxes and cats.

## FURTHER INFORMATION

### NSW Department of Primary Industries publications

- *Plan for Trees – A guide to farm revegetation on the coast and tablelands*

### ‘Trees on Farms’ home study course

The ‘Trees on Farms’ home study course, available from Murrumbidgee College of Agriculture, is aimed at providing a basic understanding of the role and function of trees on your farm. Topics include:

- Farm productivity and trees
- Getting trees on the farm
- Types of tree production
- Commercial tree products.

### Nature Conservation on Farms

The publication *Nature Conservation on Farms* is produced by NSW Department of Primary Industries, Farming for the Future, and the Australian Nature Conservation Agency. This practical guide is available for purchase from NSW Department of Primary Industries’s CB Alexander College, ‘Tocal’.

### National Parks and Wildlife Service

National Parks and Wildlife Service has free brochures on native animals and plants including:

- *Native Animals and the Landholder*, which has information on the *Threatened Species Conservation Act 1995* and how it affects rural landholders;
- *Remnant bushland – quality assessment and management guidelines*.

# Controlling vertebrate pests after a drought

## ALWAYS READ THE LABEL

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Population levels for most species of vertebrate pests can be severely affected by prolonged drought. Low breeding rates and high infant mortality are common responses of species such as feral pigs and kangaroos. Feral goats, though, have the potential to 'hang on' for longer because they can browse shrubs. Rabbits living in country that has a lot of seed in the soil, particularly clover or medic seed, are also able to survive and actually continue to breed well into the drought. However, once this feed source is exhausted, the population can suddenly crash. This crash in the rabbit population will normally be quickly followed by a reduction in the fox population. This is unless there is alternative food, such as lambs, native animals, or carrion. All pest species respond to the breaking of a drought by increasing their body weight and by beginning to breed. It is the potential rate of increase in a pest animal population that is of critical importance to decision-making when planning a management strategy for vertebrate pests.

## PEST POPULATIONS AFTER A DROUGHT BREAKS

### Mice

Populations of small vertebrate pests such as mice have the potential for a huge increase if the breaking of drought provides them with an abundance of food and shelter. Drought can also reduce the numbers of predators that would otherwise help control mice. Mice that survive natural phenomena such as drought are the strongest and fittest of the population. They respond by rapid breeding, often resulting in populations of plague proportions. A single pair

of mice has the potential to multiply to many hundreds over a six-month breeding period.

### Rabbits

Rabbits are the next most prolific species, but because they take longer to reach breeding weight and have longer pregnancies and smaller litters, they do not have the spectacular population explosions seen with mice. Nevertheless, a single pair of rabbits may produce, through their own mating and the mating of their offspring, up to 40 rabbits over a six-month period.

### Feral pigs

Feral pigs are much less prolific breeders than rabbits. Nevertheless, a pair of feral pigs has the potential to produce about six young over a six-month period. If feral pig numbers are reduced by drought and the reduction is followed-up by properly conducted control programs, pig populations can take many years to build back up.

### Wild dogs

Wild dog populations may decline during extended droughts, especially if there is a drastic decline in their preferred prey such as kangaroos and wallabies. However, this does not necessarily reduce predation on sheep because hungry wild dogs will sometimes move from bushland to adjacent grazing land in search of alternative prey.

If wild dog populations have declined during a drought and survivors have not moved onto grazing lands, there may be less predation for a time. However, landholders should remain vigilant, particularly in autumn and winter when dogs usually disperse.

Young inexperienced dogs will often disperse, regardless of food availability, from their parents' home range.

### Foxes

Fox populations generally remain relatively static during extended droughts, especially if there is a supply of carrion such as lambs, kangaroos and wallabies. In many instances foxes will turn their attention to insects such as the Australian Plague Locust to sustain themselves. However, this alternative food supply does not necessarily reduce lamb predation as foxes will increase their territories in search of alternate prey.

If fox populations do decline during a drought and juveniles do not disperse rapidly, then

there is a potential for much more localised predation of lambs and poultry. Landholders should always remain vigilant, particularly in autumn and winter when young foxes are usually dispersing or older females are breeding. Young, inexperienced foxes will often disperse regardless of food availability in their parents' home range.

A baiting program is usually inexpensive and can be carried out in early autumn (to reduce breeding animals) and a follow up in late winter to reduce pregnant females. Your local Rural Lands Protection Board ranger can assist with a baiting program and supply baits.

### Other species

Other species such as feral goats and kangaroos increase their populations much more slowly after drought.

## CONTROL STRATEGIES

The critical point to remember in vertebrate pest control is that if the pest population is already low and can be made lower by tactical control, this will generally be a good investment because the recovery rate of the population is much slower. For maximum benefit, this requires a coordinated approach by all landholders and land managers, otherwise pests will simply

breed-up and immigrate from neighbouring properties.

Drought can also severely reduce the number of predators in a system with predator populations usually taking longer to recover than their prey. This means that many pest species can breed with few constraints once good seasons return, so populations can increase extremely quickly.

### Feral pigs

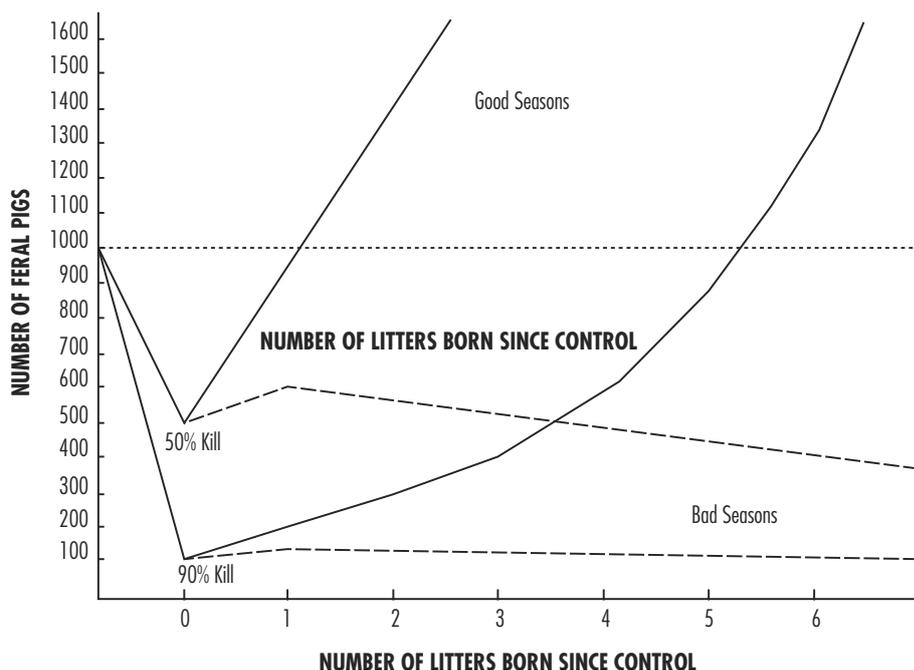
Figure 3 demonstrates the different recovery rates of feral pig populations that have been reduced by 50 per cent and 90 per cent. In good seasons, a population experiencing a 50 per cent kill will recover to the original levels within 12 months, whereas a population experiencing a 90 per cent kill will take five years to recover. This principle applies to all wild animal populations.

### Rabbit control and feed

See the advice above regarding the labels and permits concerning the use of chemical products.

Remember this simple rule of rabbit control: best results with rabbit poisoning programs are obtained when feed is short. Therefore, if you are still in a drought area, poisoning with 1080 bait will give a far greater reduction. However, if plenty of green feed is present, this feed will be a more attractive alternative to the bait and, consequently, the poisoning program will not be

**Figure 3. The change in numbers of feral pigs in good and bad seasons following 50 per cent and 90 per cent control kills**



Source: Hone, O'Grady & Pederson 1980, *Decisions in the control of feral pig damage*, Ag Bulletin No. 5, NSW Agriculture.

as effective. In these circumstances, other options such as ripping or fumigating warrens should be considered.

Trapping is seldom used for broad-scale rabbit control and it should be noted that only soft-jawed traps are permitted. The older-style steel-jawed traps are now illegal in NSW.

Those areas that have had plenty of rain and have moderate to high rabbit densities may be fortunate enough to experience a virulent myxomatosis or calicivirus outbreak. This should not be relied on, though, because it is impossible to predict the timing or effectiveness of any outbreak.

### **Wild dogs**

It is good management to increase monitoring for wild dogs during droughts and after fires so that control measures can be implemented before predation of livestock becomes a major problem. Wild dog management plans should cover this contingency, but in any case, monitoring and control of wild dogs is best done by groups because the movements of wild dogs usually extend over several properties and adjacent bushland. Coordinated precautionary baiting or trapping programs may also be useful along routes traditionally used by wild dogs.

There are strict regulations governing the poisoning of wild dogs. Poisoned baits may only be prepared by authorised rangers of your local Rural Lands Protection Boards. Advice on control and group efforts is also available from rangers.

Trapping is best conducted by experienced trappers using soft-jawed traps that conform to legal requirements.

## **LONG-TERM EFFECTS**

As with all management decisions, controlling the long-term effects of pest control is crucial. Ensure that the decisions made enhance the long-term sustainability of your property and contribute to the protection of the native animals and plants that play an important part in making your area a pleasant place to live. Balancing these decisions is an important component of your property management plan.

## **COOPERATION OF NEIGHBOURS**

Most vertebrate pests range over large areas. When considering pest animal control on your property, consider a larger area than your property alone. Try to get a group of neighbouring properties to work together for a more lasting effect. Rangers with your local Rural Lands Protection Board can organise a group control program, provide information on planning, monitoring, free feeding, poisoning and other control strategies.

## **FURTHER INFORMATION**

- Agfact A9.0.17 *Foxes and their control*

## **FURTHER ASSISTANCE**

Further assistance is available from:

- Agricultural Protection Officers through your local office of NSW DPI;
- Rangers through your local Rural Lands Protection Board.





NSW DEPARTMENT OF  
PRIMARY INDUSTRIES

## Section 3

# Animal health

- **Animal health following drought**
- **Bloat**
- **Enterotoxaemia in cattle**
- **Prussic acid poisoning**
- **Nitrate and nitrite poisoning of livestock**

# Animal health following drought

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The transition from drought is an important time to be concerned about livestock health. Even though the drought may appear to have broken, there is no time to relax on matters that concern livestock health. More care and attention needs to be given both to your current stock and to any newly-purchased stock.

With the advent of drought-breaking rains, the feed and water supply situation may dramatically change. A comment often made by graziers is that they managed to keep their stock alive through the drought only to suffer losses when the drought broke. Bloat, pulpy kidney, plant poisonings and hypothermia are among the most common problems causing deaths at the end of a drought because, at such times:

- stock may be in poor condition;
- stock may have become accustomed to eating restricted quantities of unusual types of feed;
- water supplies may be restrictive in terms of quantity and quality;
- stock are not accustomed to eating green forage, especially lush grasses and clovers;
- stock may be suffering from long-term vitamin and/or mineral deficiencies;

- the usual disease prevention measures, such as vaccination or worming, may not have been given.

## POTENTIAL PROBLEMS FOLLOWING DROUGHT

### Cold, wet and windy weather

Adverse weather conditions are frequently associated with drought-breaking rains. Even in the middle of summer, extreme cold weather conditions can be experienced, and stock in poor condition can be highly-susceptible. Poor body condition, poor or inadequate feed, lack of shelter, an interruption to provision of supplementary feed, and recent shearing, are just some of the factors that can contribute to a disaster.

Therefore, be alert to weather changes and ensure that susceptible stock have access to shelter. Bring forward supplementary feeding if there is any chance that feeding may be interrupted as a result of rain. Sheep that have been recently-shorn are the most susceptible, especially if they are in poor condition. You may need to keep them in sheds, or confine them to small paddocks with feed and shelter.

### Water

If sufficient rain falls to replenish surface water supplies, the surface run-off may carry excessive amounts of livestock manure into the water storage, making it unacceptable or even dangerous to stock. This can be avoided by restricting stock access to these water supplies. You may need to pump water to troughs or tanks from an area of the storage that is relatively-free of the contamination (the contamination tends to accumulate around the edge of the water).

See *Reassessing water requirements after a drought*.

### Feed

Initially, a 'brown' drought can become a 'green' drought with the newly-germinating plants not contributing significantly to the nutritional needs of stock (see *Grazing management following drought*). Stock, especially sheep, can therefore waste precious energy 'chasing the green pick' if drought-feeding is stopped too soon.

Following the rain, therefore, continue with the usual drought feeding regime until the feed really comes away. Then, progressively reduce the supplementary feed over about two

weeks. In this way, the major nutritional upsets associated with a sudden change in feed (such as enterotoxaemia or pulpy kidney) can largely be avoided.

## Feed changes

As mentioned above, sudden changes in the amount or type of feed can have disastrous consequences. Major problems can relate to digestive upsets and plant poisonings. Avoid these problems by allowing stock a **gradual transition** between feed types, such as limiting access to the pasture to an hour or two each day, then gradually increasing the amount of time until they can be left on the pasture permanently.

**Never, ever, put hungry stock in a fresh paddock.** In these circumstances, the stock will indiscriminately gorge themselves on the first available feed, often leading to poisonings or digestive upsets. Instead, pre-feed with hay, restrict daily access, or provide access to a safe, preferably mature grass paddocks to overcome the hunger before allowing access to rapidly growing, lush 'different' feed.

## Bloat

Rapidly-growing legumes, such as lucerne, clovers and medics, frequently cause bloat, especially in young cattle.

If pastures contain a significant amount of legume, bloat protection is an absolute must. A variety of techniques exist, including the use of:

- bloat capsules;
- pasture sprays with anti-bloat preparations;
- bloat blocks;
- bloat oils mixed with supplementary feed.

See more detailed information later in this guide.

## Grass tetany

Grass tetany can be regarded as a deficiency of magnesium and most frequently affects breeding cows grazing grass-dominant pastures in winter. It is usually associated with cold, wet weather and mainly affects cows in late pregnancy and early lactation. Unfortunately, the first sign is often sudden death, sometimes affecting significant numbers of cattle.

Magnesium supplements, in the form of blocks or as treated oats or hay, are recommended for prevention.

Coming out of a drought, it is likely that both breeding cows and ewes will be more prone to magnesium deficiencies.

For further information, see Agfact A0.9.29 *Grass tetany in cattle* and Agfact A0.9.59 *Grass tetany in cattle – treatment and prevention*.

## Vaccination

Stock should be brought up to date with their vaccinations if any have been missed during the drought.

In particular, a booster dose of pulpy kidney vaccine is recommended for both sheep and cattle. This is because the protection afforded by vaccination may only last for three months after a booster dose of vaccine. Sudden changes in the amount and type of feed available exposes both sheep and cattle to a very high risk of developing pulpy kidney.

See also the sections on Leptospirosis and Brucellosis in rams and Vibriosis in cattle.

## Blowflies

Because of the prolonged dry weather, most sheep will not have been given a preventive fly treatment. In addition, in order to minimise stress on stock during drought, many lambs may not have been mulesed. If the weather stays warm following the rains, all the factors are present for a fly problem to develop.

Susceptible sheep should be protected by jetting using Cyromazine (such as: Vetrazin<sup>®</sup>, Jetcon<sup>®</sup>), giving up to 14 weeks' protection. Adding an organophosphate (OP) insecticide is not recommended, because an OP insecticide increases the risk of residues in wool and does not provide any extra protection. Where possible, fly-struck sheep should be separated, the strike treated, and a preventive jetting applied (see Agnote DAI-72 *Hand jetting sheep*).

## Sheep worms

Through a drought, sheep worm eggs tend to accumulate because there is insufficient moisture to permit them to hatch normally. This, coupled with relatively higher stocking densities where sheep have been hand fed, can lead to the build-up of a large reservoir of worm eggs. After rain, there can be a mass hatching of eggs, and stock can be exposed to a severe worm challenge. Also, at the end of a drought, there is often very little choice of paddocks, and stock may need prolonged protection.

In the warmer months, barber's pole worm can cause problems (anaemia, ill-thrift and death) in as little time as 3–4 weeks. Most barber's pole worm drenches are short-acting, but one, Closantel, keeps killing barber's pole worms for

up to six weeks. This is very useful if you can't turn sheep onto a fresh paddock after drenching. Closantel is marketed as Seponver<sup>®</sup> and Razar<sup>®</sup>.

If the normal drenching program has not been carried out during the drought, it is wise to catch up as soon as possible. Seek advice from your local veterinary adviser on the best worm control programs to suit your area.

## PURCHASING STOCK

There is always a risk of introducing diseases with any purchased stock. If possible, be selective in the stock you buy and make sure they appear to be in a satisfactory state of health. Obtain as much information as possible about the health, vaccination and recent treatment (for lice, worms) of the stock. The vendor should be prepared to provide this information – a reluctance to do this may suggest a potential problem with the stock.

When restocking, it is wise to contact your Rural Lands Protection Board veterinarian in order to check on the disease status of the areas of origin of your new stock.

On arrival, stock should be isolated from existing stock for at least 2–3 weeks and inspected daily. During this time, any necessary treatments or vaccinations can be applied to bring the new stock up to the same standard as your current stock.

## HEALTH CONCERNS WITH PURCHASED STOCK

### Worms in introduced stock

There is no way to easily determine the drench resistance status of worms in purchased stock, so it is recommended that you drench new stock with any highly effective combination of three, preferably four, unrelated drenches, e.g. Benzimidazole + Levamisole + Macrolytic lactone. There are drench products on the market that make this easy which are ready made combinations of drenches and also drenches which can be mixed with other drenches. Follow the directions on the label. If necessary, a fluke drench may also be given. See Agnote DAI-257 *Quarantine drenching – don't import resistant sheep worms* for more information

Hold sheep (with access to water) for at least 24 hours after treatment before release onto contaminated pasture. Ensure access to feed as

well as water if NAP (Rametin<sup>®</sup>, Combat<sup>®</sup>) is used.

### Footrot

Footrot is the last disease you want to introduce onto your property. If you are purchasing sheep, make sure they are inspected and are free of any lameness. You should also ask the vendor for a footrot vendor declaration – it is a safeguard against the introduction of the disease. Where possible, buy sheep from properties in the Footrot Control Areas and Protected Areas of NSW. It is a legal requirement to obtain a footrot vendor declaration and supply it to the local Rural Lands Protection Board if you are introducing sheep into a Footrot Control Area or Protected Area from a Residual Area.

Any sheep that develop lameness should be investigated immediately. Both footrot and foot abscess can develop under similar lush pasture conditions, and it is often difficult to determine which disease is present. If you are unsure of the cause of any lameness in sheep, get advice from your local District Veterinarian or private veterinary practitioner. Act quickly to prevent spread of the disease.

### Sheep lice

Lice are always a risk when buying sheep. With around 20 per cent of flocks infested, inspect sheep well before introducing them onto your property.

It is difficult to detect lice on sheep that have less than three months' wool, even if they have not been treated after shearing. Remember, even if you can't find lice in short wool, the sheep could still be infested. Keep them isolated from other sheep for as long as possible, and re-inspect them for lice frequently. If lice are detected, consider your options:

- Keep the sheep isolated until the normal flock shearing, and treat after shearing

OR

- Treat the sheep immediately, using a product suitable for application to long-wool sheep. Maintain them separately until shearing, and treat again after shearing. Long-wool lice treatment is unlikely to eradicate lice – it will just control them until shearing.

OR

- Keep sheep isolated, shear as soon as possible, and treat after shearing.

## Johne's disease

Johne's disease causes wasting and death. It can affect both cattle and sheep. The strains of the bacteria causing Johne's disease in cattle rarely affect sheep, and vice versa. But there is a risk, and because it is very difficult to eradicate the disease, it is best to keep Johne's disease at bay.

When buying cattle, especially from the wetter southern areas, ensure you obtain a vendor declaration in respect of Johne's disease. See *Bovine Johne's Disease Protected Zones* for information on cattle movements between zones of different status. When buying sheep, producers should always request an Animal Health Statement to assess the risk of buying sheep with OJD. An Animal Health Statement is mandatory for the sale of restocker sheep. Producers should check with their local Rural Lands Protection Board for the requirements for their region.

## Leptospirosis

Leptospirosis is another bacterial disease that is often associated with wet conditions. It is important because of its ill-effects on both cattle and people. Protecting cattle by vaccination also reduces the risk of infection in people working with the cattle.

Leptospirosis vaccines for cattle are now available either combined with clostridial disease vaccines (Cattlevax<sup>®</sup>, Vaxall Clepto-7<sup>®</sup>, Vaxicare Cattlemaster 7<sup>®</sup>, 7-in-1 for Cattle<sup>®</sup>), or as straight dual leptospirosis vaccines (Lepto for Cattle<sup>®</sup>, Vaxicare Lepto HP<sup>®</sup>, Leptovax<sup>®</sup>).

## Brucellosis in rams and vibriosis in bulls

Both of these sexually-transmitted diseases can have a major impact on the reproductive performance of the flock or herd.

Buy only those rams that are from flocks accredited free of brucellosis, even if rams are hard to source. Accredited-free flocks will have a certificate which will show an accreditation expiry date. Introducing infected rams will result in a poor lambing performance and will spread the infection to other rams.

Bulls can be carriers of vibriosis, which can reduce calving rates by as much as 20 per cent, sometimes more. It is a wise precaution to determine the disease status of the herd of origin before purchase and to vaccinate all bulls on arrival before they are used; many producers are unaware that their herds are infected.

## HGPS AND RESIDUES

When purchasing stock, especially those that you will sell at a later time, it is important to obtain information about their HGP status and residue status, as this will influence your subsequent marketing decisions.

Residues are usually not a problem, although the feeding of cotton trash and stubble to cattle in the 1994 drought did result in chlorfluazuron (CFZ, Helix<sup>®</sup>) residues in some situations. Once again, the only protection is to obtain a vendor declaration of freedom from CFZ residues when purchasing cattle.

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# Bloat

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## What is bloat?

Bloat is a risk when animals are grazing young, lush pasture, particularly if the pasture has a high legume content (clover, medics or lucerne). Ruminant animals produce large volumes of gas during the normal process of digestion. This gas either is belched up or passes through the gastrointestinal tract. If something interferes with gas escape from the rumen, bloat occurs.

Natural foaming agents in legumes and some rapidly growing grasses cause a stable foam to form in the rumen. Gas is trapped in small bubbles in this foam in the rumen and the animal cannot belch up the gas. Pressure builds up in the rumen causing an obvious swelling on the left side of the body.

## Signs of bloat

Cattle with bloat may display the following signs:

- distended left abdomen;
- no longer grazing;
- a reluctance to move;
- appear distressed – vocalise, eyes bulging;
- strain to urinate and defecate;
- rapid breathing – mouth may be open with tongue protruding;
- staggering.

In **advanced cases** the animal will go down. Death is rapid at this stage, and is due to the swollen rumen compressing the lungs, interfering with breathing and tissue oxygenation, and obstructing blood flow.

## Treating cattle

### Early/mild cases

Animals that are mildly affected can be treated orally with an anti-bloat preparation. After dosing, keep the animal moving to encourage the preparation to mix with the frothy rumen contents.

### Moderately affected stock

Animals that are bloated and starting to show signs of distress need veterinary attention. A stomach tube can be used to relieve the gas build-up. Anti-foaming agents can be delivered

directly into the rumen through the tube. Moving the animal around after treatment is important.

### Severe cases

Animals that are severely bloated and distressed need rapid relief. This may be achieved by inserting a wide-bore trochar and cannula into the rumen high on the left flank (where the swelling is greatest). After gas and froth is released, an anti-bloat preparation is poured through the cannula into the rumen to help break down remaining froth/foam (dose according to label instructions – see 'Always read the label'). In emergency situations, vegetable oil (250–500 mL) or paraffin oil (100–200 mL) has traditionally been used.

In most cases of frothy bloat, a trochar and cannula will not be adequate to relieve pressure, and a 10–20 cm incision will have to be made using a clean, sharp knife. It may be necessary to scoop the frothy material out of the rumen by hand. In these emergency cases there is usually no time to wait for a vet to arrive, so stock owners will have to do this themselves. Veterinary attention is necessary to irrigate the abdominal cavity, clean and stitch the wound and give antibiotic treatment to prevent serious infection.

## Bloat in sheep

Bloat does occur in sheep but is less severe than in cattle. Bloat in sheep often occurs with enterotoxaemia (pulpy kidney), so it is wise to vaccinate against clostridial disease (5-in-1) before sheep go out onto lush pasture or when bloat occurs in the flock.

### Treating sheep

Treatment for sheep is the same as for cattle. At present only Tympanyl is registered for use in sheep. Traditional treatments include drenching with 50–60 mL of vegetable oil or paraffin oil. An oil or surfactant anti-bloat preparation registered for cattle may be used under written veterinary recommendation, usually at one-fifth of the cattle dose. Because sheep are small, it is possible to sit them on their hindquarters and massage the rumen to mix the oil and encourage belching. Emergency incisions into the rumen are rarely necessary.

## PREVENTION

When pasture is considered risky, **bloat prevention options** include the following:

- Restrict pasture intake by limiting grazing time or implementing strip-grazing.
- Fill animals on hay before turning them onto pasture.
- Spray the pasture daily with pasture oil.
- Drench each animal twice daily with an anti-bloat preparation or oil.
- Apply anti-bloat preparations twice daily onto the flank.
- Add bloat oil into the water supply.
- Use anti-bloat blocks or licks.
- Use anti-bloat capsules such as Elanco Rumensin Capsule.
- If hand feeding each day, add liquid bloat preventatives or products containing monensin to the feed.

## Products available for bloat control and treatment

**Table 4. Animal treatments – cattle**

Product	Description	Dosing instructions
BP bloat-ease	Liquid paraffin oil.	May be used as a drench (130 mL/head), or added to feed (100 mL/head), or applied to the flank twice daily.
Coopers Teric bloat liquid	Alcohol ethoxylate teric	20–40 mL/head/day for prevention. May be added to feed with molasses or added to water (40 mL/15 L).
Bloataway preventative bloat drench	Alcohol ethoxylate	20–40 mL/head/day for prevention.
Tympanyl	Contains emulsifiers, surfactants and oil-plant extract.	350 mL (cattle), 170 mL (sheep) as treatment for clinical bloat.
Bloat rid	Contains animal, mineral and vegetable oils.	60–113 mL/head as a drench, flank dressing or pasture spray.
Nutrimol Bloat Master water-soluble bloat treatment and preventative	Blue water-soluble liquid. May be used in water troughs, over feed, or in a drench gun.	For relieving clinical bloat, 25 mL is mixed with 200–300 mL warm water and given as a drench. For prevention, 5–12 mL on feed twice daily.
No-Bloat	Topical solution/suspension containing mineral and animal oil. May be applied to the flank or used as a pasture spray.	Flank application 60 g twice daily. Pasture spray 85 g/head/day.
Bloatenz oral	Alcohol ethoxylate drench. May be added to water.	7–25 mL/head for prevention.
Bloat-Drench oral bloat control	Alcohol ethoxylate drench. May be added to water or molasses.	21 mL/head (to 42 mL/head in extreme risk situations) twice daily for prevention.
Bloatac oral liquid	Alcohol ethoxylate drench	Mixed with water 1:4. 28 mL of mixed solution twice daily for prevention. For relief of bloat, 25 mL is mixed with 200–300 mL warm water. This product may be added to water troughs.
Bloatex	Mineral and vegetable oil. May be used as a drench, flank application or pasture spray.	Drench 113 mL/cow. Flank application 60 mL/head twice daily. Pasture spray 85 mL/head/day.

## Products containing monensin

Monensin changes the ratio of volatile fatty acids produced in the rumen. Its main use is to improve feed efficiency. It also decreases rumen methane gas production and reduces the amount of stable foam produced during rumen fermentation, therefore it can be used to prevent bloat.

### Important notes:

- **Monensin is extremely poisonous to dogs, horses and other equines.** Ingestion may be fatal. Care must be exercised to avoid accidental ingestion of monensin by these species.
- An **overdose** of monensin is **toxic to cattle.** Depending on the amount consumed, the signs of toxicity are:

- decreased feed intake
- poor growth
- depression
- death.

It is essential to follow label directions and accurately measure out the amount of monensin to add to feed on a weight basis. Thorough mixing and even distribution throughout the feed is essential.

- Never use monensin premix in combination with Elanco Rumensin capsules.
- If dosing cattle with Elanco Rumensin capsules in hot weather it is important to keep the capsules cool.

**Table 5.**

Product	Description	Dosing instructions
Elanco Rumensin Capsule	Rumen capsule. Decreases rumen methane gas production.	1 capsule per animal at least 7 days before grazing risky pasture. Lasts approximately 100 days.
Moneco 100; Moneco 200	Used as an additive to feed. Must be thoroughly and evenly mixed throughout the ration.	For prevention of bloat, use at a rate of: 25–33 mg/kg of feed for beef cattle, and 11–18 mg/kg of feed for dairy cattle.
Elanco Rumensin 20; Elanco Rumensin 100; Elanco Rumensin 200	Used as an additive to feed. Must be thoroughly and evenly mixed throughout the ration.	For prevention of bloat, use at a rate of: 25–33 mg/kg of feed for beef cattle, and 11–18 mg/kg of feed for dairy cattle.
PhibroMonensin 100; PhibroMonensin 200; PhibroMonensin 400	Used as an additive to feed. Must be thoroughly and evenly mixed throughout the ration.	For prevention of bloat, use at a rate of: 25–33 mg/kg of feed for beef cattle, and 11–18 mg/kg of feed for dairy cattle.

**Table 6. Licks and blocks**

Product	Description	Instructions
Blotliq	Contains alcohol ethoxylate.	One block / 15 head.
Rumevite bloat block	Contains alcohol ethoxylate and vegetable oil.	One 20 kg block / 15 head. Replace as necessary.
Teric bloat block	Contains alcohol ethoxylate.	One 15 kg block / 10 head. Lasts approximately 15 days.
Optimol bloat ade block	Contains alcohol ethoxylate.	One 20 kg block / 10 head. Lasts approximately 20 days.

**Table 7. Pasture treatments**

<b>Product</b>	<b>Description</b>	<b>Instructions</b>
BP pasture spray anti-bloat	Mineral oil	100 mL/cow/day
Mobil anti-bloat oil	Mineral oil	55–85 mL/cow/day
No-Bloat	Mineral and animal oil	85 g/head/day
Bloat-Rid	Mineral and animal oil	60–113 mL/head/day
Bloatex	Mineral, animal and vegetable oil	85 mL/head/day
Bloat pasture spray	Paraffin oil	85 mL/head/day

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# Enterotoxaemia in cattle

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Enterotoxaemia or pulpy kidney is an acute poisoning condition caused by the bacterium *Clostridium perfringens* type D. The bacterium multiplies in the intestine and produces a toxin that is absorbed into the body, eventually killing the infected animal.

Enterotoxaemia can affect cattle of all ages and is also found in sheep, goats and other ruminants. The condition usually affects better-conditioned animals.

## CAUSE

The organism that causes enterotoxaemia is a normal inhabitant of the intestine but is usually present in low numbers. These organisms produce little toxin and, under normal conditions, are removed by normal gut movements or are inactivated by circulating antibodies.

Sudden changes in diet; grazing lush, rapidly growing pastures or young cereal crops; or heavy grain feeding (as in feedlots) enables the bacteria to multiply rapidly. Toxaemia occurs when the movement of food in the intestine slows or the organisms multiply and produce toxin faster than it can be removed or neutralised.

## SIGNS

Often, affected cattle are simply found dead. There are no prior signs of sickness and no evidence of struggling.

More commonly, the acute cases survive for about 24 hours. Symptoms mostly relate to nervous changes like sudden bellowing and mania followed by convulsions. Adult cattle may develop severe bloat before dying, which usually occurs 1–2 hours after the onset of convulsions.

There is also a less acute form of the disease in which the animal becomes quite dull and docile and appears to be blind. However, if the eyeball or eyelids are touched, the animal may close its eyes. Most of these cases recover completely in 2–3 days.

## DIAGNOSIS

Diagnosis is based on: the history of the animal or herd; the characteristic short course of the disease; and, more often than not, the nervous symptoms described above. Post-mortem and laboratory evidence showing increased numbers of *Cl. perfringens* and the toxin in the intestinal contents can assist diagnosis. The disease is harder to diagnose in cattle than in sheep.

Enterotoxaemia can be confused with rabies (not present in Australia), acute lead poisoning, grass tetany (hypomagnesaemia), tetanus, bacterial meningitis/encephalitis bloat on post-mortem, polioencephalomalacia (especially in feedlots), sporadic bovine encephalomyelitis, acute phalaris poisoning and arsenic poisoning.

## TREATMENT

Treatment is unsuccessful, due to the rapid course of the disease and the damage caused by the toxin.

## CONTROL AND PREVENTION

Prevention of enterotoxaemia requires the use of vaccines to promote immunity to the toxin and management practices to avoid the predisposing causes of the disease.

A vaccine containing a component protective against *Cl. perfringens* type D (pulpy kidney) is required. This can either be a single-component vaccine or a multi-component vaccine like 5-in-1. After the initial course of two vaccinations 4–6 weeks apart, booster doses may be necessary at intervals as short as 90 days, depending on the level of risk. Booster vaccinations should be given just prior to the expected flush of feed or other expected risk period, such as the use of concentrate feeds. The vaccine is given subcutaneously, preferably on the side of the neck.

Consult your veterinarian for advice concerning your particular herd's situation.

## ENTEROTOXAEMIA AND BLOAT

Bloat is caused by gases from fermentation being trapped in a foam within the rumen. This generally occurs when cattle graze young, rapidly-growing pastures with a high legume content, such as clover or lucerne. Bloat,

however, may also occur on young lush grasses, particularly oats and barley.

While bloat and enterotoxaemia are quite separate diseases, they are often found together, due to their association with grazing on similar pastures. The post-mortem picture for each is also quite similar.

There are numerous farmer reports of the value in using enterotoxaemia vaccine for the control of bloat. While firm evidence may be lacking, vaccination of cattle where bloat is a problem will do no harm and may decrease losses among cattle that may have enterotoxaemia.

## SUMMARY

Enterotoxaemia is an acute intoxication due to the absorption from the intestine of toxin produced by the rapid multiplication of *Cl. perfringens* type D. Rapid feed changes and grazing lush, young pastures may predispose stock to the disease.

Vaccination is a cheap and effective insurance against losses. However, the period of protection is short and booster doses may be necessary at short intervals to provide complete protection.

## RECOMMENDED 5-IN-1 VACCINATION PROGRAM FOR CATTLE

### Calves

One month before marking (10-weeks-old).  
Second vaccination at marking.

### Cows

Annual booster before calving.

### Bulls and steers

Annual booster.

### Heifers

Booster as yearlings. Booster before calving. For cattle which may not have been vaccinated (for example, recently purchased stock): vaccinate as soon as possible with a second vaccination 4–6 weeks later. Annual booster vaccinations.

### Enterotoxaemia

Remember, protection is short. Additional booster vaccinations are needed for cattle in high-risk situations. Use either an enterotoxaemia or 5-in-1 vaccine at least 14 days before the risk period.

## ATTENTION

Always keep vaccines cool but do not freeze.

- Inject under the skin of the neck and not into the muscle.
- Keep equipment clean and change needles regularly.

Follow instructions on the label.

# Prussic acid poisoning

The risk of prussic acid poisoning is increased during periods of drought and even more so after drought breaks when stressed, stunted plants begin to grow.

## What is prussic acid poisoning?

Prussic acid is also known as hydrocyanic acid (HCN). Prussic acid is not normally present in plants; however, under certain conditions, several common plants can accumulate large quantities of cyanogenic glycosides which can convert to prussic acid.

Prussic acid is a potent, rapidly-acting poison. It causes death by stopping body cells receiving oxygen.

## SOURCES OF POISON

### Plants

Approximately 200 plants are known to accumulate sufficient quantities of cyanogenic glycosides to cause poisoning. The plant species that commonly cause poisoning in livestock in Australia are listed in Table 8 below;

**Table 8. Plants responsible for prussic acid poisoning in Australia**

<i>Sorghum halepense</i> . Johnson grass
Sudan grass
Sorghum spp.
Sorghum–Sudan grass hybrids
<i>Cynodon</i> . Blue couch
<i>Brachyachne</i> . Native couches
<i>Eremophila maculata</i> . Native fuschia
<i>Acacia glaucescens</i> . Acacia
Linseed meal and cake (especially immature seeds)
<i>Heterodendrum oleifolium</i> . Rosewood

### Plant factors

Certain conditions lead to dangerous levels of cyanogenic glycosides in plants. These conditions include:

- Periods of rapid re-growth following stunting. These are times such as, after a drought breaks, if a crop is eaten back and then allowed to re-grow, or if a crop is harvested for hay then allowed to re-grow. Levels are highest in young plants with green, growing shoots.
- Frosted or wilted plants which have a transient increase in glycoside levels.
- Herbicide treated plants which have a transient increase in glycoside levels.
- High nitrogen and low phosphorus levels in the soil.
- Plant species such as sorghum which can contain more prussic acid than Sudan grass – varieties vary in their prussic acid potential.
- Plants that are wet with dew or light rain.

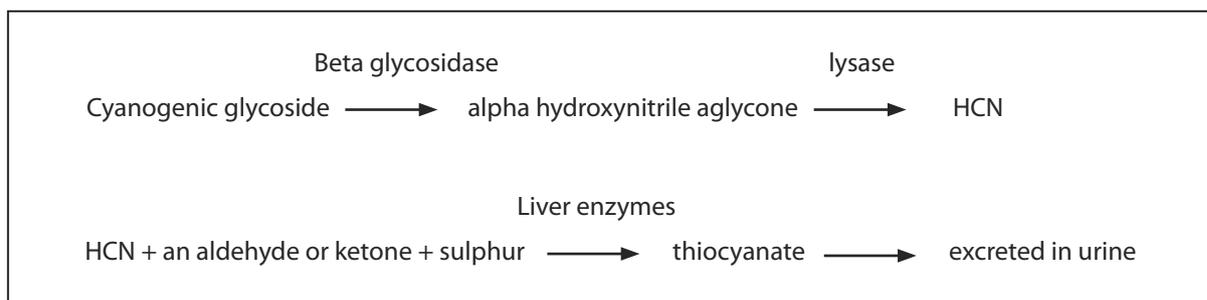
### Animal factors

Ruminant animals (cattle and sheep) are more susceptible to prussic acid poisoning than monogastric animals (horses and pigs). The lower pH in the stomach of the monogastric helps to destroy the enzymes that convert cyanogenic glycosides to prussic acid. For prussic acid poisoning to occur, high levels of cyanogenic glycosides and enzymes necessary to metabolise them need to be present. The action of rumen microbes will also metabolise cyanogenic glycosides. Therefore, poisoning is more likely in ruminant animals. Sheep are more resistant to poisoning than cattle due to their different enzyme systems in the fore-stomachs.

Hungry animals are also at greater risk as they will normally consume a larger amount of toxic material in a short time. This 'overload' of prussic acid can overwhelm an animal's ability to metabolise prussic acid to the non-toxic thiocyanate. Large amounts of prussic acid can, therefore, be absorbed and lead to poisoning.

Travelling or recently-introduced stock are at greater risk as they are unaccustomed to local plants. There is also evidence that animals become accustomed to the poison and can tolerate increasing amounts with experience.

**Figure 4. Process of prussic acid poisoning**



## SIGNS OF POISONING

Prussic acid enters the bloodstream of infected animals and is transported through the body. Prussic acid then inhibits oxygen utilisation by the cells so that, in effect, the animal dies from asphyxia.

Signs of poisoning usually occur 15–20 minutes after the toxin is consumed. Death occurs very quickly, approximately 2–3 minutes after the onset of clinical signs in peracute cases; within 1–2 hours in acute cases. Usually, animals are found dead with no signs observed. The brain and heart are the first to be affected by lack of oxygen, the resulting clinical signs include:

- Breathing difficulties
- Rapid, weak, irregular pulse
- Anxiety and restlessness followed by depression
- Stumbling/staggering
- Muscle tremors
- Moaning
- Dilated pupils
- Recumbency
- Bloat, and sometimes, salivation, vomiting
- Terminal convulsions
- Bright-red mucous membranes
- Death.

## DIAGNOSIS

A diagnosis of prussic acid poisoning is made on clinical and/or post mortem findings and by the recovery of the poison from the plants/feed and from the animal.

On post mortem examination, the blood may also be bright-red (although the blood will return to a dark colour a few hours after death) and clot poorly. Muscles may be dark and there may be haemorrhaging in the trachea and lungs. Haemorrhages will be evident on the surface of the heart. There may also be a smell of bitter almonds in the rumen. Samples for laboratory analysis include rumen contents (which should be frozen as soon as possible), muscle, liver and a sample of feed.

Prussic acid poisoning can be confused with nitrite poisoning, acute pulmonary oedema and emphysema, blue-green algae poisoning and anaphylactic reactions.

## TREATMENT

Urgent veterinary attention is necessary. It is essential to obtain the correct diagnosis as confusion with nitrite poisoning may be disastrous.

Treatment consists of re-establishing oxygen transport at the cellular level. Sodium nitrite is injected intravenously to convert haemoglobin to methaemoglobin, which reacts with cyanide (prussic acid) to form cyanmethemoglobin. A simultaneous injection of sodium thiosulfate provides sulphur to convert cyanmethemoglobin to the non-toxic thiocyanate which is excreted in the urine. An alternative treatment is to inject a large dose of sodium thiosulfate alone. This is the preferred treatment if there is suspicion that prussic acid poisoning is combined with nitrate poisoning. Treatment will need to be repeated.

Animals should be removed from the source of poison immediately and fed safe feed to help dilute the amount of poison in the rumen/stomach. Animals exposed to the poison source should be treated even if not showing any clinical signs. Animals should be handled as quietly as possible.

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**NOTE:**

Sodium nitrite and sodium thiosulfate are not approved for use in food producing animals. This matter is under urgent review. Contact your veterinarian for advice.

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**PREVENTION**

- Avoid grazing risky food sources. Have feed analysed if safety is in doubt.
- Do not graze drought-stressed, immature, wilted or frost-damaged plants that are known cyanogenic glycoside accumulators (see Table 1).
- Never graze sorghum that is less than 50 cm high.
- Feed hungry stock with hay before allowing them to graze forages which may contain high levels of cyanogenic glycosides/prussic acid.
- If buying sorghum hay, make sure that it was cut during low-risk conditions. There is no decrease in prussic acid content in the process of hay-making.
- Feeding material as silage will reduce the risk of poisoning as correct ensilage for three weeks reduces levels of toxin by approximately 50 per cent. On feeding-out, some toxin will be released as gas. It is still recommended that this feed is tested prior to use.
- Green chop forage may be safer than the same material used as pasture because selective grazing of high-risk leaf material is prevented.
- Linseed gruel should be thoroughly boiled to remove any free prussic acid.
- Supplementation of sulphur (if a deficiency exists) will increase the animal's efficiency at converting prussic acid to the non-toxic thiocyanate.

**FURTHER INFORMATION**

For further information, contact NSW Department of Primary Industries or your veterinary advisor.

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The Regional Veterinary Laboratory at Menangle can test feed samples for prussic acid. Samples may be sent via your veterinarian to any NSW Department of Primary Industries Regional Veterinary Laboratory for testing.

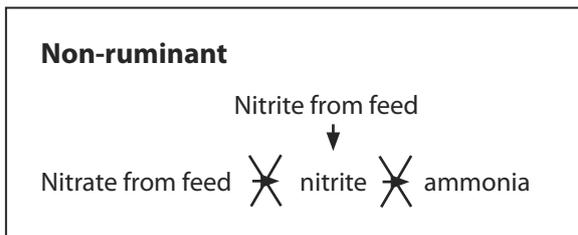
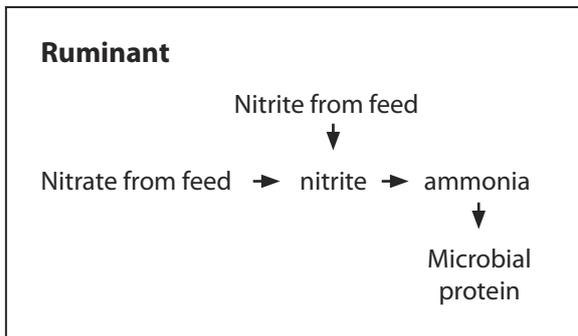
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# Nitrate and nitrite poisoning of livestock

During periods of drought, the amount of nitrate in the soil can increase greatly because of: a lack of leaching; reduced nitrate uptake by plants; and decomposition of organic matter. When the drought breaks, nitrate uptake by plants may be high, especially in the first week after rain. If hungry animals are allowed free access to such plants, losses from nitrate/nitrite poisoning may be disastrous.

## WHAT IS NITRATE/NITRITE POISONING?

Nitrates and nitrites are closely linked as causes of poisoning. Nitrate is not always toxic to animals. When feed containing nitrate is eaten by ruminant animals, nitrate is converted to nitrite, and then to ammonia, by rumen microbes. Non-ruminant animals are unable to do this.



Nitrates have a direct, caustic effect on the lining of the gut if consumed in large quantities. Signs of poisoning include diarrhoea, salivation and abdominal pain.

Nitrites are much more toxic. These are formed from nitrates during ruminant digestion and may also occur if stored plant materials heat-up or are attacked by bacteria or fungi. When high levels of nitrites accumulate in the gastrointestinal tract, they are absorbed into the bloodstream. Nitrite in the blood stream changes haemoglobin (the oxygen carrying part of blood) to methaemoglobin (which cannot carry oxygen). If enough methaemoglobin is produced, an animal will die. Some animals, though, can tolerate up to 50 per cent conversion of their haemoglobin without ill-effects but, when greater than 80 per cent is converted, death occurs.

## SOURCES OF POISONS

### Plants

Nitrogen is considered the plant nutrient most widely deficient in the world's soils. Various agricultural practices have therefore been developed to increase its soil concentration. These practices include incorporating legume varieties in pasture and applying various nitrogen-rich fertilisers (urea, sulphate of ammonia, blood and bone) to crops. Such practices sometimes cause plants grown in these soils to have nitrate levels above safe limits with livestock poisonings resulting.

Certain weeds, various root crops, cereal hays, and even immature cereal crops, can also cause these poisonings. More than 80 specific plants are known to cause nitrite poisoning. Some of these plants are listed in Table 9.

**Table 9. Some plants associated with nitrate/nitrite poisoning**

Crops/ pasture	Weeds
Oats	Capeweed
Sorghum	Variegated thistle
Maize	Mintweed
Rape	Crown beard
Lucerne	Pigweed
Kikuyu	Redroot
Turnip tops	Caltrop (cat's head)
Sugar beet tops	Marshmallow
Rye	Blackberry
Sudan grass	Fat hen
Soybean	
Wheat	
Barley	

## Plant factors

Under certain soil and environment conditions, plants can contain high levels of nitrates.

Factors that facilitate uptake of nitrate by plants include:

- Use of nitrogen-containing fertilisers.
- Low soil sulphur and molybdenum.
- Areas where stock have congregated and urinated/defaecated (yards).

Factors which cause nitrate to accumulate in the plant include:

- Drought.
- Cloudy or cold weather.
- Herbicide application – especially phenoxy herbicides such as 2,4-D.
- Wilting.

Amount of nitrate in plant tissues also depends on:

- Plant species.
- Stage of maturity.
- Part of the plant.

Nitrate concentrations are usually higher in young plants with these decreasing as plants mature. Most of the plant nitrate is also located in the bottom third of the stalk. Conversely, leaves contain less nitrate and flowers or grain contain little to no nitrate.

## Hay and Silage

Hays made from cereal crops, especially those grown under drought conditions and cut while sappy, can develop toxic nitrite levels when they heat-up. Oaten hay is particularly risky and becomes poisonous if previously-dry hay is dampened by rain or snow some time before feeding-out.

Hays made from nitrate-rich materials contain almost as much nitrate as when first made, unless some is converted to nitrite by heating or mould.

Silage contains less nitrate than its parent crop due to the fermentation process that it undergoes. Forages high in nitrate can lose from 40–60 per cent of their nitrate content during fermentation.

## Water

Water can contain toxic levels of nitrates. High-risk sources include water from deep wells fed by soil-water from highly-fertile soils; condensed water from ventilating shafts in piggeries where there are high ammonia levels in the air; and fluids draining from silos containing materials rich in nitrates. Water contaminated by fertiliser, animal wastes or decaying organic matter, may also be a source of toxic levels of nitrate. Marginally-toxic levels of nitrate in water combined with marginally-toxic levels of nitrate in feed can also lead to poisoning.

## ANIMAL SUSCEPTIBILITY

### Species

There is considerable variation between species in their susceptibility to nitrite poisoning. Pigs are the most susceptible, then cattle, sheep, and then horses.

Non-ruminants, such as horses and pigs, have no mechanism for converting nitrate to nitrite in their digestive tracts so they are not susceptible to nitrite poisoning due to excessive intake of nitrates. However, they are highly-susceptible to poisoning from nitrite intake (for instance in mouldy hay) because they cannot convert the nitrite to ammonia. Sheep are more efficient at converting nitrite to ammonia so this may be

the reason that they are less susceptible to nitrite poisoning than cattle.

### Hungry stock

These are at far greater risk than animals receiving regular and good fodder. This is because hungry stock consume more toxic feed and, in the case of ruminants, their rumen microbes will not be adapted to convert nitrite to ammonia. For example, it takes about twice as much nitrate to kill a ruminant when the nitrate comes from forages that are eaten over a long period of time, compared to that which is consumed very quickly. Animals receiving carbohydrate-rich fodders tolerate high nitrate and nitrite levels better than those that are not. This is because energy from carbohydrates (grain) helps rumen microbes convert nitrite to ammonia.

Animals that are stressed or in poor health or condition will also be more susceptible to nitrate /nitrite poisoning.

### Adaptation or acquaintance

Frequent intake of small amounts of high-nitrate feed increases the total amount of nitrate that can be consumed by ruminant animals without adverse effects. This is because rumen microbes are adapted to deal with the increased nitrate content of the feed.

## SIGNS OF POISONING

### Nitrite poisoning

The signs of nitrite poisoning usually appear 6–24 hours after the toxic material is consumed.

These include:

- Rapid, noisy and difficult breathing.
- Blue/chocolate-coloured mucous membranes.
- Rapid pulse.
- Salivation, bloat, tremors, staggering.
- Weakness, coma, terminal convulsions, death.
- Dark 'chocolate-coloured' blood.
- Abortions – pregnant females that survive nitrate/nitrite poisoning may abort due to a lack of oxygen to the foetus. Abortions usually occur 10–14 days after exposure to nitrates.

### Nitrate poisoning

- Diarrhoea and vomiting.
- Salivation.
- Abdominal pain.

## POST-MORTEM FINDINGS

### Nitrite poisoning

- Dark-red or coffee-brown blood which clots poorly.
- Pinpoint haemorrhages in internal organs and on internal surfaces.
- Accumulation of blood in the stomach wall.

### Nitrate poisoning

- Severe reddening and stripping of the stomach and intestinal linings.

## DIAGNOSIS

Diagnosis is based on observed clinical signs and possible exposure to toxic plants, feeds or water, post mortem findings and laboratory tests.

## TREATMENT

Urgent veterinary attention is required to confirm the tentative diagnosis and to treat affected animals. Stock should immediately be removed from suspect material. Also, handle stock as little and as quietly as possible. Hay or some other low-nitrate herbage should be fed to dilute the nitrate and/or nitrite in the stomach. Affected animals can be treated by intravenous injections of methylene blue, a powdered dye material. Methylene blue converts the methaemoglobin back to oxygen carrying haemoglobin. **It should be noted that methylene blue is no longer approved by the NRA for use in food-producing animals.** This matter is under urgent review. Contact your veterinarian for advice. If producers have an old supply of methylene blue on hand, they should consult their veterinarian before attempting to use it.

## PREVENTION

The risk of poisoning can be reduced by:

- Having feeds and forages analysed for nitrate when in doubt, such as drought-stressed, small grain forages.
- Not grazing stock on forages that are potentially-dangerous.
- Observing stock frequently when put on potential-risk feed.
- Feeding hungry stock on dry hay or mature grass before allowing free access to immature cereal crops or root-crop tops.
- Feeding only well-dried cereal hays.
- Preventing hungry stock from gorging recently-sprayed weeds.
- Preventing hungry stock from gorging highly-fertilised crops.
- Not overstocking risky pastures/grazing crops. Overstocking can result in more stalk material being consumed (the stalk contains the most nitrate in the plant.) Avoid strip grazing for the same reason.
- Not grazing high-nitrate pastures or crops for seven days after periods of rainfall, cloudy days, frosts, or high temperatures that cause wilting.
- Grazing stock on high-nitrate pastures or crops during sunny afternoons (when the temperature is above 15°C) and removing them at night. This reduces the amount of high nitrate forage consumed and helps rumen microbes to adapt.
- Preventing access to high-risk weeds around yards/sheds.
- Feeding risky material in small amounts diluted with safe feed, preferably high carbohydrate feed, such as grain (if accustomed to grain-feeding) and gradually increasing the amount fed. This only applies to ruminants.
- Ensure water does not contain high levels of nitrates.
- Not feeding green chop which has heated after cutting.
- Never feeding mouldy hay.

Another option to reduce the risk of nitrate/nitrite poisoning is to harvest and feed high nitrate forages as silage. This is because nitrate levels are reduced by the fermentation process

when feed is ensiled. Harvest these at least seven days after rain or cloudy weather, preferably later in the day. Harvesting close to maturity is also advised to reduce the risk of nitrate toxicity (although this means reduced digestibility of the feed). Raising the cutter head to selectively-avoid stalk bases is another method of risk reduction.

## FURTHER INFORMATION

For further information, contact NSW Department of Primary Industries or your veterinary advisor.

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The Regional Veterinary Laboratory at Menangle will test feed samples for nitrate. Samples may be sent via your veterinarian to any NSW Department of Primary Industries RVL for testing.

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NSW DEPARTMENT OF  
PRIMARY INDUSTRIES

## Section 4

# Restocking

- Restocking after a drought
- How much can you afford to pay when restocking?
- Buying sheep can be a health hazard
- OJD and sheep movement
- Bovine Johne's disease zoning
- Reassessing water requirements after a drought

# Restocking after a drought

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The reduction in stock numbers during drought offers livestock owners the opportunity to restock with animals that are not only suited to their farm, but that are also suited to new market requirements.

You should, therefore, closely assess the suitability of the animals you are considering purchasing. For example, wool from merino sheep has a range of fibre diameters (17–28 microns), but the clothing market's demands are highest for wool that is finer than 20 microns. Consequently, if the farm is capable of producing fine-quality wool, you might consider the purchase of fine wool sheep if the market for fine wool is stronger than for stronger wool.

## MAKING DECISIONS

### Restructuring enterprises

Low stock numbers at the end of a drought give farmers the chance to review enterprise mixes and breeding directions. Short-term cash flow needs may be better met by increased cropping, livestock trading, or a shift in the balance of livestock enterprises. This review needs to include careful analysis of gross margins, cash flow budgets, return on capital, the capacity of your property, and your own preferences. (See the sections on *Financial management during drought recovery*, *Grazing management following drought*, and *Managing pastures after drought*.)

### Breeding versus buying

Buying stock to restore the numbers that were reduced during the drought requires careful thought and access to finance. This allows a fast return to normal cash flow but, for many people, this will only be possible by increasing their debt levels.

Breeding-up numbers from the retained breeding nucleus is less expensive initially but is slow and reduces future cash flows.

Any breeding-up strategy after drought must also achieve high-levels of fertility. Careful management of the reproductive cycle is required to maximise the number of animals produced.

### Purchasing/trading/agistment

Buying some stock for short-term finishing or trading will be a preferred means of generating income for many producers. As prices for stock rise after drought, trading options need to be carefully budgeted for to include all costs. Be aware that store prices can exceed fat market prices. Don't get carried away – make sure that prices offered are realistic.

Also, have a particular end-market in mind when you are buying stock. This may limit your choice but it means that you will be able to sell the stock to advantage when ready. Consider the full range of options; for example, your plan for recovery may mean that purchasing old cows or ewes is a better proposition.

Make sure that you have enough feed available to meet the needs of trading stock as well as those of your existing stock (see *Managing pastures after drought*).

Taking stock on agistment is a cash-raising alternative, particularly if neighbouring areas are coming out of drought more slowly. A written agreement with the other party will ensure that you are both aware of what is expected (see Agfact M1.6 *Agistment guidelines*).

### Supply of stock

Suitable stock can be scarce, but don't let the desire to restock force you into paying too much. It may be better to wait until shortages ease and prices and choice improve.

If some of the purchased stock do not perform, cull them early and sell them. Most mobs on the market will contain a few 'poor doers' or less productive animals, and these stock are rarely profitable.

Be aware of health requirements, stock movement requirements, and area of origin of stock, so that inappropriate or disease-carrying stock are not purchased. Be particularly careful about the footrot status of sheep (see 'Animal health following drought').

## FURTHER INFORMATION

- Agfact M1.6 *Agistment guidelines*
- *Beef gross margin budgets*
- *Sheep gross margin budgets*

## FURTHER ASSISTANCE

For further assistance, contact your local NSW DPI Livestock Officer, Rural Lands Protection Board staff, or an agricultural consultant.

# How much can you afford to pay when restocking?

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Following periods of rain the supply of sheep and cattle may be reduced. Rainfall also stimulates interest in the purchase of cattle and sheep for restocking and finishing purposes as producers begin to return to normal production.

Should there be further rainfall the resulting improvement in pasture recovery will further stimulate the demand for stock. The crucial question for producers then becomes: 'How much can I afford to pay for breeding stock?'

One decision-support tool available to evaluate such a fitting question is the ImPack model from NSW Department of Primary Industry's StockPlan™. The ImPack model allows the user to input their breeding factors in order to establish their particular herd or flock structure. The model then calculates the numbers of animals for sale based on the producer's breeding factors. Once prices for stock, wool income and variable costs are entered, ImPack calculates the enterprise gross margin. The model allows the producer to evaluate various herd or flock reduction and recovery strategies by comparing the impact of those strategies on returns over a 10-year post-drought timeframe.

The lost income earning potential due to being understocked for any period of time is considerable and means that relatively high prices for breeding stock can be justified if prices paid for progeny remain high and if there are no unexpected feeding costs.

This is particularly the case where breeding numbers have been reduced significantly, as in the current situation. It may, therefore, take several years to attain full carrying capacity through herd or flock build-up. For example, the loss of income from building-up a cattle herd from 200 breeders to the pre-drought level of 300 breeders by retaining 80 per cent of heifers, is in excess of \$100,000 when compared to a herd that is already at 300 breeders (refer to enterprise assumptions in the cattle section below).

ImPack can also be used to compare a range of restocking strategies such as buying-in replacement breeders or breeding-up replacements until numbers reach pre-drought

levels. The model allows the user to nominate a discount rate in order to evaluate different options and to work out the absolute maximum price to pay for replacement stock so that pre-drought stocking levels may be reached as quickly as possible.

The figures provided are an absolute maximum because other factors, such as the lack of fodder reserves, add to the risk of being fully-stocked. Alternative enterprises such as cropping or finishing steers can also provide a cash flow and can reduce the amount that can be justified to purchase breeding stock. The following comparisons for cattle and sheep use a 12 per cent discount rate, which covers interest and some risk.

## Cattle comparisons

The following example is a guide only based on the herd assumptions listed in Table 10.

## Herd rebuilding strategies

**Strategy 1:** To retain 80 per cent of heifers until breeding cow numbers return to the pre-drought level.

**Strategy 2:** To retain 80 per cent of heifers in the year after the drought and buy in enough 3–7 year-old joined replacement cows to immediately return to pre-drought herd numbers.

## Cattle results

Given the assumptions in Table 10, paying up to \$1050 for joined cows can be justified in order to get back to full production immediately. If stocking is only reduced by 10 per cent, the maximum amount that can be paid falls to \$939 but if stocking had been reduced by 50 per cent, the amount that could be paid increases to \$1294.

## Sheep comparisons

The base flock assumptions are shown in Table 11.

## Flock rebuilding strategies

**Strategy 1:** Retain 90 per cent of maiden ewes until breeding ewe numbers return to the pre-drought level of 1000 ewes.

**Strategy 2:** Purchase enough replacement ewes in the first year following the drought in order to immediately get back to the pre-drought level of 1000 ewes and retain 90 per cent of maiden ewes in years 2 and 3.

## Sheep Results

- Strategy 1 takes four years to breed up numbers to 1000 ewes and the income foregone due to drought is \$42,833.
- For Strategy 2, Figure 5 below shows that the maximum price to pay for replacement ewes is \$93 for 5 year-old ewes, \$132 for 4 year-old ewes, and \$134 for 1–3 year-old ewes before the discounted cash flow matches Strategy 1.

There is little difference in the maximum price for 1–4 year-old ewes because at least two lambs can be bred from all these age groups, after which the pre-drought level of 1000 breeding ewes is attained. Culling of older breeding ewes is then necessary to prevent the flock expanding beyond the original numbers

The maximum price to pay for five year-old ewes is lower than the other age groups as just one lamb is produced prior to ewes being cast for age and extra purchases of five year-olds are required in Year Two to increase ewe numbers back to 1000.

Similar things would happen in the cattle enterprise if cows nearing the CFA age were purchased compared to buying younger animals.

- Should the net wool return per ewe fall by 20 per cent (from \$38.10 to \$30.48), the maximum price to pay for replacement 5 year-old ewes falls from \$93 per head to \$80 per head (a decrease of 14 per cent).

- Purchasing 5 year-old ewes in the year following the drought, as described by Strategy 2, has a significant impact on gross margin in that year where it is shown to decrease by more than one-half (from \$48,000 to \$22,000) compared with a decrease in gross margin of one-third for Strategy 1 (from \$48,000 to \$33,000). Such differences in cash flow may be important in the whole farm financial situation.

## Conclusions

There are a large number of possible situations that beef and sheep producers could be in. The above results are general ones for some typical scenarios. The analysis shows that being understocked can be a costly option and that land and other resources should be fully-utilised. For those with severely reduced numbers after the drought, and no other enterprise options, a high price may be justified for the purchasing of breeding stock. A premium may be paid for stock that are already joined because they will produce a cash flow to the enterprise much earlier than not being joined.

Producers in a tight financial situation should also complete a cash flow budget to assess appropriate financing strategies and ensure that loans to finance the purchase of replacement breeding stock can be serviced.

There are a range of changes in management that could contribute towards recovering full stocking capacity. Only two have been

**Table 10. Yearling enterprise with steers and surplus heifers sold at 15–18 months and 10 year post-drought assumptions**

Key Variable	Enterprise breeding factors and assumptions for 10 years following the drought
Usual herd size	300 breeders
Drought sale price for cows sold to reduce herd	\$400
Steer sale price @18 months (for next 10 years)	\$650
Surplus heifer price (for 10 years)	\$480
Cull cow prices (for 10 years)	\$500
Variable cost per cow	\$45
Heifers first calve at...	two years
Weaning per cent	88 per cent
Weaning per cent in Year One following drought	70 per cent
Destocking strategy	All 8–10 year-old breeders sold @ \$400. No replacement heifers retained in drought year. 200 cows joined in first year after drought in strategy 1 (see below).
Discount rate	12 per cent

tested here with either sheep or cattle. Things like retaining breeders to an older CFA age, reducing culling levels and increasing inputs to maximise weaning rate can be used in various combinations with the methods tested.

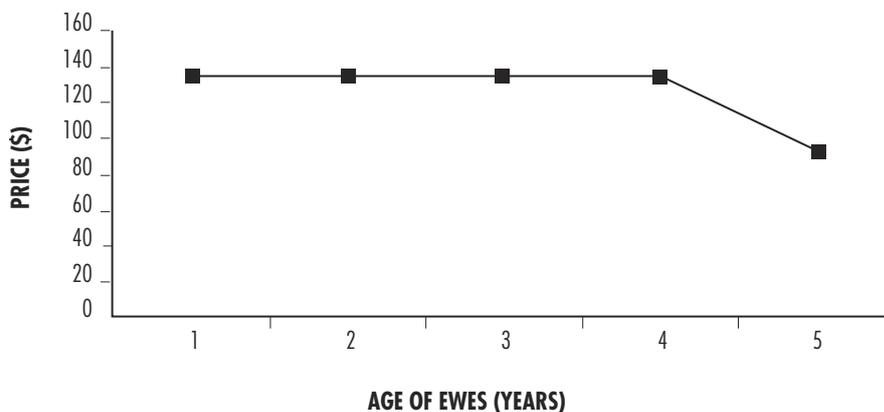
To help determine your maximum amount to pay for replacement breeding stock using the

combination of management changes most appropriate to your situation, it is recommended that you attend a StockPlan™ workshop. The StockPlan software, including ImPack, is available for producers after attending a training workshop. Producers should contact their local livestock officers in order to attend a workshop in their area.

**Table 11. Central West self-replacing medium wool merino ewe enterprise (spring lambing) and 10 year post-drought assumptions**

Key Variables	Enterprise breeding factors and assumptions for 10 years following the drought
Base flock size	1000 ewes
Weaning per cent	85 per cent
Weaning per cent in the first year after drought	70 per cent
Maiden ewes lamb at...	2 years old
Ewes are cast for age (CFA) at...	5 years old
Net wool return per ewe	\$ 38.10
Variable costs per ewe	\$ 18.00
Wether price	\$ 40.00
Surplus maidens price	\$ 40.00
Cull and CFA ewe price	\$ 20.00
Dry ewe price	\$ 30.00
Drought sale price for ewes sold to reduce mob	\$ 20.00
Destocking strategy	Reduce usual mob size by 30 per cent (to 700 ewes) through the sale of 100 per cent of all 4 and 5-year-old ewes and 9 per cent of 3-year-olds.
Discount rate	12 per cent

**Figure 5. Maximum Price for Replacement Ewes (12% discount rate)**



# Buying sheep can be a health hazard

Every year, graziers will normally introduce sheep onto their properties for restocking. These are as either ram replacements, as short-term woolcutters, or as sheep for fattening. These sheep are usually bought direct from properties, from store sales, from circuit sales and, in some cases, from fat sales. Remember that rams from studs are introduced sheep the same as any others.

Where disease is concerned, the rule for buyers is *caveat emptor* ('let the buyer beware'). The main concern in this is usually to prevent the introduction of sheep lice, footrot and ovine Johne's disease (OJD). There are, however, many other diseases which should be considered to ensure that a sheep enterprise remains profitable. Steps must therefore be taken not only to prevent the introduction of disease but also to avoid exposing introduced sheep to diseases that are already present on a property.

When buying sheep from saleyards, it must be remembered that inspectors in saleyards cannot guarantee freedom from disease. This is because of the small numbers of animals that are examined and the difficulty of examining animals in pens.

The ideal situation is, therefore, to buy sheep directly from a property where you know the disease status, treatment and vaccination history of the sheep being sold. Sheep bought from saleyards usually have no guarantees or flock history.

Vendors offering sheep for sale must use the Animal Health Statement. There are vendor declaration forms for footrot and OJD, and an accredited disease-free scheme for ovine brucellosis.

The Animal Health Statement and vendor declarations for footrot and OJD allow the purchaser to identify the vendor and obtain further information on the health of the purchased sheep.

Here is an outline of diseases you should consider when introducing sheep on to a property and the steps that you can take to reduce the risks associated with particular diseases.

## SHEEP LICE

In NSW, approximately 20 per cent of flocks are infested with sheep lice. However, very few infested pens are actually detected in saleyards. This is because, generally, inspectors

in saleyards can only detect medium to heavy lice infestations and these only in sheep with more than three months' wool. It is, conversely, very difficult to detect light lice infestations in sheep with less than three months' wool and it may take several months for a light infestation to become obvious.

Lice are small, wingless insects which feed either by biting or sucking. They hatch from eggs in a form resembling the adult lice and go through a series of moults as they grow to adulthood. The sheep body louse requires near-ideal conditions to survive and breed. These conditions are found on the skin near the base of the fleece. The number of lice present on an infested sheep fluctuates with the season and with the amount of wool present. The lowest number of lice are usually present in summer with hot weather reducing the ability of the lice to survive and breed. For further information, see Agfact A3.9.31 *Sheep lice*

### Recommendations:

- Obtain as much history as possible from the vendor, including the origin of the stock, any lice treatment after the last shearing and, if possible, whether the sheep were lousy before the last treatment.
- Examine the stock when they arrive at the property, looking carefully at any animal showing signs of rubbing or biting. If the sheep are lousy, it is important to obtain details of previous treatments to ensure that there is no problem with chemical resistance and that the appropriate treatment can be given. If there is no evidence of lice, keep the introduced sheep quarantined from other stock on the property for three months. This will allow a light lice infestation to become obvious.
- If lice are detected in introduced sheep, seek help from your local veterinarian to determine the susceptibility of the lice to various insecticides, and then treat the sheep accordingly. Use chemicals according to label instructions to avoid residue problems.

## FOOTROT

It is very difficult to detect footrot in saleyard pens when the sheep are crowded together. It is even harder when footrot is not particularly active (for example, in the dry, summer months).

When inspecting sheep in a paddock, remember that chronically-infected sheep may not show signs of lameness or loss of condition and that the infection can persist in an infected foot for many years.

Footrot in sheep appears in a number of forms, ranging from a relatively-mild (benign) condition through to a chronic infection with under-running of the sole, overgrown feet and rotting tissue. Other animals may have a chronic infection with under-running, but have no obvious lameness. Unfavourable environmental conditions and recent treatments will also mask the disease. For further information, refer to Agfact AO.9.56 on *Footrot: sheep and goats*.

#### **Recommendations:**

- Whenever possible, buy sheep from owners who are prepared to complete a vendor declaration detailing the origin of the sheep and the footrot status of both the mob and the property of origin.
- If footrot is considered a potential problem, inspect sheep before you buy and view with extreme caution any mob that shows evidence of having been pared or vaccinated against footrot.
- Be especially careful if buying lines of sheep with mixed earmarks which may indicate a dealer's mob or a mob from several sources. This increases the risk of buying sheep from an infected property.
- Try and buy sheep in non-spread periods to avoid the risk of introducing sheep that are in the early stages of the disease and which may not become obvious for another 2–3 weeks.
- Ensure that the truck used to move the sheep has been hosed-out thoroughly with high-pressure water before the sheep are loaded for their journey.
- If possible, keep introduced sheep isolated from other sheep on the property until they have been through conditions suitable for the development and spread of footrot and the disease has had the opportunity to manifest itself.
- Carefully examine any lame sheep in an introduced mob.

#### **Footrot Vendor Declaration Form**

The vendor declaration form has been developed by NSW Department of Primary Industries, in consultation with the sheep industry, to give assurance that the sheep offered for sale are free of footrot. There is no obligation for the vendor to use this form but, if a vendor can comply with the conditions of the declaration, the purchaser can be more confident that the sheep are free of footrot.

This form can be completed by a vendor who is confident of the disease status of the sheep being offered for sale. The vendor declares that:

- The stock have/have not been bred on the property. If the stock have not been bred on the property, the owner should state when the stock were introduced.
- The sheep have been inspected within the previous seven days and there is no evidence of footrot in the flock.
- There has been no evidence of footrot on the property within the previous 12 months.
- The sheep have/have not had treatments for foot conditions.
- The sheep have/have not been subject to a laboratory test for footrot. The vendor then gives details of the earmarks/ear tags on the sheep and signs the form. Any disputes over the details on the form are a matter between the vendor and the purchaser. The forms can be obtained from stock and station agents and Rural Lands Protection Boards. Vendor Declarations must be used when introducing sheep from a Residual Footrot Area (for instance, Victoria) into a Control or Protected Area.

## **OVINE JOHNE'S DISEASE**

Ovine Johne's disease (OJD) is a wasting disease of sheep caused by the bacterium *Mycobacterium paratuberculosis*. The disease has been diagnosed in certain geographical areas of NSW, these are known as the Management Areas. A vaccine is also now available to assist with control of the disease. The disease has a long incubation period and may not be obvious until some years after infected sheep are introduced onto a property. Tests to detect the disease are based on a flock diagnosis. Some areas of the state are known as exclusion areas – these are very low OJD prevalence areas. These Rural Land Protection Boards have requirements to be informed of sheep movements into these areas by providing a copy of the Animal health Statement from the consignment sheep.

#### **Recommendations:**

- Purchasers of sheep should be aware of the risks of OJD – particularly if buying sheep from a high prevalence areas or with a known disease history.
- Purchasers should only buy low-risk sheep – this could include sheep which have come from flocks which have undergone testing to Market Assurance Program (MAP) standards or which have been vaccinated according to industry protocols.

- Purchasers should also request a copy of the Animal Health Statement declaring the origin of the stock and disease risk associated with the flock.

For further information on OJD, see the NSW DPI website: [ojdinfo.dpi.nsw.gov.au](http://ojdinfo.dpi.nsw.gov.au)

## ANTHELMINTIC RESISTANCE

Anthelmintic resistance is widespread in sheep flocks in NSW with a risk of introducing resistant strains of a range of parasites on to a property when sheep are brought in.

This resistance cannot be detected by inspecting sheep. There is also no simple test to detect this problem in sale sheep. When introducing sheep, it is advisable to assume the worst and treat them as though they are carrying resistant parasites. A quarantine drench is therefore recommended for introduced sheep. See Agnote DAI-257 *Sheep worms: don't import resistance* for further details. An anthelmintic resistance test (NSW 'DrenchTest') is also available from Regional Veterinary Laboratories to determine the drench resistance status of a flock. For further information, contact your local veterinarian.

### Recommendations:

- Before buying sheep, find out if they have been on a worm control program such as WormKiller DrenchPlan. Sometimes it also may be possible to find out if there is a problem with a specific family of anthelmintics.
- Drench the sheep with a highly-effective combination of drenches (ML + Lev + BZ) on arrival and according to body weight. Then hold them in yards for at least 24 hours with access to water and hay. The practice of drenching sheep and then letting them out into the holding paddocks around the shed and yards is not recommended. This is because, if resistant parasites are present, worm eggs that are not killed immediately by the drench will survive on these areas and the larvae can then hatch and infect sheep that are later brought into the yards.
- Place sheep on a worm control program appropriate for your property, either WormKill, DrenchPlan or (Far)WestWorm. Suitably fine-tune these for your property.

## CLOSTRIDIAL DISEASES

Sheep which have not been vaccinated against clostridial disease may be susceptible to infection, particularly if they are brought from the more-arid parts of the State where the risk of infection is lower.

### Recommendations:

- Check whether new sheep have been vaccinated against the clostridial diseases (and cheesy gland).
- If the vaccination history is not available or incomplete, assume that the sheep are not vaccinated.
- Adopt the appropriate vaccination program for your district.

For further information see Agnote DAI/190 *How vaccination works* and Agnote DAI/191 *Vaccination Programs for Sheep*.

## OVINE BRUCELLOSIS

Rams at fat or store sales are usually cull rams and are likely to be carrying ovine brucellosis. Therefore, do not buy rams at store sales, in saleyards, or from non-accredited flocks. If you do, you risk introducing ovine brucellosis on to your property.

Another risk is of introducing brucellosis on to your property through pregnant ewes that have come from an infected property. Your rams can then pick up brucellosis from an infected ewe at lambing time when the ewe may excrete the organism in the birth fluids. However, there is no evidence of risk to rams that are mated with these ewes after weaning.

Ovine brucellosis causes infertility and sterility in rams and can also cause abortion in ewes. In rams, lesions (abnormalities) occur in the testis, epididymides and in accessory sex glands.

The infection first affects the epididymides, causing inflammation, and swelling of the surrounding tissues. In chronic infections, lesions can result in complete blockage of the epididymides resulting in the ram being sterile.

### Recommendations:

- Buy rams only from flocks that are accredited free of ovine brucellosis. Lists are available from NSW Department of Primary Industries, Rural Lands Protection Board offices, or from breed societies. There is no need to blood-test rams from accredited flocks.
- Do not buy rams that have had only one negative blood test. Brucellosis has a long incubation period and two negative blood tests, at least 60 days apart on all rams in the group, is required before a veterinarian can issue a certificate of freedom from the disease in non-accredited sheep.
- Do not run introduced lambing ewes with

rams, unless you know that the ewes have been joined to rams free of ovine brucellosis.

## BLOWFLY STRIKE

Un-mulesed sheep are more prone to breech strike than are mulesed animals. It is recommended that, whenever possible, replacement breeding stock and wethers be purchased as mulesed sheep. This rule also applies to first-cross ewe replacements. This is because the additional cost of buying mulesed sheep will be recouped several times over in the savings on fly control over the life of the sheep. In addition, fleecerot can also predispose sheep to flystrike and, particularly, bodystrike. Selection against fleecerot has been shown to reduce the incidence of flystrike by over 30 per cent. Producers should, therefore, avoid buying sheep with obvious signs of fleecerot.

Major fly activity usually occurs in autumn and spring and coincides with moist, warm conditions. Conversely, hot, dry weather and cold conditions limit the development of sheep blowfly populations. Green blowfly initiates more than 80 per cent of strikes in sheep. This fly is particularly attracted to areas of the sheep's fleece which are moist and affected with fleecerot or mycotic dermatitis (in the case of body strike) and areas scalded or stained by urine or dung (in the case of breech strike). The fly lays its eggs in the wool with the maggots hatching in 12–24 hours. They feed on the skin surface for a further 12–24 hours until their mouthparts harden sufficiently to tear the skin. The strike usually becomes obvious 3–4 days later and produces discolouration of wool and irritation.

Struck sheep develop fever and loss of appetite. They often leave the mob seeking shelter under trees and bushes or amongst fallen timber.

For further information on sheep blowflies, refer to Agnote DAI-70 *Sheep blowflies*.

### Recommendations:

- Buy mulesed sheep.
- Ensure that these sheep have been correctly mulesed with the appropriate tail length.
- Avoid buying sheep with signs of fleecerot.

## CHEESY GLAND

Cheesy gland not only causes losses in slaughter stock but is believed to be a significant cause of production loss and mortality in adult stock from both pneumonia and chronic infections. With the increasing importance of the disease in

the export meat market, graziers should consider cheesy gland when introducing sheep on to their properties.

Cheesy gland is a chronic bacterial disease of sheep causing abscesses in lymph nodes of the body and internal organs. Infection can occur in sheep with less than 3–4 weeks' wool. Shearing and dipping are regarded as important times when cheesy gland infection is spread.

The organism can also infect unbroken skin. Infection can also occur by the rubbing of pus or contaminated dip on the unbroken skin of recently-shorn sheep. Dipping 'off shears' in dip contaminated with the organism can also cause rapid spread of infection. After passing through the skin, the organisms travel to the lymph nodes and release a toxin which destroys the lymph node tissue. The result is an abscess that often contains large amounts of greenish pus. After a few weeks, the pus becomes dry and 'cheesy' in appearance. Abscesses then commonly occur in the point of the shoulder and the flank. For further information, see Agfact A3.9.21 *Cheesy gland caseous lymphadenitis in sheep*.

### Recommendations:

- Buy breeding sheep and replacement wethers from properties that have a regular cheesy gland vaccination program.
- When new sheep arrive on your property, ensure that vaccination for cheesy gland is included in the routine treatment program for the sheep.

## SCABBY MOUTH

Introducing susceptible sheep on to a property already infected with scabby mouth can cause problems. Susceptible sheep should, therefore, be vaccinated. Alternatively, the flock should be closely observed when they are most vulnerable to infection (for example, when they are grazing in paddocks with a lot of thistle). If an outbreak does occur, vaccination can then help to reduce production losses.

Scabby mouth is a highly-contagious viral disease of the skin of sheep and goats which usually affects lambs and kids in their first year of life.

It can also infect humans. Infection usually causes scabs and pustules around the lips but it can also affect the udder and the skin around the coronet and pasterns.

## POISONOUS PLANTS AND WEEDS

Seeds of weeds and poisonous plants embedded in the wool of introduced sheep can cause problems in the future. Some examples of these problem plants are Paterson's curse, St John's wort, khaki weed, thistles and Bathurst burr. Therefore, if there are high levels of contaminating seed in the wool of new sheep, restrict them to certain areas and consider specific weed control in the future. Early shearing might also be considered if an infestation is severe.

## HYDATIDS

Even a property with a careful hydatid control program runs the risk of introducing hydatids through infected sheep.

### Recommendations:

- Do not feed offal to dogs.
- Ensure that farm dogs have no access to dead sheep in the paddock.
- If there is a risk of hydatids occurring, consider a treatment control program for all your dogs. Consult your veterinarian for advice.

## LIVER FLUKE

Sheep from flukey properties can easily introduce this infection onto clean properties. Graziers with a routine fluke control program should therefore be aware of the risk of introducing fluke-infested sheep. A WormTest might also be considered to monitor for fluke. For further information on liver fluke, refer to *Agfact A0.9.57 Liver fluke disease in sheep and cattle*.

### Recommendations:

- Obtain information about the origin of stock and any previous treatments for liver fluke.
- If new stock have come from flukey areas and have not been treated recently, they should be treated with an efficient flukicide (preferably triclabendazole) to kill immature fluke as part of the quarantine drench.
- Place the sheep on an appropriate fluke control program if this parasite is known to occur on your property.

## CHEMICAL RESIDUES

There are no tests that can be carried out in saleyards to detect chemical residues in either meat or wool. However, graziers should keep accurate records of where sheep were purchased and, if possible, records of earmarks or ear tags. Residues of particular concern include those for chemicals which are no longer registered for sheep treatments such as arsenic; organochlorines like dieldrin; or existing chemicals such as organophosphates which have been used inappropriately. Wool contaminated with these residues present an occupational and environmental hazard which means it is severely discounted in the marketplace.

## SHEEP IDENTIFICATION

The National Flock Identification Scheme (NFIS) was introduced in July 2002 as a voluntary scheme developed by industry for the permanent identification of sheep and lambs. The scheme uses colour-coded, visually-readable ear tags printed with a Property Identification Code (PIC) and the NFIS logo. Trace-back is achieved by documenting PICs on a current National Vendor Declaration (NVD) when sheep are sold. Sheep producers are encouraged to adopt the NFIS as an effective system for identifying and tracing sheep.

This is to help determine the origin of any chemical residues or disease if contaminated or infected sheep are traced back to the property of origin.

## SUMMARY

- Graziers should be aware of the disease risks of introduced sheep and should take appropriate preventive measures. Graziers must realise that saleyard inspections give no guarantee of freedom from disease. There is a need for graziers offering healthy sheep for sale to emphasise this point.
- Request a copy of the Animal Health Statement with as much information as possible from the vendor about previous treatments in the flock.
- If possible, quarantine new sheep from other sheep on your property until they have been through a period where the major diseases could be expected to show up. With lice, this means keeping introduced sheep separate from the main flock for up to three months or until they have been treated. With footrot,

the introduced sheep should be kept separate from other sheep on the property until they have been through a period when conditions are conducive to the spread of footrot.

- Don't import resistant sheep worms. Seek advice on treatment of sheep when they arrive on your property. In general, introduced sheep should be drenched with a highly-effective combination of drenches and then started on a worm control program suitable for your area.
- Put new sheep on an appropriate vaccination program when they arrive on the property.
- Graziers offering sheep for sale should promote the disease-free status of their flock – for example, by using the Animal Health Statement and National Vendor Declarations (NVD).

## OJD and sheep movement

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A new national approach to the management of OJD (NAOJD) is in place following the end of the six year National Ovine Johne's Disease Control and Evaluation Program (NOJDP). The new approach, which commenced on 1st July 2004, has three main objectives:

- areas currently free of disease remain free,
- area prevalence will be maintained or reduced for the Very Low Prevalence, Low Prevalence and Medium Prevalence Areas, and
- area prevalence will be reduced in High Prevalence Areas such that prevalence area status may be reviewed in the longer term,

and is underpinned by four key elements:

- Removal of zones and zone-based trading restrictions,
- Establishment of prevalence areas,
- Establishment of a nationally agreed trading system using Animal Health Statements and assurance-based credit (ABC) points,
- Unrestricted access to Gudair Vaccine.

NSW has phased in a new approach to OJD management that is consistent with the NAOJD, and is underpinned by mandatory use of Animal Health Statements. While NSW includes four different prevalence areas, reflecting a

gradient of estimated infection levels, the state is essentially managed in two parts.

**The Management Areas**, mainly comprising the higher prevalence areas, encourage producers to manage their own risk by using strategies such as vaccination, on-farm management and informed purchase of sheep.

**The Exclusion Areas**, comprising most of the very low prevalence regions, have demonstrated local producer support for self-funded and self-managed district programs designed to slow the potential spread of OJD into and within the area.

An owner is required to notify an Inspector if they know a flock is infected. A vet is required to notify an Inspector if they suspect or know a flock is infected. Any breach may result in regulatory action.

The onus is on the landholder moving the sheep into the EA to obtain the Animal Health Statement and provide a copy of it, as well as the landholder's name and details of the destination of the sheep, to the RLPB within seven days before or after the movement.

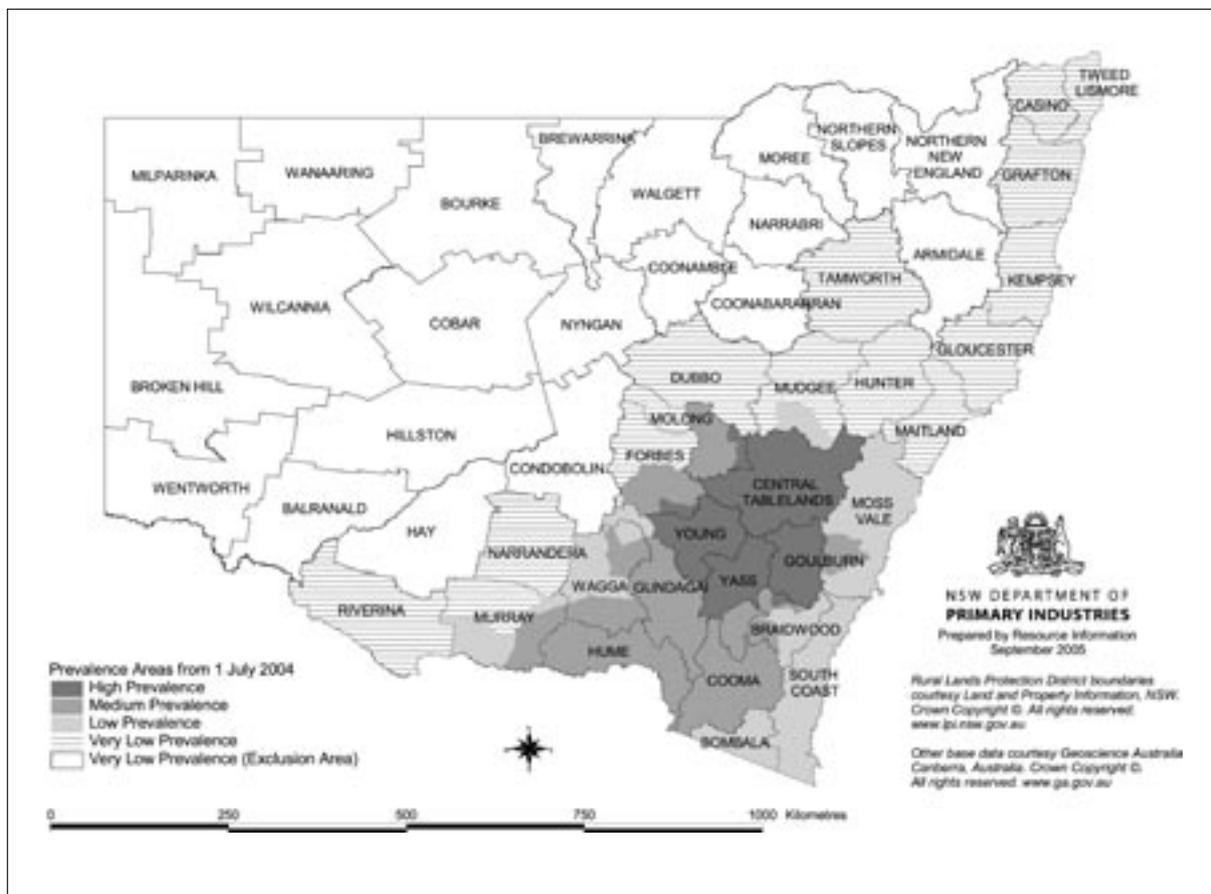
Individual landholders, including the owner of a saleyard or showground, or a RLPB in control of a TSR, may require a minimum OJD standard for entry of sheep onto that land. However, an EA can only recommend a minimum OJD standard for entry of sheep into the EA.

### Key Principles:

- OJD is a notifiable disease. An owner is required to notify an Inspector if he/she knows a flock is infected. A vet is required to notify an Inspector if he/she suspects or knows a flock is infected. No regulatory action or investigation is required following notification.
- The Animal Health Statement is mandatory for all sheep sold as re-stocker or moved for agistment; it is signed by the seller, and accompanies the sheep and provides a prospective buyer with an indication of OJD assurance or risk, using assurance based credit (ABC) points. ABC points provide assurance for trade but are not required for movements within NSW, however, may be required for interstate movements. The statement provides other information as well, and may be used as a Travelling Stock Statement.
- SheepMAP approved vets are responsible for certifying approved vaccinates. NSW guidelines for approved vaccinates are:
  - lambs vaccinated by 16 weeks of age,

- sheep vaccinated over 16 weeks of age in flocks participating in the SheepMAP,
- sheep vaccinated over 16 weeks of age in flocks in very low and low prevalence areas, where there is no known risk of exposure prior to vaccination.
- Owners of flocks that are known or suspected to be infected are required to indicate this under category A of the Animal Health Statement. Resolution of suspicion is normally the responsibility of the owner and an approved vet, with advice available from DVs and DPI vets, or from the OJD vet panel. Infection is normally confirmed by laboratory testing, i.e. positive histopathology or positive culture. However an owner filling out an Animal Health Statement may conclude, on other evidence, that his/her flock is infected.
- PDMPs may be developed for flocks suspected of being infected, but approved vets are generally advised against certifying low-risk sheep from such flocks until suspicion has been resolved by veterinary investigation, normally including testing. Note: in some cases intensive investigation is unable to resolve suspicion in the short-term eg high-risk introductions only resident for a short period of time, and recently destocked prior to investigation.

**Figure 6. OJD prevalence areas**



# Bovine Johne's disease zoning

Zoning is an internationally accepted principle for disease control. The aim of zoning is to help stop the spread of a disease from an area of higher-disease risk to one of a lower-risk. Zoning is being used as part of the overall program for the control of Johne's disease in cattle in Australia.

Zones in Australia are ranked as 'Residual', 'Control', 'Protected', or 'Free' – depending on the level of disease and the control measures that are in place. There are specific requirements that have to be met to move animals from a lower zone to one of a higher status.

## Declared Zones

A **Protected Zone for BJD** is assessed as an area where there is low risk of the disease being present. There are restrictions on the movement of stock into the area from Control and Residual Zones.

A **Control Zone** is an area where there is still a significant level of disease. There are movement restrictions into the area from areas of lower status (Residual Zones).

## PURCHASING STOCK

It has always been a problem when purchasing stock to obtain an assurance that they are not affected by Johne's disease. As the disease is not always obvious, an owner's assurance in itself is not adequate. The Market Assurance Program (MAP), however, provides the best possible assurance of this as stock enrolled in this scheme have a very-low risk of carrying infection.

### Market Assurance Program

The Market Assurance Program is a nationally-accepted scheme whereby owners submit their stock to a whole-herd test and adopt a high-level of management to minimise the risk of disease introduction. If the test results are negative, the herd is given the status of 'Monitored Negative' (MN). Zoning provides another level of assurance, particularly when Market Assurance stock are not available at the time you want them.

### Beef Only

The *Beef Only* classification recognises the fact that BJD is far more common in dairy herds

than in beef herds, and that beef herds present a much lower risk of introducing the disease. A beef herd can be classified as *Beef Only* if it meets **all** of the following five requirements at the time the declaration is made on the BJD Animal Health Statement.

1. No animal has been part of a herd classified as 'Infected' (IN), 'Suspect' (SU) or 'Restricted' (RD).
2. No animal has had contact with dairy cattle or dairy-cross cattle at any time during the previous 5 years, unless those dairy cattle were from a herd enrolled in CattleMAP.
3. No animal has grazed on land on which adult dairy cattle (2 years old, or older) have grazed in the previous 12 months, unless the dairy cattle were from CattleMAP herds.
4. Any animals for sale from a Beef Only herd that were not born in the herd must have been introduced into the herd or onto the property from herds which are of the same (Beef Only) or higher status (BC-TAS, MN1, MN2, MN3) for bovine Johne's disease (BJD) and must have come with a BJD vendor declaration to that effect.
5. Any animal which is for sale as Beef Only must be individually identified under the National Livestock Identification System (NLIS).

Cattle from *Beef Only* herds must be identified on, and accompanied by, a **completed approved vendor declaration (BJD Animal Health Statement)** issued by the owner or person in

### Order of risk for buying stock

**Best bet**

- Stock from a level 3 (MN) herd in the MAP from any zone
- Stock from a level 2 (MN) herd in the MAP from any zone
- Stock from a level 1 (MN) herd in the MAP from any zone
- Stock from a Protected Zone
- CHECKTEST stock from a Control Zone
- Untested stock from a herd in a Control Zone
- Untested stock from a herd in a Residual Zone



**Worst bet**

charge of the animals, which declares that all the above criteria have been met. **The purchaser should retain this BJD Animal Health Statement, preferably for the lifetime of the cattle to which it applies**, so that it can be made available to an inspector should any question as to the cattle's status occurs.

The *Beef Only* classification is accepted for entry into a Protected Zone in:

- NSW
- Tasmania
- South Australia

but is not accepted by:

- Queensland
- Northern Territory
- Western Australia

without additional testing. (Victoria does not have Protected Zones.)

## MOVEMENT RESTRICTIONS

### Into a Protected Zone

The borders of Protected Zones are not closed, but stock do have to meet certain requirements. Producers and agents outside of Protected Zones should also be aware that certain movements are still allowed with minimal restrictions.

People moving cattle into a Protected Zone should consult the most recent version of Agnote

DAI-322 *Stock permitted into NSW BJD Protected Zones*. Essentially, controls are aimed at stopping the widespread movement of untested stock that may be carrying infection.

Breeding stock coming into these areas must come from herds in other Protected Zones or from herds that have enrolled in the MAP and have a status of at least MN1, meet the *Beef Only* criteria or are from a CHECKTEST herd.

## CHECKTEST

A CHECKTEST herd is one in which 50 of the older adult animals have tested negative for BJD in the previous 12 months. The testing must be done by an approved veterinarian. The status can only apply to home-bred stock and is valid for 12 months.

## Exemptions

- Steers are considered to be a minimal risk of BJD as they are usually slaughtered before they have the opportunity to pass on the disease – no restriction (there are, however, restrictions on steers from Residual Zones, such as from Tasmania).
- Stock going direct to abattoirs – no restriction.
- Cattle going to special 'slaughter-only' saleyards or sections of saleyards – no restriction.
- Some feedlots, where all stock leaving that

Figure 7. BJD zones



feedlot go directly to an abattoir, may be allowed to take stock without restriction – those feedlots have to be ‘approved’ (see your district veterinarian).

- Some other movements may be approved as specific exemptions such as for agistment, heifer-rearing, and movement to dry runs.

### Notes on restrictions

The intention of zoning is to apply disease control principles with the minimal possible disruption to normal stock movement and trading patterns.

Protected Zones, though, have to collect monitoring test data over several years before they are in a position to mount a case for Free status – the next stage of zoning.

To obtain the necessary certification or to obtain advice on specific movements of stock into Protected Zones, you should consult your local RLPB.

## SUMMARY

- Stock can move without restriction from a Protected Zone to a Control Zone.
- Stock can move without restriction from a Protected Zone to another Protected Zone.
- Stock can move without restriction from a Control Zone to another Control Zone.
- Stock cannot move from a Control Zone to a Protected Zone unless:
  - they are from a MAP herd;
  - they are from a CHECKTEST herd;
  - they are *Beef Only*, or
  - they are steers or are exempt, as listed above.

As zoning is an important part of the solution to Johne’s disease, producers and others in the industry should work together to make the system work.

The goals of the Australian cattle industry include reducing Johne’s disease contamination of farms and farm products and protecting the status of non-infected herds and regions.

# Reassessing water requirements after a drought

As you come out of drought, a reassessment of your water needs should be part of your property management plan.

## STOCK AND DOMESTIC SUPPLIES

After a drought, it is important to reassess your property’s stock and domestic watering system in the light of what was learnt during the drought:

- Were there sufficient watering points in all paddocks?
- Were dams/tanks big enough?
- Were dam catchments able to be maintained satisfactorily?
- Were bores, pipelines, pumps and troughs adequate?

Dams/tanks which may have become partially-filled with silt, manure and other debris from bare catchment areas will have a reduced capacity. During drought, many landholders will take the opportunity to de-silt tanks and dams.

Adequate groundcover should, therefore, be maintained in water catchment areas and constructed waterways in order to keep water clean and prevent a loss of capacity. The area around the inlet is particularly important, and good cover here can act as a filter and as a silt trap.

The NSW Department of Natural Resources, formerly the NSW Department of Land and Water Conservation (DLWC), provides advice and assistance in farm and domestic water supplies of all kinds. Low-interest loans are available for farm water supplies and systems. The *Cap and Pipe the Bores* program also provides assistance to minimise the wastage from artesian bore drains.

## IRRIGATION

Limited irrigation water during droughts is best used on permanent or the most valuable crops

– it is better to adequately-irrigate a small area than to under-irrigate a large area.

If soil below the root zone is saline, salt may also move up the soil profile during drought. Unless rains have been sufficient to flush accumulated salts from the root zones of crops, additional irrigation water should be applied and the depth of the wetted soil profile checked to ensure that the root zone has been flushed.

During drought, irrigators have the opportunity to check over their system so that it is able to be operated efficiently when irrigation water is again available. All the mechanical and delivery components of the system should be checked (in both pressurised and surface irrigation systems).

After long periods of not being used, check the system carefully for blockages caused by dust, insects, and other debris in pipes and sprinkler outlets, and flush the system thoroughly.

After a dry spell, the opportunity should be taken to frequently monitor the infiltration depth of rainfall and irrigation. This will indicate when there is enough water available within the crop root zone. Using a moisture monitoring device, such as a soil probe or tensiometer, will indicate where water is within the soil profile.

## **WATER QUALITY**

During drought, the quality and flow rate of water in unregulated rivers and streams may deteriorate. In tidal sections of rivers, the salt can also move considerably further upstream than would be the case in a normal dry spell.

After rain, the quality of water in some streams may be variable and should be monitored before using it for stock, garden watering or irrigation of crops.

## **FURTHER INFORMATION**

- Agfact A0.5.4 *Water requirements for sheep and cattle*
- Agfact AC.2 *Farm water quality and treatment*

## **FURTHER ASSISTANCE**

- Advice on your irrigation system is available from your local NSW DPI Irrigation Officer.
- Assistance with advice on stock and domestic supplies can be obtained from the NSW Department of Natural Resources.



NSW DEPARTMENT OF  
PRIMARY INDUSTRIES

## Section 5

# Financial management

- **Financial management during drought recovery**
- **Tax issues for livestock producers during and after drought**
- **Sources of market information**
- **Planning for future droughts**
- **Appendix 1: Current drought publications**
- **Appendix 2: NSW DPI offices**
- **Appendix 3: NSW Guide to Drought Support Services**
- **Appendix 4: StockPlan**
- **Appendix 5: Restocking after drought**

# Financial management during drought recovery

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*Rain rekindles hope, but cash flow budgeting assists in establishing the facts – can borrowings be repaid? The opportunity exists to confront the reality of the farm financial situation and consider all opportunities both within and outside farming.*

Fran Rowe, Chair, Rural Assistance Authority Board

When conditions are changing dramatically after substantial rainfall, careful financial planning will assist you to cope with the many decisions that you are going to have to make about the future of your farm and your family.

Most farmers will find that their financial position has deteriorated during the drought because of crop failure, fodder costs, or the fact that stock numbers have been reduced and will need to be replaced when you are sure the drought is over.

## ASSETS AND LIABILITIES

It is important that you try to prepare a statement of assets and liabilities to calculate equity in your property and to prepare a cash-flow projection of anticipated monthly income and expenses for at least 12 months.

As a general rule for mainstream agriculture, it is desirable to have equity of at least 75 per cent. Equities lower than 70 per cent should be viewed with caution, and one option is to give consideration to actually selling the farm! A farm decision-making checklist is included below for your use.

## PREPARING A CASH-FLOW PROJECTION

A cash-flow projection is prepared by estimating the value of produce to be sold and when the expenses in this produce will be incurred. A cash book of income and expenses for previous years is a valuable aid in preparing a cash-flow budget.

Help in preparing a cash-flow budget is available from a number of people, such as your bank manager, accountant, rural counsellor or a farm consultant. Make sure that you provide realistic estimates of your financial commitments, including interest and principal. If machinery and motor vehicles are due for replacement, then be realistic in including an allowance for that as well. However, as a general rule in difficult financial times, machinery or motor vehicles should only be replaced if it is absolutely necessary.

## WHEN YOUR CASH-FLOW SHOWS A FINANCIAL PROBLEM

If your cash-flow budget shows more anticipated expenses than income, what can you do about it? Are there good reasons for this shortfall? A substantial outlay may have been budgeted for in the next 12 months for restocking. If this is the case, and income will not be back to normal in the next 12 months, you may need a longer cash-flow projection. If your projections show that you expect cash-flows to improve after the first year, it is in your interests to prepare a cash-flow projection beyond 12 months to show your bank. You may be able to convince the bank that your risk is short-term and hence have your interest margin reduced.

## OPTIONS TO IMPROVE CASH FLOW

### Buying stock versus breeding-up numbers

Buying stock to replace those sold in the drought will initially reduce cash-flows but at a later stage it will improve cash-flows when the progeny from the purchases is ready for sale. A useful measure to judge whether it is worth your while purchasing cattle is to look at the return on capital tied up in livestock. If, for example, you are considering breeders which will return an expected gross margin per head of \$300 per year, and the purchase cost of the breeder is \$700, then the return on livestock capital is 43 per cent. This return is sufficient to pay interest on borrowings plus some principal, so unless you slip back into drought, the example used would show that in the longer-term, buying cattle will produce a better cash-flow than would breeding-up. However, a cash-flow for each of the breeding and purchase options would be required to see how long it takes for the purchase option to get in front (see *Restocking after a drought*).

## Sheep versus cattle

Historical returns on livestock capital have generally been considerably higher for sheep than for cattle and the total cost of stocking a paddock with sheep compared with that for cattle has generally been lower. With recent increases in ewe prices, however, returns for sheep and cattle have been closer on a livestock capital basis, but they still generally favour sheep. If your country is suited to both sheep and cattle, and you have the facilities and labour to handle both, sheep are likely to cost less and are likely to pay for themselves more quickly than will cattle.

The final result will depend on the prices paid for sheep and cattle products over the next few years. For help in choosing enterprises, see the section on outlook information below.

## Planting that extra paddock of crop

If stock numbers are low, then an option in cropping country is to plant more crop than you normally would. It is advisable, to prepare a gross margin estimate for the crop you have in mind. Sample gross margin returns are available for winter crops in the major cropping districts. Contact your nearest NSW Department of Primary Industries (NSW DPI) office for copies.

Compare gross margin returns for winter crops with the likely gross margin returns you would expect from a livestock-based enterprise to see which enterprise is more attractive. Cropping requires an outlay for cultivation, seed, fertiliser and chemicals. Stocking that same paddock to the recommended carrying capacity with either sheep or cattle is likely to be more expensive.

Your crop price projections should be based on outlook information or on the cash prices being presently offered for the end-of-season crop, not on present grain prices. If the next winter crop harvest is near to average or better, prices for all grains will fall considerably from their present levels. See the section on sources of outlook information for more detail.

Bear in mind that if machinery capacity is being stretched, an extra paddock could mean that the timing of operations may not be optimal and yields may be down. In addition, cropping the paddock this year may limit your options for the following year. Yield potential in following years may also be reduced, so that a crop planted one year will boost the cash-flow in that financial year but may reduce the cash-flow for the following year. See *Winter cropping following drought* and *Soil management following drought*.

## Reducing costs

Take a close look at all major cost items to see if there is scope to reduce costs in a certain area. It may be time to consider whether the leased four-wheel-drive is really necessary or whether a more modest vehicle can get you through until things pick up.

Do you have any machinery items which are not being used regularly that could be sold? Look especially at those items of machinery which are being used for work that could be done by a contractor.

It is generally not prudent to reduce costs involved in production, such as drenches or cropping fertiliser, but a very close look at your major overhead costs may well indicate some areas where you could limit expenditure.

Even though initial interest rates may be higher, consider locking into fixed interest rates so that you will know what your total interest bill will be.

Review your subscriptions, and discuss your bank fees with your bank manager to see if there is room for improvement. Check that professional fees are in line with what other people are paying, and consider paying your shire rates by instalment.

## Refinancing

Your cash-flow budget will indicate whether there is a need to refinance. If your overdraft does not fall to zero for any month for the next 12 months, this indicates that your hard-core debt has increased and that you should consider transferring some of your overdraft into another form of financing at a lower interest rate. A budget, especially one that projects for a number of years, will give an indication of the best form of finance to aim for. You will also be in a better position to know whether you require short-term or longer-term finance.

The Rural Assistance Authority (RAA) will assist eligible farmers in getting back on their feet through interest subsidies for farmers in areas listed as affected by drought exceptional circumstances. Details of this scheme and eligibility criteria are available from the RAA.

For a new loan it is worth calculating the effective interest (including costs). Annual charges and the establishment fees can add significantly to the cost of a loan.

To calculate your own effective rates of interest, the publication *Understanding the Cost of Farm Finance*, available from the Australian Bankers'

Association (ABA) website at: [www.bankers.asn.au/default.aspx?ArticleID=713](http://www.bankers.asn.au/default.aspx?ArticleID=713), contains a very good method of comparing loans.

If an existing loan has an effective interest rate (including costs) which is higher than an alternative loan, it may also be worth changing, but make sure any costs involved with early settlement of the loan are included in the calculations.

A cash-flow budget is part of the information useful to your bank manager.

Other information that will assist you in putting together a business plan to provide the best case possible is covered in the section 'What do the banks want'. It covers some of the factors that banks use to decide your interest rate margin and the range of information useful to the banks. The list seems long, but farm businesses that have been through the process have a much clearer picture of the direction they wish to head, and consider the preparation time was time well-spent.

Your rural counsellor is very experienced with loan negotiations and can give you some pointers.

## IF THE BUDGET IS STILL POOR

If you cannot make the budget look reasonable with realistic projections over 2–3 years, it may be best to consider getting out. There are plenty of farmers who have made a success of life after farming, while others who have sold their farms have remained in agriculture as employees or managers, or have leased some country.

It may be difficult to consider these options in isolation, and it is helpful to get another opinion from a rural counsellor, a drought support worker or a farm consultant.

If you are in the areas which have been listed as experiencing exceptional circumstances, you may be entitled to an exceptional circumstances relief payment. These are included under the 'Farm Help' package run by the Federal Government.

## Farm debt mediation

Under the *Farm Debt Mediation Act 1994*, a creditor under a farm debt must serve written notice on the farmer advising the farmer of the creditor's intention to take possession of the farm property or other enforcement action under a farm mortgage. The creditor must offer the farmer mediation regarding the farm debt.

Mediation is a structured negotiation process in which the mediator, as a neutral and independent person, assists the farmer and the creditor in attempting to reach agreement on the present arrangements and future conduct of financial relations between them.

Mediation is a simple, voluntary and confidential process that is quick, accessible and affordable.

There are certain time lines under the Farm Debt Mediation Act that a farmer must comply with. For further information, contact the NSW Rural Assistance Authority on 1800 678 593 (toll free) or (02) 6391 3013.

## What do the banks want?

Relationships between farmers and their lenders have gone through a period of significant change over the last 15 years, primarily as a result of the stock market crash in the late 1980s and the rural recession. Bankers have changed the way they appraise loans; farmers need to change the way that they prepare for loan applications and annual reviews, particularly in the context of drought.

At your annual review, the bank evaluates not only your performance, but also your perceived level of risk. This risk is reflected in your margin or in the additional price you pay for the loan.

Lenders used to be more preoccupied with security than the ability to repay. They used to ask borrowers to submit a list of assets and their value, from which a borrowing limit would be calculated depending on the type of security offered. However, the collapse of the property and stock markets in the late 1980s, coupled with a rural recession and the large bank losses that followed, particularly on corporate loans, rendered this technique virtually useless and also very costly to the banks.

In response, the banks initiated a new technique of risk-rating loans. This is a grading system which reflects the quality of the loan and hence the risk to the bank. It is also used to reflect the margin that the customer is expected to pay. Obviously, the riskier the loan, the higher the margin.

This risk-rating technique has switched the emphasis from security to the ability to repay both principal plus interest. While banks often will not divulge the basis for their grading systems, they usually cover three broad areas:

- management factors
- financial factors
- industry factors.

As banks are now reviewing a broader range of aspects of farm businesses, increasingly they request comprehensive business plans at the customer's annual review.

## Your business plan

A business plan is far more than a financial plan. It is more comprehensive and covers all facets of your farm business. It should set out, in a logical manner, the current position of your business. The basic components of your business plan should include the following:

- **A clear, concise title page**, with your business name and contact details.
- **An executive summary**, outlining the amount and type of loan applied for, giving the bank the opportunity to accept, modify, improve or reject the loan. Clearly state the purpose of the loan and how it will be repaid. Also, briefly describe the business structure (sole trader, partnership, trust or company).
- **A mission statement**, detailing your goals and direction of the farm.
- **A management profile**. One of the most important resources of a farm business is its staff – remember that banks lend to people, not to the land. For this reason, it is important to highlight the experience, qualifications and background of all members of the farm family.
- **A physical plan**. Banks place a major value on your major asset or land. It is in your interest to present it in its best light. Include location maps or photos, discuss any special attributes, such as highway frontage, closeness to town, or soil fertility. If you have a property management plan, offer it.
- **Enterprise or production plans**. Discuss such things as additional costs over and above the usual as a result of the drought breaking or expected commodity prices (both paid and received). This enables the banker to understand the differences in the budget you forecast when the drought breaks compared with your actual performance in previous years.
- **Development plans**. Highlight any strategic plans or significant changes from previous years, e.g. anticipated capital purchases in coming years, or changes to enterprise mix or management control. Discuss any areas where there is a slightly longer pay-off period, such as breeding programs and spreading lime.

- **Marketing plans**. Banks like to see attempts to manage income as well as costs. Examples may include negotiating reduced commissions; having a range of selling methods such as selling direct to feedlots or abattoirs; or perhaps production changes in micron (fibre diameter) or breed to meet client requirements. This section also provides the opportunity to include copies of any media articles received through the year.
- **Financial plans**. By placing this section last, the bank has had a chance to build-up a perception of what the finances will look like without any unpleasant surprises. Banks will often ask for the last 3 years' tax records, but they should be accompanied by the last 3 years' management records, giving the banker a more complete picture of the farm's performance. They will also expect a cash-flow statement along with a list of assets and liabilities. Also include details of any insurance policies held.

This sounds like a lot of preparation but it will reap significant rewards when negotiating at your interview. It is often said 'the art of negotiation is in the preparation'. Remember that the depth, detail and understanding demonstrated in the loan proposal document will reflect the character, attitudes and values of your farm business. It will show your ability and commitment to servicing the loan, repaying the capital, and generating a return on the bank's investment in your business. It will also directly influence the bank's perception of your professionalism and, hence, the margin you pay.

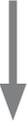
It is important for you to be aware that every year the banks are designing new products. It is therefore important that well before your annual review you investigate the alternatives..

## FARM DECISION-MAKING CHECKLIST

The 'Farm decision-making checklist' (following page) was adapted from the Commonwealth Bank booklet FARM (Finance, Agriculture and Rural Management), third edition, 1992.

## Farm decision-making checklist

<p><b>1. Are debt repayments a significant problem for me?</b></p>	<p>YES ▼</p>	<p>NO ▼</p>
<p><b>2. Can I reduce my debt repayments?</b> Consider, for example:</p> <ul style="list-style-type: none"> <li>• seeking lower interest rates;</li> <li>• extending the period of the loan;</li> <li>• seeking an interest-only loan;</li> <li>• selling some less-productive assets to repay some or all of the loan, for instance, the 'back' paddock;</li> <li>• repay the stock and station agent;</li> <li>• machinery that could be hired or contracted instead;</li> <li>• livestock that could be replaced by agisted stock.</li> </ul>	<p>←┘ YES ▼</p>	<p>←┘ NO ▼</p>
<p><b>3. Can we increase our family income?</b> Consider, for example:</p> <ul style="list-style-type: none"> <li>• increasing crop yield;</li> <li>• increasing crop area;</li> <li>• increasing livestock numbers;</li> <li>• increasing marketing percentages;</li> <li>• increasing growth rates;</li> <li>• improving product quality;</li> <li>• improving marketing;</li> <li>• introducing new enterprises;</li> <li>• getting a job off-farm;</li> <li>• investing in an off-farm business;</li> <li>• contracting or share farming.</li> </ul>	<p>←┘ YES ▼</p>	<p>←┘ NO ▼</p>
<p><b>4. Can I reduce my costs?</b> Consider, for example:</p> <ul style="list-style-type: none"> <li>• minimum tillage;</li> <li>• rationalising your machinery;</li> <li>• reducing wastage at harvest and in storage;</li> <li>• sharing your machinery or specialised buildings with neighbours;</li> <li>• sell equipment under hire purchase or lease;</li> <li>• using sires longer;</li> <li>• reviewing feed purchases;</li> <li>• improving fuel efficiency;</li> <li>• reducing hired labour;</li> <li>• lowering your sights;</li> <li>• altering your lifestyle;</li> <li>• reducing personal costs.</li> </ul>	<p>←┘ YES Prepare gross margins for the enterprises currently on the farm, and also look at other possible enterprises. ▼</p>	<p>←┘ NO ▼</p>

<p><b>5. Can I now see any action that I can take to improve our situation?</b></p>	 <p><b>YES</b> Prepare a cash flow budget for the coming 12 months.</p> 	 <p><b>NO</b></p> 
<p><b>6. Will I now have enough cash to pay my bills as far as I can see into the future?</b></p>	 <p><b>YES</b></p> 	 <p><b>NO</b></p> 
<p><b>7. Will this new situation offer me and my family a satisfactory life?</b></p>	 <p><b>YES</b> <b>STAY WITH IT!</b></p>	 <p><b>NO</b></p> 
<p><b>8. It seems clear that I cannot continue to farm my own land. Can I see any other ways of continuing to work on the land in a satisfying manner, apart from owning my own land?</b></p> <p>Consider, for example:</p> <ul style="list-style-type: none"> <li>• selling, and working for another farmer;</li> <li>• selling, and leasing the farm land;</li> <li>• selling, and leasing a more productive farm;</li> <li>• selling livestock and machinery, leasing the farm to someone else, and working for another farmer.</li> </ul> <p>You would be well-advised to discuss your plan with your family, your banker, your accountant and your solicitor in order to see if there are any hidden traps. If there are not, proceed as quickly as you can without unduly jeopardising the price you will receive for your land, livestock and machinery.</p>		

## FURTHER ASSISTANCE

### Outlook information to prepare your budgets

The Australian Bureau of Agricultural and Resource Economics (ABARE) prepares detailed Outlook information in February and further updates during the year.

Farmers are increasingly subscribing to the range of newsletter services and 'infofax' services available for grains and livestock products. These services not only help in arriving at a realistic budget estimate, but are

even more valuable close to the point of sale when prices are being negotiated.

### Further information

- Spackman, G. (1994) 'Surviving and Recovering from the Drought', *The Australian Farm Manager*, 5:3. (Mainly financial considerations when preparing for recovering, including preparation of a farm business plan.)
- Australian Bankers' Association, *Understanding the Cost of Farm Finance*.

# Tax issues for livestock producers during and after drought

Disclaimer: While the content of this article is considered accurate, conflicting comments were received from the accounting profession. In addition the Australian Taxation Office (ATO) was not prepared to give an opinion on a general article such as this. Individuals should seek specialist advice from their tax advisers, which specifically apply to their particular situation. If doubt still exists, an individual ruling can be sought from the ATO.

A number of tax concessions are available to livestock producers experiencing drought. These concessions generally defer tax liabilities to later years. This can be particularly important for livestock producers who are faced with a situation of increased costs in handling the drought and limited funds for drought recovery.

Farmers can apply for these concessions when their area has been officially drought-declared.

Producers that sell breeding stock during a drought have a number of options in the way they declare the income from the forced sales and also in their restocking strategy. These options include:

- Option 1: Include the whole of the proceeds from the disposal of the animals in the year of disposal and re-purchase breeders when the drought has finished.
- Option 2: Include 20 per cent of the proceeds in the year of income and a further 20 per cent of the proceeds in each of the four following years.
- Option 3: Defer declaring the sale of animals until after replacement stock have been purchased.
- Option 4: As per Option 3, but only a portion of the number of replacements are purchased in the year following the drought. Additional heifer replacements would then be retained to increase the herd to the original size.

## How livestock trading profits are calculated

It is necessary to understand the livestock trading account system that is used to calculate profit or losses made from livestock enterprises. A simplified trading account calculation is as follows.

Trading profit	=	Gross sales
	plus	Value of stock on hand at end of year
	plus	Value of stock killed for rations
	minus	Value of stock at start of year
	minus	Value of purchases

A complete livestock trading schedule also includes a section to cover losses or deaths. This has been left out, however, because the impact is negligible and would have the same impact on each option.

The value of stock-on-hand includes valuing any natural increase (calves bred on the farm during the year). Natural increases of stock during the year can be valued at cost, market selling value, or replacement value. Cost is whichever of the following you elect:

- actual cost of the calf; or
- cost prescribed by the regulations (cattle, horses and deer \$20; pigs \$12; emus \$8; goats and sheep \$4; poultry 35 cents).

Most farmers tend to record the value of natural increase at the minimum prescribed by regulations. This reduces tax in the year of declaration but, when the progeny are actually sold at much higher values, they incur additional tax in that year. For farmers that have valued their natural increase at higher rates, more tax is paid initially but less tax is paid in the future. The value of the animals as submitted to the tax office is commonly termed the 'book value'.

As trading profit is calculated in this way, an apparent loss in market value due to drought does not automatically result in a loss for tax purposes. In fact, when book values for stock are low, the reverse can happen. For example, if the market value of animals prior to drought was \$600 per head but they are sold for \$400 per head on a low market there is not necessarily a \$200 loss for tax purposes. If the book value is

less than the \$400 sale price, say \$20 per head, the transaction will in fact show as a profit of \$380 per head.

However, in some cases, if losses are made in the overall farm operation, there would not be a tax bill, but losses carried forward into future years would be less.

To demonstrate the tax effect of each of the four options listed above; two 'example' cattle herds are described. Both herds have 100 cows, both have the same sale prices (\$500), both have the same repurchase prices (\$600) but they have different book values (\$40 and \$300)

	<b>Example 1</b>	<b>Example 2</b>
Book value of cows at start of year 1	<b>\$40</b>	<b>\$300</b>
Sale price during year	\$500	\$500
Repurchase price in financial year 2	\$600	\$600

### Details of calculations for option 1

To demonstrate the method used in calculating taxable profit, details of what happens using Option 1 is shown below. A summary of results of all options follows. Details of Options 2, 3 and 4 appear in Appendix 1.

#### Option 1. The entire proceeds from the disposal of the animals declared in the year of disposal

<b>Financial Year 1</b>	<b>Book value stock before sale, \$40</b>		<b>Book value stock before sale, \$300</b>	
	Number	Value \$	Number	Value \$
Opening Stock on hand [A]	100	4000	100	30,000
Purchases [B]	–	–	–	–
Gross sales [C]	100	50,000	100	50,000
Closing stock on hand [D]	0	–	0	–
<b>Taxable profit [C+D-A-B]</b>		<b>46,000</b>		<b>20,000</b>

<b>Financial Year 2–5</b>	<b>Book value stock before sale, \$40</b>		<b>Book value stock before sale, \$300</b>	
	Number	Value \$	Number	Value \$
Opening Stock on hand [A]	0	–	0	–
Purchases [B]	100	60,000	100	60,000
Gross sales [C]	0	0	0	0
Closing stock on hand [D]	100	60,000	100	60,000
<b>Taxable profit [C+D-A-B]</b>		<b>0</b>		<b>0</b>

## SUMMARY OF RESULTS

### Example 1. Effect on taxable profit of forced sale of stock where book value is \$40

Option*	Year 1	Year 2	Year 3	Year 4	Year 5
1. Declare all income up front. Buy replacement cows in year 2.	46,000	0	0	0	0
2. Profit on forced disposal spread over 5 years. Replacements bought in year 2.	9200	9200	9200	9200	9200
3. Deferred tax profit, all replacement stock purchased in year 2	0	46,000	0	0	0
4. Deferred tax profit, half replacement stock purchased in year 2	0	23,000	0	0	23,000

### Example 2. Effect on taxable profit of forced sale of stock where book value is \$300

Option*	Year 1	Year 2	Year 3	Year 4	Year 5
Declare all income up front	20,000	0	0	0	0
Profit on forced disposal spread over 5 years	4000	4000	4000	4000	4000
Deferred tax profit, all replacement stock purchased year 2	0	20,000	0	0	0
Deferred tax profit, half replacement stock purchased year 2	0	10,000	0	0	10,000

\* Note with trading stock options, total taxable profit over the five year period is higher than the alternatives because buying and selling steers has, in this example situation, generated more income.

## Effect of high replacement costs on future tax liabilities

When stock are repurchased at high values, it may be assumed that this will reduce the tax liability in the year of purchase. In this case, however, the closing stock value also rises by the same value as the purchases meaning that there is no impact on tax if the animals are retained past the end of the financial year. In subsequent years, though, breeding replacements can be introduced at a low-value which will thereby reduce closing stock values and, effectively, defer tax until the replacement animals are sold from the herd or flock

## Conclusion

When selling stock and restocking after a drought, the taxation consequences will depend on the original book values of stock. Tax can be deferred by either declaring 20 per cent of the income over the next five years or by declaring the income from forced stock sales after stock have been repurchased. In most circumstances, deferring tax would be the preferred option but, if tax rates are the same in each year, the same amount of tax is paid at the end of the five-year period and tax deferment is the only advantage. If tax rates vary from year-to-year, there could be a variation in total tax paid, depending on the

option used and the pattern of the tax rates over the five years.

There can be circumstances where delaying the tax may result in more tax being paid in the long run. The option of only repurchasing a portion of the stock can delay tax but may not be a good strategy; if it means that the property is understocked and not generating as much income as possible. Therefore, if your country is suited to growing-out steers, it would generally be better to buy steers or run sheep rather than leave the land idle. Farmers should ensure, however, that the replacement price of trading stock is reasonable when compared to the likely price that the stock are expected to receive when a sale is contemplated. The use of 'futures' should be considered as a means of reducing this risk.

A herd that breeds their own replacements can still opt to value future replacement animals at a low value and defer future tax liabilities.

Here we have offered the reader an overview of the taxation consequences of each option, however, each farming situation varies and your accountant is in the best position to recommend the best course of action for you. If doubts exist about the outcome of a particular course of action, an individual tax ruling can be applied for from the Australian Taxation Office.

## Effect of options 2–4 on taxable profit over five years. (Sale value \$500 and purchase value \$600.)

**Option 2. Profit from forced disposal is spread over five years. (A decision to use this option can be made at the end of the financial year.)**

Financial Year 1	Book value stock before sale, \$40		Book value stock before sale, \$300	
	Number	Value \$	Number	Value \$
Opening Stock on hand [A]	100	4000	100	30,000
Purchases [B]	–	–	–	–
Gross sales [C]	100	50,000	100	50,000
Closing stock on hand [D]	0	–	0	–
<b>Profit on sale [C+D-A-B]</b>		<b>46,000</b>		<b>20,000</b>
Less: Deferred profit on sale		–36,800*		–16,000**
<b>Taxable profit on sale</b>		<b>9200</b>		<b>4000</b>

\*4/5ths of 46,000 \*\*4/5ths of 20,000

Financial Year 2–5	Book value stock before sale, \$40		Book value stock before sale, \$300	
	Number	Value \$	Number	Value \$
Opening Stock on hand [A]	0	–	0	–
Purchases [B]	100	60,000	100	60,000
Gross sales [C]				
Closing stock on hand [D]	100	60,000	100	60,000
<b>Profit on sale [C+D-A-B]</b>		<b>0</b>		<b>0</b>
Plus: Deferred profit on sale*		9200*		4000**
<b>Taxable profit on sale</b>		<b>9200</b>		<b>4000</b>

\*1/5th of 46,000 \*\*1/5th of 20,000

**Option 3. Declaration of breeding stock sale income is deferred until replacement stock are repurchased in Year 2. (100 sold year 1 100 purchased in Year 2.)**

Financial Year 1	Book value stock before sale \$40		Book value stock before sale \$300	
	Number	Value \$	Number	Value \$
Opening stock on hand [A]	100	4000	100	30,000
Purchases [B]				
Gross sales [C]	100	50,000	100	50,000
Closing stock on hand [D]				
<b>Profit on sale [C+D-A-B]</b>		<b>46,000</b>		<b>20,000</b>
Less: Deferred profit on sale		-46,000		-20,000
<b>Taxable profit on sale</b>		<b>0</b>		<b>0</b>

Financial Year 2	Book value stock before sale, \$40		Book value stock before sale, \$300	
	Number	Value \$	Number	Value \$
Opening stock on hand [A]				
Purchases [B]	100	60,000	100	60,000
Gross sales [C]				
Closing stock on hand [D]	100	60,000	100	60,000
<b>Profit on sale [C+D-A-B]</b>		<b>0</b>		<b>0</b>
Plus deferred profit		46,000		20,000
<b>Taxable profit on trading</b>		<b>46,000</b>		<b>20,000</b>

Financial Year 3-5	Book value stock before sale \$40		Book value stock before sale \$300	
	Number	Value \$	Number	Value \$
Opening stock on hand [A]	100	60,000	100	60,000
Purchases [B]	-	-	-	-
Gross sales [C]				
Closing stock on hand [D]	100	60,000	100	60,000
<b>Taxable profit [C+D-A-B]</b>		<b>0</b>		<b>0</b>

**Option 4. Declaration of breeding stock sale income is deferred until replacement stock are repurchased. In Year 1, 100 are sold with 50 purchased in Year 2.**

Financial Year 1	Book value stock before sale, \$40		Book value stock before sale, \$300	
	Number	Value \$	Number	Value \$
Opening stock on hand [A]	100	4000	100	30,000
Purchases [B]				
Gross sales [C]	100	50,000	100	50,000
Closing stock on hand [D]	0	0	0	0
<b>Profit on sale [C+D-A-B]</b>		<b>46,000</b>		<b>20,000</b>
Less: Deferred profit on sale		-46,000		-20,000
<b>Taxable profit on sale</b>		<b>0</b>		<b>0</b>

Financial Year 2	Book value stock before sale, \$40		Book value stock before sale, \$300	
	Number	Value \$	Number	Value \$
Opening stock on hand [A]	0	0	0	0
Purchases [B]	50	30,000	50	30,000
Gross sales [C]	0	0	0	0
Closing stock on hand [D]	50	30,000	50	30,000
<b>Profit on sale [C+D-A-B]</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
Plus deferred profit		23,000*		10,000**
<b>Taxable profit on trading</b>	<b>50</b>	<b>23,000</b>	<b>50</b>	<b>10,000</b>

\*half of \$46,000 as \$46,000 is deferred in Year 1, but only half the replacement cattle are repurchased.

\*\* half of 20,000

Financial Year 3–4	Book value stock before sale, \$40		Book value stock before sale, \$300	
	Number	Value \$	Number	Value \$
Opening Stock on hand [A]	50	30,000	50	30,000
Purchases [B]				
Gross sales [C]				
Closing stock on hand [D]	50	30,000	50	30,000
<b>Taxable profit [C+D-A-B]</b>		<b>0</b>		<b>0</b>

Financial Year 5	Book value stock before sale is \$40		Book value stock before sale is \$300	
	Number	Value \$	Number	Value \$
Opening Stock on hand [A]	50	30,000	50	30,000
Purchases [B]				
Gross sales [C]				
Closing stock on hand [D]	50	30,000	50	30,000
<b>Profit on sales[C+D-A-B]</b>		<b>0</b>		<b>0</b>
Balance of deferred profit brought to account		23,000		10,000
<b>Taxable profit for the year</b>		<b>23,000</b>		<b>10,000</b>

## Sources of market information

Disclaimer: This chapter contains information on sources of market information. It is provided for information purposes only, and no recommendation of the accuracy or appropriateness is intended or should be implied.

### Infifax/fax services

These vary from 1–6 pages in length. They cost between \$0.60 to \$1.00 per minute.

### AWB Ltd

1902 935 674 (poll fax) The 'NSW Market Report' notes daily grain market highlights, grain prices and local contact numbers for further information.

Hotline phone number: 1800 054 433  
Risk Assist (for growers) phone number 1300 666 011.

### Livestock price information

Infifax 1902 910 711 [code]  
Sale information for beef, sheep and pigs in NSW, Victoria and South Australia. A list of codes is available from the NLRS website. Also available as recorded information service.

### Oilseed Market Update

Infifax 1902 935 350  
From Cargill Australia Ltd, lists oilseed crop price information, futures information, currency price information, oilseed crop figures of major world producers, and a list of local Cargill agents. Updated daily.

### Fruit and Vegetable Prices

Control Quality Services is an Ausmarket service, and Ausmarket operates a Infifax service for Brisbane, Sydney, Melbourne, Adelaide and Perth fruit and vegetable price reports: 1902 262 580

To contact Control Quality Services: phone 02 9746 3437

### Newsletters

Newsletters also provide up-to-date market information. It is advised to trial them before choosing one, since some take different approaches. The following is a sample of what is available.

- **FarMarCo** provides the Grain Market Review via email, fax or mail subscription, phone 1800 688 884 for more information. They also publish FUTURESWATCH, containing analysis of the futures market.
- **Profarmer** is a weekly newsletter on grains, wool and meat from the Kondinin Group, phone 1800 677 761 for subscription details.

- **ABARE** (Australian Bureau of Agricultural and Resource Economics) produces the 'Crop Report' five times a year, available by mail or fax subscription. It contains an overall assessment of crop prospects and national estimates of yield, area and production, as well as a summary of regional conditions. Phone (02) 6272 2076 for further information.

## Books

The Grain Marketing Handbook is available from the Grains Research and Development Corporation. It is a resource booklet designed to assist grain growers by enhancing their marketing strategies to improve farm gate price and profit. Available from:

GRDC Communications Section  
PO Box E6  
Kingston ACT 2604, or  
Phone: (02) 6272 5525

## Internet

Following is a list of some Internet resources that may be useful. This is not an exhaustive list and it would also be advisable to use a web search engine or index to search for topics of interest.

### General web pages

NSW Department of Primary Industries ([www.dpi.nsw.gov.au](http://www.dpi.nsw.gov.au)) – this website includes a wide range of publications and other information.

NSW Government ([www.nsw.gov.au](http://www.nsw.gov.au)) – including links to all NSW Government agencies.

Queensland Department of Primary Industries and Fisheries ([www.dpi.qld.gov.au](http://www.dpi.qld.gov.au)) – contains information on DPI&F activities and hosts some e-mail lists.

The Long Paddock ([www.longpaddock.qld.gov.au](http://www.longpaddock.qld.gov.au)) contains information on climate variability, the Southern Oscillation Index and rainfall probability maps.

The Commonwealth Bureau of Meteorology ([www.bom.gov.au](http://www.bom.gov.au)) – information on the weather and the climate, including the latest satellite pictures, forecasts, charts and warnings.

The Australian Bureau of Agricultural and Resource Economics (ABARE) ([www.abare.gov.au](http://www.abare.gov.au)) website lists Products and Services, Agriculture Research, Energy Research, Mineral Research, Natural Resources, Key Contacts and Media Releases.

The Australian Bureau of Statistics ([www.abs.gov.au](http://www.abs.gov.au)) lists statistical summaries of Australia and its States and Territories, key National

Indicators, ABS Catalogue Publications, contact details of libraries which hold a collection of ABS publications and ABS Papers and Classifications, including Information papers, Occasional papers and Directories.

The website of the Department of Agriculture, Fisheries and Forestry ([www.affa.gov.au](http://www.affa.gov.au)) – Australia is the main entry point to Australian electronic information on agriculture, fisheries, forestry and food industries.

FarmOnline ([www.farmonline.com.au](http://www.farmonline.com.au)). A selection of agricultural newspapers and magazines. Lists properties for sale and market reports for cotton, financial, livestock, meat and wool.

Farmwide ([www.farmwide.com.au](http://www.farmwide.com.au)) – a site run by the Canberra-based Farmwide Pty Ltd. A commercial organisation, Farmwide was set up to look for commercial opportunities for farm organisation members at the national level. It is owned by the National Farmer's Federation (NFF) State farm member organisations. The Farmwide site includes links to web sites for various commodities.

Google Groups ([www.deja.com](http://www.deja.com)) Searchable Web-based archive of USENET (USER NETWORK) newsgroups discussions, you can search for a particular topic or newsgroup.

### Crop information web pages

The Grains Research and Development Corporation ([www.grdc.com.au](http://www.grdc.com.au)) (GRDC) website ('Grain Zone') contains information for growers, publications and papers, media releases, relevant grains sites and newsgroups.

AWB Ltd ([www.awb.com.au](http://www.awb.com.au)) – website contains information on AWB Ltd products and services, Australia's marketing arrangements for wheat and other grains, the history of wheat in Australia, latest AWB Ltd press releases, AWB Ltd products and services and general information about the Australian wheat industry.

Dunavant Enterprises ([www.dunavant.com.au](http://www.dunavant.com.au)) – daily cotton market update

Namoi Cotton ([www.namoicotton.com.au](http://www.namoicotton.com.au))

Queensland Cotton ([www.qcotton.com.au](http://www.qcotton.com.au))

Ozcotton ([www.ozcotton.net](http://www.ozcotton.net)) – Australian Cotton Industry website, includes commodities information links.

Ezigrain ([www.ezigrain.com.au](http://www.ezigrain.com.au)) – an initiative of Ausbulk Ltd, provides information such as news, weather, grain market reports, receival standards and grain industry contacts.

GrainCorp ([www.graincorp.com.au](http://www.graincorp.com.au)) – Grain Storage and Handling in NSW.

GrainCo ([www.grainco.com.au](http://www.grainco.com.au)) – Includes commodity price updates, as well as NSW Pool Estimates for barley and canola.

Growcanola.com ([www.growcanola.com](http://www.growcanola.com)) – contains information on growing canola. Soon to have an Australian section.

Pulse Australia ([www.pulseaus.com.au](http://www.pulseaus.com.au)) – lists standards, traders and pulse industry statistics. Also lists current chemicals permits.

One Globe Marketing ([www.oneglobe.com/agriculture/resource.html](http://www.oneglobe.com/agriculture/resource.html)) – An American-based site that includes links to overseas futures markets and weather reports.

The Grain Marketing Page ([www.grainfarmer.com/grainmarkets.htm](http://www.grainfarmer.com/grainmarkets.htm))

Chicago Board of Trade ([www.cbot.com](http://www.cbot.com))

USDA Outlook Reports ([usda.mannlib.cornell.edu/reports](http://usda.mannlib.cornell.edu/reports)) – contains outlook information for major American agricultural commodities.

## Livestock information web pages

Meat and Livestock Australia (MLA) ([www.mla.com.au](http://www.mla.com.au)) (Formerly the Australian Meat and Livestock Corporation), for information on the red meat industry structure, overview, and market intelligence. Includes sections on beef, lamb and goat meat.

MLA also has websites to promote Australian meat:

- Australian beef ([www.australian-beef.com](http://www.australian-beef.com))
- Australian lamb ([www.australian-lamb.com](http://www.australian-lamb.com))

BeefNet ([www.beefnet.com.au](http://www.beefnet.com.au)) – a beef marketing support network that was formed in June 1997. It is a producer-initiated scheme established with the aid of (MLA).

BeefNet's primary objective is to provide the necessary support and information to encourage producers to work together in groups.

Cattlefacts ([www.cattlefacts.com.au](http://www.cattlefacts.com.au)) – produced by Australian CATTLEFACTS, an independent, cattlemen owned market intelligence network.

National Livestock Reporting Service ([www.nlrs.com.au](http://www.nlrs.com.au)) – market reports available on this website

Safefood NSW ([www.safefood.nsw.gov.au](http://www.safefood.nsw.gov.au))

Australian Pork Limited ([www.apl.au.com](http://www.apl.au.com))  
Australian Pork Limited has replaced the functions of the Australian Pork Corporation, the Pig Research and Development Corporation and the Pork Council of Australia. Includes a market reporting service.

Australian Wool Innovation Ltd ([www.wool.com.au](http://www.wool.com.au)) – provides information on wool issues and markets.

Woolcheque ([www.woolcheque.com.au](http://www.woolcheque.com.au)) – a wool pricing tool for Australian wool producers funded by Australian Wool Innovation Limited.

# Planning for future droughts

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Good planning provides opportunities to be productive, not only in the normal times, but also during adverse seasons. Future drought preparedness relies upon long-term or strategic planning as part of an overall property management plan. All farmers should develop a property management plan which details the physical, financial, human and other resources available to the farm and the strategies to achieve short-term and long-term goals – including managing for drought.

## PROPERTY MANAGEMENT PLANNING

Drought is a recognised part of the Australian climatic regime. Farm planning should recognise that drought can occur at any time and can cause land degradation, financial hardship, family stress, and threats to productivity, especially if it is prolonged and followed by heavy rain and floods.

The thought of drought may be unpleasant, but property management planning which recognises the inherent limitations of the Australian environment can maintain productivity and profitability while reducing the impact of drought.

Property management planning includes:

- an assessment of the farm's physical resources;
- goal-setting;
- an assessment of the human resources available to run the farm business;
- financial management to enable the accumulation of reserves or the implementation of strategies for alternative income generation;
- conservative farming practices (stocking rates, tillage, weed and pest management) to allow flexibility in the face of changing climatic conditions;
- maintenance of the farm infrastructure;
- maintenance of the farm's natural resources including soils, water, pastures, shelter belts and remnant native vegetation;

- monitoring and reassessment of the farm's capability and the management plan;
- determining your future in farming (see *Financial management during drought recovery*);
- recognition of animal welfare issues and community expectations.

## STRATEGIC DROUGHT PREPAREDNESS

The monitoring and reassessment phase of a plan greatly helps in drought preparedness because the signs of the onset of drought are subtle, incremental and often unrecognised until remedial action is needed.

The following regular and ongoing activities and strategies will greatly assist in the development of drought preparedness strategies and will reduce the risks associated with drought:

- monitoring water supplies for both quality and quantity;
- financial record-keeping and analysis;
- understanding the weather forecasts and trends;
- monitoring the feed, or the market value of standing crops;
- storing feed reserves;
- using grazing pressure that accounts for future pasture growth and value;
- assessment of total grazing pressure, that is domestic livestock + ferals + wildlife;
- identification of the most valuable breeding stock and phased removal of the lowest priority stock;
- using management techniques which enhance the integrity of paddock trees, shelter belts and native vegetation;
- planning changes to farm enterprise mixes which take advantage of worsening seasonal conditions (such as changing from grain crops to fodder production, or changing from breeders to wethers in sheep flocks);
- assessing the introduction of different on-farm enterprises, such as tourism or farm forestry;
- developing off-farm sources of cash flow and assets for financial security.

The involvement of the whole family and farm staff in the information gathering and analysis,

and in making the hard decisions, will make the identification of trigger points for action more reliable.

### **Tactical drought preparedness**

Each individual farming unit will respond in a unique way to changing seasonal conditions depending on the property's land capability, financial resources, goals, the perception of risk, and the level of development of a property management plan. A plan which incorporates the following types of options in response to the onset of drought will provide better tactics for drought preparedness:

- Progressive and/or selective destocking. This may include reducing total stock numbers or selectively culling certain categories of stock.
  - Contingency plans either to reduce livestock numbers and hence grazing pressure, or to feed livestock (sell? agist? feed?).
  - Progressive and/or selective reduction of grazing pressure on pastures. This should be based on land capability, paddock condition, the need to maintain ground cover to prevent erosion, retention of identified reserve feed paddocks, and the potential for pasture regeneration.
- Strategic stock feeding for production or maintenance.
  - Retention of standing crop stubbles for soil protection and livestock shelter.
  - Strategies to ensure the rapid return to normal production activities.

### **Further assistance**

NSW Department of Primary Industries provides information for managing the farm during a drought, and can assist with property management planning through District Extension Officers across the State.

The Australian RAINMAN computer-based decision support package (for sale through the NSW Department of Primary Industries Bookshop) allows farmers to understand the Southern Oscillation Index (SOI) and use it to advantage in assessing rainfall probabilities, hence tailoring their farm activities and expectations to prevailing seasonal conditions.

# Appendix 1

## Current drought publications

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Current drought publications available from the NSW Department of Primary Industries website and offices.

Updates of this guide and a substantial number of additional documents are available from the NSW Department of Primary Industries (NSW DPI) website. Clients who do not have direct Internet access are encouraged to use Internet facilities available at most public libraries. Printed copies of publications may also be available from the NSW DPI offices listed in Appendix 3.

Website address:

[www.dpi.nsw.gov.au/drought](http://www.dpi.nsw.gov.au/drought)

Features of the NSW DPI Drought website include the following.

- Drought assistance available, including the forms for state-based assistance and some information on eligibility criteria.
- Drought feeding, including a range of feeding strategies for different species and classes of stock, and some handy tools and resources for calculating feed values and costs.
- Assessing pasture, including information on pasture sustainability and management.
- Assessing animal condition.
- Animal health and welfare.
- Drought and climate forecasting, including current maps of drought-affected areas, guidelines on assessing pasture condition, information on risk assessment, and notes on reviewing historical climate information.
- Planning to handle drought, including drought strategies, water considerations and key prompts.
- Financial considerations, including transport, agistment, feeding, selling, and taxation implications.
- Drought recovery information, including information on restocking, soil management, weed control and tree management.
- A site map of the website.

Other relevant websites include:

Bureau of Meteorology – [www.bom.gov.au](http://www.bom.gov.au)

NSW Association of Rural Financial Counsellors – [www.ruralcounselling.org.au](http://www.ruralcounselling.org.au)

NSW Rural Assistance authority – [www.raa.nsw.gov.au](http://www.raa.nsw.gov.au)

Queensland Government: The Long Paddock – [www.longpaddock.qld.gov.au](http://www.longpaddock.qld.gov.au)

Rural Lands Protection Boards – [www.rlpb.org.au](http://www.rlpb.org.au)

## Appendix 2

# NSW DPI offices

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Albury _____	6041 6500	Inverell _____	6722 1388
Alstonville _____	6626 2400	Kempsey _____	6562 6244
Armidale Beef Industry Centre _____	6770 1800	Kyogle _____	6632 1900
District Office _____	6738 8500	Lockhart _____	6920 5177
Balranald _____ (03)	5020 0045	Moree _____	6752 5111
Bathurst _____	6330 1200	Mudgee _____	6372 4700
Bega _____	6492 1733	Murwillumbah _____	6672 2770
Berry _____	4464 1251	Narrabri _____	6799 1500
Bingara _____	6724 1616	Nyngan _____	6832 1305
Bourke _____	6872 2077	Orange – Head Office _____	6391 3100
Broken Hill _____ (08)	8087 1222	– Agricultural Institute	
Camden – EMAI _____	4640 6333	(Advisory Office) _____	6391 3800
Canberra _____	6246 5548	Parkes _____	6862 1000
Casino _____	6662 2288	Paterson (Tocal) _____	4939 8888
Coffs Harbour _____	6650 3111	Queanbeyan _____	6297 1861
Condobolin _____	6895 1025	Richmond _____	4588 2100
Cooma _____	6452 3411	Scone _____	6545 1800
Coonabarabran _____	6842 1452	Tamworth _____	6763 1100
Coonamble _____	6822 1000	Taree _____	6552 7299
Cootamundra _____	6942 4957	Temora _____	6977 3333
Cowra _____	6349 9777	Trangie _____	6880 8000
Dareton _____ (03)	5019 8400	Tumut _____	6947 4188
Deniliquin _____ (03)	5881 9999	Wagga Wagga _____	6938 1999
Dubbo _____	6881 1270	Walgett _____	6828 1288
Finely _____ (03)	5883 1644	Warren _____	6847 4507
Flemington _____	9764 3311	Wellington _____	6840 0999
Forbes _____	6850 2922	West Wyalong _____	6972 2244
Glen Innes _____	6730 1900	Wollongbar _____	6626 1200
Gloucester _____	6558 1707	Yanco _____	6951 2611
Gosford _____	4348 1900	Yass _____	6226 2199
Goulburn _____	4828 6600	Young _____	6382 1077
Grafton _____	6640 1600		
Griffith _____	6960 1300		
Gunnedah _____	6741 8333		
Hay _____	6993 1608		

# Appendix 3

## NSW Guide to Drought Support Services

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This guide is a ready reference to drought support services in NSW. For a more comprehensive guide, however, see the booklet *Support Services for Rural Families and Businesses* available from NSW Department of Primary Industries and RLPB offices

### NSW DPI

Drought Hotline: 1800 814 647

Website: [www.dpi.nsw.gov.au/drought](http://www.dpi.nsw.gov.au/drought)

- Information on access to and eligibility for assistance measures (including state and federal assistance programs).
- Drought Support Workers: personal support, basic information on assistance and referral to other appropriate services.

#### Drought Support Workers

Bourke – Lyn Leigo  
(02) 6872 2077; 0427 265 810

Condobolin – Julie Greig  
(02) 6895 1025; 0427 257 191

Cooma – Jan Bruce  
(02) 6452 3411; 0427 459 176

Deniliquin – Don Burrowes  
(03) 5881 5766; 0427 324 033

Goulburn – Dick Kearins  
(02) 4828 6614; 0427 781 514

Gunnedah – Jenny Croft  
(02) 6741 8336; 0429 446 417

Hay – Danny Byrnes  
(02) 6993 1608; 0428 973 141

Parramatta – Campbell Trotter  
1800 018 444, (02) 9683 2388; 0439 428 572

Scone – Tania Chesworth  
(02) 6545 1800; 0428 249 092

#### Other services

- Livestock, pasture and cropping information and advice.

- Subsidies for the transport of fodder and water for livestock. Contact your RLPB for details.
- Rural Women's Network: Information for rural women and their families.

### NSW RURAL ASSISTANCE AUTHORITY (RAA)

Phone: 1800 678 593

Website: [www.raa.nsw.gov.au](http://www.raa.nsw.gov.au)

- Information regarding Exceptional Circumstances (EC) eligibility and assistance.
- Special conservation scheme assistance, e.g. dam de-silting, planting of perennial species such as lucerne, grain storage, stock and domestic water supplies..

### NSW FARMERS ASSOCIATION

Member Service Centre: 1300 794 000 or (02) 8251 1700.

- Services include advice on relief measures available and distribution of drought-related information.

### DEPARTMENT OF COMMUNITY SERVICES

State Disaster Recovery Centre: 1800 018 444

Website:

[www.community.nsw.gov.au/html/diseaster/drought.htm](http://www.community.nsw.gov.au/html/diseaster/drought.htm)

- Immediate financial assistance from the Community Disaster Relief Fund for household essentials including food and water.
- Personal family support and advice.

### CENTRELINK

National Drought Assistance Line: 132 316

Website: [www.centrelink.gov.au](http://www.centrelink.gov.au)

- Personal counselling and access to a Financial Information Service.
- Exceptional Circumstances (EC) relief payment and information on exemptions from the means test for student payments.

## DEPARTMENT OF STATE AND REGIONAL DEVELOPMENT

Website: [www.business.nsw.gov.au](http://www.business.nsw.gov.au)

Albury	(02) 6041 4808
Armidale	(02) 6771 3284
Broken Hill	(08) 8087 8033
Dubbo	(02) 6882 8744
Orange	(02) 6361 2444
Tamworth	(02) 6766 1360
Wagga Wagga	(02) 6921 6422

- Payroll Tax relief for businesses dependent on farm income and supporting the farm sector such as machinery suppliers, to enable the retention of skilled workers.
- Grants of up to \$3000 for small businesses which support the farm sector to implement credit or business management strategies to sustain operations through and beyond the drought.

## RURAL LANDS PROTECTION BOARDS

First point of contact for drought transport subsidies for fodder, livestock and water.

Armidale	(02) 6772 2366
Balranald	(03) 5020 1691
Bombala	(02) 6458 3055
Bourke	(02) 6872 2322
Braidwood	(02) 4842 2536
Brewarrina	(02) 6839 2047
Broken Hill	(08) 8087 3378
Casino	(02) 6662 3166
Central Tablelands	(02) 6331 1377
Cobar	(02) 6836 2081
Condobolin	(02) 6895 2152
Cooma	(02) 6452 1122
Coonabarabran	(02) 6842 1300
Coonamble	(02) 6822 1588
Dubbo	(02) 6882 2133
Forbes	(02) 6852 1688
Gloucester	(02) 6553 4233
Goulburn	(02) 4821 2522
Grafton	(02) 6642 3699
Gundagai	(02) 6944 1588

Hay	(02) 6993 1403
Hillston	(02) 6967 2507
Hume	(02) 6040 4210
Hume (Holbrook)	(02) 6036 2733
Hunter (Scone)	(02) 6545 1311
Hunter (Singleton)	(02) 6572 2944
Kempsey	(02) 6562 7822
Maitland	(02) 4932 8866
Milparinka	(08) 8091 3306
Molong	(02) 6366 8505
Moree	(02) 6752 8012
Moss Vale	(02) 4655 9165
Mudgee-Merriwa	(02) 6372 1866
Merriwa	(02) 6548 2175
Murray	(03) 5886 1203
Narrabri	(02) 6792 2533
Narrandera	(02) 6959 2322
Northern New England	(02) 6732 1200
NNE (Tenterfield)	(02) 6736 1355
Northern Slopes	(02) 6729 1528
Nyngan	(02) 6832 1008
Riverina	(03) 5881 1055
South Coast	(02) 6492 1283
SC (Ulladulla)	(02) 4454 3053
Tamworth	(02) 6766 5899
Tweed - Lismore	(02) 6621 2317
Wagga Wagga	(02) 6923 0900
Walgett	(02) 6828 1047
Wanaaring	(02) 6874 7749
Wentworth	(03) 5027 3064
Wilcannia	(08) 8091 5070
Yass	(02) 6226 1155
Young	(02) 6382 1255

## NSW HEALTH

Rural Support Line:  
1800 201 123 (24 hour, seven days a week service)

- Help if you or your family are having trouble coping personally and emotionally.

## COMMUNITY PARTNERS WITH STATE GOVERNMENT SERVICES

- Salvation Army: counselling, referral and limited household financial assistance in emergency situations. Salvo Care Line 1300 363 622
- Anglicare: various forms of physical, emotional, social and spiritual support (02) 9895 8000
- St Vincent de Paul: food, clothing and some financial support to people in need (02) 9560 8666
- ADRA Australia: food, clothing, personal and financial support to people in need (02) 9489 5488

## RURAL FINANCIAL COUNSELLORS

Website: [www.ruralcounselling.org.au](http://www.ruralcounselling.org.au)

- Assess current financial position and help prepare budgets.
- Review contracts with financial institutions.
- Help with loan and assistance applications.
- Provide information on government assistance schemes.

Southern New England Rural Counselling Service Inc.

**Armidale** \_\_\_\_\_ (02) 6778 4784

Bourke Rural Counselling Service

**Bourke** \_\_\_\_\_ (02) 6872 3255

Brewarrina and District Rural Counselling Service

**Brewarrina** \_\_\_\_\_ (02) 6839 2588

Richmond Valley Business and Rural Financial Counselling Service

**Casino** \_\_\_\_\_ (02) 6662 6503 or 6662 6195

Lachlan Advisory Group Inc

**Condobolin** \_\_\_\_\_ (02) 6893 3843

Monaro Rural Financial Counselling Service Inc

**Cooma** \_\_\_\_\_ (02) 6452 5059

Warrumbungle Rural Community Program

**Coonabarabran** \_\_\_\_\_ (02) 6842 3105

Cowra Regional Advisory Service Inc

**Cowra** \_\_\_\_\_ (02) 6341 1244

Southern Tablelands Rural Counselling Service

**Crookwell** \_\_\_\_\_ (02) 4832 0070

Southern Riverina Rural Advisory Service

**Deniliquin** \_\_\_\_\_ (03) 5881 5766

Macquarie Rural Advisory Service

**Dubbo** \_\_\_\_\_ (02) 6884 2275

Forbes Rural Counselling Inc

**Forbes** \_\_\_\_\_ (02) 6852 3837

North Eastern Riverina Rural Counselling Service

**Ganmain** \_\_\_\_\_ (02) 6927 6622

Castlereagh Advisory Centre Inc

**Gilgandra** \_\_\_\_\_ (02) 6847 1084

**Coonamble** \_\_\_\_\_ (02) 6822 3220

Lower Hunter/Manning Rural Counselling Service Inc

**Gloucester** \_\_\_\_\_ (02) 6558 2570

Murrumbidgee Valley Rural Counselling Service Inc

**Griffith** \_\_\_\_\_ (02) 6964 1557

Gunnedah and District Rural Counselling Service Inc

**Gunnedah** \_\_\_\_\_ (02) 6742 2763

Southern Riverina Rural Advisory Service

**Hay** \_\_\_\_\_ (02) 6993 4130

New England Rural Counselling Service

**Inverell** \_\_\_\_\_ (02) 6721 0030

Lower Lachlan Community Services

**Lake Cargelligo** \_\_\_\_\_ (02) 6898 1151

Mid North Coast Rural Counselling Service

**Macksville** \_\_\_\_\_ (02) 6568 3888

North West Rural Counselling Service

**Moree** \_\_\_\_\_ (02) 6752 3561

Upper Hunter Rural Counselling Service Inc

**Mudgee** \_\_\_\_\_ (02) 6372 6660

North-West Rural Counselling Service

**Narrabri** \_\_\_\_\_ (02) 6792 4798; 0427 924 798

Bogan Advisory Service

**Nyngan** \_\_\_\_\_ (02) 6832 2169

Central West Rural Financial Counselling Service Ltd

**Orange** \_\_\_\_\_ (02) 6361 1117

Upper Hunter Rural Counselling Service Inc

**Scone** \_\_\_\_\_ (02) 6545 3544

Upper Murray Ag Care

**Tumbarumba** \_\_\_\_\_ (02) 6028 9157

Walgett Advisory Group

**Walgett** \_\_\_\_\_ (02) 6828 2049

Wentworth/Balranald Rural Counselling Service

**Wentworth** \_\_\_\_\_ (03) 5021 1558

# Appendix 4

## StockPlan

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StockPlan is a suite of three computer decision-support tools that enable cattle and sheep producers to explore management options in the early stages of, and during, a drought. The main aim of these decision-making tools is to assist producers make management decisions that minimise the environmental and financial impacts of drought.

Management options are explored through three StockPlan tools:

- Drought Pack
- ImPack
- FSA Pack.

There is also helpful advice from seven StockPlan links: Introduction; Decision-making Process; Drought and Overgrazing Issues; Animal Health and Welfare; Climate; Bob's Story; and Where To Get Help.

An optional shortcut key is also available to connect users to the NSW Department of Primary Industries Drought Website.

StockPlan is a useful tool for evaluating the following questions:

- How much will it cost to feed my stock for a specified time?
- How will my decision affect my flock or herd and financial position?
- Is it better to sell or agist my cattle? Is agisting an option for certain classes of animals?

The philosophy behind these decision-support tools is to foster drought preparedness – an important component in managing animal production systems before the situation on a farm becomes irreversible. Sound management decisions early in the drought period and during drought can also prevent severe financial losses.

StockPlan workshops are available to producers and agribusinesses. The package assists producers to: improve their drought management skills; lowers the risk of degrading your pastures and of financial losses; encourages pro-active decision-making; and provides a platform for producers to investigate the

production and financial implications for a farm business.

### The StockPlan Suite

These three decision-making tools are integrated into one package to assist making management decisions. This is because no program alone can answer the complexities of pro-active decision-making for a drought. The decision to use only one or all of the decision tools will depend on the individual circumstances of a producer and thus provides them with a choice.

### Drought Pack

Drought Pack is an energy-based model (MJME/kg fed) that assesses the cost of feeding stock and determines the break-even price for specific animal classes.

### ImPack

This decision tool uses a static modeling approach that provides a producer with the opportunity to assess the structure of the herd or flock over a 10-year period. The ImPack decision tool allows the user to explore a wide range of options, for instance selling-off parts of the herd or flock and recovering stock numbers over the following years.

### FSA Pack

The FSA Pack ('feed', 'sell' or 'agist' decisions) is designed to evaluate the cost of various options for a specific group of livestock rather than for a whole-farm analysis. FSA allows the user to specify up to four different drought lengths, and provides cash cost estimates and 'bottom-line' financial estimates.

The integration of these three decision-making tools into one package assists producers to address a number of issues in the early stages of drought.

Fostering drought preparedness is critical! StockPlan has the potential to assist producers to make informative and timely decisions before the onset of a full-blown drought.

For more details and for workshop registration, contact your regional NSW Department of Primary Industries livestock officer.

# Appendix 5

## Restocking after drought

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Don't bring home more than you've bargained for when you restock after a long, dry spell!

### WHAT YOU SHOULD LOOK FOR

#### Sheep

In sheep, examine stock for:

- Wool contamination
- External parasites
- Footrot
- Mulesing
- Weed seeds.

#### Cattle

In cattle, check evidence of:

- Age – mouth animals
- External parasites
- Pink eye
- Weed seeds.

### WHAT YOU SHOULD CHECK

- What are the requirements for bringing stock into your district?
- Have the stock undergone health testing for Johne's disease?
- Have the stock undergone testing for drench resistance?
- Are there any movement restrictions placed on these animals?
- Ask about the treatment and vaccination history of the stock?
- Have hormone growth promotants (HGPs) been used?
- Are chemical residues a problem?
- What is the weed status of the property of origin?

### WHAT YOU SHOULD GET

- Vendor declarations – including details of chemical treatments.
- Animal Health Statement for OJD.
- Relevant health certificates.
- Health checks by qualified personnel, if appropriate.

### ON ARRIVAL

For new stock brought on to your property, decide if you need to:

- Drench
- Vaccinate
- Quarantine
- Confine stock.

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Note: Remember to closely observe all stock as they settle in.

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### FURTHER INFORMATION

For more information, you can contact:

- District veterinarians
- Agents
- Local livestock officers
- NSW DPI's website: [www.dpi.nsw.gov.au/drought](http://www.dpi.nsw.gov.au/drought)

### JOHNE'S RESTRICTIONS

Restrictions for Johne's disease apply to moving livestock between zones. Remember that animals must meet minimum requirements which are outlined in the tables below. Quarantined properties, also, may only move animals on permit.

## SHEEP

Status of Zone of ORIGIN	Status of Zone of DESTINATION		
	OJD Management Area	Control	Protected
OJD Management Area	No Restrictions	TMS* All Sheep from MAP flocks. X-bred wether lambs.	All Sheep from MAP flocks, except MN1
Control	No Restrictions	No Restrictions	TMS* All Sheep from MAP flocks
Protected	No Restrictions	No Restrictions	No Restrictions

\*TMS (Tested MAP Standard): 350 Pooled Faecal Culture test in previous 12 months.

## CATTLE

Status of Zone of ORIGIN	Status of Zone of DESTINATION	
	Control	Protected
BJD Control	No Restrictions	Check-Tested. All MAP herds. Steers.
Protected	No Restrictions	No Restrictions

Young female cattle may move from control to protected zone, on permit under certain conditions. Permits and conditions can be obtained from Rural Lands Protection Boards.