



NSW DEPARTMENT OF
PRIMARY INDUSTRIES

MANAGING DROUGHT

Sixth Edition

December 2006

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(Beef Grazing Systems)**

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NSW Department of Primary Industries
Drought Hotline 1800 814 647
Hours of operation 8.30 am–4.30 pm,
Monday to Friday
Voice mail (message machine) after hours.
NSW Rural Assistance Authority
1800 678 593
Hours of operation 8.30 am–5.00 pm,
Monday to Friday
Voice mail (answering machine) after hours.



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PRIMARY INDUSTRIES

Title: Managing drought
Compiled by: BJ Mackay, Former Technical Specialist
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Sixth edition revised by: Edward MK Joshua, District Livestock Officer
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DISCLAIMER. The information contained in this publication is based on knowledge and understanding at the time of writing (December 2006). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of New South Wales Department of Primary Industries or the user's independent adviser.

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Foreword

The State's producers continue to be seriously affected by this ongoing drought – generally regarded as the worst we have seen in 100 years. In fact, some farmers are now in their sixth consecutive year in drought.

This updated edition of *Managing Drought* has been prepared to assist farmers in making decisions that see them through this extended dry period.

The drought has had a significant long-term impact on the financial position of producers. As a result, our State's farmers will have some difficult financial and management decisions to make in coming months. They'll also need to prepare for the eventual recovery phase, once the much-needed rain finally falls.

To assist producers through this process, NSW Department of Primary Industries has updated this important guide. It is designed to act as a management tool for farmers. It is not intended to be a complete manual on running the farm during drought.

Managing Drought includes a range of important information regarding short and long-term planning, managing and feeding livestock, caring for the land, and the protection of plant and animal health.

More detailed information on other aspects of drought management and recovery is also available on NSW Department of Primary Industries website www.dpi.nsw.gov.au and from NSW DPI offices. Assistance is also available from the NSW DPI drought hotline on 1800 814 647.

I hope you find this guide beneficial as you work to meet the challenges of life on the land. Rest assured that the NSW Labor Government will continue to support drought-affected farmers whilst ever this drought continues.

IAN MACDONALD MLC

Minister for Primary Industries
Minister for Natural Resources
Minister for Mineral Resources

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Drought planning: G. Meaker, DLO (Beef Cattle), Goulburn.

The role of climate science in drought management: P. Carberry and P. Hayman, Agroclimatology unit, Tamworth.

Drought strategies for the livestock producer: G. Markwick, Former Livestock Officer Sheep, Dubbo and L. Davies, Economist, Paterson.

Drought increases residue risks: G. Williamson, Veterinary Officer (Pesticide Residues), Wollongbar.

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Full hand feeding of beef cattle – management: I. Blackwood, Livestock Officer, (Beef Cattle), Paterson and E. Clayton, Former Livestock Officer, Armidale.

Full hand feeding of beef cattle – quantities: W. McKiernan, Technical Specialist, Beef Grazing Systems, Orange and E. Clayton, Former Livestock Officer, Armidale.

Managing dairy cattle: R. Coomber Livestock Officer (Dairy Industry), Coffs Harbour.

Full hand feeding of sheep: A. Bell, Program Leader, Animal Grazing Systems, Tamworth and D. Alcock, Livestock Officer (Sheep & Wool), Dubbo.

Water requirements for sheep and cattle: G. Markwick, Former Livestock Officer Sheep, Dubbo.

Family information and counselling services: P. Madden, Rural Policy Officer, Orange.

Pasture sustainability and management in drought: W. McDonald, Technical Specialist (Pastures), Tamworth and R. Hacker, Program Leader (Rangelands), Trangie.

Animal welfare: E. Clayton, Former Livestock Officer, Armidale and A. Paul, Veterinary Officer (Animal Welfare), Orange.

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Cattle health during drought – common diseases and preventative management: B. Walker, Veterinary Officer, Gunnedah.



NSW DEPARTMENT OF
PRIMARY INDUSTRIES

Section 1

Planning

- **Drought planning**
- **Drought strategies for the livestock producer**
- **Drought hints**
- **The role of climate science in drought management**

Drought planning

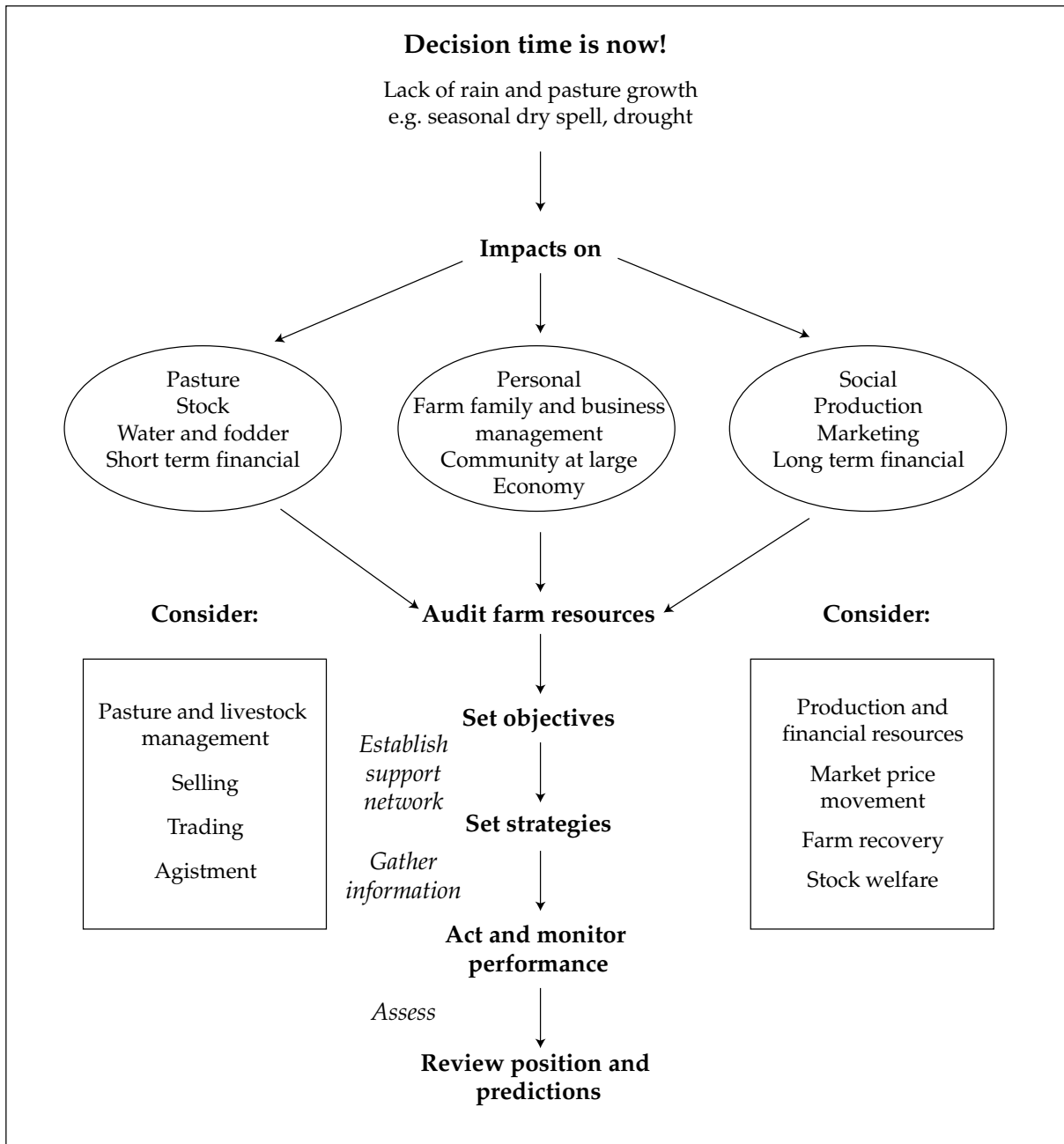
In drought management, a positive approach to the problem, a clear understanding of your objectives and a careful evaluation of alternative courses of action are essential for success. You should be realistic in your assessment of the situation and not underestimate what is required to complete a particular course of action in terms of resources (capital, fodder and management) and personal and family cost.

In drought it is important to not ignore the signs and to have a plan, act early, review and then plan again, and revise the plan with each action as you play out your strategy.

Where to start?

Step One: Check the most limiting farm resources:

- mental and physical energy to do the continuous tasks required;
- funds available;
- stock and domestic water available;
- feed reserves (paddock and stored) available;
- surface/subsoil moisture for crop leaf and root growth;
- available livestock fat reserves stored enabling controlled weight loss;
- need to service machinery – breakdowns cost time, money and frustration.



Audit sheets are provided on the following pages to assist in guiding you through the resource audit.

Step Two: Set action strategies, considering:

- breakeven position of each strategy chosen;
- windows of opportunity to adopt management practices that will be profitable during drought;
- your available resources and the implications for animal welfare, ground cover, chemical residues, etc., of carrying out each strategy;
- when situations are changing, conditional and timely fall-back options.

Step Three: Monitor and review performance, position and outlook by:

- using your established network to stay informed about key factors that affect your drought strategies;
- being proactive about the decisions made;
- being prepared for change;
- remembering that the impact falls very heavily not only on the decision makers but on the whole farm family.

To make good decisions during a drought it is necessary to assemble as much information as you can on the factors that will influence your decisions.

Information on 'what to do?' comes from:

- past dry spells and drought experiences;
- using your established rural network;
- using past trends and current predictions;
- computer decision supports to model potential strategies.

The degree of planning depends on your level of risk and how you assess your past, current and future climate, pastures, livestock and business situations.

A whole-farm plan approach is required. Targeted action strategies can be implemented, including fall-back options, forward contracts, etc. to ensure that the farm business and its goals are achieved.

Computer decision support programs like Rainman, Grazfeed, ProPlus and the newly released program StockPlan can help producers, professionals and industry to make forward planned decisions.

StockPlan (see Appendix 6) is a suite of computer decision support tools that enable cattle and sheep producers to explore management options in the early stages of drought and during drought. The main aim of these decision tools is to help producers to make management decisions that minimise the environmental and financial impacts of drought. Visit www.dpi.nsw.gov.au/reader/drtplanning/stockplan.

The purpose of this guide is to give you, the decision maker, information to assist in making drought decisions.

What livestock do you have on hand?

Class of stock	Fat scores	Now	Can sell	Keep and Feed
1st calf heifers				
Cows with calves				
Dry cows				
Bulls				
Weaner/yearling heifers				
Weaner/yearling steers				
1-2 year old steers				
TOTALS				
Maiden ewes with lambs				
Mature ewes with lambs				
Dry ewes				
Weaned lamb				
Hoggets				
Wethers				
Rams				
TOTALS				

What feeds do you have on hand?

Feed	Quantity

Paddock feed – describe your pasture situation.

I estimate that on average my paddocks have _____ kg DM/ha

Stock water supplies

See Primefact 269 *Stock water – a limited resource* to help you estimate your useable stock water supplies and requirements.

Estimated total useable water	ML (A)
Stock water requirement per day for current stock	ML/day (B)
Sufficient water to supply my stock for (A ÷ B)	days

What are your priority groups of livestock to:

Sell
Feed

Stock sales

If there is no paddock feed/rain for six months what are your choices?

Sell calves	all
	some
Wean calves & feed	early calves
	late calves
Sell cows	all
	some
Sell bulls	all
	some
Sell wethers	all
	some
Sell ewes	all
	some
Sell lambs	all
	some

What income can your sale stock bring?

Stock type	Number of stock		Estimated sale price	Total
1st calf heifers		head at		=
Cows		head at		=
Bulls		head at		=
Weaner/yearling heifers		head at		=
Weaner/yearling steers		head at		=
1–2 year old steers		head at		=
Maiden ewes with lambs		head at		=
Mature ewes with lambs		head at		=
Dry ewes		head at		=
Weaned lambs		head at		=
Hoggets		head at		=
Wethers rams		head at		=
			Total	

Discuss your drought management options with your accountant to ensure that the Australian Tax Office classifies your business as 'Drought Declared' and forced sale of stock has been necessary.

What evidence can you provide?

Photos	Y/N
Livestock sale records	Y/N
RLPB advice	Y/N
NSW DPI advice	Y/N
Rainfall records	Y/N

Do you plan to feed?	Y/N
What will you feed?	
Will you feed cows, to get them back in calf?	Y/N
Will you feed ewes, to get them back in lamb?	Y/N
Are you using a 'sacrifice paddock' to feed stock now?	Y/N

How much do you need to feed each animal to achieve your goals?

See Section 2 for details on calculating feed requirements: *Full hand feeding of beef cattle – quantities* and *Full hand feeding of sheep – quantities*.

Kg feed/day/head =	
x Number of head (.....) =	(a)
Cost/kg feed =	(b)
Total feed cost per day (a) x (b) =	\$

How long are you prepared to feed – until which month?	
How many months will that be from now?	

Finances

How much money are you able to spend on drought feeding?	\$
How much will it cost you to feed the stock you plan to keep for the months you plan to feed?	\$

Drought strategies for the livestock producer

The overriding objective of drought strategies, while always taking into account the welfare of stock, should be to ensure that the farm business survives and that the productive resources of the farm – the soil, the capital, and the genetic merit of the livestock – be managed in such a manner as to allow production to recommence after the drought.

Objectives should be clearly defined both for the drought period and for the post-drought (recovery) period. Recovery from a significant drought may take several years, particularly if debt levels rise substantially or if pastures are depleted and require re-sowing.

Your objectives should be clear and, wherever possible, be stated in terms of numbers, dates or dollars.

Write down your objectives and review them regularly. Modify objectives as the situation dictates. It is important that your objectives not be 'set in concrete' – they are a guideline, not a boundary, and if the situation requires that you alter them, provided you have examined the options thoroughly, then they have served their purpose and can be replaced.

Unless you do this, there is a danger that the strategies you adopt to survive the drought may make recovery after the drought impossible. In this situation you may have to make a trade-off between short-term and long-term objectives. You may elect to incur greater costs during the drought so as to reduce your costs or increase your enterprise's chances of survival during the post-drought recovery stage.

DEVELOPING YOUR STRATEGIES

Once you have clarified your objectives, you can then select various strategies and determine how each would contribute to meeting these objectives. To do this properly, you need to cost these strategies for droughts of various lengths; that is, you need to develop a 'model' of the drought so that you can estimate the effectiveness of various strategies. You will find that as the assumed period of drought varies, so does the likely cost of the different strategies. Similarly, varying the assumptions about the cost of restocking, or the current sale value of

stock, dramatically affects the cost of various strategies.

No single strategy will be sufficient in most cases, and each situation will require a unique set of strategies according to the physical, financial and managerial resources available to the individual producer.

The six most common options are discussed below. Each producer must choose which options to employ, to what degree, and under what circumstances.

Tax treatment of forced livestock sales due to pasture and fodder loss

The five years following a forced livestock sale

If you are obliged to sell livestock because of the destruction of pastures or fodder through fire, drought or flood, you can elect to spread over five years the profit on the livestock sale. This means that one-fifth of the profit would be included in your gross income for the year of the sale of the livestock, and one-fifth would be included in the gross income for each of the following four years.

To take advantage of this concession, you are required to declare that the sale was genuinely occasioned by the loss or destruction of pastures or fodder because of fire, drought or flood. In addition, you must demonstrate that the main part of the proceeds of the sale will be used to purchase replacement livestock or will be used in the maintenance of breeding stock for the purpose of restocking.

Alternatively, you may elect to have the profit on a forced livestock sale excluded from your assessable income for the year in which it was derived, and applied to reduce the cost of stock acquired during that year (or any of the five years after the sale) to replace the stock disposed of. Where replacement stock are bred instead of purchased, you may elect to include in your assessable income, over the same period, appropriate instalments of the profit on the forced sale (as described above).

If, at the end of the fifth year from the year in which the forced sale occurred, any part of the profit on the disposal has not been applied in reducing the cost of new stock purchased, or has not otherwise been included in assessable income, the amount that has not been applied will be included in your assessable income for that fifth year.

Advantages and disadvantages of the various options

Strategy	Advantages	Disadvantages
Selling some or all stock	<p>No cash outlay is required (unless values are minimal).</p> <p>Interest on proceeds of sale can be earned.</p> <p>Good prices are likely if stock are sold early.</p> <p>Risk of damage to pastures is reduced.</p> <p>Improved performance of remaining stock post-drought may compensate for reduced numbers.</p> <p>Reduces labour input—time is available to pursue other activities.</p> <p>Freight rebate may be available. Can select culls to improve flock genetics.</p>	<p>Stock may need to be repurchased after drought (prices could be high).</p> <p>Income is lost because of no production.</p> <p>Breeding cycle may be disrupted.</p> <p>Stock may have to be sold at a substantial discount if held for too long.</p> <p>Taxation may be affected.</p> <p>Genetic material is lost if culling does not discriminate.</p>
Production feeding	<p>Throughput of stock is maintained.</p> <p>Livestock inventory can be maintained at high levels by purchasing additional stock for feeding, hence reducing restocking problems.</p> <p>Futures can be used to guarantee prices.</p> <p>With breeding stock, the breeding cycle, natural increase and cash flow in the post-drought recovery phase are maintained.</p> <p>Lotfeeding protects pastures.</p>	<p>Costs are high, while market prices are uncertain.</p> <p>High labour input is required.</p> <p>If this strategy is used with breeding stock, stock numbers may increase, with consequent extra feeding costs.</p>
Maintenance feeding	<p>Income may be earned from production of progeny and/or wool.</p> <p>Restocking costs are avoided.</p> <p>Maintenance of breeding cycle may be possible.</p>	<p>Costs are directly related to length of drought.</p> <p>Large financial reserves may be required for practical periods.</p> <p>High labour input is required.</p> <p>Performance levels are affected.</p> <p>Young stock do not perform well.</p> <p>Weeds may be introduced.</p> <p>Losses can be high when break comes.</p>
Agistment	<p>Generally, agistment is much cheaper than is maintenance feeding per unit of food provided.</p> <p>If good agistment is available, full production may continue.</p> <p>Damage to pastures is minimised.</p> <p>Breeding program can continue.</p>	<p>Drought may affect agistment property.</p> <p>Stock must adapt to new area.</p> <p>Stock thefts may occur.</p> <p>Handling facilities and managerial control may be inadequate.</p> <p>Stock may be lost during transport.</p> <p>When stock are returned to original property, weeds, diseases etc. may be introduced.</p>
Trading in livestock	<p>Cash flow is provided for feeding and running costs so that total livestock numbers can be maintained.</p> <p>Can allow enterprise shift.</p>	<p>Weeds, diseases etc. may be introduced.</p> <p>Breeding cycle may be disrupted.</p> <p>Genetic base is lost.</p>
Humane destruction	<p>Prevents unacceptable suffering.</p> <p>Reduces stocking rates, enhancing chances for the remaining stock.</p> <p>Helps reduce further pasture and land degradation.</p> <p>Reduces hand feeding costs.</p> <p>May reduce the impact of, or eliminate, a disease, e.g. footrot.</p>	<p>Financial loss of stock value.</p> <p>Costs of slaughter and disposal.</p> <p>Unpleasant task.</p> <p>Some risk to operator.</p> <p>Loss of genetics can occur if there is no selection.</p>

THE SIX MOST COMMON OPTIONS

1. Selling stock

The timing of selling stock, and the condition of the stock at sale, are critical.

Selective reduction of stock numbers early in a drought is nearly always an attractive proposition, especially with cattle. If stock are sold early in the drought, prices received are likely to be better because the stock should be in reasonable condition and the market firm. Also, feeding costs are avoided.

The question of which stock to sell revolves around which types are easier to handle during drought, and which are going to be most productive or give the best returns after the drought.

Sheep, for example, have consistently given a higher percentage return to livestock capital invested than have cattle. The longer the drought lasts, the more effective this strategy will prove.

If the drought is short and a small percentage of stock have been sold, the remaining stock will probably compensate through increased performance per animal as a result of reduced stocking rate. It may not even be necessary to repurchase stock.

With a longer drought and a higher percentage of stock sold, the critical factor becomes the ability to purchase restocker animals at reasonable prices when conditions improve. Livestock prices in the post-drought phase do not always rise dramatically, because the financial reserves of graziers are depleted.

Early sale of stock will generate liquidity to bolster the farm's equity position or generate interest, which will assist in the longer-term survival of the business.

This option should almost always be the first measure taken in the early period of drought. As the drought progresses, stock should be sold class by class, starting with finished young stock, then castrate stock, replacement stock, aged stock and older breeders, until you are left with a nucleus of young, sound, breeding females, which represent the class of stock likely to be most valuable when the drought breaks, and most capable of the best production at that stage.

2. Production feeding

This strategy includes a couple of options which seek to maintain a level of production either by ensuring turn-off of finished stock at a time

when quality slaughter stock are at a premium, or by the maintenance of the breeding flock/herd in a hope that conditions will improve to allow progeny to be finished normally.

Option A – farm lotfeeding

The first option is best referred to as 'farm lotfeeding'. It is an attractive option if there is a large gap between the price of store animals and that of finished animals. You need to pay attention to the feeding technology, marketing, and particularly the economics of such an undertaking, as results can be highly variable according to the market relativities and physical performance.

Option B – maintaining performance of the breeding unit

The second option for maintaining performance of the breeding unit is subject to many variables which will have an impact on its success or otherwise. This approach assumes a short-term drought period and a market demand for the offspring at some time in the future. This practice is more common in the cattle industry because the longer gestation period for cattle gives a greater chance of encountering a break in the drought than is the case for sheep, and, even if drought conditions do not break, bobby calves can be sold, unlike young lambs.

The cost involved in the production feeding of breeding females is very high, and undertaking this option at a time when markets and seasonal conditions are erratic carries considerable risk.

3. Maintenance feeding

Maintenance feeding is widely practised, especially with sheep, because the wool they will grow generates income to help offset costs. Decisions to feed are often based on factors such as the availability of fodder stored on the farm and the level of cash reserves, rather than on a rational examination of costs and returns.

In a short drought, maintenance feeding is likely to be a low-cost strategy. However, if the drought is prolonged, maintenance feeding can be very expensive, particularly if continued to the point where resources are exhausted.

Generally, the wider the expected gap between drought sale revenues and repurchase costs, the greater the incentive to feed.

Before commencing feeding, numbers should be reduced to some extent, as related in '1. Selling stock'. Also, animals should be allowed to use some of their own body reserves before feeding commences. This reduces the length of

the feeding period and ensures more efficient utilisation of the feed provided.

4. Agistment

Agistment is widely used in regional droughts, and tends to be more widely practised with cattle than with sheep.

If you choose agistment, it is in your interest, as well as that of the other party, to have a written agreement. You should also inspect the facilities and the quality and quantity of feed at the agistment property before dispatching your stock.

You should also ascertain the disease status of the agistment property particularly concerning ovine/bovine Johne's disease and footrot.

5. Trading in livestock

Trading in livestock is not acceptable to many producers because of the loss of the genetic base built up over many years of a breeding program, and the risk of introducing disease. However, the market for livestock during a drought can fluctuate widely, and the opportunity often exists to buy one class of stock which is cheaper than another class. Using this strategy it may be possible to retain the same number of stock in terms of dry sheep equivalents and have considerably less capital tied up in livestock. The cash thus generated could be used to pay for feeding costs.

6. Humane destruction

Humane destruction of livestock is another strategy which may be applicable in times of very low livestock prices, when animals are unfit to be transported.

It is not acceptable to allow domestic animals to starve to death or die of thirst. Under the *Prevention of Cruelty to Animals Act 1979*, penalties can be imposed on a person who fails to provide an animal with appropriate and sufficient food and drink.

Humane destruction should be carried out when animals are approaching such poor condition that survival would be unlikely. In making this assessment, producers need to consider both animal and non-animal indicators that can affect survival. Animal indicators include emaciated body condition, depression, loss of appetite, inability to rise, and the presence of disease. Non-animal indicators include availability of feed and water, and extremely hot or cold weather.

In some situations it may be preferable to humanely destroy groups of animals before this 'point of no return' is reached. Decreasing

competition for feed will help the remaining animals to stay in better condition and be more productive following the drought. It will also reduce the costs of feeding. In making the decision as to which groups of animals need to be humanely destroyed, the producer should consider the genetics that are required after the drought and also the underlying vulnerability of different classes of animals.

If it is necessary to keep the same gene pool, then it is preferable to keep females and remove castrates. With regard to vulnerability to drought, aged or unweaned animals are more vulnerable, as are pregnant or lactating animals.

In some situations it may be advisable to remove all stock from the property, for example if sheep are infected with footrot. If animals with similar or better breeding are likely to be available after the drought, then all animals could be either sold to the abattoirs or humanely destroyed.

For more detailed information on the humane destruction of stock, see Primefact 310 *Humane destruction of stock*.

SUMMARY

By approaching the problem of drought in a logical manner you can increase your chances of success. To summarise, the recommended steps are as follows:

- Start early in a dry period to establish your short-term and long-term objectives.
- Assemble facts and figures on all aspects of alternative strategies: feed costs, rainfall records (official records and local experience), stock prices, agistment, support and subsidies.
- Cost out strategies for various lengths of drought.
- Select the mix of strategies which best fits your projections and situation.
- Write down your objectives and strategies, and whenever possible set down numbers, dates or dollar figures as benchmarks or triggers for particular actions.
- Review your strategies continually and adopt them if necessary.

FURTHER INFORMATION

The NSW Department of Primary Industries website has a wealth of information available at

www.dpi.nsw.gov.au/drought

Drought hints

REMINDERS

The following general hints are handy to keep in mind when a drought is in its early stages. They may appear to be just simple common sense, but it is easy for these to be overlooked at this early stage:

- Make decisions early and review them regularly.
- Don't wait – set a timetable and keep to it as closely as possible.
- It is a common belief that livestock will be expensive and unprocurable at the end of a drought – this has not been the case after past major droughts.
- Paddocks that have poor water should be grazed first.
- Don't forget about the routine procedures for maintaining animal health, particularly drenching against worms.
- Wean calves – feeding cows with calves is expensive.
- Consider changing from hay to grain – cost hay against grain.
- Pregnancy test – why feed non-productive animals?
- Condition score your stock.
- Mouth older stock.
- Assess the structural soundness of your stock.
- Cull stock that are not up to scratch.

The following advice is more in-depth than the general hints given above. You should review it early in a drought and use it to help you plan your strategies.

PLAN YOUR STRATEGIES EARLY

Droughts develop progressively, not overnight. Use the early period of a drought to plan the main strategies you will need to implement in order to ensure the economic survival of your business.

Experience that has been recorded from previous droughts provides some guide as to what can happen. While such factors as stock prices, feed costs, availability of feed, and interest rates will vary, the following points typical of all droughts are worth considering:

- During droughts, decisions are often made on an emotional rather than a logical basis. Try to make objective decisions, and seek skilled help when necessary.
- One reason often given for retaining livestock in early drought is that the stock on hand are thought to be of superior quality and that replacing them at reasonable cost would not be possible. Except for seedstock animals, this is rarely the case.
- Not all aspects of drought are bad – it can lead to opportunities for making money from enterprises such as lotfeeding, and this experience can be used to your advantage in normal seasons.
- The producers who do best during droughts are those who adopt sound management and financial plans, review these regularly, make firm decisions, and act early and quickly.

BE ON THE ALERT FOR OPPORTUNITIES

Every drought is different, so you must evaluate all possibilities. Be on the alert for opportunities such as these:

- buying or leasing land instead of buying feed;
- replacing old animals with younger ones;
- changing breeds.

A single trading decision at the right time could contribute more to your viability than a lengthy feeding program. Remember also that your ability to take advantage of opportunities depends on maintaining stock in saleable condition.

ACT QUICKLY TO REDUCE RISK

The higher the risk of a major crash in the market, the more important it is to take progressive action early. Dollars earned from selling culled animals while the market is still strong will give you greater flexibility should conditions deteriorate.

Factors affecting risk are:

- the total population of cattle and other livestock;
- the killing capacity of the abattoir;
- strength of the store market and export market;
- the extent of the drought-affected area;
- the time of year and the likelihood of rain;
- the adequacy of feed supplies in your district and elsewhere;
- the number of animals in feedlots.

ASSESS YOUR POSITION

When assessing your own position, think about the risk factors and ask yourself the following questions in the key areas of stock, finance and feed.

Stock

For each class of stock, ask yourself the following:

- How quickly are my stock losing weight?
- When will I have to start to feed / increase feed / agist / sell?
- Should I cull again?

Finance

- What are my stock worth on the market, and what are the market prospects?
- Are there other trading opportunities? For example, sell cows? Buy yearlings? Buy sheep?
- In terms of dollars per head per month, what is it costing to feed my stock?
- What can I afford to spend on maintaining my stock?
- What are the taxation considerations?

Feed

- What feed do I have? Is it suitable?
- Assuming purchases will be necessary, what is the price and availability of suitable feeds?
- Is it worthwhile selling conserved fodder, such as hay, and buying another type of feed, such as grain?
- Will reserves be adequate for covering increased seasonal needs, for instance at calving or in winter?
- Have I allowed for full drought feeding or only for supplementary feeding?
- What are the prospects for agistment or leasing?

REVIEW YOUR PROGRESS REGULARLY

The extra worry and stress caused by a drought, especially when you are preoccupied with feeding regimes, makes it hard to think logically about the big decisions. But it is vital to take time to review what is happening, to relate the changing situation for stock, feed or agistment, and to look ahead to the next step in your drought management program.

Review progress systematically and regularly, say once a month. By planning, you can retain some feeling of control and anticipate each major crisis.

Sometimes it is beneficial to have an outsider help with your assessment. Your local NSW Department of Primary Industries Livestock Officer can help you assess your options.

DEVELOP SKILLS FOR ASSESSING PASTURE

Develop your assessment skills for pasture quantity and quality. Good drought management relies on matching animal requirements with available pasture. Degradation of pasture leads to future income reduction and soil loss.

MAKE SOUND LIVESTOCK DECISIONS

In early drought you should aim to:

- reduce grazing pressure by selling, agisting, culling or lotfeeding stock – this is the most effective way of staying viable and reducing costs should drought persist;
- continue a positive cash flow by selling some stock;
- keep your options open;
- concentrate your effort on the animals that have the potential to earn the most money – your enterprise is then more likely to stay productive.

Draw up a timetable with progressive deadlines for taking action, such as seeking agistment, selling stock, or starting to feed.

It is common to feed stock during dry spells and seasonal shortages of feed. However, full drought feeding can be expensive, laborious, depressing and frustrating. Make sure you evaluate and implement options that reduce or eliminate feeding wherever possible.

FURTHER INFORMATION

The NSW Department of Primary Industries website has a wealth of information available at

www.dpi.nsw.gov.au/drought

The role of climate science in drought management

In the past, there has been a hope that science could solve the problem of drought by cloud seeding, irrigating vast tracts of land or breeding super-resilient plants and animals. Clearly drought is not a problem that can be solved but rather a risk that must be managed. Since the earliest days of settlement the erratic rainfall has been a recurring feature of agriculture in NSW. It is unusual for any decade to pass without one or two major droughts but no-one can say for certain when droughts will occur or how long they will last.

The future climate will always be uncertain. There are two advances in climate science for producers managing drought.

- Easy access to the rich resource of daily rainfall records collected across NSW over the last century. This data can be used to put numbers on uncertainty, in other words provide risk assessment. This data can be run through crop and pasture models to convert rainfall into crop yields and animal production. The decision on how to manage the risk is always up to the decision maker; what climate science can offer is better risk assessment.
- A growing ability to forecast the climate for the next season. There is an enormous international and national effort in climate science to understand the causes of seasonal climate variability. Much of this work has focused on the proven impact of the patterns of ocean temperatures on climate. The forecasts can not be used as categorical forecasts (for example, it will be dry, therefore reduce stocking rates), rather they must be used as part of risk management where the availability of feed, the condition of the stock and the seasonal outlook are all considered.

The agroclimatology unit of NSW Department of Primary Industries is a statewide unit that seeks to deliver the advances of climate science to NSW producers and their advisers. This is achieved by running workshops, providing written material and conducting applied research into ways in which climate information can be integrated into NSW farming systems so

that all of climate variability (the wet and the dry seasons) can be better managed.

WHAT IS AN EL NINO?

NSW rainfall is influenced by the Pacific, Indian and Southern oceans. Although the Pacific ocean is the main influence, the Indian ocean can play an important moderating role. In their outlook, the Bureau of Meteorology considers the influence of both the Pacific and the Indian oceans. The major impact is from the El Nino.

An El Nino event is a sustained warming by 1 degree Celsius of the surface temperature of the eastern equatorial ocean (adjacent to South America). The opposite phase called La Nina is a sustained cooling by 1 degree of the same region. An El Nino event is accompanied by a negative Southern Oscillation Index (SOI) and a decrease in the strength of the Pacific trade winds, resulting in less moisture over eastern Australia from which rain may develop.

IMPACT OF EL NINO ON NSW

Generally, NSW receives below average rainfall during an El Nino and above average rainfall with La Nina. The inside back cover of this book shows the impact of 12 major El Nino events. It is important to note that each El Nino event is different – for example, the 1997 El Nino had far less impact on NSW than the 1994 El Nino. Also, while total rainfall over a season is commonly below average, we can expect there will be some rain, although the amount and timing can not be forecast beyond a few days in advance.

If drought is defined as drier than the lowest rainfall decile (1 year in 10) and El Nino events occur every 4–5 years, then during any one particular El Nino there will be some areas that will not have a drought.

Although Eastern Australia is more likely to be in drought during an El Nino, it is possible to have drought at other times, though these other droughts are usually more localised. During an El Nino, the risk of drought in an area increases from 10% to 50%. Hence there is a greatly increased risk of drought rather than a prediction of drought for specific areas when the sea surface conditions are in an El Nino state.

The 'classic' El Nino forms in autumn and breaks down the following autumn. The term El Nino ('boy child', i.e. Jesus) was first used by Peruvian fishermen and refers to Christmas because that was when the pattern of warm

water off the coast of South America peaks. In most of NSW however, the main impact is felt in the winter and spring prior to the peak in ocean temperatures. This doesn't mean that El Nino droughts will break in summer or autumn after an El Nino winter and spring. Rather it means the probability of a dry winter or spring is higher in an El Nino year than the chance indicated from the long-term climate information while the chance of a dry summer and autumn is about the same as the long-term probability.

To make decisions with the help of this climate science, farmers now have extraordinary access to up to date information. Below are some readily available sources of information.

RAINMAN + STREAMFLOW CD

'Rainfall information for better management'

This CD (previously called Australian Rainman) gives you the power to:

- analyse rainfall records (Australian and worldwide) for individual locations for seasonal, monthly and daily patterns;
- forecast seasonal rainfall based on the southern oscillation index (SOI) or sea surface temperatures (SST);
- group locations for spatial analysis;
- import daily and monthly rainfall and streamflow data;
- print results as tables, graphs or maps.

Other information includes:

- Will it rain? The effect of the southern oscillation index and El Niño on Australia (interactive multimedia with animated illustrations).
- Tutorials on variability in rainfall and streamflow, including web links for worldwide climate forecasting.

Three different editions are available:

- standard – for farmers and business;
- educational – for universities, colleges and schools;
- professional – agricultural advisers, consultants, water managers, government planners, and researchers.

The current version at the time of writing is 4.3. Users of earlier versions can upgrade for \$25 but will need proof of ownership.

Minimum computer system configuration required:

Pentium II (preferably Pentium III or IV), CD-ROM drive. Suitable for Windows 98, NT, 2000 and XP.

Price: \$125 (standard edition)

Order from the NSW DPI Bookshop (see appendix 2 for details).

Order Number: C101

SEASONAL OUTLOOKS – THREE MONTH FORWARD PROJECTIONS OF PROBABLE RAIN AND TEMPERATURES

Poll Fax

Bureau of Meteorology fax numbers.

Directory of available information (free) 1800 630 100.

Includes the following that may be of special interest. These 1902 numbers are charged at \$1.38 per minute.

- 3 month climate outlook 1902 935 251
- Southern Oscillation Index and Sea Surface Temperature update 1902 935 432
- 1 & 3 month Australian rainfall maps and Drought Statements 1902 935 262
- NSW state monthly weather summary 1902 935 234.

Internet

- Australian Bureau of Meteorology – www.bom.gov.au

Check their Seasonal Outlook (updated monthly) and El Nino wrap up (updated weekly)

- Various forecasts are accessible via NSW Department of Primary Industries Drought web site – www.dpi.nsw.gov.au/drought
- Additional and more location-specific detail is available from the Bureau of Meteorology in a fee for service 3-month seasonal outlook product. Contact the Silo section of their web site for access to this product, www.bom.gov.au/silo.

WEATHER AND CLIMATE INFORMATION – SHORT-TERM WEATHER INFORMATION OUT TO 10 DAYS

Poll Fax

Bureau of Meteorology fax numbers.

Directory of available information (free)
1800 630 100.

Includes the following that may be of special interest.

These 1902 numbers are charged at \$1.38 per minute.

- MSLP analysis chart, 36 hr forecast chart and latest cloud picture 1902 935 252
- Australian region 4-day forecast 1902 935 002
- 2–5 day forecast chart 1902 935 003
- 6–7 day forecast chart 1902 935 004
- Rain radar – maps of currently falling regional rain
Moree 1902 935 766
Williamtown 1902 935 767
Sydney 1902 935 749
Wagga Wagga 1902 935 768
Grafton 1902 935 800
Coffs Harbour 1902 935 765

- Farmweather – includes latest cloud picture and 4-day forecast plus written description of the weather systems and how they are expected to develop as well as probability estimates of forecast rain times and amounts within each region.

Cottonfields – Bourke, Moree, Gunnedah,
Tamworth 1902 935 376

Stock and Grain – Coonabarabran, Dubbo,
Nyngan, Parkes 1902 935 377

Vineyards – Scone, Newcastle, Mudgee,
Orange 1902 935 378 Haystacks – Wyalong,

Young, Griffith, Wagga, Tumut, Albury
1902 935 375

Internet

- Australian Bureau of Meteorology –
www.bom.gov.au
- Various forecasts accessible via
NSW Department of Primary Industries
Drought web site –
www.dpi.nsw.gov.au/drought
- Additional and more location specific detail is available from the Bureau of Meteorology in two fee for service products. Contact the Silo section of their web site for 'Meteograms' or the Special Services Unit section for 'Premium weather'.

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