Straw as a roughage source for livestock

By Dione Howard, Veterinarian
Riverina Local Land Services, Hay
Phone 0427 418 006

The current dry climate and decreasing supply of roughage for livestock feed has many producers looking to use straw as a roughage source. If you’re weighing up whether to use straw in your livestock rations you need to consider its nutritive value. Here are some key points to consider about straw:

» All straws are extremely fibrous and have a high content of lignin, meaning that they are not digested easily.
» All straws have a low protein content and a low content of essential minerals and are poor-quality feed for livestock: 2 kilograms of straw is equivalent to 1 kilogram of grain.
» Straw is not suitable for young or lactating stock without the addition of grain or a mixture of molasses and a high-protein feed.
» Rice straw has an exceptionally high silica content; this is indigestible and further decreases feed digestibility.

To make straw work for your livestock operation:
» test the straw for crude protein and metabolisable energy, preferably before you buy it
» work out what other feeds or supplements will have to be provided to meet the nutritional needs of your animals:
  • Urea treatment of straw (with urea applied as a solution in water) has been discussed as a way of breaking down the lignin in the straw to increase its digestibility. However, this treatment is expensive and not always practical on-farm.
  • The most appropriate way of making the best use of straw is to supplement it with adequate protein and energy. For the protein and energy requirements of different classes of stock, see the table below.
  • Compare the costs of feeding other alternatives.

For more information about straw, or advice on alternative feed sources, contact your vet.

Protein and energy requirements of sheep and cattle

<table>
<thead>
<tr>
<th></th>
<th>CP (% of dietary DM)</th>
<th>ME (MJ)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sheep</td>
<td></td>
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</tr>
<tr>
<td>Lambs growing at 200 g/day</td>
<td>12</td>
<td>11.2</td>
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<tr>
<td>50-kg ewe: maintenance</td>
<td>8</td>
<td>8.7</td>
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<tr>
<td>50-kg pregnant ewe</td>
<td>Single 8</td>
<td>11 (mid) to 14.2 (late)</td>
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<td></td>
<td>Twins 8</td>
<td>12.8 (mid) to 18 (late)</td>
</tr>
<tr>
<td>50-kg lactating ewe condition score &lt;3 at lambing</td>
<td>Single 9</td>
<td>19.8 (early) to 15 (late)</td>
</tr>
<tr>
<td></td>
<td>Twins 12.5</td>
<td>24.9 (early) to 18.5 (late)</td>
</tr>
<tr>
<td>Cattle</td>
<td></td>
<td></td>
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<tr>
<td>450-kg dry cow in mid- to late pregnancy</td>
<td>10</td>
<td>65</td>
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<tr>
<td>450-kg cow + calf 1 to 3 months old</td>
<td>13</td>
<td>90</td>
</tr>
<tr>
<td>150-kg early-weaned calf growing at 250 g/day</td>
<td>13</td>
<td>30</td>
</tr>
</tbody>
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CP, crude protein; ME, metabolisable energy; MJ, megajoules
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The information contained in this publication is based on knowledge and understanding at the time of writing (December 2018). 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 the Department of Trade and Investment, Regional Infrastructure and Services or the user’s independent adviser.

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### National Vendor Declaration (NVD) booklets

You need to complete your Livestock Production Assurance (LPA) reaccreditation before you can order your next booklet.

**How do I do this?**

2. Enter your PIC, LPA User ID and LPA password. (If you don’t have all of this information or if you need help, call 1800 683 111 to talk to an LPA staff member.)
3. Make sure all your contact details are up to date.
4. Complete the seven modules that are part of the LPA learning package and practise the questions at the end of each section.
5. You can download the entire learning package as a single printable document and work through it this way.
6. Answer a series of multiple choice questions and complete the declaration.
7. Pay a 3-yearly fee of $60 plus GST (you need to pay only when reaccreditation is due; LPA will contact you 2 months prior).
8. Order your NVD booklet or use the free electronic NVDs on the website.

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### New service centre in Hay

Riverina Local Land Services’ newly appointed Customer Services Officer Melissa Gillis (pictured) is ready to help landholders complete their Emergency Drought Relief Transport Subsidy (freight rebate) applications through the new service centre in the Hay office (phone 02 6990 1300). Application forms for the Transport Subsidy are downloadable from the Rural Assistance Authority.

The service centre can help landholders who are not able to access the internet or who need documents scanned to attach to their applications. A table of information containing all current drought information is also available at the service centre. Assistance measures that landholders are finding extremely useful include GIVIT, Country Women’s Association of NSW Drought Aid (a fund that helps farming businesses to pay some necessary expenses) and the NSW Rural Assistance Authority Drought Assistance Fund, which provides interest-free loans for drought-related items such as water and fodder infrastructure.

*Photo provided by The Riverine Grazier*
To feed or not to feed in drought?

In drought it’s important to have a plan, act early, review and then plan again, and then revise the plan with each action as you play out your strategy. This spring, Local Land Services have been working with the StockPlan suite of decision-support tools to help producers explore drought-management options. The suite includes the Drought Pack program, an energy-based model (MJ ME/kg fed) that can be used to estimate feed requirements and feed costs during drought. Below are two scenarios based on western production systems; we have used these scenarios to generate feed cost estimates.

Scenario 1

Feeding 1000 Merino ewes weighing 60 kg from August 2018 until July 2019: wheat grain

In this case, we are feeding wheat at $500/tonne (t) and allowing for 10% of the sheep’s intake to come from the paddock. Ewes are joined in December, with lambing in May–June. Ewes are fed to maintain their body weight.

Using Drought Pack, we estimated that the amount of wheat grain required to feed these ewes is:

- through to the lead-up to lambing—18t/month fresh (0.6 kg/head at 30c/head/day) at a cost of $9025/month (see Scenario 1 table).
- as lambing approaches in May, to maintain increases in body weight—23.9t/month fresh (0.8 kg/head at 40c/head/day).
- as the ewes start lactating in June—45.1t/month fresh (1.5 kg/head at 75c/head/day).

Summary: Feeding wheat to 1000 x 60-kg ewes for 12 months, including lambing and lactation, will require 260.4 t of wheat. If the wheat costs $500/t, the total cost for this feed will be $130,179 (see Scenario 1 table).

<table>
<thead>
<tr>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed cost ($)</td>
<td>9025</td>
<td>9025</td>
<td>9025</td>
<td>9025</td>
<td>9025</td>
<td>9025</td>
<td>9025</td>
<td>9025</td>
<td>11,958</td>
<td>22,561</td>
<td>14,439</td>
<td>130,179</td>
</tr>
<tr>
<td>Wheat (t-fresh)</td>
<td>18.0</td>
<td>18.0</td>
<td>18.0</td>
<td>18.0</td>
<td>18.0</td>
<td>18.0</td>
<td>18.0</td>
<td>18.0</td>
<td>23.9</td>
<td>45.1</td>
<td>28.9</td>
<td>260.4</td>
</tr>
</tbody>
</table>

DM, dry matter

Scenario 2

Feeding 1000 Merino ewes weighing 60 kg from August 2018 until July 2019: wheaten hay

This is exactly the same scenario, except that this time wheaten hay is used at $220/t. Once again, 10% of the sheep’s intake will come from the paddock. We estimated that the amount of wheaten hay required to feed the same ewes is:

- through to the lead-up to lambing—32.8t/month fresh (1.09 kg/head at 24c/head/day) at a cost of $7214/month (see Scenario 2 table).
- as lambing approaches in May—41.6t/month (1.39 kg/head at 30c/head/day)
- as the ewes start lactating in June—55.4t/month (1.85 kg/head at 41c/head/day).

Summary: Feeding 1000 x 60 kg ewes for 12 months, including lambing and lactation, will require 447.5 t of wheaten hay. If the wheaten hay costs $220/t, the total cost of this feed will be $98,456 (see Scenario 2 table).

<table>
<thead>
<tr>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed cost ($)</td>
<td>7214</td>
<td>7214</td>
<td>7214</td>
<td>7214</td>
<td>7214</td>
<td>7214</td>
<td>7214</td>
<td>7214</td>
<td>9145</td>
<td>12,193</td>
<td>12,193</td>
<td>98,456</td>
</tr>
<tr>
<td>Wheaten hay (t-fresh)</td>
<td>32.8</td>
<td>32.8</td>
<td>32.8</td>
<td>32.8</td>
<td>32.8</td>
<td>32.8</td>
<td>32.8</td>
<td>32.8</td>
<td>41.6</td>
<td>55.4</td>
<td>55.4</td>
<td>447.5</td>
</tr>
</tbody>
</table>

DM, dry matter

These estimates are based on wheaten hay with an energy value of 8.5 MJ/kg dry matter. Whenever possible get a feed analysis done, as there can be considerable variation. Note that these are estimates only, and individual business situations will vary. Please contact your nearest Local Land Services office for more information about StockPlan software and other decision-support tools to explore drought-management options for your farm.

Drought Feed Calculator

You can do the calculations on this page easily and simply by using the Drought Feed Calculator. Drought Feed Calculator is a free app designed by NSW DPI to help sheep and cattle producers deal with drought and dry seasons. It can be used for both cattle and sheep and is an easy way of working out cost-effective feed rations and calculating minimum feed requirements. The app calculates:

1. the amount of feed per head
2. the cost per head
3. the cost for a period
4. the amount for a mob/ herd
5. the total cost for a mob/ herd.

You can download the free app from sites such as Google Play and the iPhone app store.
Drought feeding: lessons learned
By Charlotte Cavanagh
District Veterinarian – Western Local Land Services, Bourke
Phone 0429 773 021

Fortunately, for some, recent rain has provided some welcome relief, but for others the hand-feeding continues. The table below aims to share some of the lessons learned from animal health investigations into the hand-feeding of stock in the Western Local Land Services region over the last 6 months or so.

Lessons learned from drought feeding in the western region

<table>
<thead>
<tr>
<th>Issue</th>
<th>Lessons learned</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Acidosis/grain poisoning</strong></td>
<td>Acidosis can affect stock that have been hand fed for a long period, not just those that have just started. The misconception is that the rumen will have adapted to hand-feeding, but the fact is that the rumen has to adapt to each change in feeding management. Even if stock have been fed the same meal for months, if they are fed intermittently (e.g. every 3 or 4 days), with no ad-lib feed available, the rumen will have emptied before the next feed. The stock may be hungry and gorge: the microbe population will then be in a state of flux and acidosis can occur.</td>
</tr>
</tbody>
</table>
| ‘The sheep are dying but it can’t be grain poisoning, as these sheep have been hand fed for months.’ | ■ Acidosis can occur when feeding pellets.  
■ Acidosis can also occur on lush green feed (green pick after rain), which is also highly fermentable and requires a change in rumen microbes for digestion.  
■ Acidosis can occur not only when a new type of feed is introduced (e.g. from paddock feeding to grain/oats to wheat) but when the source or batch of feed changes, particularly if feeding pellets.  
■ Always introduce a new feed slowly, and shandy an old batch with the new batch where possible. Make sure roughage is available. |
| **Enterotoxaemia/pulpy kidney** | Pulpy kidney can occur hand-in-hand with grain poisoning. Anything that slows the movement of grain through the gut can result in a proliferation of clostridial bacteria and the production of toxins that cause sudden death. These toxins affect the lining of the blood vessels, making the vessels ‘leaky’ and allowing the toxins to be absorbed and spread quickly around the body. Sheep that die from pulpy kidney decompose very quickly, but if they are opened up when freshly dead the kidneys may appear normal. |
| ‘There’s more to pulpy kidney than just ‘pulpy kidneys.’ | ■ Many producers in the Western Local Land Services region don’t routinely vaccinate their stock against clostridial diseases such as pulpy kidney. A complete vaccination program is recommended, particularly when hand-feeding, as hand-fed stock are more susceptible to clostridial disease.  
■ If your stock are dying, contact your vet early for further investigation. |
| **Scouring** | Drought-affected, immune-suppressed, hand-fed sheep are ideal candidates for worm infestation because of the intensive conditions created. However, worm eggs require warmth, moisture and grass to complete their life cycles. If there is no standing feed in the paddock and there has been no rain and the stock are watered from troughs, the cause of the scouring is unlikely to be worms. |
| ‘The sheep were scouring so we gave them a drench and that didn’t fix it.’ | ■ Scouring is likely an indicator of a stomach upset, for example from acidosis.  
■ Other causes of scouring include coccidiosis and bacterial infections such as Salmonella.  
■ The consistency of the droppings should be monitored.  
■ The presence of loose sheep dropping or cattle pats with bubbles may be feed related.  
■ Collect faeces for a worm test before reaching for the drench gun.  
■ See http://www.wormboss.com.au |
| **Hypocalcaemia** | We know that calcium is an essential nutrient for pregnant and lactating animals, as it is required for formation of the skeleton of the developing foetus and for the production of milk. Calcium is also required for nerve conduction, muscle contraction and blood coagulation. Diets made up of mainly cereal grain and cottonseed will be lacking in calcium. It’s important to achieve a calcium to phosphorus ratio of 2:1 for all classes of stock. |
| It’s not just pregnant and lactating stock that require calcium supplementation. | ■ Adding calcium to the diet is cheap and easy. Provide calcium carbonate in the form of agricultural limestone, either mixed with grain, or mixed with salt in a trough/tub, or on its own.  
■ Calcium also has buffering ability, which helps prevent acidosis.  
■ If stock have access to chenopods, the oxalate in these plants binds calcium.  
■ If stock are grazing chenopods, or if the water source is salty, it is best to provide calcium on its own or mixed with feed, rather than mixed with salt in a trough.  

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<table>
<thead>
<tr>
<th>Issue</th>
<th>Lessons learned</th>
</tr>
</thead>
</table>
| Sodium deficiency | Sodium will also be deficient in grains. Provide salt (sodium chloride) at 0.5% of the diet by weight. Sodium is required for the sodium–potassium pump in the rumen wall. This pump ensures movement of essential minerals such as calcium and magnesium into the blood. Sodium is needed for growth, to maintain hydration, and to utilise digested energy and protein from feed.  
  - Coarse salt is cheap and can be placed in basic home-made troughs (e.g. drums cut in half). If the stock need it they will lick it up. |
| Feeding cotton seed and mulga over prolonged periods | Cotton seed and mulga have been widely and successfully used as supplementary feeds in the Western Local Land Services region for years, mainly because they are more readily available than good-quality hay and cereal grains. Both are excellent supplementary feeds, but care needs to be taken when they are fed for long periods of time and as the main supplement.  
  - Cotton seed and feeds such as grape marc are high in oil. Oils kill rumen microbes and coat fibrous feedstuffs, stopping them from being broken down in the rumen. Stock will usually self-limit their intake. This is fine when alternative feed is available, but if these materials are the stock’s only feed source then they will essentially be reducing their total intake, meaning that they may not be meeting their energy needs.  
  - Mulga may be suitable for maintenance of cattle, but at a metabolisable energy content of 8.5 and only about 55% digestibility it will be of low value when feeding pregnant or lactating stock. |
| Overcrowding in drought lots | There’s a whole raft of considerations in setting up drought lots, but to keep it simple I like to compare the grouping of stock into a confined space to a childcare centre, where young children lacking in hygiene and social awareness are mixing, eating, pooing and weeing.  
  - If it’s worth doing it’s worth doing properly.  
  - Get the group size right: the smaller the numbers, the better. Packing 1000 sheep in together is not ideal. Smaller group sizes of 100 to 400 help to eliminate issues (e.g. with gutsy or shy feeders) within social groups. Group according to weight, not age.  
  - Hygiene is critical: feed off the ground and make adjustments to troughs so that lambs cannot climb into them and defaecate. Flush water troughs regularly to keep the water clean and cool.  
  - Where possible, spray yards with water to keep the dust down. This will help to prevent pink eye and control flies.  
  - Have a hospital pen. Disease spreads quickly in childcare centres! |
| Nitrate toxicity | Nitrate toxicity is recognised as a risk when stock are grazing Brassica species such as canola. Canola hay is becoming readily available at the moment, and stock eating it have died from nitrate toxicity. Seek advice before feeding canola hay.  
  - One to watch out for as canola hay becomes available |
| DO THE SUMS | Taking the time to work out the requirements of your stock and matching them to what you are giving them as feed is critical.  
  - Ask for feed test values for fodder, or have the feed tested yourself.  
  - Work out your stock requirements per head per day.  
  - Be aware that the high water content and low digestibility or palatability of some cheaper feeds may cost you in the long run, as stock may not be able to physically consume enough feed to meet their needs. |

For more information regarding animal health contact your nearest Local Land Services district vet on 1300 795 299.

**Book review: Sunburnt Country**

**By Greg Curran**

Animal and Climate Investigations, Broken Hill

Are you interested in questions of climate change? If you are, then *Sunburnt Country* by Joelle Gergis might answer your questions. Published in April this year, the book covers every aspect of changes in Australia’s climate, with predictions of what the future might and will be across the country. The book comes from the work of a team of palaeoclimatologists, historians and meteorologists, and it accurately describes the history of climate change in Australia, in both the immediate past (since 1873) and the deeper past. They looked at change from evidence in lake sediments, tree rings, coral banding and the Antarctic, and from newspapers, historical documents, drawings and paintings.

The SEARCH (South-Eastern Australian Recent Climate History) team behind the book won the Prime Minister’s 2014 Eureka Prize for Excellence in Interdisciplinary Scientific Research. Peter Milthorpe, who many of you will know as the co-author of *Plants of Western NSW*, recommended that I read it. Well-written, complete, and with references to original work that allow you to do your own research, Dr Gergis’s book is something of a ‘Magic Pudding’ that I believe you will go back to time and again. Of the many notable points she makes, one that struck me was that we are now in a time when systems of predicting climate are starting to break down as the world warms. *Sunburnt Country*—The History and Future of Climate Change in Australia, by Joelle Gergis, is published by Melbourne University Press, 2018. ISBN 9780522871548 (paperback), 9780522871555
Feed budgeting continues: should I keep and feed weaner lambs this year?

Having spent the last few months at the desk working with (mainly) NSW farmers and helping to guide them through the challenge of feeding thousands of lambing ewes (and a few cattle) during this drought, I’m really encouraged by how well organised and communicative those that I have dealt with have been. The size of some of the feed budgets has been scary (and I’m sure at times completely overwhelming) for many farmers, but the commitment to getting through this has been nothing short of amazing; and it’s not over yet.

Key messages emerging from the last 6 months are as follows:

» Act early:
  • If it’s been dry over the previous 6 to 12 months, there won’t be the dry matter available to maintain usual stock numbers.

» Decide which mobs are going, and sell early:
  • The young ones are the most costly to feed.
  • The older ones are well adapted to your environment and are likely to recover more quickly and cost less to feed.

» Once the numbers are settled:
  • Secure the feed you need before the price escalates and the quality drops.

Many of you will now be faced with young, light weaners, so here are a few things to consider in spite of the lure of high wool and livestock prices:

» Feed costs are very high, and the cost of protein grain is still climbing.

» Young, light weaners need a high protein diet and highly digestible hay to grow fast.

» The faster they grow the sooner you can sell them.

If your Merino lambs are 25 kg live weight and are currently worth more than $67/head, sell them unless you’re sure that they will grow at 150 g/day or more; if you’re confident that they will grow at 200 g/day, they would currently need to be valued at less than $89/head to make a profit out of feeding them on to 45 kg live weight (see the tables below).

With forward contracts out for January 2019 at $7.60 hundredweight, the breakeven on feeding crossbred lambs to 50 kg live weight over 100 days is a value of $120/head at 30 kg live weight. In other words, if your 30-kg lambs are currently worth more than $120 it’s unlikely to be profitable (or at least it will be high risk) to feed them to heavier weights.

### Tables for feedlotting Merino lambs from 25 to 45 kg live weight over 100 days post-weaning, growing at 200 g/day

#### Effect of lamb purchase price and carcase price on gross profit per lamb

<table>
<thead>
<tr>
<th>Lamb purchase price or value @ weaning ($/head)</th>
<th>$70.00</th>
<th>$80.00</th>
<th>$90.00</th>
<th>$100.00</th>
<th>$110.00</th>
<th>$120.00</th>
</tr>
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<tbody>
<tr>
<td>Carcase price ($/kg cwt)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$6.00</td>
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<td>$7.50</td>
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<td>$20.43</td>
<td>$10.43</td>
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<td>$9.57</td>
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#### Effect of lamb growth rate on gross profit per lamb

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<thead>
<tr>
<th>Lamb growth rate (g/head/day)</th>
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<th>120</th>
<th>150</th>
<th>200</th>
<th>250</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross profit</td>
<td>$-65.32</td>
<td>$-43.76</td>
<td>$-21.55</td>
<td>$20.00</td>
<td>$13.06</td>
</tr>
</tbody>
</table>

#### Effect of skin price on gross profit per lamb

<table>
<thead>
<tr>
<th>Skin price ($/head)</th>
<th>3.00</th>
<th>5.00</th>
<th>10.00</th>
<th>12.00</th>
<th>15.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross profit</td>
<td>$-8.00</td>
<td>$-6.00</td>
<td>$-1.00</td>
<td>$1.00</td>
<td>$4.00</td>
</tr>
</tbody>
</table>

A quick note on hay feeding

If you’ve been feeding out low-quality hay for some time now, it’s likely that your stock will be getting low on minerals and vitamins—particularly copper, selenium and vitamin B1 (thiamine)—as a lot of weather-damaged hay was produced in 2016 and has been sold extensively over the last 6 months. Even though the new-season hay should be of very good quality this year, it would pay to source a well-balanced mineral mix for ewes and lambs and cows and calves to top them up over summer. Make sure the mix contains at least the nutrients mentioned above, and if you’re feeding wheat make sure that all stock have access to a mix of salt (20%) and lime (80%) right through to the point of lambing or calving next year. Where and when halophyte shrubs such as saltbushes are plentiful, mineral supplementation is not usually required.
Water resources

Water is an essential nutrient for all animals. For both animal welfare and business profitability reasons, it’s important to know the quantity, quality and reliability of water sources in dry times. You can assess your available water resources by using the strategies shown in the box below.

Assessing water resources

**Demand**
The amount and quality of water required varies between livestock species and class and the environment in which the stock are running (see table).

**Quantity**
How to estimate the volume of water storages:
1. Determine the width (W), length (L) and depth (D) of the water storage
2. Calculate the surface area (W x L)
3. Calculate the volume in cubic metres (m$^3$) using the following formula: Volume (m$^3$) = 0.4 x surface area x D
4. Calculate the capacity of each water storage in megalitres (ML) by dividing the volume in cubic metres (m$^3$) by 1000.

**Quality**
Principal factors affecting water quality:
1. Salinity – total dissolved salts are the main factor that determines the suitability of water for stock
2. Acidity or alkalinity (pH)
3. Toxic elements and compounds
4. Algal growth or bloom

Water sampling kits are available from your nearest Local Land Services office.

<table>
<thead>
<tr>
<th>Stock Type</th>
<th>Consumption per head per day (L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sheep</td>
<td></td>
</tr>
<tr>
<td>Weaners</td>
<td>2–4</td>
</tr>
<tr>
<td>Adult dry sheep – grassland</td>
<td>2–6</td>
</tr>
<tr>
<td>Adult dry sheep – saltbush</td>
<td>4–12</td>
</tr>
<tr>
<td>Ewes with lambs</td>
<td>4–10</td>
</tr>
<tr>
<td>Cattle</td>
<td></td>
</tr>
<tr>
<td>Lactating cows – grassland</td>
<td>40–100</td>
</tr>
<tr>
<td>Lactating cows – saltbush</td>
<td>70–140</td>
</tr>
<tr>
<td>Young stock</td>
<td>25–50</td>
</tr>
<tr>
<td>Dry stock (400 kg)</td>
<td>35–80</td>
</tr>
</tbody>
</table>

Dissolved salts in bore water
- Generally, surface waters are low in salts compared with artesian or underground water.
- Salinity increases the intake of water by animals.
- Sheep can tolerate 5000–10,000 mg/L total dissolved solids and beef cattle can tolerate 4000–5000 mg/L total dissolved solids.
- Water hardness (calcium and magnesium concentration) is not the same as salinity (other dissolved salts). Hard water is not detrimental to livestock unless the water has a high level of salinity.

Local Land Services: responding to the dry times

Local Land Services is taking a proactive approach to drought across the Murray and Riverina regions, facilitating a series of workshops to help producers adjust to the dry times.

Both Murray and Riverina Local Land Services are conducting sessions aimed at dryland and mixed farming enterprises, with a focus on stock welfare as available feed becomes scarce.

However, with the current conditions forecast to continue, there will be an additional focus over the coming months on providing help and information to producers in the irrigation district.

Riverina Local Land Services is planning a series of community sessions over the remainder of 2018 and the beginning of 2019. These low-key events will be planned individually according to the needs of particular groups or communities; they could involve technical agricultural or biosecurity advice, presentations from rural counsellors or mental health professionals, and information on how to access drought help and other services.

In addition, irrigator workshops will be held in February and later in 2019. These will focus on key financial indicators and the outlook for the 2019–20 water year.

If you’re in the Riverina region, keep an eye on our various communication channels for dates and times or, alternatively, suggest a date and location for a session by contacting Irrigation Officer Anna Wilson on 6954 4650 or 0429 964 785.

In the Murray region, there are plans to run training and workshop sessions focused on best-management practices for both surface and overhead irrigation systems. These are likely to begin in late 2018 and continue into 2019. Watch the Murray communication channels for details of these, but in the meantime, remember that our expert staff are always on hand to provide advice to irrigators on system upgrades, irrigation efficiency and productivity. Call the Murray Agriculture team in Deniliquin on 03 5881 9900.
In July 2018, a producer in the Western Local Land Services region reported deaths in 130 home-bred poll Hereford weaners between 13 and 15 months old. This mob of weaners had been vaccinated at marking with a 7-in-1 vaccine and with Piliguard® for pinkeye. The heifers received a 7-in-1 booster at weaning, but the steers did not. The animals had been weaned 3 weeks before the onset of clinical signs, with steers going into a feedlot and heifers going out into a paddock. In the feedlot, the steers were initially fed a ration of vetch hay, oats and fava beans, and after a week on this diet they were transitioned to a ration of vetch hay and a finisher pellet.

The producer reported finding two steers dead in the feedlot 5 days before he contacted the district vet; he also noted three other steers showing signs of lethargy, lack of appetite and runny noses. On inspection the producer also found one heifer in the paddock showing clinical signs.

The district vet visited the property and examined both a heifer and a steer that had been brought in by the producer. Both animals had a purulent discharge from both nostrils and watery eyes. The heifer had severe opacity of both corneas, with no menace reflex, and the steer had milder bilateral corneal opacity but still had a menace reflex. Both animals had peeling of the nasal epithelium, but there were no lesions in the mouth, including on the tongue, or on the feet. Both the heifer and steer were feverish (40.1 °C and 40.7 °C, respectively) and had increased respiratory rates (60 and 64 breaths per minute), with rough respiratory sounds on both sides. Both the heifer and steer were still alert and responsive and had normal ruminal contractions, but they had diarrhoea and were hyper-responsive to external stimuli. Samples, including blood and nasal swabs, were collected from both animals.

The samples were submitted to the State Veterinary Diagnostic Laboratory for testing; infectious bovine rhinotracheitis was the leading likely diagnosis. Both animals were negative for this disease on antibody ELISA testing but were positive for malignant catarrhal fever (MCF) virus on real-time PCR, which detects the virus that causes sheep-associated MCF, namely ovine herpesvirus 2.

During the wait for the test results the affected animals were treated with an antibiotic (oxytetracycline) and an anti-inflammatory (ketoprofen) prescribed by a private vet. None of the affected animals responded to the treatment. The steers were also moved into a paddock to reduce animal-to-animal contact while the test results were pending. By the time obvious signs of the outbreak had stopped, nine of the affected animals had died.

With a positive diagnosis of MCF made, further details were collected from the producer. The producer also runs a poll Merino stud on the property, but the poll Hereford weaners had had with the sheep were with Suffolk rams that had been introduced to the property and were being lot-fed in the same area as the steers. The owner had not seen signs of MCF previously, and no other reports of the disease had been made in the area.

Differential diagnoses for MCF include bovine viral diarrhoea/mucosal disease and infectious bovine rhinotracheitis, but they also include important notifiable diseases such as foot and mouth disease and rinderpest, so definitive diagnosis and disease exclusion is important for animal health monitoring.
Insect predators winning the cactus battle in the western region

By Mitch Plumbe
Senior Land Services Officer, Western Local Land Services, Broken Hill, Phone 0408 241 200

Just over 2 years after a new biotype of cochineal insect (*Dactylopius tomentosus, cholla* biotype) was released to control boxing glove cactus (*Cylindropuntia fulgida var. mamillata*), positive results are now being seen by Western Local Land Services staff.

In October 2016, the new cochineal biotype was released at a site near Tibooburra onto approximately 30 individual plants within the core infestation of boxing glove cactus.

A site inspection 6 months later showed positive signs that a population of cochineal had begun to establish itself, with individual plants displaying evidence of infestation. However, at that point, the cochineal had not spread more than a metre or so from the individual release points.

By May 2018, all plants within the core infestation area were exhibiting a very high level of infestation, most being completely dead or in a very weakened state.

The cochineal had also spread up to 400 metres from the release site onto more sparsely distributed cactus plants, which was pleasing to see.

The use of a biological control at this site has achieved a substantial reduction in the cactus population with minimal investment by the landholder.

This has allowed labour and herbicide resources to be concentrated on containing more isolated plants.

In addition to the initial population decline, using cochineal as a control tool has been beneficial as it infects even the really small plants that are just getting established, meaning that they don’t get the chance to grow and mature.

The site near Tibooburra is now being used as a source population to further spread cochineal to other boxing glove cactus infestations around the region, such as at Stephen’s Creek Reservoir near Broken Hill.

The identification and release of the new cochineal biotype are the results of many years of research by NSW DPI and the Queensland Department of Agriculture and Fisheries.

The release is part of a broader national collaboration project led by Meat and Livestock Australia and supported by funding from the Australian Government Department of Agriculture and Water Resources, as part of its Rural R&D for Profit program to implement biological control of six high-priority weeds.

For more information about biological control of cactus, contact Mitch Plumbe (Broken Hill) on 0408 241 200 or Senior Land Services Officer Brian Dohnt (Cobar) on 0455 901 258.
Broken Hill to host the 2019 NSW Landcare and Local Land Services conference

Landholders and community members in the western region and throughout NSW will have a great opportunity to experience the best of the outback, with Broken Hill announced as the host city for the 2019 NSW Landcare and Local Land Services conference.

The conference, which will be held from 22 to 24 October 2019, will highlight some of the great work and achievements by the Landcare community and landholders both in the western region and throughout NSW, while also offering informative speakers, workshops and field trips.

The theme of the 2019 event is ‘Healthy Landcare – Healthy Landscapes’.

Although the conference is still in the early stages of planning, Western Landcare NSW Executive Officer Louise Turner, who is on the steering committee, is encouraging people to save the date and start planning their travel arrangements for what promises to be a real highlight of next year.

‘All of us involved in the committee are really excited this event is coming to the Western region,’ said Louise.

‘This conference will be a great way to showcase what Landcare is all about in the Western region and showcase some of the amazing things that are being achieved by landholders and community members across the state.’

‘The Western region provides such a beautiful landscape and is full of innovative and deep-thinking people, as well as Aboriginal cultural heritage, and that’s just part of what will be on display at the conference.’

With accommodation in Broken Hill expected to be at capacity for the event, participants are encouraged to make bookings as soon as they can.

Tickets for the conference will go on sale in early 2019. Announcements about guest speakers and field trips will be made in due course.

For further information on the event, visit the conference website or social media pages:
www.nswlandcareconference.com.au
www.facebook.com/nswlandcareandlocallandservicesconference
www.twitter.com/nswlandconf
Sheep Connect NSW has recently started delivering practical new workshops to help producers with their sheep operations, and they’ve been very well received by attendees throughout all areas of the state.

Making the delivery of these workshops even more exciting is that two of them were developed in NSW with input from producers. Sheep Connect NSW is the key extension investment by Australian Wool Innovation (AWI). It’s directed strategically by a panel of producers, from all around the state, who provided direct input into the gaps in knowledge and information for sheep producers. The results of this are the RAMping Up Repro and Winning With Weaners workshops.

The Winning With Weaners workshop is held indoors; participants discuss the causes of weaner ill thrift, best-practice weaner management, weaner nutrition and strategies for reaching joining target weights, and optimal lifetime performance. The workshop is very interactive, and participants calculate targets for their own sheep operations, along with learning how to balance nutrition for meeting weaner growth targets. In light of the current seasonal conditions, early weaning management is also discussed. Weaner management can be fickle, but with some sound groundwork early in their lifetime weaners can be managed effectively for productive lives in the flock.

As many as 250 people have attended Winning With Weaners, and 99% of attendees have said that they would recommend the event to others. All attendees said that they would change things on their properties; most have said that they are going to manage the tail of their weaners separately, or weigh their weaners more often.

Another practical workshop available is the RAMping Up Repro workshop. This workshop discusses best-practice ram management for optimal performance of the ram team. Importantly, management of the ram team needs to be ongoing throughout the year, and pre-joining preparation should start 3 months before joining.

This workshop is a collaboration between AWI and Zoetis. It is held on farm, and participants get close up and hands on, learning how to perform a 4 Ts ram check: teeth, toes, testes and tackle. Demonstrated by accredited, experienced consultants, the practical skills will make sure that all participants can prepare their rams for their job. Similar to marathon runners or other elite athletes, rams need careful preparation in the lead-up to joining so that the best performance, value and transfer of genetics can take the flock forwards. As spermatogenesis (production of sperm) takes 42 days, preparation and management need to start with this in mind, and major management tasks need to be completed well in advance of joining. If this is done, the rams will start joining without any unnecessary or avoidable problems that could adversely affect conception rates.

Again, this workshop has been very well received; all participants would recommend the event to others and intend to implement management to better prepare their rams for joining. The aim of these new workshops is to help sheep producers to gain knowledge and skills to implement on-farm practical management that will improve their productivity. The workshops were put through a rigorous testing process ahead of their roll-out. This ‘farmer test’ has resulted in practical workshops with simple tools and best-practice information backed by sound science and distilled to best fit the audience requirements. The workshops aim to make best practice simple and achievable, with useful tools and resources to support attendees both on the day and afterwards, when they are back home.

The cost to attend a workshop is $75 per person; this includes catering and comprehensive workshop materials.

For more information about when the workshops are held, look up the Sheep Connect NSW website at www.sheepconnectnsw.com.au
In a new project funded by Meat & Livestock Australia, researchers are asking goat producers to think about the importance of reproductive efficiency to their business profitability and the industry’s growth. NSW DPI is leading the project in collaboration with Charles Sturt University through the Graham Centre for Agricultural Innovation. The project’s aim is to quantify the prevalence, causes and costs of kid loss in Australian goatmeat production systems.

Post-graduate university students will play a leading role in the research, which will build capacity and experience within the goat industry.

On-farm productivity improvements are needed for the industry to increase supply to meet the expected international demand for goat meat. Currently the capacity to increase productivity on farm is limited, because too little is known about the scale and impact of kid loss. Addressing this knowledge gap has the potential to substantially improve kid survival rates, which is likely to be a key profit driver, as suggested by the results in industries such as beef and sheepmeat.

The project team is prioritising collaboration with producers in a range of production systems, including managed and semi-managed rangeland enterprises. Input from producers is critical to ensure that results that can be implemented on farm to improve the national goatmeat supply.

In 2019, expressions of interest will be sought from producers interested in investigating kid loss in their herds. Getting involved is a great opportunity to work with leading researchers who specialise in fields such as reproduction, nutrition, maternal efficiency, herd health and veterinary epidemiology.

Investigating kid survival requires producers to compare a herd’s potential reproduction rate (PRR) with its net reproduction rate (NRR). PRR is the number of foetuses per doe joined and is a product of fertility (does in kid / does joined) and litter size (number of foetuses / pregnant doe). The survival rate then determines the NRR (kids weaned / doe joined).

Quantifying kid survival requires minimal changes to management and is relatively cheap. Ultrasound pregnancy scanning is vital to understanding PRR and improving NRR. Contractors can scan 100 to 200 does an hour for litter size. Producers who collect information on reproduction may already have very useful data. The team is encouraging goat producers to consider what data they have that could be analysed to determine historical survival rates.

In Australia, goatmeat production occurs in diverse geographical regions and production systems. The prevalence and causes of kid loss are unlikely to be uniform across all production systems. Causes of kid loss may include starvation/mismothering, difficult births, infection or predation. Determining the causes of kid loss will allow the development of management guidelines to increase kid survival for the different production systems. The management practices needed to address kid loss will vary with the scale of enterprises.

Whereas the collection of on-farm data and producer case studies will generate valuable information, a survey of animal health laboratories and a literature review will also inform drivers of kid loss. The survey of animal health laboratories will gather information on the level and cause of submissions relating to kid loss and goat abortions in the past 15 years. The literature review will look at Australian and international research on newborn survival and reproductive performance in goats and sheep.

This project is likely to deliver considerable on-farm and industry benefits. Producers interested in finding out more about how they can become involved in the project are encouraged to contact Dr Gordon Refshauge on 02 6349 9715; gordon.refshauge@dpi.nsw.gov.au.
An interesting historical footnote on malleefowl

By David Kellett, Land Services Officer, Riverina Local Land Services, Griffith
Phone 0428 693 990

There is the evil that comes from the destruction of valuable links in nature’s chain, on which man’s very existence largely hangs.

So I thought it might be nice to reflect back to the early 1900s when the man who said these wise words, Thomas Paine Bellchambers, was alive. In 1914 he became the first person to breed malleefowl in captivity.

Tom Bellchambers was well known as a naturalist and conservationist and was most notable for his study of, and lifelong passion for, malleefowl. He was born in England in 1858 and migrated to Australia in 1874. He had an intense interest in the environment—nurtured by his mother—and in 1905, at the age of 47, he bought some land in the Mount Lofty Ranges and started the Humbug Scrub Wildlife Sanctuary. Tom and his wife Eliza lived at the sanctuary with their 10 children; Tom died and was buried there in 1929.


The following extract is from *A Nature-Lovers Notebook*, published in 1931:

In the story of Hoolow & Hoola I am making a special plea for the preservation of the wild life of the Australian bushlands, which generally speaking, is so little valued, and all too swiftly passing. The story is founded on facts gathered over a great number of years, and after the study of many birds, with the idea of presenting a life history of one of the most wonderful forms of the feathered tribe—one of the small group of mound-building birds known as the malleefowl (*Leipoa ocellata*). This bird is remarkably intelligent—a born philosopher, an engineer in its knowledge of construction, and a chemist in its adaption of the laws that govern fermentation. As a physicist, too, one would almost imagine that the bird understands the principles of heat, radiation, capillarity, evaporation, and meteorology, for it appears to be able to regulate the temperature and gauge the thermal conditions of its gigantic mound, which acts the part of an incubator.

Malleefowl bred at the Humbug Scrub Sanctuary were supplied to aviculturists across the country, including the Le Souef brothers in Melbourne and Sydney. The Le Souef brothers, William Henry (1856–1923), Ernest Albert (1869–1937) and Albert Sherbourne (1877–1951), were directors of the Melbourne, Sydney and Perth Zoos around that time and were also trained scientists. In 1924, a pair of malleefowl bred at the Humbug Scrub Sanctuary were presented to His Majesty King George V.

In his ideas and beliefs, Thomas Paine Bellchambers was truly ahead of his time. He was a remarkable man with a remarkable vision. The Humbug Scrub Wildlife Sanctuary has been kept going by the Bellchambers family, with the help of volunteers.

For information on the sanctuary go to [https://www.facebook.com/HumbugScrubWildLifeSanctuary/](https://www.facebook.com/HumbugScrubWildLifeSanctuary/)

Back in the present, there is a NSW Malleefowl Recovery Group currently in the making and we are looking for volunteers to be a part of this amazing group. Please contact one of the following people if you are interested in becoming a volunteer or would like further information:

Ronni O’Donnell, Western Local Land Services: 03 5021 9429, ronni.odonnell@lls.nsw.gov.au

Libby McIntyre, Central West Local Land Services: 02 6841 6525, libby.mcintyre@lls.nsw.gov.au

David Kellett, Riverina Local Land Services: 02 6960 1355, david.kellett@lls.nsw.gov.au

Malleefowl bred at the Humbug Scrub Sanctuary and presented to His Majesty the King in 1924. Illustrated London News
Legal Roads Network project update

By Sharon Hawke
Area Manager – Far West
Department of Industry – Crown Lands & Water
Phone (02) 6883 5405

The Legal Roads Network (LRN) team has now completed all the plan drawing and registration for the Western Division of NSW. A total of 82 plans have been registered, identifying 18,610 kilometres of shire road and 3220 kilometres of restricted easements to landlocked properties in the Western Division.

This project has provided legal access to about 2263 Western Lands leases covering just over 110,400 hectares of road area, and it has reduced liability issues for both landholders and the government. It has also reduced the number of access disputes and trespass issues and allows local government authorities to legally manage the roads in their shires.

If you have any inquiries regarding this project please contact the Department of Industry – Crown Lands & Water, Far West office on 02 6883 5400 or via email on clwestern.region@crownland.nsw.gov.au

Clean-up of rubbish dumped illegally at Kelso Reserve, Dareton

Crown Reserve 1013826, known locally as Kelso Reserve, is located near Dareton. The Reserve is just over 7500 hectares in size and includes areas managed for conservation and rehabilitation. Since 2007, as Rangelands Management Officer from the Buronga Office, I have been responsible for all day-to-day management of the reserve under the Lands Administration Ministerial Corporation (LAMC).

When the reserve came over to the LAMC it was extremely degraded through overgrazing; it was infested with both weeds and feral animals, and there were constant problems with unauthorised access and continual illegal dumping of rubbish.

The reserve has had rubbish clean-ups in the past, and signage was erected to deter future dumping, but since 2013 the rubbish had again accumulated to the point that it was a major issue. The causes were the absence of roadside rubbish collections for nearby residences, the remoteness and isolation of the reserve, and an absence of drop-off points for domestic and larger rubbish or green waste.

In tackling the rubbish issue, LAMC recently completed a project totalling about $90,000 that cleaned up over 60 hectares and filled 12 trucks and trailers and five skips of recycled materials and scrap metal. The project engaged local companies and involved BMEET (the Barkindji Maraura Elders Environment Team), which employs Aboriginal youth and helps them to obtain certification in environment and agriculture. These young people did a fantastic job in what can only be described as quite unsavoury work.

The clean-up has benefited the reserve for all users and has removed material that is hazardous to native animals and the local community. Ongoing conversations will be encouraged with the local community and Wentworth Council to keep the reserve rubbish free.

There will be increased compliance monitoring through security cameras; LAMC will increase monitoring of the site and staff will undertake compliance inspections there. These inspections could include weekend work for staff. The council by-laws officer will also be keeping an eye on the reserve.

Kelso Reserve, Dareton, before the cleanup (left) and after (right) Photos by Ian Kelly
TUFF Leadership program for rural men

TUFF workshops are run for rural men by NSW DPI’s Rural Resilience Program. Here’s what men are saying about TUFF:

I’d highly recommend it.
It was definitely worthwhile.
It’s changed my way of thinking – it’s an opportunity of a lifetime.
I’d encourage anyone to come to a TUFF course – what you put in you’ll get out double.

- Be more effective as a leader in your work, family and community life.
- Improve your ability to deal with uncertainty and change.
- Improve your communication skills and ability to deal with conflict.
- Look to the future and make plans for action.
- Support other men to overcome challenges and achieve their goals.

THE PROGRAM INCLUDES:

- investigating the work–life balance
- looking forward to what you want in life
- focusing on being more effective when making decisions and dealing with difficult situations
- developing achievable actions to create the future you want
- practising ways to help other men deal with difficulty and achieve what they want.

This is a rare opportunity to take some time out to reflect on what’s important to you, practise using some tools and ideas for being more effective, and focus on what needs to happen next in your life.

TUFF FAQS

Why should I go? – TUFF has been designed specifically for rural men. The workshop is about spending some focused time thinking about where you are now and where you want to go in the future. You will have the opportunity to look at skills and tools to help you communicate better, make good decisions and be more effective in your work and personal life. You will be able to set goals for yourself and learn skills to help you determine what you want to achieve—for you, your family, community or business. You will get to know other men from your region and have a chance to enjoy some time out from the busyness of life.

What will we do? – Over the 2 days, you will listen to a local man’s story, have discussions with others in small groups, undertake individual and group exercises and spend time socialising. At times you will be invited to share your insights and ideas with the group, but you won’t be forced to do anything. The workshop is not about making men feel uncomfortable or talking about things they don’t want to; instead, it’s an opportunity to build knowledge and skills, learn new tools and increase social networks.

What will it cost me to attend? – This pilot program is free to participants. We will provide morning tea, lunch and afternoon tea. You will also receive a workbook for use during the workshop. You will need to cover the cost of travel, accommodation (should you choose to stay overnight) and any other costs.

For more information about TUFF
Contact Danny Byrnes of the Rural Resilience Program,
T 0400 374 258;
E danny.byrnes@dpi.nsw.gov.au;
The NSW Government has cut the cost of farming for drought affected farmers, including waiving LLS rates, fixed rate water charges and wild dog fence rates, and provided a range of drought preparedness and direct support measures.

**NSW Drought Assistance**
- Drought Assistance Fund
- Farm Innovation Fund
- Drought Transport Subsidies
- License and rate waivers

**Wellbeing and Support**
- NSW Rural Resilience Program
- Rural Financial Counselling Service
- Mental Health Counselling
- Rural Adversity Mental Health Program

**Animal Welfare**
- Donated fodder transport subsidy
- Animal welfare transport subsidy
- Feed Quality Service
- Guide to animal welfare in dry times
- Livestock transport calculator

**Tools and Technology**
- Farm Tracker app™
- Drought feed calculator
- Drought maps
- State Seasonal Update
- Assistance Near You map

**Resources to Manage Drought**
- Interstate feed and fodder requirements
- Farm water quality
- Hay and grain report

**DroughtHub**
A one-stop resource to help primary producers, their families and communities prepare for and manage drought conditions.

droughthub.nsw.gov.au