Brown rot is causing more than $1 million damage annually to peach and nectarine crops. NSW Department of Primary Industries horticulturist Phillip Wilk has helpful advice for growers with distant recall of previous outbreaks before the drought.

Mr Wilk, pictured checking a data logger for orchard temperature and humidity, says localised weather data is very helpful for determining when infection periods may occur.

For more information please call AusWest Seeds on 1800 224 987 or visit www.auswestseeds.com.au

Titan 7 and 9 represent a significant step forward in Lucerne breeding.

Titan 7 is highly recommended for irrigation growers seeking a stand that combines both yield and quality for hay production.

Titan 9 is highly recommended for growers seeking high production under irrigation and superior persistence compared to other highly winter active varieties.
Brown rot hammers stone fruit growers

PHIL BEVAN
Wollongbar

A MULTI-PRONGED approach is the best solution to control brown rot, a major and increasing disease problem causing more than $1 million damage to peach and nectarine crops each year, growers heard at a recent gathering to target the disease.

“This disease causes yield losses due to fruit rots pre- and postharvest,” said NSW Department of Primary Industries horticulturist Phillip Wilk.

“Economic losses occur in high disease pressure years, particularly when there is tree damage and more so in nectarines and peaches which are among the most susceptible of the stonefruit crops.”

Mr Wilk said the industry is looking for solutions after a series of wet growing seasons, heavy losses and distant recall of previous outbreaks for solutions after a series of wet growing seasons, heavy losses and distant recall of previous outbreaks before the long drought.

“Orchard hygiene, improved disease forecasting and Carpophilus beetle trapping were some of the initiatives discussed to improve brown rot control in stone fruit orchards,” he said.

“It is very important for growers to understand the disease cycle.

“It starts with flower infection, leading to twig infection, which provides inoculum for green and ripe fruit infections throughout the season.

“The disease is most severe when warm and wet conditions occur close to harvest.

“Orchard hygiene is critical to reduce disease carry-over from season to season.

“Spores produced by mummified fruit which overwinter on the ground and in trees in cankers on twigs are the main source of infections.

“So it is important to remove old fruit from the orchard floor and prune out cankers before spring.”

Mr Wilk, based at Wollongbar Agricultural Institute, said these measures do not completely prevent the disease and growers are still dependent on the targeted application of fungicides for controlling blossom blight and fruit infections throughout the season.

“Good management of brown rot involves integrating orchard sanitation to reduce disease carry-over with well-timed applications of fungicides for more effective disease control.

“Weather data collected in orchards is therefore better for determining when infection periods may occur.

“By monitoring the infection period in the orchard the time of fungicide application and the effectiveness of control can be improved.”

Mr Wilk said other crop and orchard factors that influence infection risk such as susceptibility of stonefruit cultivars, inoculum pressure and early Carpophilus beetle trapping are also important as it’s “a numbers game”.

“Brown rot is a major and increasing disease problem causing more than $1 million damage to peach and nectarine crops each year.”

“Evidence suggests that controlling Carpophilus beetle reduces brown rot incidence in fruit.”

“The Carpophilus beetle, a major pest of stone fruit, has been implicated as a vector of brown rot spores.”

“An integrated approach is the way to grow to reduce this problem,” he said.

Contact Phillip Wilk, Wollongbar, (02) 6626 1294, phillip.wilk@dpi.nsw.gov.au

Report exposes cropping’s critical breaking points

A NEW report Critical breaking point 2012 from the Birchip Cropping Group reveals the toll that climate extremes in the past 15 years of droughts and floods have taken on farming families in north-west Victoria.

After the 10 year drought, rain was initially welcomed with joy, but the unprecedented rainfall and flooding brought more heartbreak.

During the drought farmers had adapted their practices to reduce their business exposure to dryness, but the report says “the extreme wet exposed unanticipated weaknesses or trade-offs in some of these”.

For instance, grain growers who had increased the proportion of sheep in their business found themselves dealing with feed shortages and flyblown animals, and some drought-resistant crop varieties seemed susceptible to sprouting.

During the drought some businesses bought land in a wetter zone and then had to deal with severe water damage on this land.

Many farm families had taken off-farm jobs during the drought, and this strategy reduced their ability to protect their properties from flooding.

Flooding closed roads and made the jobs difficult to get to, further threatening income.

“In other words,” says the report, “adaptation efforts need to take into account not only extant or predicted drying, but also ongoing and potentially increasing climate variability.”

The household interviews also showed that climate adaptation was contributing to a new style of farming where many farm families are part way between staying and going, often decoupling farms and homes, and spending much more time traveling to their properties or to off-farm work.

This then reduces the time available for on-farm work, which means on-farm time is filled with intense activity, increasing the risk of things going wrong.

“Operating at stretched capacity in this way means that there is little room in the system for error or additional tasks, which is why disturbances such as the extra work created by the extreme wet can be so disruptive,” the report says.

Many of the farmers interviewed were questioning how they were meant to manage an uncertain climate, family needs, financial risk and agricultural markets and still make a living.

The concept of endurance is also questioned. It is a quality that is valued and expected by farm families but some query the rationality of enduring without making any changes, and women particularly were ambivalent about their personal resilience in the face of such climate extremes.

Out of their experiences in the droughts and floods, the farm families have come up with a list of ideas to better prepare farmers in future extreme events.

You can read these suggestions in the report Critical breaking point: the effects of climate variability, climate change and other pressures on farm households at http://www.bcg.org.au/ch_pages/Social_and_Comm_Development.php

Read Rebecca’s column online at www.dpi.nsw.gov.au/agtoday

Environmental Agriculture

with Rebecca Liu-Yee,
Extension Coordinator, Wollongbar

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New permit for soda apple battle

A NEW permit for the highly invasive tropical soda apple gives producers greater flexibility and more effective control measures against the weed. It is the third permit approved for three different herbicide choices and greater flexibility for treating the weed near waterways, roadsides and urban bushland," said NSW Department of Primary Industries (DPI) weeds technical specialist, Tony Cook.

"DPI has provided on-the-ground research and feedback to the Australian Pesticides and Veterinary Medicines Authority (APVMA) to support the development of the permit," Mr Cook said.

"The NSW research, which included a range of herbicide trials, was undertaken following the first outbreaks of tropical soda apple in Kempsey and has provided enough evidence to form the basis of a specific pesticide permit."

"It is important that we get the most out of our treatments, particularly in the earlier stages of a weed incursion," Mr Cook said. The development of the new permit builds on a concerted effort by DPI to eradicate tropical soda apple.

Several outbreaks on the Mid North Coast and North West have been successfully eradicated by a rapid response team, involving DPI, local community groups, councils and farmers, Mr Cook said.

"Through initiatives such as the NSW Weeds Action Program we have ramped up surveillance and on-ground eradication projects throughout the control area. It is critical farmers remain vigilant against this very aggressive weed and report any sightings to their local council weed officer," Mr Cook said.

"Mr Cook said tropical soda apple could quickly invade pastures and can spread over wide distances by the movement of livestock. "Cattle are attracted to the fruit and can spread the weed to new areas such as cattle yards, sale yards, abattoirs and stock routes," he said.

"Growing up to 1.5 metres tall, the weed is a very prickly and spiky plant, and is easily identified by its distinctive golf-ball sized fruit, watermelon in appearance, that turns yellow as it matures," Mr Cook said.

For more information, contact DPI NSW on 0447 651 607, tony.cook@dpi.nsw.gov.au or weed.training@dpi.nsw.gov.au for training and reporting and monitoring operational matter.

**Tune into move against nematodes**

MICROSCOPIC worms living in millions inside the roots of crops, often confused with other disease-causing agents, have their own YouTube video series.

Root lesion nematodes are troublemakers that need exposing.

Plant pathologist Steven Simpfendorfer is advising winter crop growers to take immediate steps to prevent significant yield losses caused by root lesion nematodes.

Yield losses of up to 35 per cent were recorded in nematode intolerant winter crop varieties in 2011.

NSW DPI Dubbo district agronomist Kathi Hertel said most growers need to find out if nematodes are present in their paddocks before selecting crop varieties.

"Soil tests should be conducted to test for the presence of nematodes to identify which species are present and in what populations," she said.

"With this soil test information, growers should choose crops and varieties that will reduce or maintain root lesion nematode numbers to less than 2000 per kilogram of soil."

NSW DPI has produced a series of video clips to help growers better understand root lesion nematodes.

“One clip provides an understanding of the hidden problem of root lesion nematodes and another examines their impact and management through a case study," Ms Hertel said.

Dr Simpfendorfer also presents a three-part series explaining what root lesion nematodes are, where they are found, why they matter and what growers can do.

The Grains Research and Development Corporation funded last year’s paddock survey.

The other good news is that not all nematodes are bad.


NSW DPI website.

Don’t gamble on the quality of your olive oil. Department of Primary Industries laboratories will test your olive oil to ensure you get the best returns for your product.

Our laboratories are ISO 9001:2000 certified and use IOOC accredited test methods.

Tests for:
- extra virgin oil quality
- oil production
- flavour components
- oil stability

Contact our customer service unit for a quotation and oil sampling kit.

**Less red tape on leases**

THE NSW government is streamlining the perpetual lease conversion process to remove much of the red tape imposed on farmers, making it easier to manage their land while still protecting land with high conservation value.

With key environmental protection solutions now covered by the Native Vegetation Act and the Threatened Species Conservation Act, the time has come to remove the duplication of regulatory processes restricting productive use of farmers’ land.

From 2004, the former Labor government converted almost 9000 perpetual leases to freehold and many bad land management covenants attached.

The NSW Liberals and Nationals have confidence in our primary producers as professional land managers and are providing them with greater flexibility and reduced regulatory requirements.

In future, covenants to protect native vegetation will not generally be placed on leases converted to freehold unless the land is of high conservation value.

NSW Department of Primary Industries (DPI) data shows there are around 10300 remaining leases where covenants will no longer be required on conversion.

All new applications will be considered against the new agreement and I encourage holders of perpetual leases to continue applying to convert to freehold.

**Bumper winter crop**

Record-breaking rain in the past six months devastated some summer crops and prevented winter crop sowing in some areas.

However, the silver lining is that good summer rain has set the State up for a big winter crop this year.

The latest DPI Grains Report estimates a 5.18 million hectare winter crop will be sown this season in NSW, only slightly down on last year’s 5.28 million.

This includes an all-time high for canola sowings of 548,350 ha, 39 per cent up on the 2011 harvest.

Good subsoil moisture, strong prices compared to wheat, and good yield and oil contents in 2011 have contributed to this result.

Forecasts for the State’s biggest crop, wheat, have dropped by 4 per cent on low forecast prices.

The NSW grains report for April 2012 is available on the NSW DPI website.

DPI at Sydney Royal

I had a wonderful time at the Royal Easter Show this year and would like to say a big thank you to everyone involved in promoting primary industries by showcasing a range of services and information for our farmers and the public.

Some highlights included:

- The District Exhibits: I was impressed with the regions incredible “Our Farming Future” displays and proudly presented Arthur John of the Northern region with the winning trophy.
- The Schools District Exhibits competition: Congratuations to overall winner Murrfield High School, and to the inaugural Student’s Choice Award winner Menal High School.
- The Woodchop arena: I presented ribbons to the winners of one of these hard fought competitions.
- Jasmine Nixon of Crookwell, in my Electorate of Berrinjuck, won the Showgirl competition and DPI employee Kate Warren, from the Trangle Agricultural Research Centre, placed third.

**Scholarships**

Do you know a PhD student looking to travel overseas to expand studies and research in field crops? Applications for Farrer Memorial Travelling Scholarships are invited from PhD students to support international travel on any aspect of field crop research up to a value of $5000.

Applications close on May 11. More information at www.dpi.nsw.gov.au or contact the Secretary of the Trust, (02) 8289 3905.
Get the good oil on storage

SARAH CHESTER
Albury

For the first time there is scientific evidence to confirm the importance of proper storage to maintain the quality of olive oil. The Australian olive industry has expanded rapidly in the past decade, becoming increasingly renowned for producing high quality oil.

It is now beyond dispute that olive oil should be stored at cool temperatures, away from light and without exposure to oxygen. Mr Ayton says olive oil should be stored in a cool room, room temperature and heated, oxygen exposure and exposure to light over three years, "This should be the case not just in the short term, but throughout the life of the oil which includes during transport, storage and marketing, and when the oil has reached its final destination, the consumer.

"Often growers produce oil with very high quality initially which quickly deteriorates due to storage conditions. "At huge expense to them, the oil can deteriorate so much that it can no longer be classified as extra virgin." Mr Ayton says olive oil should be stored the conditions they store the olive oil under, and to promote this information to ensure the product is of the highest quality possible, Mr Ayton said.

"This is of the highest quality possible, "Olive oil traders, exporters, importers, wholesalers, retailers, transporters and consumers need to be aware of the implications of the conditions they store the olive oil under, and to promote this information to ensure the product is of the highest quality possible," Mr Ayton said.

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Margins down

FOR Burgundy on the central
Monaro plateau, climate
change impacts and adapta-
tions were modelled for a Merino
breeding enterprise grazing Posa-
based native pastures on basalt
soils.

Four global climate models
(see p7) were applied, showing a
range of economic impacts.

Three of the four projections
indicate a decline in average
gross margins including one
returning a loss by 2030 (see
table).

“One widespread belief is
that with increased world
population, demand for agri-
cultural commodities will
reverse the cost price square,
leading to a period where
prices received will increase
faster than input costs,” said
NSW DPI sheep and wool
livestock officer, Doug Alcock
(pictured).

“It is often assumed this
will be sufficient to offset the
potential negative impacts of
climate change.”

The graph (right) shows
economic modelling for the
three negative climate projec-
tions while adjusting the rela-
tive change in input costs and
prices received.

It is assumed input costs will
track base inflation, increasing at
three per cent.

The rise in prices farmers
received has been modelled to
increase between three per cent
(base inflation) and nine per cent
– rising three time faster than
base inflation.

The graph is truncated to the
historical profit figure of $72/ha
(corrected to 2009 dollar values).

Mr Alcock says to fully offset the
negative impacts of the
HadGEM1 projections (i.e. main-
tain base period profits), prices
need only increase at 3.8 per cent
a year (2.5pc faster than inflation).

However, to maintain base prof-
its on theECHAM5-OM projec-
tions, prices would need to
increase at 8.5pc a year, (almost
times the base rate of infla-
tion), or at 5.3pc a year (75pc
faster than inflation) in order for
the enterprise to simply break
even.

He said clearly the scale of
change in market conditions,
(commodity prices and inflation)
is far less likely but active adapta-
tion to this level of climate change
would be required.

Contact Doug Alcock,
Cooma, (02) 6452 3411,
douglas.alcock@dpi.nsw.gov.au

What’s next, after the
sopping end to summer?

The Southern Oscillation Index and other
indicators of the El Nino Southern Oscillation
(ENSO) are now in neutral territory and
expected to stay that way for the next three
to six months.

But we have a very warm Indian Ocean off
the coast of Western Australia and this is now
the main driver for rainfall in the current
seasonal climate outlook.

So long as these sea surface temperatures
remain high and ENSO remains neutral we do
not expect this outlook to change too much.

Here’s a trend to watch: the 12 years from
1997 to 2009 were dry over much of
Australia’s south-east, with the decline in late
autumn and early winter particularly
notable.

Despite the record rains of the past two years,
there was average to below average rain
between May and July in the south-east.
It is not so surprising when one takes into
account the cause of the decline.

Over this previous period, the sub-tropical
high pressure ridge has intensified, reducing
the amount of rain the south-east receives
from rain-bearing cold fronts.

The DPI’s NSW Climatologists provide a great
explanation of this process and was developed
in collaboration with us at the Bureau –
climate-and-weather/variability/climatedogs
Agata Imielska, Acacia Pepler and I have
explained this process.

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Still in the game by 2030

A DAPTING future livestock enterprises in NSW can still be productive and profitable, with change initiated over time in response to constraints forced by climate.

That’s the key modelling prediction – with no one-size-fits-all approach – from the Southern Livestock Adaptation 2030 project.

In late 2009 the project started looking at the impacts on livestock industries of potential changes in the weather at 2030.

Four global circulation models (see bottom of page) generated daily weather data for 2030 at 24 locations in NSW, in a total of 36 Australia-wide:

- NSW Department of Primary Industries (DPI) staff conducted the analyses in NSW.
- The Commonwealth Department of Agriculture, Fisheries and Forestry (DAFF) funded the national project.

All four global climate models predict that in 2030, consistent temperature increases and varying rainfall decreases would mean lower annual pasture production, compared to the 30-year base period of 1970 to 2000.

Modelled responses across NSW varied, with wetter higher altitude areas (900 metres plus) sites being least affected.

Generically, winter pasture production increased but growing seasons were shorter, requiring decreased stocking rates to enable maintenance of adequate ground cover in late summer-autumn.

Decreased stocking rates would cause a reduction in profits.

At most locations, practical adaptation would be possible but recovering most of the drop in profit would be far from easy.

Further west – and this was a common trend for southern NSW – the impact by 2030 on profits at drier locations was much greater.

Modelling a worst case scenario at marginal locations facing severe stocking rate reductions, agricultural commodity prices would not rise fast enough against input costs to break even or match base period profits.

“The best result will come from combinations of changes which farmers can implement over time as required,” said NSW Department of Primary Industries (DPI) grazing systems technical specialist, Phil Graham.

“It is unrealistic to expect producers to be making big changes now when they are not warranted,” he said.

Mr Graham and NSW DPI colleagues, Michael Cashen, Phil Bowden and Warwick Badgery will present key findings from the project at a Future Farming Forum in Wagga Wagga on May 22.

Grain growers and livestock producers will hear first-hand results of the research.

Mr Graham said the forum would not be about telling producers what to do, but simply making them aware of practical solutions they can apply to continue farming profitably and productively, despite variable climate.

“People may consider moving from breeding to trading, or chang- ing calving or lambing times,” said Mr Graham.

“They may make more use of drought lots or sell animals earlier.

“There is no one-size-fits-all approach – our research has been conducted in 24 locations,” he said.

Mr Graham added the forum was not just for livestock producers.

Timely advice for grain growers will also be presented.

“The program is a significant research effort, providing practical solutions for agriculture to adapt and respond,” Mr Graham said.

Impacts at seven locations, base 1970-2000

IMPACTS in NSW of modelled 2030 weather include positive effects from increased carbon dioxide levels on temperate pasture production.

Results presented in the tables are for a self-replacing merino ewe enterprise that sells the wethers and surplus ewes at 15 months.

Orange and Glen Innes are high altitude sites (900 metres) and the impact of the 2030 weather is neutral.

In these environments cold winters are the current limiting factor on pasture production, so higher winter temperatures would outweigh the advantage of the drop in rainfall.

For the other sites, annual pasture production would decrease by approximately 10 per cent but winter pasture growth would increase.

The growing season would become shorter, making the management of minimum ground cover in late summer-autumn break difficult.

Stocking rates would have to be reduced by a greater amount than the pasture decline to manage the ground cover.

Modelling assumes the reduced impact on pasture will offset some of the overall overhead costs, which would reduce profit per hectare.

Climate models chosen for Australian hindcasting skills

FOUR global climate models used in the Southern Livestock Adaptation 2030 project were chosen for their ability to model historical Australian climate (hind-casting skill) and for their spread in representing the spectrum of projected change in both our temperatures and rainfall.

- The Community Climate System Model (CCSM), maintained by the national centre for atmospheric research in the US.
- Hadley Centre Global Environmental Model, version 1 (HadGEM1) from the UK Met Office’s Hadley Centre.
- Geophysical Fluid Dynamics Laboratory (GFDL) model developed by the Max Planck Institute for Meteorology, known as ECHAM5-OM, in Hamburg, Germany.

Answer the key question

IMPACTS on livestock systems if predicted degrees of climate change occur, regardless of what caused the changes, is the key thrust of the Southern Livestock Adaptation 2030 project.

“Most of the discussion I’ve heard during our modelling has been about the cause of change, accepting the fact that change is occurring,” said NSW DPI’s grazing systems technical specialist, Phil Graham.

“I’m trying to get non-believers and doubters to at least to have a look at the material.

‘Have they looked at their local data to see if temperatures have risen in their areas over the last 20 years?’

‘The inescapable reality is that at all sites we examined in southern NSW, local weather data says temperatures have – but something many people tend not to notice is that most of the increases have been in the minimums. Mr Graham says the contrary argument is “we have had these temperature rises and rainfall before in the 1920s so it is not climate change”.

His response is “that’s what so, how were livestock production systems affected by that weather, what did pro- ducers have to do differently?”

Inevitably their answer is “I don’t know, I was not around.”

Mr Graham says most importantly, the modelling project is not about telling producers what to do, it’s about suggesting solutions to continue farming profitably and productively.

– RON AGGS

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**The logic behind a climate project**

The Southern Livestock Adaptation 2030 project used the GrassGro model to assess farm systems at a range of locations in NSW for wool, beef and sheep meat enterprises. The steps in the modelling process were:

- Select a locality and obtain weather data since 1960
- Characterise the soil type at the location
- Select the most relevant pasture species for each location from those available in GrassGro
- Consult producers to establish the livestock production systems for each location
- Five year averages (2005 to 2009) were used for market prices and costs in all runs (base and 2030)
- The stocking rate was adjusted in all runs to ensure the desired minimum ground cover would be maintained. Ground cover targets vary between locations to reflect local conditions. In higher rainfall locations (eg. Moss Vale) the target was 70 per cent of years above 80pc ground cover, down to 70pc of years above 60pc ground cover (eg Lockhart, Grenfell)
- Establish historical production system data
- Use the farm systems devised for the base runs and change the atmospheric carbon dioxide concentration from 350 parts per million for base to 444ppm (for 2030) and run the systems for the four GCM. Stocking rates were again adjusted to achieve the original ground cover targets
- Compare the base run with the four 2030 runs to assess the range of impacts
- Show producers the modelled impacts, ask them what adaptations they think would be feasible, then model their suggestions and assess the effects.

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**Yass and Cootamundra**

AT COOTAMUNDRA, major adaptations for a prime lamb enterprise included genetics and a combination of genetics coupled with summer feedlotting.

There were more options at Yass for an 18 micron merino enterprise selling all wethers and surplus ewes at 15 months.

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**About Australia’s Farming Future**

Australia’s Farming Future is the Australian Government’s key climate change initiative for primary industries. It provides funding over four years to help primary producers adapt and respond to climate change. The Climate Change Research Program is a key element of Australia’s Farming Future and provides funding for research projects and on-farm demonstration activities under the three priority areas of reducing greenhouse gas emissions, improving soil management and research into adaptation management practices.

The Department of Agriculture, Fisheries and Forestry manages the Climate Change Research Program.

Contact the Australia’s Farming Future Hotline 1800 638 746 or visit www.daff.gov.au/climatechange/corp

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**Lucerne at Culcairn and Lockhart**

A prime lamb enterprise was modelled at Culcairn and Lockhart using the same two pastures at each location – all annual (grass-clover), and annual plus 20 per cent lucerne.

For both locations the addition of 20pc lucerne was profitable. Lucerne did a better job for Culcairn of buffering the decreased rain and increased temperature.

A five per cent drop could be easily covered by management changes. However, as we look further west – and this is a common trend for southern NSW – the impact by 2030 on profits at Lockhart, the drier location, is much greater.

In the base period (not shown on table) the Lockhart system with added lucerne was 40pc more profitable but felt a greater impact by 2030. More work needs to be done to find the best adaptation for this area.

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**Agriculture Today**

<table>
<thead>
<tr>
<th>Location, pasture type</th>
<th>Pasture production</th>
<th>Stocking rate</th>
<th>Profit $/ha in 2030</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CULCABIN</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual</td>
<td>97%</td>
<td>92%</td>
<td>86%</td>
</tr>
<tr>
<td>Annual + 20% Lucerne</td>
<td>98%</td>
<td>92%</td>
<td>95%</td>
</tr>
<tr>
<td><strong>LOCKHART</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual</td>
<td>91%</td>
<td>78%</td>
<td>43%</td>
</tr>
<tr>
<td>Annual + 20% Lucerne</td>
<td>91%</td>
<td>67%</td>
<td>21%</td>
</tr>
</tbody>
</table>
Act early on tail end of sheep flock

JANE KELLY
Orange

Taking some extra effort early with sheep in the tail end of the flock can boost production and prevent animal welfare concerns. Regardless of how an animal may reach a poor state, livestock owners need to intervene to ensure their welfare.

Intervention may involve veterinary assessment and care or improved nutritional management. When the body condition of an animal drops to fat score one, welfare is compromised and the animal requires immediate intervention to prevent further deterioration and to restore acceptable condition.

An animal in fat score one is described as an “at risk” animal under the recently developed welfare descriptor system, published in the DPI Primefact, Welfare Decisions for Sheep. If an animal continues to drop body condition upon reaching fat score one, they are classed into further categories of increasing severity under the welfare scoring system.

This system is now commonly used by various organisations and enforcement agencies within NSW when describing the condition of animals during animal welfare investigations. An animal compromised by poor body condition is at risk of experiencing a multitude of health issues. A weakened immune system makes such an animal more prone to contracting worm burdens, lice infestations and disease, with many dollars spent in treatment costs. Even if only five per cent of the mob experience such issues, the cost can be great when having to take measures with a specialised management for the whole mob, such as for lice infestation or prevention of disease spread.

Reproductive performance is also affected. Ewes will have reduced conception rates and will very likely experience difficult pregnancies and lambing. The risk of pregnancy toxemia in poorly conditioned ewes is very high. Lamb survival is also likely to be very low. Other production targets are not met when animals fall into sub-optimal condition.

These may include lambs that fail to meet market specifications and targets for Merino weaners, which are at greater risk of ill-thrift and death. Wool cut and quality also suffer.

Due to the high costs resulting from veterinary treatments or feeding bills accrued while trying to restore such animals, it becomes obvious that action needs to happen before animals become compromised.

Such costs, coupled with reduced return from loss of lambs, possible ewe deaths, a lower wool cheque and fewer surplus sheep or progeny, available for sale can place producers at significant financial disadvantage that could have been prevented.

Additional to these costs are the potential for prosecution costs and resulting consequences under animal welfare legislation if animals become welfare cases. Making feeding decisions early will help prevent animals losing condition during normal seasonal feed shortages. Likewise, active care and management will also ensure animals are not left until it is too late.

This might include taking the time to understand feed and health requirements of all stock classes ahead of time and investigating possible disease early under veterinary advice.

Moreover, having the ability to fat score and complete a thorough muster, while also drafting animals into priority feeding and progeny management groups will ensure all animals have the best chance of achieving and maintaining satisfactory condition.


FREE field days are planned to highlight the importance of windbreaks in the lead up to what may be a cool, windy winter. NSW Department of Primary Industries (DPI) advisory officer, Dhyan Blore, said well-designed windbreaks prove themselves in tableland areas where they can improve lamb survival and live weight gain.

“Many existing windbreaks were planted in the 1990s and it is important that landholders update their skills to ensure they know how to manage mature windbreaks,” Ms Blore said.

“Grazing management to protect windbreaks plays an important role in maintaining their effectiveness, especially where low shelter is necessary to protect lambs and calves in cold, wet and windy conditions.

“North-south orientated windbreaks also provide good shade from afternoon sun and ram fertility can be improved by the shade they provide, which reduces heat stress.”

DPI and the Central West Catchment Management Authority are staging the free field days. Tentative dates for a Bathurst Windbreak Day are May 29, and pending site confirmation, at Mudgee on June 12.

Contact CMAs to register: Clayton Miller, Bathurst, (02) 6339 4905, clayton.miller@cma.nsw.gov.au or Colleen Farrow, Mudgee, (02) 6792 8906, colleen.farrow@cma.nsw.gov.au

— Bernadette York
In two very different seasons and following cotton, the durum variety EGA Bellaroi out-yielded bread wheat by one tonne per hectare. This was under full irrigation and fertilised with 200 kilograms of nitrogen per hectare.

A four-year trial project between 2007 and 2011 focused on developing management guidelines for irrigated wheat grown directly after cotton – a big achievement because cotton leaves the ground so bare.

So the EGA Bellaroi yield is a critical management finding from the High Yielding Irrigated Grains in Cotton Farming Systems Project coordinated by the Cotton Catchment Communities CRC, said research agronomist Verity Gett.

“In 2011 four varieties were compared under full irrigation,” she said. “EGA Bellaroi (7.23 tonnes per hectare) and Caparoi (6.9t/ha) came out as the top two.”

In 2010 the top four varieties were EGA Bellaroi (7.4 t/ha), Tjilkuri (WID801) pending APDR classification (7.1 t/ha), Hyperno (6.9 t/ha) and Caparoi (6.9 t/ha). The project recommended EGA Bellaroi and Caparoi for the highest yield potential and lodging resistance for sowing in 2012 cotton paddocks.

Hyperno has high yield potential and following cotton, “she said. “Soil tests indicated very low soil-N availability, with less than 30kg N/ha available in both years. “Rain provided enough moisture to establish trials in both years at optimum sowing dates,” she said.

“In 2010 nitrogen was applied as a 60-40 split (120kg N/ha at sowing and 80kg N/ha at stem elongation),” Ms Gett said. “Total nitrogen applied as urea was approximately 200kg N/ha.”

In 2011 the trial only received 10kg N/ha as starter fertiliser at sowing. The remaining nitrogen was top-dressed as urea at stem elongation (150kg N/ha) on August 9 and just prior to flowering (50kg N/ha) on September 5.

In 2010, 384 millimetres of rain fell on the crop, which also received three spring irrigations.

In 2011 the crop received 426mm of rain, of which 200mm fell between physiological maturity and harvest. This heavy rain caused grain losses.

The crop received four spring irrigations.

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The irrigated durum and bread wheat trial at the Australian Cotton Research Institute. Irrigated wheat researchers Brendan Griffiths and Verity Gett.

Fire women recognised as hidden treasures

MANY women form part of the NSW Rural Fire Service (RFS) “volunteer army” and you can find many of them in last year’s Hidden Treasures Honour Roll.

Shanelle Anderson from Jerry’s Plains is one such hidden treasure who was unearthed in 2011. Despite a very busy lifestyle raising a family and running a dairy farm, she still finds time to give to the community and was named local Citizen of the Year a few years ago.

Shanelle is actively involved in the RFS, a member of the CWA, on the School of Arts Hall committee and was a member of the P and C while her children were at the local school – and there are so many hidden treasures just like her.

The Rural Women’s Network developed the Honour Roll to recognise the volunteering contributions women make to rural communities and we need your help to find them.

The 2012 Honour Roll is now open and we invite you to nominate women who do any kind of volunteer role within your community. While researching Shanelle and RFS women, I also learned about the organisation’s Assist Infirm Disabled and Elderly Residents (AIDER) program.

This free service supports vulnerable residents to live more safely and confidently in their home on bush fire prone land.

We all know how ferocious and destructive fire can be yet I never really stopped to think just how terrifying this would be for someone who had a disability or was elderly.

Bravo RFS for thinking ahead to those who may not have family close by or a strong support network.

Throughout AIDER, residents can have their gutters cleared of debris, trees lopped grass slashed or vegetation around the garden considered a fire risk be thinned or removed.

As we head out of the fire season we should not sit back and be complacent. Fire can strike at any time and we need to be aware of our own fire preparation plans as well.

It is your responsibility to prepare yourself, your family and your home for the threat of bush fire. The Bush Fire Survival Plan is a great little booklet that gives you all the information you need to make informed decisions and the appropriate preparations.

To help rural landholders prepare for and prevent bush fires, the RFS has also developed Farms FireWise with checklists and action plan templates that you just need to read and fill in.

All this and more is available on the RFS website so don’t wait until it is too late.

Have a family meeting, making it a fun activity and get everyone involved.

For the AIDER program contact (02) 6741 4955 or email aider@rfs.nsw.gov.au or visit www.rfs.nsw.gov.au

See the RWN website for more about the Hidden Treasures Honour Roll or call (02) 6391 3620 for a nomination form.

Follow on twitter at http://twitter.com/NSW_RW or read her blog at nswuralwomensnetwork.wordpress.com and her column online at www.dpi.nsw.gov.au/agtoday.

This book contains 12 chapters and over 120 diagrams covering land management. Fencing is a key part of sound land management finding from the High Yielding Irrigated Grains in Cotton Farming Systems Project coordinated by the Cotton Catchment Communities CRC, said research agronomist Verity Gett.
**Treat your seeds right**

There has been a trend in recent years to widen row spacings to accommodate stubble retention practices. Wider row spacing allows the passage of stubble between rows. Manufacturers of some minimum till seeders recommend 25 centimetre row spacings. Another reason for this is that soil thrown behind the tynes covers up the stubble, reducing the establishment if harrows are not used to flatten out the seedbed. There have been a large number of row spacing experiments grown in temperate Australia for the past 50 years.

More recently the DPI Variety Specific Agronomy Packages project has conducted a large number of row space experiments in wheat, canola and lupins. The data from all these experiments have been analysed in an attempt to estimate the effect of row spacing changes on grain yield across temperate Australia.

Widening row space of wheat decreased yields when yields were above about 1.3 tonnes per hectare (see Table below).

However, at yields below 1.3 t/ha there was a small increase in grain yield. It seemed that canola yields were reduced at all yield levels when row spacing was increased.

The value of these yield reductions should be taken into account when considering farming system options that use equipment with wider row spacing.

The likely economic loss from row space widening needs to be offset by the economic advantages of the minimum till stubble retention system. At low yield it is easy to justify the decision to widen row space. However, at higher yield levels (eastern NSW wheatbelt or under irrigation) the loss of yield with widening of rows increases, and the offset benefits of the stubble retention system need to be carefully evaluated.

If benefits are not sufficient to make up for the loss associated with wider rows, then alternative methodology for retaining stubble, including sowing into stubble using narrower row spacing, should be investigated.

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**Wide row spacing reduces wheat and canola yields**

<table>
<thead>
<tr>
<th>SEED LOT</th>
<th>SEED TREATMENT</th>
<th>SEED LOT</th>
<th>SEED TREATMENT</th>
<th>SEED LOT</th>
<th>SEED TREATMENT</th>
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</thead>
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<td>Thiram</td>
<td>P Pickel-T®</td>
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</tr>
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<td>16</td>
</tr>
<tr>
<td>SL2</td>
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<td>Thiram</td>
<td>P Pickel-T®</td>
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</tr>
<tr>
<td>29</td>
<td>29</td>
<td>16</td>
<td>16</td>
<td>16</td>
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</tr>
</tbody>
</table>

**Table 1. Percentages of plants with Botrytis seedling disease in the 2011 Moree trial.**

**Table 2. Percentage of plants with Botrytis seedling disease in the 2011 Moree trial.**

**Table 3. Grain yield (t/ha) in the 2011 Moree trial.**

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**Treatments were Crop Care Thiram 600 (600 grams per litre thiram); Crop Care P Pickel-T® 360g/L thiram, 208g/L thiabendazole) both at label rates; untreated control (nil) and an off-label treatment (data not presented).**

**Treatments were applied following label directions in a Hegre treater until all seeds were thoroughly covered.**

**The trial was a randomised complete block with four replications.**

**Plots were two metres by 11.5m, consisting of five rows at 32 centimetre row spacing. Twenty one days after sowing, plants that had emerged in the central three rows were counted.**

**Plants with seedling disease in the same rows were also recorded.**

In terms of establishment, untreated SL1 had significantly fewer plants/m2 21 days after sowing than untreated SL2 (Table 1).

Treatement with either Thiram or P Pickel-T® significantly increased establishment but these products were not different from each other or the off-label treatment. Laboratory tests confirmed Botrytis seedling disease was caused by Botrytis cinerea.

Generalised Linear Model analyses showed a significant difference between the untreated and treated seed but there were no differences between fungicides (Table 2).

The off-label product was no better than Thiram or P Pickel-T®. The incidence of disease in untreated SL1 (25.7pc) approximated the level of Botrytis seed infection (25pc). The higher incidence of disease in untreated SL2 (15.0pc) relative to seed infection (four per cent) probably reflects the higher plant population (16 plants/m2) in the untreated plots, facilitating root contact between primary infections and nearby unaffected plants.

When it came to grain yield, treatment seed with Thiram or P Pickel-T® significantly increased yield compared with no treatment (Table 3). There was no difference between these fungicides or the off-label treatment.

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GLEN RIETHMULLER

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**Contact Kevin Moore, Tamworth, (02) 6763 1133 or 0488 251 866, kevin.moore@dpi.nsw.gov.au**
Stopping spread of tilapia into MDB

A N EDUCATION program is the key to keeping one of the world’s worst invasive species, Tilapia, out of NSW and out of the Murray Darling Basin (MDB) river system.

Tilapia exist in catchments in south-east Queensland and while they have been recorded in unconnected waterways as close as three kilometres from the MDB, physical catchment boundaries including the Great Dividing Range restrict the threat of natural spread to the Basin.

The highest risk for transporting them into the MDB would be via human activity, that is, by carriage of live fish or live eggs.

Our best advice to anyone who catches, finds or handles live tilapia is to take a good quality photo and call us immediately so that we can confirm its identity, said Debra Doolan, aquatic biosecurity officer with NSW Department of Primary Industries (DPI).

“If it is a tilapia we ask that the fish be humanely destroyed and disposed of appropriately and not returned to the waterway, as any eggs contained within the fish’s mouth have the potential to survive,” she said.

“This is particularly because they are such successful breeders.”

“Mothers produce up to 1200 eggs a year and protect their young fry in their mouths – known as mouth brooding – for up to 14 days before releasing them.”

“Tilapia compete with native species, affect water quality and reduce recreational, environmental and conservation values of the bodies of water they inhabit.”

DPI’s aquatic biosecurity unit and the Queensland Department of Employment, Economic Development and Innovation have been collaborating over the past 18 months, funded by the MDB Authority, to prevent tilapia from entering the Basin.

To help target an education strategy to minimise the risk, the project undertook social research to understand community knowledge of and attitude towards tilapia and pest fish issues.

Data from surveys conducted in selected northern NSW and southern Qld communities were used to develop a series of tilapia publications including brochures, fact sheets and posters. Tilapia “train the trainer” workshops for key stakeholders in selected communities showed participants how to identify the pest, potential impacts of the species and what to do in the case of a suspected sighting.

“Workshop participants included government agency and Shire council staff, fishing club representatives and local community groups,” Debra Doolan said.

“They can now pass on knowledge and resources to others, to help prevent the spread and help any government response to a future incursion.”

Workshops have been delivered to communities of Brewarrina and Moree in NSW, and Warwick and Dalby in Qld as part of the project.

Additional workshops funded by the Namoi Catchment Management Authority were held at Narrabri, Walgett, Gunnedah and Tenterworth.

To measure the success of the education campaign, a second survey determining if communities have increased their knowledge of tilapia and pest fish issues.

“Encouragingly, initial results indicate a 120 per cent increase in NSW respondents who say they are aware of tilapia,” Ms Doolan said.

Tilapia (Oreochromis mossambicus) were first detected in Queensland’s waterways in the 1970s and are listed as a noxious fish species in all jurisdictions of Australia.

They said a neighbouring property was used to train the weaners to you and to the working yards is well worth considering.

Weaning is stress time in the yard or over the fence

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Natural weaning in cattle (as observed and written about in *Bos indicus* cattle) is a gradual process.

Over time the cow will initiate weaning until it will no longer tolerate suckling.

Eventually the strong maternal bond established at birth is broken and the animals separate.

This doesn’t happen in most current weaning management.

Studies have looked at weaning over a period of time compared to abrupt separation.

Weaning by separating cows and calves by a fence line is common and generally the process is complete within a week or so.

Separation by fence line followed by total separation a few days later has also been tried.

Using anti-sucking devices attached to the calves’ noses also mimics a gradual separation.

Gradual separation strategies try to enable the calf to cope with the change.

In several studies, weight gain and stress (as measured by calf behaviour) were compared for gradual weaning, against abrupt weaning.

There seemed to be contradictory results and the different experimental designs may have been part of this. Some work suggested different effects on weight gain, but several showed after a few months this was not significant. Different studies gave differing results as to the most stressful methods.

Gradual weaning mimics what happens in the natural world.

Exposing calves while they are still with their mothers during weaning to things they will experience such as different feed, different paddocks, cattle yards or different watering points will reduce the stress of weaning.

No matter how the weaning is done, if you then spend time feeding and training them through the yards, they will remember it and handling will be easier later on.

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No matter how the weaning is done, if you then spend time feeding and training them through the yards, they will remember it and handling will be easier later on.
READING pumping costs by $10 an hour with a diesel-gas mix has put a smile on the face of Baan Baa cotton irrigator Warwick Wannan.

Adding to his joy, simplified technology in the conversion process recently cut the cost of installing a diesel-gas system by 40 per cent.

Mr Wannan has always looked for ways to reduce his energy costs. Twenty years ago he used to have fuel delivered by road train to his irrigation farm at Collarenabri. Then he started using reduced tillage techniques, cutting his fuel use by at least 50pc. A few years ago Mr Wannan introduced rubber tracks on his tractors to reduce wheel slip which in turn reduced fuel intake.

Now he is converting his diesel engines pumping irrigation water from diesel to a mix of diesel and gas. “Savings per hour are around 10 dollars, so over a thousand hours pumping at current conversion costs is approximately a six month pay-back period,” Mr Wannan said. The increasing price of gas won’t affect the operation too much. “It’s tied to the price of diesel – the first one we did five years ago the price of gas was half the price of diesel, now it’s gone up but the price of diesel is still roughly half the price of diesel.”

The only fly in the ointment for anyone else considering conversion is the prospect of the federal government reducing a significant portion of the diesel rebate in the coming budget. Mr Wannan employs Diesel Gas Technologies, a specialist Sydney company and one of few in the market to do the conversions. Installation is relatively straightforward. Components are mounted on a box close to the engine.

The aim is to replace 30 per cent of diesel with LPG, saving 15pc of the total fuel bill. DPI and the Cotton Research and Development Corporation at Narrabri, will conduct energy assessments on irrigation farms to determine where high use is occurring.

Contact Janelle Montgomery, Moree, 0428 640 990, janelle.montgomery@dpi.nsw.gov.au to take part in assessments.

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**Water use efficiency of centre pivot and lateral move irrigation systems**

Management is the main cause of wide variations in the performance of centre pivot (CP) and lateral move (LM) irrigation systems in cotton.

Although CP and LM irrigation systems can be highly efficient, a number of factors can reduce their performance. Changing to these systems requires careful consideration as they require a significant capital investment. Their sophistication also requires a different mindset and management method to furrow irrigation.

A recent study by the NSW Department of Primary Industries in collaboration with Queensland Department of Environment and Resource Management sought a better understanding of how cotton growers are adapting to CP and LM irrigation systems. The study benchmarked 21 lateral move and 19 centre pivot irrigation systems during the 2010-11 cotton season in south-western NSW and southern Queensland.

The study collected yield, water use and rainfall data in the field to calculate an indicator of performance called the Gross Production Water Use Index (GPWUI). The index takes into account all water used to grow the crop in a field – irrigation water applied, effective rainfall and soil moisture – and can be used to compare fields across different geographic regions.

Flood inundation of some cotton crops meant poor yields in 2010-11. Other farms got timely rain and applied less irrigation water. One farm had a yield of 8.75 bales per hectare and applied only 0.5 ML/ha irrigation water.

Variation in rain and irrigation water applied emphasises the value of using the index to compare farms and regions.

There was a significant variation from 0.7 to 1.9 bales/ML in the GPWUI assessment of CP/LM systems across the cotton industry.

Climate might explain some variation from southern Qld to southern NSW but there was no consistent relationship between GPWUI and region.

This indicates the variation arises primarily from management of these irrigation systems and that cotton irrigators need to adopt new skills to realise the potential benefits.

Janelle Montgomery

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**Farm water testing service**

Don’t gamble on the quality of your farm water. Department of Primary Industries laboratories will test your farm water for stock and irrigation use.

This is vital during dry periods as water sources dry up and new water supplies are tapped.

Contact our customer service unit for the water testing service to suit your needs.

- pH
- Salinity
- Hardness
- Nutrient levels
- Heavy Metals
- Pesticide contamination

Farm Water Test Kits are available through all Department of Primary Offices.

Diagnostic & Analytical Services

Ph: 1800 675 623

WWW.DPI.NSW.GOV.AU

…answers you can use from technology you can trust
**Demo farms help with high-tech recycling gains**

**LUKE JEWELL**

**Richmond**

INVESTING in disinfection systems is enabling an increasing number of greenhouse growers to improve the quality of their water. The Border Rivers-Gwydir CMA successfully bid for $375,000 from the Australian Government’s Caring for Our Country program to protect critical aquatic habitats on the Barwon River. The Murries on the Barwon project is employing a local Aboriginal group, the Murries, to undertake strategic on-ground control of feral pig numbers over a much larger area and that’s good news for the environment and for farmers.

As the number of grower commitments increases, there is a growing demand for water disinfection technologies that can be adapted to a range of countries. The project is underpinned by concepts of ‘Resilience’ so that the framework can be expanded beyond National Parks and Wildlife Service and the Livestock Health and Pest Authority (LHPA) to expand control programs beyond National Park boundaries to neighbouring properties. By combining resources we’ll get a bigger reduction in feral pig numbers over a much larger area and that’s good news for the environment and for farmers.

New tanks save rainwater and cut greenhouses production costs

GREENHOUSE vegetable growers in the Sydney Basin have significantly cut potable water use and costs by installing new infrastructure.

Over the last 12 months, 26 growers have been collecting rainwater from their greenhouse roofs and storing it in new tanks for reuse in their irrigation systems, with incentive funding from the WaterSmart Farms project.

The project comprised an extension program and incentive grants to improve water use efficiency. Growers have put in tanks ranging in capacity from 50,000 litres to one million litres, most being approximately 200,000 litres.

WaterSmart Farms project officer Luke Jewell estimates that an operator of an average sized 5000 square metre greenhouse could save $5000 a year and store 2.5 ML off that roof area.

Potable water costs more than $1 per thousand dollars per megalitre.

Above average rainfall has meant some users used very little town water in the past season.

Grower Carlos Azzi said he was worried someone would think he had tampered with his meter because his town water use has dropped so much.

Mr Jewell said growers were still learning to manage rain water in hydraulic systems.

“Rain water is generally more acidic than town water and some modifications are needed to adjust the pH of the irrigation feed solution,” he said.

“WaterSmart Farms was a project by the NSW Department of Primary Industries from June 2009 to December 2011. It was funded by the Australian government’s Water for the Future initiative and the NSW Climate Change Fund as part of the Hawkesbury-Nepean River Recovery Program.”

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**Catchment Management Authority Border Rivers-Gwydir NSW**

May 2012

Border Rivers-Gwydir CMA Chair’s Column

As the financial year draws closer and the Border Rivers-Gwydir CMA team is wrapping up their projects for another year, it is time to reflect on the project highlights, of which there are many. A few are mentioned below.

- Building and implementing an extensive feral control program, the Border Rivers-Gwydir CMA team has been part of ongoing efforts to assist farmers in the rehabilitation of natural resources.

- The CMA has successfully funded projects by the NSW Department of Primary Industries from June 2009 to December 2011. It was funded by the Australian government’s Water for the Future initiative and the NSW Climate Change Fund as part of the Hawkesbury-Nepean River Recovery Program.

- The Barwon project is employing a local Aboriginal group, the Murries, to undertake strategic on-ground control of feral pig numbers over a much larger area and that’s good news for the environment and for farmers.

- By combining resources we’ll get a bigger reduction in feral pig numbers over a much larger area and that’s good news for the environment and for farmers.

- New tanks save rainwater and cut greenhouses production costs

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**GOT A LEAKING DAM?**

Seal it with ease using WaterSave Plug

- No need to drain or rebury
- Most effective and easy to apply
- Can be applied to full or partially full dams

**Building a Dam**

- Failure to hold water is the most common problem for farm dams.

**Repairing a Dam**

- Structural leaks are expensive and not always successful. Growers normally try to repair them to save the cost of constructing a new dam.

**An Easy Solution**

To avoid a permanent fix to seal the area where the water is leaking, WaterSave Plug in a unique blend in powdered form. When mixed with water it will stop the leak in 15 seconds, filling the small empty conduits that are holding water.

**NON TOXIC AND ENVIRONMENTALLY FRIENDLY**

**THE LAND**

Find us on twitter: @landnews

John O’Connor, Berry, (02) 4464 2122, john.o’connor@dpi.nsw.gov.au

Luke Jewell, Richmond, (02) 4588 2122, luke.jewell@dpi.nsw.gov.au or

John O’Connor, Berry, (02) 4464 2122, john.o’connor@dpi.nsw.gov.au
Ideas for saving the Basin water

LOCAL communities in the Murray-Darling Basin can make suggestions until May 18 for projects that could save water for the environment.

The NSW Office of Water is inviting ideas as part of the NSW Murray-Darling Basin Environmental Works and Measures Feasibility Project funded by the Australian Government. Eight proposals worth $2 million have already been nominated by the NSW Government.

Another $1.2 million will help Basin communities identify viable local water savings and efficiency measures. Community groups and individuals are invited to develop and submit ideas for measures that may help to deliver improved water use efficiency with the NSW Office of Water.

Installation of a pump at Euston Lakes to supply stock and domestic users – an example of infrastructure to save water by limiting evaporative losses.

Submissions should address the project criteria and can be made online using the submission form on the Office of Water website.

■ Visit www.water.nsw.gov.au and go to Water management > Water recovery > Environmental works and measures or contact (02) 4224 9745.

■ Contact Steve Cheal, Inverell, (02) 6721 9823, steve.cheal@dpi.nsw.gov.au

Installation of a pump at Euston Lakes to supply stock and domestic users – an example of infrastructure to save water by limiting evaporative losses.

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<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td>3 Point Linkage Chipper</td>
<td>6&quot; Cap</td>
<td>$2099</td>
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<tr>
<td></td>
<td>8&quot; Cap</td>
<td>$2349</td>
</tr>
<tr>
<td>Vertical Shaft Engine</td>
<td>NOW</td>
<td>$496</td>
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<tr>
<td></td>
<td>BIG 1 13HP</td>
<td>$549</td>
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<tr>
<td>Air Operated C Ring Fastener</td>
<td>NOW</td>
<td>$349</td>
</tr>
<tr>
<td>Log Splitter</td>
<td>14ton</td>
<td>$595</td>
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<tr>
<td></td>
<td>(uses Hydros on tractor)</td>
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<tr>
<td>40ton Log Splitter</td>
<td>13hp Petrol pull start</td>
<td>$1449</td>
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<tr>
<td></td>
<td>(kit form)</td>
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<tr>
<td></td>
<td>13hp Electric start</td>
<td>$1549</td>
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<tr>
<td></td>
<td>(kit form)</td>
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<tr>
<td>Seed/Fertiliser Spreader</td>
<td>(spread with 2-3 meters)</td>
<td>$495</td>
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<td>Chainsaw Sharpener</td>
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<td>$1195</td>
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<tr>
<td>Bucket Forks</td>
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<td></td>
<td>1350kg</td>
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<td>Chipper Shredder</td>
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<td>$695</td>
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<tr>
<td>Demolition Hammer</td>
<td>big 1500 w</td>
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<tr>
<td>Mobile Quick Fold Scaffold with Outriggers</td>
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<tr>
<td>Max platform height 2metres</td>
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<tr>
<td>Ripper</td>
<td>350mm</td>
<td>$169</td>
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<tr>
<td>Twin Impeller Fire Pump 6.5hp</td>
<td>4 Stroke, Massive 70m head</td>
<td>$329</td>
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<tr>
<td>Heavy Duty Cement Mixer</td>
<td>500 watt motor</td>
<td>$299</td>
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<tr>
<td></td>
<td>3.2 cu ft</td>
<td>$399</td>
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<tr>
<td>High Pressure Water Blaster</td>
<td>4 stroke 6.5hp and 2500psi</td>
<td>$359</td>
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<tr>
<td>Petrol Powered Earth Auger</td>
<td>Big 9HP includes 5 augers up to 300mm</td>
<td>$1849</td>
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<tr>
<td>Petrol Swing Wood Cutter</td>
<td>4 stroke with 700mm tungsten tipped blade</td>
<td>$849</td>
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<tr>
<td></td>
<td>Big 13hp Motor</td>
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<tr>
<td>Gun Safes</td>
<td>5 gun</td>
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<td>12 gun</td>
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<tr>
<td>Swivel Ute Crane</td>
<td>450kg</td>
<td>$189</td>
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<tr>
<td></td>
<td>900kg</td>
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<tr>
<td>Industrial Socket Set</td>
<td>1&quot; drive</td>
<td>$199</td>
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<tr>
<td></td>
<td>(30-80mm)</td>
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<tr>
<td>Petrol Chainsaw</td>
<td>Stump Grinder</td>
<td>$189</td>
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<tr>
<td></td>
<td>BIG 13hp</td>
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<tr>
<td>Box Blade</td>
<td>8ft</td>
<td>$595</td>
</tr>
<tr>
<td>30ton Log Splitter</td>
<td>4 stroke engine, Pull Start</td>
<td>$195</td>
</tr>
<tr>
<td></td>
<td>(kit form)</td>
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<tr>
<td></td>
<td>Works Vertically and Horizontally (electric start also available at extra charge)</td>
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<tr>
<td>Body Frame Repair Kit</td>
<td>includes push, pull + mini rams</td>
<td>$309</td>
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<tr>
<td></td>
<td>Petrol Engines 4 Stroke Pull Start Horizontal Shaft</td>
<td>$169</td>
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<tr>
<td></td>
<td>2.5HP</td>
<td>$295</td>
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<td></td>
<td>Electric Start Also Available</td>
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<tr>
<td>Heavy Duty Billy Cart</td>
<td>6.5hp, Max Speed 35kph, Limited Stock_ Be Quick</td>
<td>$795</td>
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<tr>
<td></td>
<td>(Tilting width 600mm)</td>
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<tr>
<td>Transfer Pump</td>
<td>1 1/2&quot; 4 Stroke</td>
<td>$199</td>
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<tr>
<td>Rotary Tiller</td>
<td>6.5 HP 4 stroke</td>
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<tr>
<td>Tipping Lawn Cart</td>
<td>227kg cap (kit form)</td>
<td>$139</td>
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<tr>
<td>Petrol Air Compressor</td>
<td>50 Rpm 5.5hp</td>
<td>$995</td>
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<tr>
<td>12 Volt pumps</td>
<td>36psi 12L/min, 40psi 17L/min</td>
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<tr>
<td>Landscape Rakes</td>
<td>6ft</td>
<td>$439</td>
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<tr>
<td></td>
<td>7ft</td>
<td>$469</td>
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<tr>
<td></td>
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