

Climate Champion Program

AUSTRALIA



Australian Government
Grains Research and Development Corporation



Climate Champion Program

Thirty-three Australian farmers have been recruited by the national Climate Champion Program to help improve communication between scientists and farmers about managing climate risk.

What do they have in common?

- » They are all interested in managing risks associated with climate and weather to improve productivity on their farms.
- » They are keen to share their knowledge with other farmers.

The program aims to:

- » get climate-related research information out to farmers—research about new technologies and practices for dealing with climate variability and climate change
- » feed information from farmers back to researchers about what they need to better manage climate risk on their property.

The program is supported by:

- » Grains Research & Development Corporation
- » Managing Climate Variability
- » Meat & Livestock Australia

Foreword

Australia has the most variable climate in the world. The last 10 years have demonstrated this fact dramatically, with both severe droughts and flooding rains causing great hardship and destruction for farmers across the nation.

This booklet explains how more than 30 farmers are rising beyond the challenges to manage climate risk on their farms, and examines the strategies they use to maximise the opportunities—and their production. They come from all over Australia and from a range of industries.

These Climate Champion farmers have had access to the latest research in both weather forecasting and climate analysis. They have interacted with researchers studying climate variability and have had many discussions about each other's farms.

The stories in this book tell of the innovations and technologies that have made farmers more sustainable in the range of climate scenarios which they confront on a yearly basis. Maximising profits in the good years and minimising losses in the drought years—and knowing the difference between the two—is the key.

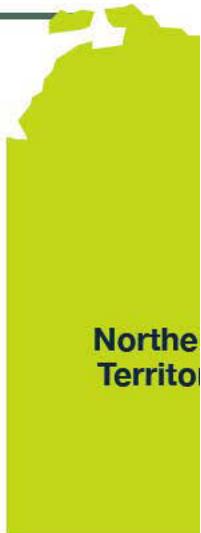
These leading farmers welcome this opportunity to share their ideas and solutions with other farmers relevant to their industry. They are more than willing to be contacted. For this we are indebted to them all.

The Managing Climate Variability program is proud of the Climate Champion Program and we believe it will help farmers adapt to both climate variability and climate change.

Ian McClelland, Chairman
Managing Climate Variability

Representing Australia

-  GRDC-supported farmers
-  MCV-supported farmers
-  MLA-supported farmers



Managing Climate Variability



20



27



21



28



22



29



23



30



24



31



18



25



32



19



26



33

Managing Climate Variability

Climate Champion	State	Sector								Page	
		Beef	Cotton	Dairy	Grains	Grapes	Horticulture	Sheep/wool	Sugar		Other
Matthew Pitt	Tas	■								■	17
David Cattanach	NSW				■						18
Andrew Carmichael	NSW				■						19
Pele Cannon	NSW									■	20
John Ive	NSW	■						■		■	21
Peter Holding	NSW				■			■			22
Anthony Gordon	NSW				■						23
Sam Hamilton	NSW	■						■			24
Lynne Strong	NSW			■							25
Jennifer Hawkins	NSW	■			■			■		■	26
Leslie & Alice Roberts	NSW	■									27
Bill Yates	NSW	■			■			■			28
Robert Quirk	NSW	■							■		29
Linton Brimblecombe	Qld				■		■				30
Colin Dunne	Qld	■			■						31
Peter Whip	Qld	■									32
Michael Waring	Qld								■		33

At the time of publication, two more Climate Champion positions are in the process of being filled.

Region Ajana, north-east agricultural region, Western Australia

Commodity Wheat, canola and lupins

Farming area 12,000 hectares (8000 cropping)

Rainfall 308 mm average per year



Beef

Cotton

Dairy

Grains

Grapes

Horticulture

Sheep/wool

Sugar

Other

Contact Fleur

Email fleur.grieve@bigpond.com

Phone 08 9921 3937



We have been minimum-till cropping for 20 years. We use GPS guidance and our new machine will have the ability to apply liquid fertiliser. We retain stubble to protect the soil.

We choose wheat varieties that fit with the season and use forecasting information to inform our decisions.

Sometimes there's no going past your intuition, but as our confidence in forecasting grows—which is mostly based on understanding the drivers for our region—we find that our decisions are less reactive and more responsive.

My father started doing Landcare in the 1980s—he removed livestock, planted trees, worked to protect waterways and remnant vegetation and invested in an extensive contour bank system.

In the past four years we have reduced our cropping program significantly to the better producing paddocks and we have been planting oil mallees in alleys in the remaining fields—50,000–100,000 per year.

We plan to be Carbon Farming as part of our system in the near future.

Region Mingenew, Western Australia

Commodity Cropping (wheat, lupins), livestock (LAMBPLAN-tested Poll Dorset rams)

Farming area 3440 hectares

Rainfall 405 mm average per year



Beef	Cotton	Dairy	Grains	Grapes	Horticulture	Sheep/wool	Sugar	Other
------	--------	-------	--------	--------	--------------	------------	-------	-------

Contact Peter

Email lockieriver@bordnet.com.au

Phone 08 9928 1171, 0428 281 173



Farming is like life and most businesses—change is ongoing. In the 25 years after I went to ag college, our farm has changed a lot.

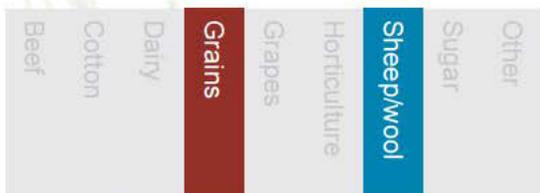
We have moved from mechanical weed control and sowing with full-cut disc machines, to knife points and furrow-sowing minimum tillage. Crop varieties are ever changing, and we aim to keep up with the latest varieties. One way that we do this is to allow major grain-variety trials on our farm.

In our farming system, which is reliant on winter rainfall, I use online rainfall charts from the Department of Agriculture. The charts are very basic but over the last few years they have been very useful. For example, in 2010 (a dry year), we made an early decision using present and historical information—the probability of a good season was small so we fertilised accordingly. This decision resulted in a very good outcome.

The better all parties associated with agriculture in Australia understand seasonal and future climate change, the more productive we all can become.

Peter Horwood

Region West Midlands, 2.5 hours north of Perth
Commodity Wheat, barley, canola, lambs and hay
Farming area 3200 hectares
Rainfall 300–650 mm per year



Contact John

Email ejs@bigpond.com

Phone 08 9652 9042



Losing the autumn rains has had a significant effect on our farming practices.

We offloaded big numbers of sheep and replaced them with crops. Now, 3000 sheep graze where 8000 formerly ran.

We introduced a new five-year crop rotation system: two years of pasture with fat lambs and merino lambs, followed by annual crops of canola, wheat and barley. We run sheep on one-third of the property. The crops are normally one-third each of the remainder: canola, wheat and barley.

We might take risks with a canola crop by dry-seeding. Canola provides a good disease break and weed control for the following wheat crop. Barley grows well after wheat and gives better weed-control options in the third year of the cropping rotation.

A barley-to-pasture rotation is good because barley germinates with the pasture, and that is great feed for the ewes. The pasture phase also provides a disease break, a weed break and nitrogen for the following canola crop.

Region Corrigin, central wheat belt, Western Australia

Commodity Grains and cattle

Farming area 2200 hectares

Rainfall 300–340 mm per year



Beef

Cotton

Dairy

Grains

Grapes

Horticulture

Sheep/wool

Sugar

Other

Contact Simon

Email swallwork@westnet.com.au

Phone 08 9063 2505



We don't always wait for the traditional one-inch rainfall event before we start seeding. We might dry sow. We grow a longer season barley in general so we can sow early and make use of the moisture.

Frost through this area is a massive cost to a lot of farmers. The traditional approach is to delay sowing. But some of my worst frost has been on my latest sown crops.

We have a no-till farming system. We use knife-points on our seeding equipment and do very little cultivation, if any. We sow the crop in one pass with very narrow points.

We try and keep all our residue from last year's crop. It protects the soil surface from erosion, reduces evaporation and keeps more moisture in the ground.

We use soil surveys to get a very good idea of our soils' characteristics, divide our paddocks up into different soil classes, link it to GPS and be very accurate about changing our input rates.

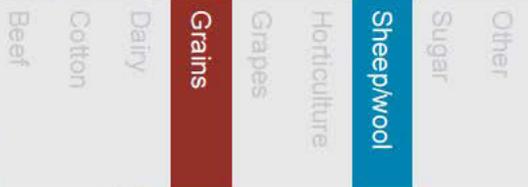
Simon Wallwork

Region Lake Grace, south-east Western Australia

Commodity Mixed cropping and sheep

Farming area 5000 hectares

Rainfall 325 mm average per year



Contact Royce

Email annaroyce@esat.net.au

Phone 08 9865 1507



We have to stop hoping changes in climate are going to pass by, and instead try and farm with it rather than against it.

We make decisions in principle then adjust our plans according to the season. I work out what I'm doing in each paddock in October with my agronomist. We make sure we can afford everything; perhaps trim up on fertilisers.

If it hasn't rained by the middle of May, certain crops will get dropped and different varieties put in. If it's a dry start, we back off on our cropping area.

Wheat and barley generally go in regardless. Canola is an opportunistic crop, so we look at our rainfall and subsoil moisture.

I've been using zero-till and cropping rotations since I began farming. There's less soil erosion and good trash flow, so we can leave our stubbles in our paddocks. I try to retain all my stubble and that helps retain moisture.

Region Cleve, central Eyre Peninsula, South Australia
Commodity Wheat, barley, canola, peas, vetch and fat lambs
Farming area 1700 hectares
Rainfall 400–425 mm per year



Beef	Cotton	Dairy	Grains	Grapes	Horticulture	Sheepwool	Sugar	Other
------	--------	-------	---------------	--------	--------------	------------------	-------	-------

Contact Mark and Andrea

Email mahannemann1@gmail.com
Phone 08 8628 4036



Over the last 13 years we have adopted minimum-till practices and, with the stubble retention, we're not getting the run-off we used to. We direct drill straight into last year's stubble.

Adopting minimum-till practices has enabled us to grow good crops on less rainfall, because of improved soil moisture retention. We want to further improve our soil and soil carbon.

We have now developed a water-harvesting scheme which is going to satisfy our water needs for stock, spraying and domestic use. Our catchment area gravitates down into a three-metre deep holding dam which is 30 x 30 metres. For every millimetre of rain, we collect a litre of water.

Stock are a great opportunist tool we use here. We feedlot sheep if we get the opportunity, if we've got hay on hand. We do hay when the season's good.

We also look at the Bureau of Meteorology seasonal outlook and the four-day forecast for spraying, the Elders weather site and occasionally Water and the Land.

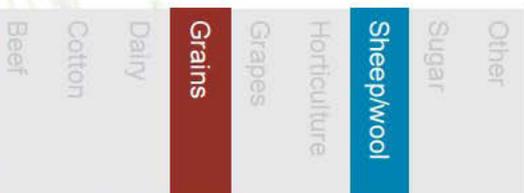
**Mark & Andrea
Hannemann**

Region Quorn, Flinders Ranges, South Australia

Commodity Merino sheep, wheat and barley

Farming area 10,700 hectares

Rainfall 220–300 mm per year



Contact Susan

Email carnnomi@bigpond.com

Phone 08 8648 6438



I use a variety of seasonal forecast models—including the Bureau of Meteorology's experimental forecasting tool, POAMA-2—to help in my decision making.

If the year looks like it is not going to pan out for having good winter or spring rains, we assess our stock numbers early and sell off stock.

The aim is to look after our land as well as our stock.

If the models are showing good summer rain and less in winter, we aim for an early lambing to take advantage of better autumn feed, thus improving percentages.

In 2008 the models were agreeing that we weren't going to have a very good winter and spring. We decided not to sow as much grain and that was a good decision.

By having an understanding of the drivers of climate, we can mentally get prepared for a bad year, for example, and put some plans in place.

Susan Carn

Region Orroroo, South Australia

Commodity Wheat and sheep

Farming area 2050 hectares

Rainfall 350 mm average per year



Beef	Cotton	Dairy	Grains	Grapes	Horticulture	Sheep/wool	Sugar	Other
------	--------	-------	---------------	--------	--------------	-------------------	-------	-------

Contact Kym

Email fromms@bigpond.com

Phone 08 8658 1183



Our hilly terrain and erosion means it makes sense not to cultivate our soil and use a no-till system.

I've been no-tilling with narrow points for about seven or eight years now. I noticed a very rapid improvement in soil structure within a few years when you're no-tilling.

No-till farming also helps increase water infiltration rate and allows more water to soak into the ground.

The holy grail of low-rainfall farming is to make the most of the good years and minimise the impact of the bad years.

Now, I almost have one-third my main crop, one-third pasture and then one-third either pasture or crop. I like the flexibility of this sort of system.

Handling risk is probably the thing that I've learnt the most about over the years. I'd like to get back to a sheep-oriented, lower risk scenario where I can control my ground cover better.

Kym Fromm

Region 'Temple Bruer', Strathalbyn, South Australia

Commodity Certified-organic grapes and wines

Farming area 40 hectares

Rainfall 490 mm average per year



Beef	Cotton	Dairy	Grains	Grapes	Horticulture	Sheep/wool	Sugar	Other
------	--------	-------	--------	---------------	--------------	------------	-------	-------

Contact David

Email baywines@internode.on.net

Phone 08 8431 0911

South Australia

If we want any wine market to take us seriously, we have to achieve greenhouse gas neutrality. We will pick the 'low-hanging fruit' first, for example:

- » use lightweight bottles, which also saves on transport costs
- » cut out all air freight
- » generate our own green power
- » shift from freon-based refrigeration to ammonia
- » revegetate more land
- » increase soil carbon sequestration by reducing or eliminating cultivation, and adding compost and biochar

We harvest all our white wine grapes at night so the grapes are as cool as possible—we are trying to minimise our refrigeration demand. We want some of the red wine grapes to be warm, so we pick them during the day.

To prevent damage from extreme heat events, we heavily water the vines the night before to prevent them getting water-stressed during the heat of the day.

David Bruer

Region Padthaway, south-east region, South Australia

Commodity Grapes, small-seed crops, livestock, beans, wheat and canola

Farming area 500 hectares

Rainfall 400–550 mm per year



Beef

Cotton

Dairy

Grains

Grapes

Horticulture

Sheep/wool

Sugar

Other

Contact Krysteen

Email bkmcelroy@bigpond.com

Phone 0408 655 108



Mixed farming means we can swap and change our enterprises to suit how weather and prices are going. We can increase the number of paddocks we plant if cropping is going well, or increase our stock numbers if cropping is not so good. It gives us a bit of flexibility.

In Padthaway, we have an underground water supply. We use surface irrigation on the small seeds and drip irrigation in the vineyard. We've also upgraded our surface irrigation system to a surge irrigation system and increased our channel holding area. It's been a huge success.

We increase our water efficiency by spraying weeds between rows to allow the water to flow through quicker, compacting the base of our irrigation channel to reduce seepage, monitoring soil moisture and retaining stubble.

Keeping accurate records of every irrigation event, pumping rate and rainfall throughout the irrigating season is one of the most important things we do each season.

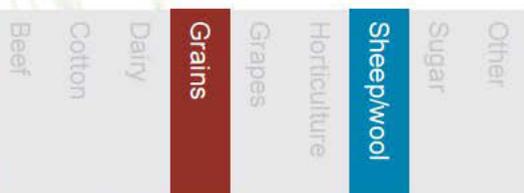
Krysteen McElroy

Region Bordertown, Upper South East region, South Australia

Commodity Wheat, durum wheat, milling oats, beans, oilseed, barley, canola and South African Merino Mutton x Merino sheep for prime lambs

Farming area 1000 hectares

Rainfall 440–480 mm per year



Contact Bill

Email wdhunt@bigpond.com

Phone 08 8752 0255

South Australia

In a normal sort of year we would hope to get about 60% of our place under crop, and 40% under pasture. But if a season gets a bad start we'd drop two or three cropping paddocks out.

Then at the end of the year when harvest time comes, our pasture is a bit thinner but better, and the crops are finer and more nutritious. So our sheep go out there and we probably end up with 70% livestock and 30% crop.

So it's just a matter of swinging with the seasonal variability.

One of the things that made a huge difference to us is the adoption of minimum- or zero-tillage. It's all about maximising water-use efficiency.

We spray weeds when they come up at the season break and then the sheep clean them up through the autumn. Then we direct drill our crops in May and June.

We sell our lambs at the end of April/early May, and then towards the end of June we start getting new lambs. That way we are destocked through the toughest feed months.

Region Warracknabeal, Wimmera, north-western Victoria

Commodity Wheat, barley, pulses, prime lamb and wool

Farming area 1400 hectares

Rainfall 300–350 mm per year



Beef	Cotton	Dairy	Grains	Grapes	Horticulture	Sheep/wool	Sugar	Other
------	--------	-------	--------	--------	--------------	------------	-------	-------

Contact David

Email dndrage@bigpond.com

Phone 03 5399 1247



In the late 1990s I was cropping 80–85% of the farm every year, but now I'm down to about 60%. I've become very reluctant to plant any crops where I think that the chance of growing a good crop is marginal.

I've increased the size of the prime lamb enterprise on the farm and I've altered the mix of crops over the last 10 years to deal with a changing climate. The only pulse crop I plant now is vetch, which will either be cut for hay and baled, or grazed off.

No-till farming has helped us to remain flexible because we don't have to make planting decisions up-front. We've got a zero-tolerance approach to summer weeds.

I'm not backward in putting a fire break around something and burning it if there's a weed or disease problem. But the value of stubble cover for moisture conservation is extremely important.

We must also keep looking beyond the farm gate at all the other influences on us, because European and United States export policies can have a larger effect on my business than 20 or 40 mm of rain.

David Drage

Region Wimmera, western Victoria

Commodity Wheat, lentils, chickpeas, barley, beans, hay and canola

Farming area 3000 hectares

Rainfall 400 mm average per year



Beef

Cotton

Dairy

Grains

Grapes

Horticulture

Sheep/wool

Sugar

Other

Contact Susan

Email susan.findlay@dpi.vic.gov.au

Phone 03 5381 0762



Victoria

Our agronomic strategy is to know exactly where we are at the start of each season before we put the crop in.

We measure soil moisture rather than relying on gut feel.

We start with low fertiliser rates and feed the crop as needed throughout the growing season. Soil tests and modelling software help us achieve realistic yields for the season's rainfall.

Shorter season varieties improve yields in dry seasons. Now we're prepared to change our program depending on summer rainfall and the timing of the break.

Stubble retention and no-till help us retain soil moisture, keep our soils healthy and build organic matter levels.

Using GPS systems gives our business many benefits, from yield mapping to less overlap of inputs and reduced operator fatigue.

Over the last few years we have added to our on-farm storage. We now have around 8000 tons of silo storage. The returns from this system help with harvest efficiency, value-adding, marketing and cash flow.

Region Birchip, southern Mallee, western Victoria

Commodity Cereal crops, pulses and canola

Farming area 2800 hectares

Rainfall 350 mm average per year



Beef	Cotton	Dairy	Grains	Grapes	Horticulture	Sheepwool	Sugar	Other
------	--------	-------	--------	--------	--------------	-----------	-------	-------

Contact David

Email dnb@activ8.net.au

Phone 03 5399 0536



One of the things that climate change has taught us is that we have to be more adaptable and versatile in what we do.

We usually plan a six-year rotation, but by about the third or fourth year the technology's changed, the weather's changed, the rain's changed. Although we don't get through these rotations, we still plan for them. We're finetuning our plan all the time now.

We try to run a low-risk enterprise sowing predominantly wheat and barley. We also have about 900 first-cross ewes. We've chosen to keep sheep in our enterprise mix as another option up our sleeves.

Every year we test our soils to find out the soil type and nutrient status. Our farm is heading towards minimum-till and direct drill. It reduces soil and wind erosion, it's better for the soil structure and it conserves moisture.

We practice full stubble retention and minimal cultivation. Fallowing is quite a good tool to use because it gives you a bank of moisture that you can use for the next year's crop.

David Smith

Region Western Australia, South Australia and Victoria

Commodity Olives and grapes



Beef	Cotton	Dairy	Grains	Grapes	Horticulture	Sheep/wool	Sugar	Other
------	--------	-------	--------	--------	--------------	------------	-------	-------

Contact Paul

Email hortempm@bigpond.com

Phone 0412 854 974



Harvesting olives normally happens during May and into June in South Australia, and waterlogging is not a problem because of the well-drained soils.

The weather that goes with drought—frost—has been a major issue. Keeping frost at bay in October, when the flowers are setting, is critical. We needed a blanket of fog that held the heat that the grove floor absorbed during the day.

We developed our own fog machines. They're gas-powered so that we can use them out in the grove, and they successfully generate large amounts of fog.

My work for and with the Australian Olive Association has taken me around the world. Our industry is working very closely with the Californian olive industry.

They are carefully watching what happens in Australia with how we deal with climate change because they see us as being right out there at the edge, experiencing it before many other parts of the world. This is not just an Australian issue, it's a global issue.

Paul Miller

Region Corryong, north-east Victoria

Commodity Small seeds, vegetable seeds, summer crops and beef cattle

Farming area 1300 hectares

Rainfall 849 mm average per year



Beef

Cotton

Dairy

Grains

Grapes

Horticulture

Sheep/wool

Sugar

Other

Contact Bruce

Email saxto@bigpond.com

Phone 02 6076 9222



In relation to climate variability and change, as the cost of inputs increase and our margins decrease, we're much more exposed when the season turns against us.

If we expect more variability because of climate change, the answer is to plan, but be flexible so you can respond to a situation.

Diversity in our crop choice has given us a degree of insurance against the variable seasons. We can grow 12 or 14 different types of crop in one year, and cultivar variations within that, to spread our harvest date over a longer period.

With dry finishes and increased temperatures, we have successfully moved more toward summer cropping.

A group in my area has set up a monitoring system and website which monitors, gathers and collates weather data from three remote weather stations in the surrounding districts.

It's useful to be able to compare production and soil temperature, your minimums and maximums, and soil moisture.

Bruce Saxton

Region Hamilton, Tasmania

Commodity Oil seeds, dairy heifers, veal production and contracting

Farming area 70 hectares

Rainfall 356–431 mm per year



Beef

Cotton

Dairy

Grains

Grapes

Horticulture

Sheep/wool

Sugar

Other

Contact Matthew

Email clunypitt@activ8.net.au

Phone 03 6287 1229



We farm essential oil crops with another company, are establishing dairy heifer and veal production, and have a farm contracting business. Most of the contracting work we do is drilling, with a focus on direct drilling.

We try to encourage clients not to burn stubbles or plough stubbles in, but to leave them standing there to protect their soils and retain moisture.

We encourage pasture cropping and can direct drill straight after harvesters, so we can sow into poppy or cereal stubbles as soon as the harvester's left the paddock.

Retaining moisture in the soil is just as important here as it is in the Victorian Mallee.

Our rainfall patterns are similar and we have howling winds that blow away our light soils. We risk losing soil carbon and organic matter if we turn the soil.

I encourage farmers towards a middle ground—doing the right thing by your country within the boundaries of what your business allows you to do.

Matthew Pitt

Region Darlington Point, south-west New South Wales

Commodity Wheat, barley and maize

Farming area 600 hectares

Rainfall 50–500 mm per year



Beef	Cotton	Dairy	Grains	Grapes	Horticulture	Sheep/wool	Sugar	Other
------	--------	-------	---------------	--------	--------------	------------	-------	-------

Contact David

Email david.cattanach@bigpond.com

Phone 02 6954 4685



The biggest issue for me is water, or lack of it. In the past, I would budget two megalitres per hectare to grow wheat and about 8–9 megalitres to grow corn. Now, my water budget is 4.5–5 megalitres for a hectare of wheat and 10 megalitres for corn.

We are using two-centimetre guidance systems on the tractors and all our machinery is set up with narrow tyres. The tyres on all the machinery are spaced so that they run only in the furrows and never over the beds. This hopefully improves our soil structure.

We are also looking a lot closer at fertiliser—namely, what we apply, how we apply it and when we apply it.

I leave the mulch on the surface and using a disc system to sow through the stubble. We estimate that having the mulch on the surface is saving us 1.5 megalitres of water per hectare from reduced evaporation.

If we bury the stubble back into the soil, the nitrogen and carbon stored in it can be used by our next crop and would go towards our next harvest.

David Cattanach

Region Coolamon, New South Wales

Commodity Continuous cropping

Farming area 423 hectares

Rainfall 230–520 mm per year



Beef	Cotton	Dairy	Grains	Grapes	Horticulture	Sheep/wool	Sugar	Other
------	--------	-------	---------------	--------	--------------	------------	-------	-------

Contact Andrew

Email akcarmichael@bigpond.com

Phone 02 6927 2949



We retain our stubble to help with higher temperatures and a lack of rainfall, and are about to invest in soil moisture monitors. I'll be able to evaluate the effect of our water-retaining strategies, as well as rainfall, on the soil profile.

These monitors will help us make those important mid-to-late-season decisions quicker; for example, whether we should cut our crop for hay if there is little to no moisture left for it to yield well.

My biggest decision is how to set up the business so that I don't have too much money invested in plant and equipment.

I have modified our seeders to install a press wheel behind each tine. This allows us to sow into situations where we would not normally be able to sow (e.g. soils with marginal moisture levels).

I also introduced field peas to my rotations because it's in our interests to minimise the fertiliser nitrogen we're applying.

Region Urila, south-east New South Wales

Commodity Honey, beeswax and pollination

Farming area 16 hectares, but the bees need access to 20,000 hectares of land



Beef

Cotton

Dairy

Grains

Grapes

Horticulture

Sheep/wool

Sugar

Other

Contact Pele

Email pele.cannon@gmail.com

Phone 02 6236 3294



Increasing variability of rainfall and temperature are going to make it a lot harder to find the right trees in an area that's within reach for our operation.

As flowering patterns change, beekeepers will have to change their patterns of hive movement in an effort to compensate for altered honey flows.

Moving the bees is the traditional method of dealing with climate problems in an area. That's a tool that we're using to combat climate variability, because at least the bees will be strong if we find a small supply of nectar or pollen. But we've also become importers of a feed supplement that gets the bees strong.

The Bureau of Meteorology's rainfall and temperature records and forecasts are crucial for deciding where to take the bees and whether we think the trees are going to produce nectar. As climate variability increases, having good forecasting tools will make it a lot easier for beekeepers.

Region Yass Valley, Southern Tablelands, New South Wales

Commodity Ultrafine wool, Angus cattle and farm forestry

Farming area 250 hectares

Rainfall 625–650 mm per year



Beef

Cotton

Dairy

Grains

Grapes

Horticulture

Sheep/wool

Sugar

Other

Contact John

Email talaheni@webone.com.au

Phone 02 6258 2661



One of the most critical things in our operation at Talaheni is maximising and then using soil moisture.

We're looking at getting some alternative pasture species and varieties that will be more tolerant of drier and slightly shorter seasons. We need a mix of pasture systems—those that respond to the summer rain and others that respond to the winter rain.

When we had dryland salinity, we had lots of bare ground and erosion. We re-fenced the place based on soil type and landscape position, so we could plant pastures that were best suited for each paddock and then manage their grazing accordingly.

Trees were established on high-recharge areas to reduce deep drainage.

To monitor salinity, we have measured the depth to the water table every week for over 20 years. We also measure the salinity levels of the groundwater and the dams to check progress.

We also put in a series of contour banks to slow the movement of the run-off through the landscape.

Region Harden, south-east New South Wales

Commodity Wheat, canola, legumes, merino sheep and lambs

Farming area 600 hectares

Rainfall 200–600 mm per year



Beef	Cotton	Dairy	Grains	Grapes	Horticulture	Sheep/wool	Sugar	Other
------	--------	-------	--------	--------	--------------	------------	-------	-------

Contact Peter

Email peter.holding@bigpond.com

Phone 02 6386 2020



My farming philosophy now is based around being low-cost, flexible and integrated.

We've cut our inputs by working out how much nutrient we have to put back into the soil. We have soil moisture meters to tell us how much moisture is used per day, and that helps us decide later in the season whether it's worthwhile putting nitrogen on, for example.

The biggest changes we've made are direct drilling with long points, using press wheels and trying to retain crop stubble.

We try to integrate our sheep and our cropping enterprises. If I need to I can take the sheep off the pastures and put them on wheat.

To account for the climate change here, we've moved our sowing times back.

Seasonal outlooks can give us a realistic view of what our production ought to be for a season; then I build budgets around the approximate return.

Peter Holding

Region Forbes, central west New South Wales

Commodity Wheat, barley, canola, chick peas, field peas and lupins

Farming area 400 hectare family farm and 17,000 hectare cropping system

Rainfall 475–525 mm per year



Beef

Cotton

Dairy

Grains

Grapes

Horticulture

Sheep/wool

Sugar

Other

Contact Anthony

Email agordon@agmangroup.com.au

Phone 0458 561 156



We operate a no-till, conservation-farming system where we make our management decisions on how much soil moisture we have at sowing time.

In our main operation, we know the exact soil moisture status in every paddock (100+) because we constantly probe and test each paddock with penetrometers.

We apply a no-till, controlled-traffic farming system with full stubble retention on all of our dryland properties.

To help improve our soil structure we've aligned all our sowing, spraying and harvesting machinery onto three-metre tramlines (controlled traffic).

We predominantly use tine seeders—one fixed tine and three parallelogram tine machines—and call in disc machines to complete specific tasks.

We've taken out long-term relationships with contractors to allow them to invest in sustainable machinery and technologies, and to develop their expertise.

Anthony Gordon

Region Rylstone, central-east New South Wales

Commodity Sheep and cattle

Farming area 1000 hectares

Rainfall 650 mm average per year



Beef	Cotton	Dairy	Grains	Grapes	Horticulture	Sheep/wool	Sugar	Other
------	--------	-------	--------	--------	--------------	------------	-------	-------

Contact Sam

Email hamilton.sam@bigpond.com

Phone 02 6379 1359



Our shift from a breeding to a trading business is one of the biggest changes we've made, and it was largely climate-based.

We now run an operation where we fit in with the climate, rather than try to fight it.

Since 1994, we completely changed our grazing management to a time-control system, where we run animals in relatively big mobs and move them regularly.

Ground cover for us is absolutely paramount. We aim for 100% ground cover 100% of the time. We won't compromise that, so we remove the stock before the ground cover is depleted in drier times.

We're happy to destock totally if need be in drier times, which continually proves a winner for us. We see a lot of people struggle with high costs and feeding during dry times. We have totally destocked three or four times since 1994.

Sam Hamilton

Region Jamberoo, Illawarra, New South Wales

Commodity Dairy farming

Farming area Clover Hill—50 hectares; Lemon Grove Research Farm—68 hectares

Rainfall 1500–2000 mm per year



Beef	Cotton	Dairy	Grains	Grapes	Horticulture	Sheep/wool	Sugar	Other
------	--------	--------------	--------	--------	--------------	------------	-------	-------

Contact Lynne

Email lynnestrong@cloverhilldairies.com.au

Phone 02 4236 0309

Web www.cloverhilldairies.com.au

Twitter @chdairies



We run a highly intensive pasture-based dairy farm system. Optimising our pasture growth rate, energy content and yield has allowed us to graze five–six cows per hectare (2.5 times the industry average).

Ensuring good year round pasture cover also helps maintain catchment water quality as there is less nutrient run-off in high rainfall events.

Milking three times daily has allowed us to both increase milk production by 20% and reduce greenhouse gas emissions by 30% per litre of milk produced.

We regularly conduct soil tests and create nutrient budgets which allow us to reduce unnecessary fertiliser use and greenhouse gas emissions and costs. By breeding cows that are highly efficient at converting pasture to milk, and optimising their diet, we achieve six times the industry average of litres of milk produced per hectare.

All of these strategies have helped us become one of Australia's most water-efficient milk production systems.

Region Finley, southern New South Wales

Commodity Canola, wheat, rice, cattle and prime lambs

Farming area 1200 hectares

Rainfall 200–396 mm per year



Beef

Cotton

Dairy

Grains

Grapes

Horticulture

Sheepwool

Sugar

Other

Contact Jennifer

Email jhawkins26@bigpond.com

Phone 03 5883 9423



It's only been in recent years that we started to address managing some of the environmental resources that we use as part of our business process.

We do things like no-till farming, chemical fallowing, and land-forming. We developed a whole-farm reticulation system that allows us to control every drop of water that comes onto our land, either from our allocation or rain.

All of the paddocks have been laser-levelled to allow water to run into surrounding channels. These channels all flow into major arterial drains that come back to a centralised dam in the middle of the property.

Between the dam and the drainage channels we can realistically hold and control 120 megalitres of water.

During the worst times of the drought we had to look at having distinctive stock-containment areas on the farm. It allowed us to ration and control our feed, and we were still able to produce prime lambs.

Jennifer Hawkins

Region Dyers Crossing, mid-north coast of New South Wales

Commodity Organic beef

Farming area 82 hectares

Rainfall 600–1450 mm per year



Beef

Cotton

Dairy

Grains

Grapes

Horticulture

Sheep/wool

Sugar

Other

Contact Leslie & Alice

Email clondella6@bigpond.com

Phone 02 6550 2220



New South Wales

We practise no-till farming and try to use native pasture and perennial pastures because they stand the heat conditions better. We let our pasture set seed and mature every two years, which increases the seed quality. The pasture seed becomes acclimatised to local conditions.

We grow some legumes for periods of time when we anticipate feed shortages. We always have about 100 mm cover of grass over the paddock to keep the ground cool. If the grass gets too high, we mulch it in as fertiliser, which increases the land's carrying capacity.

After a bad drought, we changed to strip-grazing instead of set stocking the paddocks. That meant we could keep a certain amount of feed all the time and purchase grain when we needed to subsidise the pasture.

We are trying to improve our cattle by breeding for more heat tolerance. We have Zebu-cross cattle which don't seek shade like our Angus and Shorthorn cattle do.

We have kept rainfall records every day since 1981.

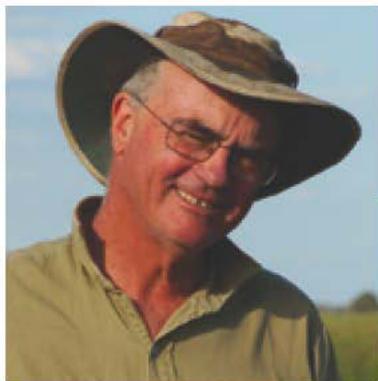
Leslie & Alice Roberts

Region Garah, north-east New South Wales

Commodity Wheat, barley, canola, lambs and hay

Farming area 12,000 hectares

Rainfall 175-1050 mm per year, average 540 mm



Beef

Cotton

Dairy

Grains

Grapes

Horticulture

Sheepwool

Sugar

Other

Contact Bill

Email yatesbill@bigpond.com

Phone 02 6754 3389



I balance risk by using a mixture of crops and grazing. Our strategy is based on an increased reliance on crops, preserving water by using zero-till and stubble retention.

The use of depth wheels, narrow points and press wheels enables the best plant establishment. Rotating our crops looks after the soil health, minimises disease build up and helps with weed control.

Our typical rotation is chickpeas, wheat, barley then back to chickpeas. In paddocks that have been farmed for 50 years, we might use faba beans because they add more nitrogen to the soil, even if yields and returns are lower.

During autumn, we decide how much barley to plant. We make a matrix up according to how much moisture we have—the high, medium and low moisture in the soil—and cross that with our view of the autumn, winter and spring rainfall from El Niño and the Indian Ocean Dipole.

If the outlook is for an average winter, we'll plant mostly wheat, followed by barley, then chickpeas.

Bill Yates

Region Tweed River, Far North Coast New South Wales

Commodity Sugar cane and cattle

Farming area 126 hectares of sugar cane, plus land for a few breeding cattle

Rainfall 1600 mm average per year



Beef

Cotton

Dairy

Grains

Grapes

Horticulture

Sheep/Wool

Sugar

Other

Contact Robert

Email rgquirk@bigpond.com

Phone 02 6677 7227



New South Wales

We have to cope with acid sulfate soils, and our solutions also help reduce greenhouse gas emissions. We laser-levelled the paddocks then limed the soil.

We decided to mound the soil and grow cane above the surface of the ground, using a controlled traffic system.

The top of the mound is the only soil we work. The fertiliser goes on there. When the watertable rises, it has to pass through the lime in the mound, and this neutralising medium seems to capture the acid and decrease nitrous oxide production. We'd like to see more research done to measure that decrease. We've been able to cut the fertiliser to about 50% of what we used to use.

I don't burn the cane; instead, I leave the trash on the ground after harvest. This along with minimum- to zero-tillage has increased our organic carbon levels from 3% to 6%.

We do four years of cane then one year of beans to break the monoculture. We get the same tonnage of cane from the four years of cane with the one-year break crop as we would with five years of cane with no breaks.

Robert Quirk

Region Lockyer Valley, Queensland

Commodity Beetroot, sweet corn, broccoli, onions, seed and grain

Farming area 500 hectares

Rainfall 773 mm average per year



Beef	Cotton	Dairy	Grains	Grapes	Horticulture	Sheep/wool	Sugar	Other
------	--------	-------	--------	--------	--------------	------------	-------	-------

Contact Linton

Email linminbrim@bigpond.com

Phone 07 5465 4151



Since 2000, we have been getting more days above 30°C, which has substantially impacted on planting times and how we manage water.

Vegetables are normally grown in winter months, but we have already moved from January planting to February planting. If we plant early, we can irrigate twice a day, which cools the crop and soil, but can be costly and increases the chance of disease.

But the most significant issue we face on our farm is water security. Over half of our land is irrigated with our own water so we are very dependent on rain constantly filling our two dams (totalling 2000 megalitres).

We have conserved water by improving our irrigation system to reduce any waste from run-off or evaporation, and upgraded from flood irrigation to lateral irrigators.

We've also invested in solar panels to generate electricity which we predict will probably take about five years to pay for itself.

Region Daringa, central Queensland

Commodity Sorghum, corn, mung beans, chickpeas, wheat and organic beef cattle

Farming area 2200 hectares for cropping, 60,000 for grazing

Rainfall 250–1500 mm per year



Beef

Cotton

Dairy

Grains

Grapes

Horticulture

Sheep/wool

Sugar

Other

Contact Colin

Email c_dunne@bigpond.com

Phone 07 4935 7145



Responsive management to seasonal conditions is important for our business. The main climate-related decisions we make are weaning times, feeding breeders, stocking rates, row-spacing and double-cropping decisions.

My main summer crops are mung beans, corn and sorghum. In winter, I grow chickpeas and wheat.

Wider row-spacing is central to moisture management in summer crops. During grain-filling time, the crops will spread their roots sideways looking for water—especially sorghum. Trials suggest that in a dry year, 1.5 metre-wide rows give significant yield benefits over rows that are only one metre wide.

As the region's climate gets warmer and frosts are not happening as much, we're probably able to get away with planting a little bit earlier, and use planting rain as in-crop rain.

Our cattle operation is fully certified organic through the United States Department of Agriculture National Organic Program.

Region Longreach, western Queensland

Commodity Beef cattle

Farming area Royston—15,800 hectares; Bandon Grove—7300 hectares

Rainfall 150–380 mm per year



Beef

Cotton

Dairy

Grains

Grapes

Horticulture

Sheep/wool

Sugar

Other

Contact Peter

Email peter@prwagri.com.au

Phone 07 4658 1512



While we want our steers to get to our target weight as quickly as possible, we don't aim to grow huge-framed cows. In drought conditions, these smaller cows tend to manage better.

Research suggests that smaller, more efficient cows also produce less methane.

At the end of the wet season we do a feed budget to take best advantage of the available feed. We look to adjust cattle numbers to suit what feed we have.

We use a program of wet-season spelling and rotational grazing. The Bureau of Meteorology's 10-day forecasts are really helpful with planning our weeks so we can respond with forethought.

We aim to maintain ground cover by making sure cattle don't overgraze our paddocks. The extra ground cover allows water to seep in and protects our soils from being washed away.

Smaller paddocks at our properties reduces the energy the cattle lose walking to water and doesn't overgraze country closest to water because there is much more even grazing pressure.

Peter Whip

Region Trebonne, north Queensland

Commodity Sugar cane

Farming area 133 hectares

Rainfall 1.5–4 metres per year



Beef	Cotton	Dairy	Grains	Grapes	Horticulture	Sheep/wool	Sugar	Other
------	--------	-------	--------	--------	--------------	------------	--------------	-------

Contact Michael

Email michael@terrain.org.au

Phone 07 4777 1361



Our big 'weather decisions' are when to plant, when and where to harvest, and the timing of fertilising.

I look at the Southern Oscillation Index and the forecast from the Herbert Cane Productivity Services.

The farm is entirely under a green cane trash blanket, which means we don't burn any of the cane or any of the leaf matter from the cane. This mulch on the ground conserves moisture, controls weed growth and puts organic matter back into the soil.

I have changed to a 1.9-metre row spacing and use controlled traffic and autosteer. In that 1.9-metre space, we plant two rows of cane. I plant on a mound that is six to eight inches high with a disc opener planter.

There's no cultivation of the soil after planting.

We are also trialling varying the rate of applied nutrients depending on the yield potential of each area of each paddock.

Across Australia there are over 28,000 grain growers nurturing the land to grow the best crop possible, to generate on-farm profit and to produce food for the nation and the world.



Australian Government
**Grains Research and
Development Corporation**

Critical to growers' continued success is access to new information, products and services made possible through ongoing RD&E funded by the Grains Research and Development Corporation (GRDC).

In 2010–11 GRDC invested over \$140 million in more than 900 projects, across 230 organisations, to deliver technology and practices to increase the profitability and productivity of the grains industry.

Like any industry that depends on natural resources, the grains industry is exposed to the environmental and economic effects of a variable and changing climate. Recognising the need for an informed and coordinated response, GRDC applies a climate change strategy to invest in RD&E:

- » to better understand how on farm management may help the grains industry to reduce greenhouse gas emissions
- » to identify options and develop technology to assist the industry to adapt to climate change and variability. A key investment in this area is improved seasonal and in-season climate forecasts.

This work is translated into awareness raising and practical resources to help grain growers respond to climate change effects.

GRDC is proud to co-invest with the Department of Agriculture, Fisheries and Forestry in the Nitrous Oxide Research Program, the Soil Carbon Research Program, and the National Adaptation and Mitigation Initiative. GRDC also co-invests with other RDCs in the Managing Climate Variability Program and proudly supports the Climate Champion Program, funding 16 grain growers to participate.

MCV Partners



Climate variability is a fact of life for Australian farmers because we live in one of the most variable climates on the planet.

Recent Bureau of Meteorology and CSIRO studies have included broad-ranging predictions such as:

- » increased risks to productivity due to an increase in extreme events
- » decline in pasture quality and growth with increased temperatures
- » reduced stream flow and quality of water supply across southern Australia
- » some crop yields benefiting from warmer conditions and higher carbon dioxide levels, but vulnerable to reduced rainfall
- » greater exposure of stock and crops to heat-related stress and disease
- » southern migration of some pests
- » likely increase in the distribution and abundance of some exotic weeds.

Climate variability, recent increases in temperature and predicted changes in rainfall patterns will potentially impact on grazing areas of Australia, with regional differences in vulnerability. Therefore research in the Managing Climate Variability Program is focused on eight-week rainfall and temperature forecasting accuracy to allow producers to make better management decisions.

Meat and Livestock Australia (MLA) assists producers to manage climate variability through new tools and management strategies, supported by research and development initiatives such as Managing Climate Variability.

The MLA proudly supports four of Australia's Climate Champion participants.



Australian Government
**Rural Industries Research and
Development Corporation**

Rural Industries Research and Development Corporation (RIRDC) is a statutory authority established by the *Primary Industries and Energy Research and Development Act 1989*.

RIRDC was established by the Australian Government to work with industry to invest in R&D that generates practical knowledge and innovation which assists rural industries to be productive, profitable and sustainable—now and into the future.

Specifically, RIRDC's mandate is to achieve results from research and development investments in three areas:

- » new and emerging industries
- » specific established rural industries
- » national rural issues.

Within the national rural issues portfolio, RIRDC has a particular interest in progressing R&D addressing climate change and variability as it relates to agriculture. This includes addressing the impacts of an increasingly variable climate and improving forecasting performance. Consideration of the impacts of an increasingly variable climate extends across all RIRDC's activities, including impacts on new and emerging rural industries and the established industries within RIRDC's portfolio.

A significant component of R&D is the extension of results to industry. RIRDC views the Climate Champion Program as a fundamentally important way in which the latest R&D results are communicated to the broader industry, and is fully supportive of its progress.

MCV Partners



Australian Government

Sugar Research and Development Corporation

The Sugar Research and Development Corporation (SRDC) works in partnership with Australian sugarcane producers and the Australian Government to foster an innovative and sustainable sugarcane industry.

The sugarcane industry spans more than 2000 kilometres of Australia's eastern coastline, from Mossman in northern Queensland to Grafton in northern New South Wales, and is strongly influenced by the impacts of weather and seasonal variation.

SRDC recognises the need for targeted investment in research and development to better understand the impact that climate variability poses for the sugarcane production regions and, as such, is a partner in the Managing Climate Variability Program.

In addition to co-funding climate related R&D, SRDC recognises that if the industry is to capitalise on the opportunities and minimise the risks associated with climate change and climate variability, every sector needs to be aware of the potential impacts.

SRDC sees the Climate Champion Program as an important communication channel to the sugarcane growing sector: it helps ensure that new climate R&D is assessed by growers for practicality and relevance, it provides an opportunity for sugarcane growers to network and share ideas with peers from other industries, and the Champion farmers become a source of information and leadership for their respective industries.

The sugar industry is proud to be represented by two Climate Champion farmers, Michael Waring and Robert Quirk.



Australian Government

Department of Agriculture, Fisheries and Forestry

Climate change poses challenges for all sectors of the Australian economy but particularly for those sectors dependent on natural resources, such as agriculture and forestry.

Australia's climate is changing and the impacts of climate change can be seen in the differences we are experiencing in rainfall, temperature and extreme weather events. Climate change will influence our actions, choices and decisions.

The Australian Government is investing \$1.7 billion over the next six years through the Securing a Clean Energy Future Plan's Land Sector Package. The investment will create new opportunities for Australian land managers to increase carbon storage on the land, reduce greenhouse gas emissions, gain an economic benefit and help protect Australia's natural environment.

The Australian Government has been investing in research on climate change and agriculture since 2008 through the Australia's Farming Future Climate Change Research Program (CCRP).

The CCRP funds research projects and on-farm demonstrations to improve opportunities for primary producers to respond to climate change and manage emissions while maintaining their productivity. Over the next six years, the new Carbon Farming Futures program—a part of the Land Sector Package—will build on and expand the findings from the CCRP.

For more information about Australian Government climate change programs for primary industries, go to www.daff.gov.au/climatechange or phone 1800 108 760.

Accolades for the program

In August 2011, the Climate Champion Program was announced as one of three finalists in the NSW Government Eureka Prize for Advancement of Climate Change Knowledge.

The program participants were recognised for their outstanding achievements in:

- » increasing understanding and positively changing attitudes about the cause, process and impacts of climate change and the need for action
- » improving skills to respond to climate change and
- » positively changing behaviour towards helping reduce the impacts of climate change.

Their results to date are impressive. The Climate Champion farmers have:

- » shared their stories in Australian media, including the Climate Kelpie website
- » presented at, held and attended field days, demonstration days, on-farm walks and tours, seminars, conferences, panels and farmer workshops
- » established links with a host of organisations to understand opportunities for Australian agriculture
- » provided feedback to researchers about climate products for farmers, research priorities and fact sheets
- » invited researchers to their farms to study their practices.



L-R: John Ive, Robyn Ive, David Cattanaach, Lynne Strong, Andrew Carmichael, Peter Holding

Praise from industry and research

This program should be applauded for its innovative approach to getting Australia's landholders to start a conversation about not only what is occurring due to climate change and climate variability in our rural industries, but what can be done about it.

**ANN PENNY, NETWORKS COORDINATOR
NATIONAL CLIMATE CHANGE ADAPTATION RESEARCH FACILITY**

I cannot applaud this activity and approach strongly enough. I would love to see a day where the program is expanded to ensure we have a suite of climate extension and communication occurring across rural Australia, so that those on the front-line of climate change are better informed and can access good support to develop their responses.

**GRAEME ANDERSON, SPECIALIST, CLIMATE CAPABILITY
VICTORIAN DEPARTMENT OF PRIMARY INDUSTRIES**

All the farmers we have contacted through the program have been very willing to share their insights regarding farming in a changing climate, and have had fascinating stories to tell and experiences to share.

**ROBBIE SEFTON
SEFTON & ASSOCIATES**



Street address

Grains Research & Development Corporation
Level 1, 40 Blackall Street, Barton ACT 2600 Australia

Mailing address

PO Box 5367, Kingston ACT 2604 Australia

Program enquiries	General enquiries	Communication enquiries
Beverley Henry Program Coordinator p: 0409 343 388 e: beverley.henry@qut.edu.au	Kylie Paulsen GRDC Communication p: (02) 6166 4500 e: k.paulsen@grdc.com.au	Sarah Cole Econnect Communication p: (07) 3846 7111 e: sarah@econnect.com.au