Cotton Research & Development Corporation

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Spotlight on Cotton R&D

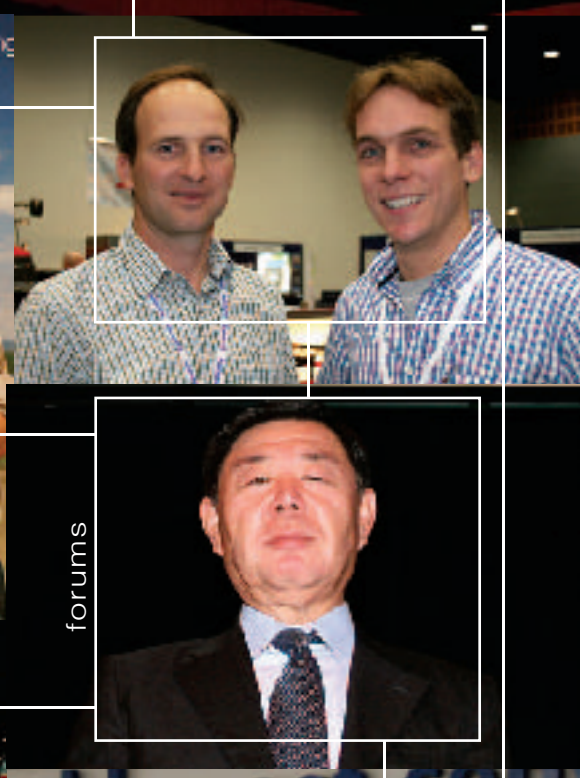
Spring 2008

Conference: an R & D Showcase

networking forums face-to-face conference seminar discussion discovery learning latest-trends

networking

conference



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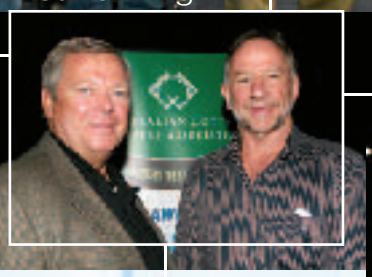

seminar

discovery

discussion

learning

face-to-face

Australian Government
Cotton Research and Development Corporation

Spring, September 2008

Spotlight is brought to you by Australia's cotton producers and the Australian Government through the publisher Cotton Research & Development Corporation (CRDC).

CRDC is a research and development partnership between the Australian cotton industry and the Australian Government.

Cotton Research and Development Corporation
ABN: 71 054 238 316

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Our vision: A globally competitive and responsible cotton industry

Our mission: Invest and provide leadership in research, innovation, knowledge creation and transfer.

Our outcome: A more sustainable, profitable and competitive cotton industry providing increased environmental, economic and social benefits to regional communities and the nation.

Corporate background

CRDC was established in 1990 under the Primary Industries and Energy Research and Development Act 1989 (PIERD Act.) which outlines its accountability to the Australian Government and to the cotton industry through the Cotton Growers' Research Association (ACGRA). CRDC is responsible to the Australian Government through the Minister for Agriculture, Fisheries and Forestry, Tony Burke MP.

CRDC is committed to fulfil its legislated charter to: Invest in and manage an extensive portfolio of research, development and extension projects to enhance the ecological, social and economic values associated with cotton production systems and to benefit cotton industry participants, regional communities and the Australian community.

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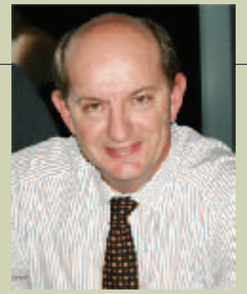
Spotlight



Bruce Finney Executive Director, CRDC

Firstly, it was wonderful to see so many of you at this year's Australian Cotton Conference.

The event provided the perfect opportunity for the industry to 'regroup' both in a physical and mental aspect and consider our future.

As a showcase for industry research, development and application, the Conference once again proved it is indeed the premier industry event.

With nearly 1000 delegates attending, and taking into consideration the amount of cotton farmed in the past two years, it is clear the thirst for information is still as great as ever.

The quality and breadth of the presentations was appreciated by all who attended.

The collaboration with Australian Cotton Shippers Association this year certainly ensured the full industry chain was represented by high profile speakers.

Participants also took the time to network, catch up with industry friends and partners in business, while also making new acquaintances and contacts.

There was a certain upbeat feeling to Conference, some would think unlikely due to the adverse effects on the industry of drought, rising input costs and unfavourable prices. This is partly due to what ACGRA Chair Ben Stephens described as "the power of pulling people together".

By pulling the industry together at the Conference, it was discovered that yes, the industry and many agricultural sectors are facing many new challenges related to climate change, drought, rising inputs and skills shortages.

More importantly, for attendees was knowledge that the industry, from the research perspective is addressing and will continue to address these issues.

However research cannot succeed without innovative growers and advisors willing to put knowledge into practice and a supply chain that enhances the efforts made by the industry to produce the best cotton in the world.

This edition of Spotlight highlights just some of the industry research, practice and issues presented at the Conference.

Also included are the latest developments in research into pressing issues such as the Resistance Management Plan, the exciting Premium Fibre Project, and ways to reduce energy use on-farm.

Finally, find out how innovative Emerald growers Scott and Alicia Dunbar are improving the Water Use Efficiency on-farm.

Wishing you all a wet and prosperous Spring.

Contributors: Editorial and photographic contributions to Spotlight are welcomed. All intending contributors should in the first instance contact the Editor.

Cover Photo: The many faces of the 14th Australian Cotton Conference, "New Beginnings: Cotton in a Climate of Change".

Further information: **?** Where this symbol appears, readers are invited to access further information from the identified source.

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Structural changes to 2008/09 season RMP

By Mary Ann Day

There are concerns that insects, particularly Helicoverpa armigera, are becoming resistant to Cry2Ab, one of the proteins contained in Bollgard II, despite stringent stewardship measures to prevent resistance from escalating.

Prior to the introduction of Bollgard II into Australia, testing by CSIRO indicated that there were unexpected background levels of resistance to Cry2Ab in Australian populations of H. armigera.

In the last 12 months researchers from CSIRO have confirmed that the frequency of resistant alleles detected in the resistance monitoring program has increased significantly, and therefore may pose a threat to the longevity of the technology in the future.

The committee responsible for putting measures into place to manage resistance to these technologies, the Transgenic and Insecticide Resistance Management Strategy committee (TIMS) is seriously looking at the situation and weighing up options for the next growing season, in the light of current research findings.

Andrew Parkes, chair of TIMS and himself a cotton farmer from Moree said ever since BT cotton was introduced in to Australia annual testing has been conducted on insects to determine whether resistance is developing.

"In the past insects have built up resistance to every conventional chemical used in the crop and we have tried to slow this down as much as possible," Mr Parkes said.

"We have always been especially concerned about Helicoverpa armigera and that one day resistance could potentially develop to Bollgard II.

"In the past we have only exposed insects on a restricted basis to conventional chemistry but Bollgard II produces the toxins continuously. This exposes the insects to the toxin 24/7 throughout the life of the crop."

"This is why the industry's Resistance Management Plan (RMP) has been so important," Mr Parkes said.

Bollgard II cotton contains two insecticidal genes, Cry1Ac and Cry2Ab. It appears that resistance is developing to one component of the technology- Cry2Ab. This is because as the season progresses the Cry1Ac expression declines leaving Cry2Ab as the only effective insecticidal protein in the crop.

Because some H. armigera already carry a gene that confers a level of resistance to Cry2Ab, exposing a population to this single protein selects for those individuals carrying the gene conferring resistance, could contribute to a shift in resistance levels.

"The TIMS Committee is now considering the options we have available to us. We rely heavily on the Bollgard II technology as it has been proven to be a very robust product and comprises over 80 per cent of the varietal make up of the industry.

"We are hopeful that as a result of increased awareness and compliance, the resistance level decreases between this year and next year. We need to give growers the opportunity to stem the trend of resistance if we can." - Andrew Parkes

"Bollgard II cotton was introduced into Australia in 2004, and therefore the change in the Cry2Ab resistance level has occurred after only four years.

"We have always known that the natural population has shown a level of background resistance, even before the introduction of Bollgard II – it's now showing that it is increasing at a significant rate."

Determining what to do next is complicated and the TIMS committee must consider thoroughly the implications of any decision it makes.

"We are fortunate that we have a number of world recognised experts that comprise our committees and we will be relying heavily on the advice they provide," Mr Parkes said.

"In addition the regulatory authorities and in particular the APVMA needs to approve any resistance management plan developed by the TIMS committee. Unfortunately this process can take up to six months.

"Due to this restraint the TIMS Committee have agreed to make a few structural changes to the 08/09 Resistance Management Plan for the 08/09 cotton season, but have not yet attempted to implement any resistance mitigation strategies within the plan for Cry2Ab.

"Our data has only been finalised by our researchers in the last six weeks, so we have taken the approach of little structural change.

"At the same time, however, we will be endeavouring to highlight that we have concerns about the ongoing resistance to Cry2Ab and we need everybody to work to as high a degree of compliance as they can."

Mr Parkes explained that there are three main structures in place that help manage the build up of resistance:

- Restrict the planting of Bollgard II cotton within a "calendar window", so no one will end up planting outside that window, which restricts the

• continued page 4

TIMS chair Andrew Parkes.

Dr Ian Taylor, CRDC Program Manager Farming Systems Investment .

Resistance management: TIMS and IRMS

* TIMS, which is convened by ACGRA, was formed in 1995 to better manage the existing process of formulating the annual Insecticide Resistance Management Strategy (IRMS) and develop industry supported Resistance Management Plans for the 'new' BT cotton INGARD®. For over 10 years the TIMS committee has supported the development and annual review of the Cotton IRMS, Bollgard II® Resistance Management Plan (RMP), Roundup Ready® Crop Management Plan (CMP) and is currently contributing to the Roundup Ready FLEX® CMP and the Liberty Link® Cotton and Liberty® 150 Herbicide CMP.

* The TIMS Committee is made up of members of organisations with a stake in resistance management.

Pupae busting is a vital element in controlling resistance.

• **from page 3**

time that insect generations are exposed to the toxin, particularly at the back end of the season if people plant too late.

- Every grower has to grow a refuge crop alongside their Bollgard II cotton crop, which is there to provide as many "susceptible helicoverpa moths as possible. This dilutes the overall moth population which have been exposed to the toxin.
- Pupae busting at the end of the year- which exposes the pupae to natural predators and is a cultural form of stopping resistance development.

"In the meantime there will be a number of industry meetings and discussions to look at options for mitigating resistance," he said.

"We have to plan what we will do this time next year now, due to the regulatory time frames that we have to work to. If we have another big shift towards resistance, we need to have a plan that is ready to go.

Mr Parkes sees the situation in three scenarios

"The worst case scenario is that resistance continues to develop at the same or increased pace. We need to plan around that and what we can put in place in case this does occur," he said.

"The second is that the resistance has not changed all that much-and we will need to consider what we do about that.

"And lastly, we are hopeful that as a result of increased awareness and compliance, the resistance level decreases between this year and next year. We need to give growers the opportunity to stem the trend of resistance if we can.

"If we can't then we may need to make more significant changes. There are some wide ranging implications for all stake holders in the cotton industry and we need to take into consideration the ramifications of changes to the Resistance Management Plan not only for growers but seed distributors, chemical manufacturers, etc"

Dr Ian Taylor, CRDC Program Manager, Farming Systems Investment, said that while so far no significant changes to the RMP have been made, the TIMS Committee will meet to discuss the position in February 2009 to review the latest resistance data.

In the meantime the CRDC will increase funding to the resistance monitoring program to sample the insect population more intensely this year, and have a clearer picture.

Dr Taylor outlined some of the additional options open to the Committee.

"These alternative strategies could include increasing the refuge area; using mandatory sprays for resistance management and introduction of the last alternative, a cap on Bollgard II -restricting the amount of Bollgard available to possibly 70-80 percent," Dr Taylor said.

"We also have a bio-pesticide which we may be able to use. All actions and solutions will be looked at in depth."

? More information
TIMS Chairman Andrew Parkes,
02 67533000.

"Research and extension has underpinned the cotton industry's progress and prosperity over the last 30 years and will be crucial to the future success of the industry"

2008 Australian Cotton Industry Awards winners: (left to right) Glenn Fresser, Andrew Parkes, Hamish Millar, René van der Sluijs (represented by colleague Stuart Gordon on the night), and Andrew Watson.

Shining stars out at gala dinner

The industry's recognised five of its highest achievers at the gala 2008 Australian Cotton Industry Awards dinner, held on August 14 at the Gold Coast Convention Centre.

The leaders in the uptake, creation and extension of research and innovation were presented their awards in front of more than 600 industry peers.

The dinner showcases the finest researchers, growers and young achievers.

Hamish Millar, "Tandawanna" Emerald was the Young Achiever of the Year, Researcher of the Year was René van der Sluijs, CSIRO Textile and Fibre Technology/Cotton Catchment Communities CRC, Grower of the Year was Andrew Watson, "Brigadoon" Boggabri, Innovative Grower of the Year Award went to Andrew Parkes "Keytah" Moree and the Service to Industry Award went to Glenn Fresser of Mayfield Farming Company, Dalby.

Hamish manages irrigated and rain-grown crops and believes research and extension has underpinned the cotton industry's progress and prosperity over the last 30 years and will be crucial to the future success of the industry.

Researcher of the Year René van der Sluijs is regarded as the "go-to" person for the post-harvest sector as a technical expert on the characteristics and benefits of Australian cotton.

One of his key contributions was organisation of the "Cotton Field to Fabric" course.

Andrew Watson is the second generation operating farming enterprises near Boggabri.

The focus is on profitable farming within the constraints of responsible environmental management.

Andrew is well known for his excellent farm management practices, especially for extensive bush regeneration he has undertaken on his properties.

Andrew Parkes over 10 years at "Keytah", has enhanced production and reduced costs hence his award as Innovative Grower of the Year.

His innovations have seen production increase from an average of below seven bales/ha to above 12.5 while reducing the crop water requirement. Water use efficiency (WUE) has increased by 60 percent, with many fields now starting to push the 15 bale per hectare barrier.

Glenn Fresser has owned and operated his successful cotton and grains production business on the Darling Downs since 1981.

He is past Chairman of the ACGRA, and a director of the CRDC and cotton industry representative to Qld Minister for Primary Industries.

His farming approach and an interest in adopting new technology and farming systems, as demonstrated by his selection as a finalist in this year's Innovative Grower category.

Cotton's 50-year research milestone

The Australian Cotton Research Institute, ACRI, will celebrate its 50th anniversary with a special day at the Institute on Thursday, September 18.

No single person can be singled out as the catalyst for the beginnings of the modern Australian cotton industry. However, a key figure was arguably cotton scientist Nick Derera.

Mr Derera, a former Director of the Hungarian Cotton Research Unit, was sent to the Narrabri Research Station, Myall Vale, to work on the development of a cotton variety suitable for the Namoi Valley.

His scientific work - and enthusiastic promotion locally and at government levels of the possibilities for a cotton industry - was a key factor at a critical time. He was closely involved with the growing of the first crops in the Namoi Valley and with pioneers of the industry Paul Kahl and Frank Hadley.

The ACRI is arguably Australia's most significant single agricultural research centre.

Over 50 years, the Institute has evolved through phases as the Department of Agriculture Experimental station, to the Department of Agriculture Research institute and ultimately the ACRI.

The 50th anniversary will be the occasion for a gathering of research, industry and community people from the past five decades and the present.

One of the key figures is (now) Professor Nick Derera, whose journey to Myall Vale was not a simple one, as he recalls.

His involvement in the abortive attempt to establish a viable cotton growing industry in central Europe drew the attention of his superiors in the Department of Agriculture and found himself at the Department as temporary Research Agronomist - Plant Breeder.

His initial duties were to find where cotton could be grown in NSW and how to utilise the Keepit Dam water in the best possible way.

After three months intensive study of the environmental data he recommended that the best utilisation of the Keepit Dam water was to produce cotton under an intensive irrigated cropping system in the Namoi Valley.

"Consequently to my report I was transferred to Narrabri to the Agricultural Research Station with the task to commence a cotton breeding program and demonstrate the potential of cotton growing in the Narrabri-Wee Waa region," he said.

"After abandoning old methods that were tried to grow cotton in the area and establishing up-to-date, proper production practices, I demonstrated the feasibility of a viable cotton industry in the region."

Initially the Department, or more precisely the Minister was not very happy with his findings.

"There were established irrigation areas in the south and they were longing for a cash crop," the Professor said.

"The Minister was from the south and he wanted cotton in his electorate.

"I knew from my previous study of the environmental data that the southern attempt to grow cotton there would be just another 'political' crop as it was in Hungary.

"So I convinced a number of Narrabri businessmen that it was in their interest to promote the idea of growing cotton in the Namoi Valley."

Support for Mr Derera from the business community and importantly Paul Kahl and Frank Hadley, helped Nick Derera carry out his work at Myall Vale which clearly demonstrated that cotton could be a highly successful crop, and the rest, as they say, is history.

Nick Derera, left, with Experimental Farm manager Tom Lawler in a trial plot of Sea Island cotton at Myall Vale, probably about 1959.

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Research & Development Showcase

ACGRA and ACSA Chairs Ben Stephens and Pete Johnson were delighted with the turnout and positivity of attendees at this year's Conference title "New Beginnings: Cotton in a Climate of Change".

Optimism the winner at industry's R&D showcase

Growers, researchers, exhibitors, presenters and organizers responded positively to the 'New Beginnings: Cotton in a Climate of Change' theme of the 14th Australian Cotton Conference at the Gold Coast.

The 14th industry Conference was convened jointly by the Australian Cotton Growers Research Association (ACGRA) and Australian Cotton Shippers Association (ACSA). Previously the associations held individual Conferences and in 2008 the merger proved more than successful.

890 participants converged on the Gold Coast Convention Centre for the three-day event. Industry leaders reported broad delight with attendances on all three days and despite times of rapid change in the pressures on agriculture, delegates were buoyed by the Conference event and its broad program of leading speakers and presenters.

ACGRA and ACSA chairs and joint Conference convenors, Ben Stephens and Pete Johnson emerged strongly positive in the light of high levels of optimism generated over the Conference.

"The Conference showed that even during the drought we have got better at what we do and we continue to learn from each other. You cannot help but feel positive about the future of the cotton industry in Australia," said ACGRA chair Ben Stephens.

"There was a real feeling of wanting to get on with the job as soon as we all receive some much needed rain.

"The power of pulling the industry together during these tougher times and talking about how we can position ourselves for the future cannot be underestimated.

"There were some good messages to delivered and I believe that they were well received. The cotton industry is still here, still proactive, still innovating and willing to adapt to change.

"It was a great chance for those supporters of the industry to show case themselves and to provide recognition for that support," he said.

"Feedback from participants suggests the coming together of the whole industry was a real highlight. Delegates enjoyed the flavour that the post farm-gate sector brought to the event and delegates generally thought that the Conference was very well supported and had a great suite of topics that catered to everyone's needs.

ACSA's Pete Johnson said the merging of resources between ACGRA and ACSA helped form a more rounded program - providing the opportunity for discussion and understanding throughout the supply chain as well as cross pollination of ideas.

"I have heard only positives from attendees," Mr Johnson said.

"A strong event like this has helped highlight the fact that tough conditions often create opportunity, to have so many people showing such faith in the industry despite the challenges of the last 12 months really tells the story."

The organising committee of Tracey Byrne Morrison, Andrew Greste, Debbie McVeigh, Paul McVeigh, Cleave Rogan, Guy Roth, Arthur Spellson and David Swallow knew this Conference was going to be a challenge for the industry as a whole.

During preparation time they had even considered moving it to a rural location.

"We seriously considered taking it to a regional area to try and contain costs and run an event with a much lower profile," Mr Stephens said.

But after canvassing the industry with this suggestion we got an overwhelming response to keep it at the Gold Coast and just make it work!

Organisers estimate that more than 30 percent of the people there were growers.

Mr Stephens said he thought that well over half of the industry's production area participated in the Conference which is great reflection of the resilience and willingness of the industry to adapt and continue to take on the challenges that impact on our day to day businesses.

ACSA Chair,Pete Johnson agrees. "There was a very strong international contingent which demonstrates the interest and faith our end users continue to have in the Australian fibre," he said.

"This coupled with strong grower participation - and a general favourable price outlook holds the industry in very good stead if seasonal conditions allow.

"As we heard at the Conference, we have outstanding quality and yield traits, we have efficient supply chains and the transparency of our marketing systems is the envy of other agricultural industries."

Both the chairs thank everyone who participated in the Conference for making it the success that it was.

"Don't forget we will be back to do it all again in 2010, hopefully with full dams and many more new innovative ideas to take us forward again," Mr Stephens said.

A highlight of the Conference was the chance for delegates to network with people from all links in the industry chain, from field to fashion, including international visitors. Takashi Shimazaki - a director and manager of the cotton trading and other textile businesses of Toyoshima, Japan's largest cotton trader, which handles 10 to 15 percent of the Australian crop in any year. Mr Shimazaki enjoyed an interesting discussion with North Queensland cotton growers Jennifer and Andrew Keeley of Ayr, Queensland Cotton's John Robinson, Barry Braden of Ag N Vet Theodore and Bob Dall' Alba, Chief Marketing Officer, Queensland Cotton.

Free day makes promising debut

The Department of Agriculture, Forestry and Fisheries (DAFF) engaged closely with the cotton industry by investing in the Conference to ensure best practice in water management became a key theme for Day 3 of the Conference. Cotton growers and their staff participated strongly in series of specially created sessions themed, 'Growing cotton's future: practical solutions for managing your water'.

The timely delivery of this information was appreciated by growers, many who made the trip just for the day, bringing their staff along.

Highlights were US speaker Dr John Purcell, Monsanto's cotton technology lead based in St Louis. He fielded questions about the future of GM cotton and the release of Bollgard III. Joining him were industry researchers Nilcola Cottee, Dr James Neilsen and Stephen Yeates. They revealed new techniques for selecting cotton types for hotter temperatures and irrigation scheduling and productivity during drought.

Irrigators Roger Commins from Whitton and Andrew Keeley who is growing cotton near Ayr shared their experiences with taking cotton into new regions, north and south.

The afternoon consisted of a series of hands-on sessions, where small groups gathered to talk to the speakers and extension staff on a range of issues from human resources to carbon emissions.

The event was rounded off with 2008 Cotton Industry Awards dinner, organised by the Awards Taskforce.

Young innovators to service to industry awards were given at the gala event.

Broad program excites

A diverse group of presenters satisfied delegates from many backgrounds. Researchers, international guests and industry leaders provided presentations covering the many topical industry favourites in addition to topics of broader interest to agriculture more generally. The ever-present topic of climate change touched most presentations and reflected how future climates are ready to shape how farming is done. Many discussed how industry and farmers can prepare to adapt and how embracing emissions trading is set to be a set piece in tomorrow's farming scene.

Science commentator and past agricultural journalist Julian Cribb spoke about the global food crisis, while progressive cotton farmers shared their ideas on preparing cotton farms now toward 2020.

CRDC Chair, Mike Logan outlined how a year of engagement across industry had allowed CRDC to forge a forward-looking Strategic R&D Plan designed to address immediate and long-term industry challenges and through this, invest industry and public R&D funds to deliver a 'sustainable competitive advantage' for the Australian cotton industry.

Day 2 delegates heard it straight from the horse's mouth when the likes of Adam Ford from The ICE (Inter-Continental Exchange - formerly New York Board of of Trade) spoke about what is in store in the volatile world of cotton futures. Adam Ford was well-backed by a list of speakers forming the who's who of trading and markets, including ANZ Deputy Chief Economist Tony Pearson, Rob Imray of FarMarCo, Ed Jernigan Managing Director, FC Stone Asia and General Manager and Director of Central Textile Hong Kong's Leo Yung.

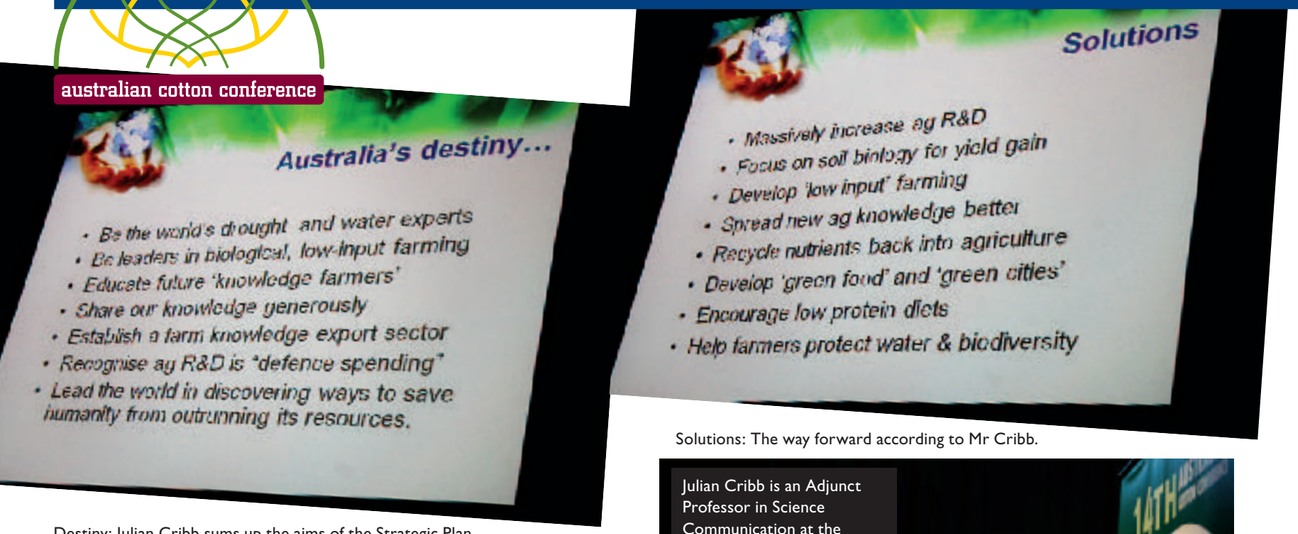
Research leaders in entomology, weeds resistance, disease and crop protection shared the latest information on how the industry is placed to deal with current and future challenges.

They included Cotton CRC chief scientist Peter Gregg and research scientist Dr Sharon Downes, whose research as part of the CSO entomology team at ACRI monitoring the evolution of resistance to Helicoverpa to BT Cotton.

Agribusiness was well represented. Rob Hall, General Manager of Bayer CropScience's bioscience and CSD's senior plant pathologist Dr Stephen Allen embraced the outlook for crop protection. Of particular interest from both was information on how the new GM varieties were withstanding resistance, and the latest breakthroughs in disease management.

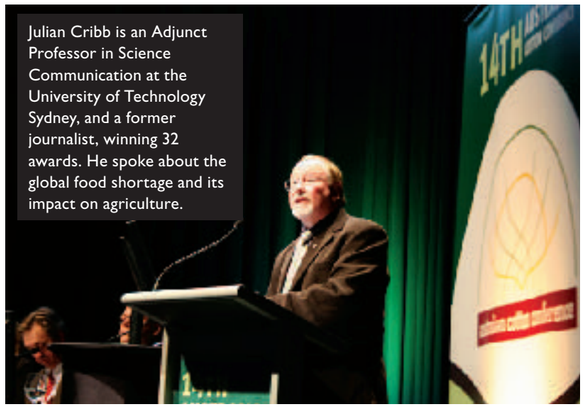
Advisors, growers and researchers also shared their experiences using novel ideas for nutrition, irrigation and crop rotations, which ranged from the use of organic fertilisers to using vetch in rotations.

australian cotton conference



Destiny: Julian Cribb sums up the aims of the Strategic Plan.

Solutions: The way forward according to Mr Cribb.



Julian Cribb is an Adjunct Professor in Science Communication at the University of Technology Sydney, and a former journalist, winning 32 awards. He spoke about the global food shortage and its impact on agriculture.

Sustainable and competitive

Industry strives for its new advantage

The 2008 Australian Cotton Conference heard how the Cotton Research and Development Corporation's (CRDC) Strategic R&D Plan 2008 – 2013 would focus on the industry's "quest for a sustainable, competitive advantage".

Chair Mike Logan introduced this new theme and focus in his opening address. He described how the cotton industry's showcase event of research and development, the Australian Cotton Conference, had embraced this new thinking in its Conference theme - New Beginnings: Cotton in a Climate of Change.

His address worked these themes in the context of industry preparing in advance for its future challenges. He said focused research, development, and information sharing are vital to ensure the Australian industry is positioned to maintain and improve its sustainable and competitive a dvantage.

Measures to improve our advantage in the face of future challenges became a core theme that ran through many speakers' presentations and Conference activities.

Delegates heard that to maintain our competitive advantage, farmers would find and adopt new technologies. The whole industry is learning about adapting complex farming systems and mitigating the effects of climate change, while at the same time better understanding the needs, wants and trends dictated by consumers.

CRDC's Strategic R&D Plan was described as benefitting from intensive input from industry and external expertise. In it, three core investment areas emerged. These are investing in R&D to discover new value for Australian cotton throughout the Value Chain; discovery of adaptive and integrated farming systems; and investing in the capacity and innovation of the industry.

CRDC chair Mike Logan said applying research to meet challenges is something the Australian Cotton Industry has done successfully for 40 years.

"The early challenges of farming systems are still relevant to our research today," he said.

"Developing new varieties was once a new research challenge, but is now an accepted part of industry research operations.

"Similarly with insects, disease, nutrition and how we interact with the natural environment are all part of ongoing research efforts."

"It was really pleasing to hear delegates talk about the relevance of the Conference program to them and the positivity generated by what they heard about the ways the industry is addressing future challenges," said CRDC Executive Director Bruce Finney.

"It affirms the new Strategic Plan is well focused, as it has captured the demands of growers and industry for areas of research that are most pressing to the industry now and in the long term."

Delegates heard from post farm gate sectors that world textile trends, needs and wants are changing and how Australia can improve its competitive advantage and meet the trends toward eco-friendly and premium fibre demand.

Leaders in climate research told eager listeners that we certainly are living in a changing climate and must turn the focus to finding ways to mitigate and adapt to the effects of change.

Coupled with the increasing global demand for food and pressure on land and water in growing bio-fuels, Australian growers need a farming system that is flexible in producing a wide range of complementary crops.

Ian Plowman, in his entertaining and inspiring presentation and hands-on sessions, talked about steps the industry can take to promote innovation through people.

The industry's new online resources point to a sustainable competitive advantage.

Through the 2008 Conference, the industry has invested in new knowledge systems. The key element of this new investment is the Conference website: australiancotton conference.com.au

The new website was used extensively before the event to promote the program to potential delegates. E-Newsletters were extensively used to promote the event and given the final attendances were ahead of organisers expectations. By the end of the Conference, more than 25,000 hits onto the site were recorded.

The industry's Conference has emerged from a big event every two years to becoming a central plank of knowledge for all sectors. The Conference website will continue to promote the showcase of R&D between events with delegates being able to log in and find papers, videos and presentations from the 2008 event – paving the way to new levels of innovation and adoption of the technologies that will keep the industry sustainable and competitive.

Identifying immature fibres

CSIRO Project Leader in Cotton Research, Dr Stuart Gordon and Hy Hwang of BSE Electronics at the launch of SiroMat at the Conference. SiroMat is revolutionary technology to measure fibre maturity and immature fibre content, which can cause neps and dyeing problems.

IMMATURE FIBRE

MATURE FIBRE

CSIRO launced SiroMat™, the only instrument in existence - that measures cotton fibre maturity directly, at the 14th Australian Cotton Conference.

"SiroMat™ is unique, providing a direct measurement of cotton fibre maturity and the percent of immature fibres in a cotton sample," explains Dr Stuart Gordon, a Project Leader in the Cotton Research Unit at CSIRO Materials Science and Engineering.

SiroMat™ is funded by CSIRO and Australian cotton growers through CRDC and CCC CRC and is nearly ready for commercialisation.

Worldwide, the cotton industry is looking for more accurate methods of measuring immature fibre content, especially in countries where the crop is machine-harvested. Machine-harvested cotton often has higher immature fibre content.

"Immature fibres are a significant problem," says Dr Gordon.

"They are more likely to form entanglements, known in the industry as neps, and take up dyes differently from mature fibres, leading to uneven finishes and dull colours in fabric.

"SiroMat™ yields valuable statistical information about the levels of maturity that we can't get from any other method, allowing us to judge more precisely how serious the immature fibre content is, and how the cotton will spin."

SiroMat™ is an optical technique for measuring fibre maturity. It uses a high-resolution colour digital camera and innovative colour image analysis to measure the relative maturity of cotton fibres presented under a polarized light microscope.

"The image analysis system used in SiroMat™ is also able to provide a measurement of fibre ribbon width," Dr Gordon says.

Delegates saw this new technology at the Cotton Catchment Communities (CCC) CRC stand where the internationally successful OFDA technology - a wool fibre diameter test instrument - was also on show to demonstrate similarities with SiroMat™ in terms of speed and practicality and to emphasise the industry readiness of SiroMat™.

BSC Electronics, an Australian company, manufactures the OFDA instrument and is one of three manufacturing companies that have expressed an interest in commercialising SiroMat™.

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australian cotton conference

wwww.australiancottonconference.com.au

Research & Development Showcase

australian cotton conference

Landmark staff get the run down on the system from co-creator Brendan Fox at the 14th Australian Cotton Conference.

Conference launches knowledge centre

The cotton industry is the first to come on board with a world-first agricultural information search and delivery system launched at the Australian Cotton Conference at the Gold Coast this month and sponsored through the Cotton Research and Development Corporation and Landmark.

FarmPlus is a world first on-line knowledge centre developed in Australia to benefit Australian farmers by providing streamlined access to our agricultural industry research.

The system is unique as it combines a search engine facility and content management service linked to key information providers, which will be provided to the Australian agricultural advisors' network.

The benefit for Australian agriculture is that advisors can then work direct with farmers using cutting edge Australian R&D findings to access practical strategies to apply and adapt on their own farms, improving sustainability and profitability.

The research company Horticulture Australia Limited has also recognised and adopted FarmPlus as an innovative opportunity, in a time when there has been pressure on research and development organizations to increase the speed of information delivery.

Others in the R&D arena are presently looking very closely at adopting this innovation too.

It is planned for the system to cover all aspects of primary industry associated with agriculture. This will create one 'entry point' for agribusiness advisers and key farmer clients (and scientists) where accessing information on all elements of managing the contemporary farm business operation can be obtained.

CRDC Communication Manager Rohan Boehm described the site as a "one-stop information shop - once you have this system you don't need to go anywhere else".

He said FarmPlus had aggregated information from more than 300 agricultural sites and now Australian cotton producers would be able to access research and developments quickly and easily.

"The way the indexing is customized is to search only relevant parts of a site correlating with what the user is looking for," Mr Boehm said.

> The site is different from other types of agricultural websites, as it is not a news or sales site – it is focused on facilitiating access to credible information that helps them run their business better.

"The benefit for growers is for the first time their agribusiness advisor can get access to a one stop shop - or entry point - into cotton industry research and development."

Knowledge strategist Gordon Stone, of the agribusiness Corporate Development Institute, works with research and development organizations and agribusiness to facilitate information delivery from scientists to farmers. He says the FarmPlus system is a revelation for the agricultural industry, as to source research information in the past involved 'meandering' through many different websites, publications, field days, brochures and technical manuals, to name a few.

"Growers are time poor so they want someone - that is their trusted agribusiness advisor - to find information, make sense of it, explain its relevant to their business - and assist in making key decisions," Mr Stone said.

"Advisors are also time poor - they and farmers need one place to go to source specific information without having to wade through reams of both relevant and irrelevant literature.

"They often know the information is 'somewhere' but first they have to find 'the somewhere' which can take up far too much valuable time - thankfully FarmPlus takes the guesswork and searching element away."

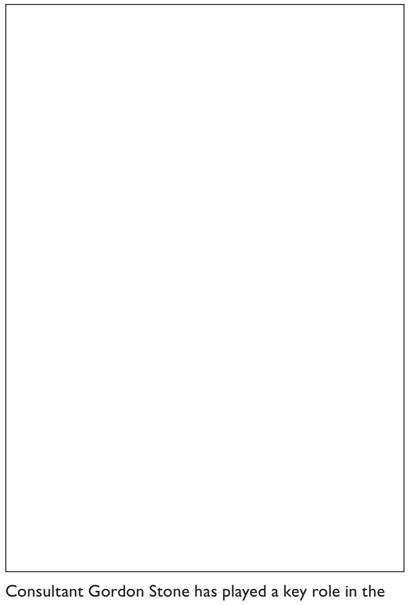
The site is different from other types of agricultural websites, as it is not a news or sales site - it is focused on facilitating access to credible information that helps them run their business better.

"The number one issue in agricultural sustainability and profitability is access to credible and relevant information," Mr Stone said.

"This is why FarmPlus is so innovative because this part of the chain (between information production by researchers and use by growers via advisers) has never been linked before."

FarmPlus is an interactive site so preferences and information are customized to suit the user and will engage researchers and advisors through on-line forums and chatrooms.

Original research, reports, outcomes and developments from research can also be accessed.



Consultant Gordon Stone has played a key role in the development of Knowledge Central for the cotton industry by demonstrating the opportunity for delivery of industry knowledge through agribusiness.

Co-creator Adrian Davis said the system had received broad acceptance and support from other information providers at the Australian Cotton Conference, including educational institutions, schools, individual researchers and service providers.

"This system will change the world of agricultural information as we know it - it is breakthrough knowledge for a breakthrough industry," he said.

"Suppliers also felt it would be an ideal conduit to go straight to the farmer with updated information on new products, changes in existing products and other vital information that needs to get to farmers quickly" he said.

FarmPlus will be accessed after the official launch in the next few months through the national agribusiness company Landmark.

Landmark National Farm Services Manager Bruce Cairns said that FarmPlus will provide Landmark staff with an improved level of access to information.

"It staggers me how much agricultural production and natural resource management research information is available but how hard it is to access," Mr Cairns said.

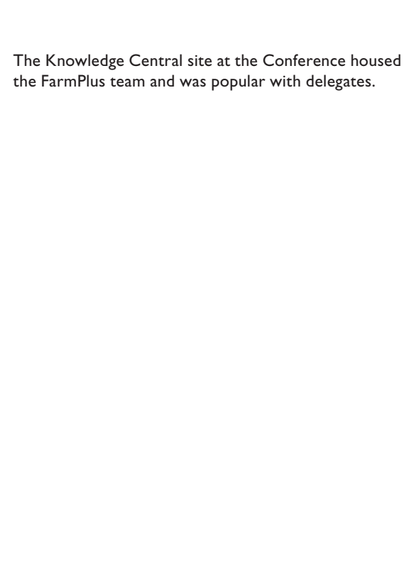
"As the demographics of agriculture change - there are lot more information-seeking farmers and more pressure for advisers to be well informed.

"Farmers are turning to our agronomists and animal production specialists for this information especially with the gradual decline in advisory services by government.

"We find ourselves in a situation where we are providing a lot more advice in terms of whole farm planning, issues of sustainability, water use efficiency, cropping systems and alternate farming methods.

"With research and information now available in such an accessible way, it improves our ability to be more informed, allowing us to provide greater value to clients.

"Importantly, it also stops the situation of irrelevant information overload."



The Knowledge Central site at the Conference housed the FarmPlus team and was popular with delegates.

Paperless Conference

In line with the theme, "New Beginnings: Cotton in a Climate of Change" the Australian Cotton Conference this year went on-line, with the creation of a website and a 'paperless conference'.

The website australiancottonconference.com.au was the point of access for all information regarding the conference, news, speaker and sponsor profiles and registration.

At the Conference, delegates were provided with an ANZ flash drive, which gave them direct access to the website and also the conference proceedings, which were uploaded daily during the event, negating the need for reams of paper and brochures.

Presentations were also made available for download onto the flash drives on computers at the Knowledge Central/FarmPlus stand, CRDC and some exhibitors' stands.

Delegates are reminded that papers, powerpoints and video of most presentations are available on the website.

To access the site, either insert the ANZ flash drive or go to the website above, enter you login name and password (both are the same - the number on the rear of the lanyard received on registration).

On the left hand side of the site are the Day 1,2 and 3 boxes, just click on the arrow to the right of the boxes to access presentations.

australian cotton conference

Leo Yung, General Manager and Director, Central Textiles, Hong Kong enlightened the delegates as he defined current world textile and garment trends, must-have knowledge for the Australian crop if we want to continue to satisfy the needs of our customers abroad.

A changing world textile market

In order to retain its competitive advantage, the Australian cotton industry must be aware of emerging world trends in apparel and the needs of spinners and textile manufacturers.

Leo Yung of Central Textiles Ltd in Hong Kong said there had been fundamental changes in the global textile and apparel industry in recent years.

The globalization of the industry, with fewer trading barriers and the migration of textile production bases to the developing nations has seen the annual cotton consumption rise 14.5 percent in three years.

This equates to (up to the 2007 crop) an increased consumption of 15.7 million bales per year.

Over 70 percent of cotton is consumed in Asian countries, more than half (42 percent) by China.

Mr Yung said cheap imports from developing countries have enabled garment prices to cling to their usual levels and has suppressed prices in every step of the supply chain.

"With the rapid expansion in capital investment in this industry in many developing countries, the oversupply situation is becoming increasingly apparent and has started to lead to concerns on the earnings and survival of many textile mills in Asia over the last two years," he said.

"In China we have seen the growth of some super large size textile mills, which are exerting further pressure to the market by being more cost effective."

He said that in addition to this large scale retailers such as Wal-Mart had developed distribution channels in many parts of the world and would "no doubt have enormous negotiation power to give prices the squeeze".

These situations together have made the price competition more severe than ever.

Positive news is that there is a trend of partnership and strategic alliance being formed along the supply chain.

"These co-operating parties in the supply chain may enjoy exclusive marketing channels, joint product development programs and joint effort to market the end product," Mr Yung said.

"Some raw material suppliers work as partners with selected brands and retailers, along with the textile mills and all these attempts are making marketing effort more effective and likely to succeed with the joint effort along the supply chain."

Mr Yung said there are four themes in apparel trends.

1 Comfort - People dress casually, with light weight and comfortable hand-feel fabrics with stretch are in demand.

2 Well Being - People are looking for more added value in their apparel, for example now we have moisture management to keep the body dry, with a finishing technology that can take moisture from the back side of the cotton garment to the surface side.

3 Easy care - Wrinkle free cotton garments are popular. There is a trend today with man-made fibre garments that can be dried fast and do not need ironing.

4 Environmental protection - Has started to focus for more consumers and retailers than ever before. So far the number of garment sold under this theme has been limited. Mr Yung says sustainability can come in the form of raw materials such as organic, recycled cotton and polyester material, the use of environmentally friendly dyestuff chemicals. Some organisations (such as Cotton Australia here with BMP Cotton) are working on a certification program and marketing labels to be attached to the garments.

Changes in spinning technology

Changes in spinning technology will see a bigger demand for stronger cotton fibre with longer staple, and less neps.

Compact spinning is modified from ring spinning.

The yarn has fewer hairs and thus the fabric looks cleaner and more solid in colour.

Mr Yung said compact yarn is seen as a premium type of ring spun yarn, and with the growing popularity of ring-spun yarn, the spinning industry will see a bigger demand in cotton with qualities to produce compact yarn. (See article on pages 24-25 on advancements in Australia's premium fibre project.)

Four themes in apparel trends.

1 **Comfort** - People dress casually
2 **Well Being** - People are looking for more added value in their apparel.
3 **Easy care** - Wrinkle free cotton garments are popular.
4 **Environmental protection** - Has started to focus for more consumers and retailers than ever before.

How we're keeping ahead

The world trends are for softer, stronger fibre with an eco-friendly tag.

The Australian cotton industry is responding to the changing world textile market through many avenues and industry associations.

Through BMP certification of our product, research into new varieties with desirable traits and sharing knowledge along the production chain to ensure we are producing what spinners desire, the industry is in good stead to meet future demands and trends.

In particular the industry is well placed due to the production and promotion of BMP branded cotton, breeding of premium fibre varieties, promoting awareness of the needs of end users through the Field to Fabric Course and the development of new technology to analyse fibre such as Siromat and Cottscan.

In June 2007 the Australian cotton industry, led by researcher Allan Williams completed the "EMS (Environmental Management Systems) Pathways Program Project: Enhancing the cotton industry's BMP (Best Management Practice) Program to improve adoption".

The CRDC project was funded through the Australian Government's Pathways to Industry EMS Program which was supported by the Natural Heritage Trust.

It investigated if and how the cotton industry's adoption of environmental management systems (through BMP) could lead to increased awareness of the environmental credentials of Australian cotton, and ultimately increased market value.

In 2006, under the auspices of the EMS Pathway's project, 100% Australian 'BMP certified' cotton was used to create garments sold in the Japanese department store, Izumiya, under the store brand "Good - i". The promotion was based around the Australian and sustainability attributes of the cotton.

BMP shipments of Australian cotton have been ongoing since, with several brand owners selling goods tagged as Australian BMP Cotton.

A delegation from Izumiya also attended this year's conference to catch up with their industry partners in Australia.

Delegates at this year's conference had the opportunity to view and take home some of the BMP "Good-I" garments.

Throughout the life of the EMS Pathways project ACSA and Cotton Australia supported and co-funded a parallel project to investigate branding issues.

The idea of highlighting the differentiation point of environmentally sustainable Australian BMP Cotton has been in the pipeline since the emergence of international brands like 'Pure Brazil Cotton' and other.

ACSA Chair Pete Johnson 750,000 Australian BMP Cotton garments were sold in Japan last year, with the aim to break the million-mark.

Mr Johnson met with the Izumiya contingent at the Conference and said they are definitely positive about the product.

"The challenge is tapping into what Japanese consumers want and marketing directly to them," he said.

"Izumiya have indicated they would be happy to help with this and also to help us develop more retail partners, as with more points of sale comes greater consumer recognition.

Part of the plan to expand on the BMP market is for ACSA and Cotton Australia to liaise with domestic brand owners to create local end user demand and consumer awareness.

"Our challenge is to grow the demand," Mr Johnson said.

According to CRDC Research and Extension General Manager Bruce Pyke, the EMS Pathways project has helped the industry to concentrate on quality.

"In some ways, the project has uncovered that there is generally more interest in quality than in environmental stewardship."

"Industry adoption of BMP can assist in producing the right quality. It can help focus on efficiency and give farmers 'more strings to their bow'. In the end, I believe it will serve to keep us in certain markets."

Inspecting some of the Japanese Australian BMP Cotton garments at the Conference was Cotton Australia's BMP Program Manager Chaseley Ross.

ACSA Chair Pete Johnson says greater consumer recognition of Australian BMP Cotton products is an important step in growing the market.

Cotton's move south in good hands

Whitton farmer Roger Commins told the delegation that varying farming systems due to water becoming a limited resource would be a real challenge for the industry. "However, on a global scale, countries number one priority will be producing grain to feed their people so cotton growing areas will shrink. This will limit production, prices will rise and that will be good for Australian producers."

Roger Commins says his number his goal is to develop a farming system that offers long term sustainability to the family business.

Roger and his brother Tim have grown cotton for two years in the southern most growing region of Whitton near Griffith in the Murrumbidgee Irrigation Area.

"Because of the dynamics of farming, we will be continually changing and adapting to keep abreast of technology, changing climate, increasing input costs and changing market," Roger says.

"For what it's worth, I see a positive future for agriculture going forward. We as farmers need to position ourselves to meet the changing forces and embrace the needs of a more discerning public who will return to natural fibres and grain to meet their basic needs."

Commins Enterprises operates a diverse farming and manufacturing business, starting its farming operation in 1989, purchasing a 500 acre irrigation property.

The enterprise now has six farms, all laser leveled and developed with integrated drainage recycle systems.

The last few years have presented new challenges - predominantly water related.

"We know we have to adapt our farming program and practices to make the most of this precious resource, water," Roger said.

"Returns now have to be based on Gross Margins/ML and not Gross Margins/Ha as they were previously."

The diverse business comprises cotton, maize, seed sunflowers, seed onions, winter cereals, faba beans, beef cattle, a hardwood eucalyptus plantation for saw log production, tank manufacturing business, and 38 million litre wine storage complex.

Recently 30 ha of mandarins under an intensive open hydroponic irrigation system was developed.

For many years maize was the bread and butter crop, but although the seed crops grown offered a much higher return/ML, there is considerably more risk attached.

"Strategically we cannot plant the majority of our area to seed crop due to being financially over exposed if there was a production problem," Roger says.

The challenge was to find a broad acre summer crop more profitable than maize, which suited the existing farming system in regard to crop rotations, irrigation infrastructure, geographical location, existing machinery, labour and management experience and good market opportunities.

Cotton was on the short list and has been on the enterprise's radar for a few years now.

"We looked at the challenges and benefits of growing cotton in our farming system and after analysing this data we decided to give it a go," Roger says.

Roger said there were some main areas of concern, but these were overcome.

1 Irrigation

The development of terraced bankless channel irrigation layout has given the biggest improvement in irrigation efficiency over any of the existing systems.

Advantages of this system include:

- Dramatic reductions in irrigation labour, ie. elimination of the dreaded siphon change every 12 hours.
- An ability to achieve high yields on poor subbing soils.
- Very good chemical incorporation.
- Minimal drainage water, which means fuel saving on drainage pumps.
- Smaller drainage pumps required so less capital investment.
- Excellent machinery access i.e. no rotor bucks.
- Increased yield due to less water logging.
- Slightly less water used on free draining soils.

2 Plant Establishment

Due to the shorter growing season plants need to be robust as early in the spring as possible.

"We have had establishment issues with cold weather, with 40 cold shock days recorded in our first year and 31 in the second year."

The aim is to reduce seedling stress or mortality by:

Pre-irrigation and plant into moisture, use pop-up fertilizers, plant at a slightly higher population, control soil borne insect pests and aim to have water on and off in 12 hours. This can be achieved with our bankless channel system.

3 Geographical Location.

The Commins are as far south as any commercial cotton growing area.

"We are very mindful of the total day degrees so our crops have to be managed for earliness as a priority to ensure fibre quality.

- This means the use of Pix in mid to late January to manage earliness and timely defoliation to ensure mature fibres are a pre requisite.
- Prepared to sacrifice yield to reduce risk of exposure to wet harvest compared to growers in more northern regions.

4 Minimising Harvest Weather Risk.

"This was probably was probably our greatest concern, as we wanted to minimise our exposure to weather risk and quality discounts," Roger says.

"Having a crop being ready to pick and being Johnny-come-lately to the industry, we believed we would find it difficult to entice a contractor when they were committed to larger existing clients.

"Purchasing our own equipment (2 x JD 9976 Pickers, 4 x Module Builders, 1 x Boll-Buggy etc) created some initial challenges, mainly due to lack of experience. However, with our second harvest behind us I feel we managed quite well."

To date it has been very cost effective to purchase good quality second hand equipment, however the biggest challenge was committing to a large capital investment before even growing a crop.

The aim was to:

- Have machinery in the field the day the crop is ready to pick.
- The ability to leave fields if not ready and come back to them.

5 Water

The shortage of this resource is an issue faced by everyone. The reality is it will become more valuable and less available in the future.

Water security is high on the agenda and the Commins have been proactive in:

- Securing both general and high security entitlements along with groundwater to complement the farming business.
- Building a network of storage dams to harvest water if there is significant rainfall or off allocation events.

6 Labour

To most organisations labour is an issue, particularly harvest labour if you are doing your own harvest.

"Irrigation labour can also be a challenge. We are fortunate we can call on staff from our other enterprises to fill the gaps during the busy times."

Agronomy Staff is contracted.

"Due to our inexperience in cotton agronomy, we have utilized the services of Allan Jones an experienced cotton agronomist for our in field advice, all other fieldwork is done by our experienced staff.

7 Stubble Management

A stubble management system developed over the last seven to eight years incorporates high yielding maize stubble, and all other crop stubble, by mulching and adding lime with the aim of having them break down in time for summer crop planting.

"We have seen a marked improvement in soil structure, soil biota and water holding capacity. Our soil carbon level has gone from 0.9 to 3.5 percent," Roger said.

8 GMO Technology/Rotations

"It has only been because of this technology that it has been possible to grow cotton in this sensitive and closely settled area."

Cotton fits well within the existing enterprises and the Roundup Ready varieties actually enhance opportunities.

The Roundup Ready gene has also made management more simplified because most on the traditional rice growing farms there is a significant weed bank of both broadleaf and grasses which would cause problems with control in cotton. It is also a great tool to clean up our country for subsequent rotational crops.

9 Knowledge Base

There is a wealth of knowledge and experience, which is readily accessible to all participants within the cotton industry. "We have been very impressed with its support and professionalism. There was free exchange of information and encouragement to achieve the highest yields and quality possible," Roger said.

"This is a marked difference to several of the other industries we are involved in - information is kept secret for fear of the competitor gaining an advantage.

"Technology is constantly changing and improving and it is up to the farmers to continue adapting their farming system to keep abreast of these improvements, which in turn, will help maintain profitable margins."

10 Community Attitude

There has been no negative feedback towards the cotton industry in this area.

"I think this is largely due to the guidelines outlined by the cotton BMP program and also because of the diverse agricultural enterprises in this region. The community is familiar with the practices of similar enterprises."

11 Ease of Management

"Our experience over the last two years is that cotton is just another crop and to be perfectly honest it is easier to manage than growing maize or seed crops, now we have access to the Bollgard and Roundup Ready varieties."

- Once established cotton is a very hardy plant, it compensates if you have plant stand issues, unlike maize and sunflowers.
- Cotton is more forgiving than maize if late with irrigation, and with less yield penalty.
- As a fibre crop it offers significant diversification from the traditional grain crops
- Staff has enjoyed the challenge of introducing a new crop into the system and it has extended contacts within the agricultural industry.

Cotton in the MIA - where to from here

This area has the potential to produce far more cotton than the Lachlan Valley.

If you had asked me this question 5 years ago, with the knowledge of the new GM varieties and the dry late autumns, I would say we would see a significant expansion of cotton in this area. However, with the water issues we have at present, we may see a gradual increase amongst some of the more progressive farmers but not a big expansion.

While grain prices remain high, the return/ML on grain/cereal crops is similar to cotton. Farmers will thus remain with the grain/cereal option.

Roger and Tim Commins - have just grown their second cotton crop.

Inspecting the 'new rotation' crop at Whitton, the southern-most cotton growing region in the country.

The Commins run a diverse operation, with a range of interests including a 38-million litre wine storage and stainless steel tank manufacturing business.

In the first two years of growing cotton, Commins Enterprises won the Southern NSW Cotton Crop Competition's Murrumbidgee Division in first year and were runners up this year in the overall Southern Crop Competition.

A few keys to the success:

- Bankless irrigation
- Attention to detail
- Good advice
- Timeliness of operation
- Dedicated staff
- A bit of luck -

Ian Plowman's Hands-On sessions were extremely popular on Day Three, which was free to growers and their staff. He engaged the crowd with his ideas to develop skills and awareness to remove blockages and raise levels of creativity and innovation.

Praising the power of people

Ian Plowman - With a doctorate in Management (researching innovation), an Advanced Masters in Business Administration, a Masters in Organisational Psychology and an Honours Degree in Clinical Psychology, Ian Plowman has every right to understand human behaviour. He also has the skill to be able to transfer his knowledge.

The way of innovation

While considerable investment has been made in research intended to improve industry practices, the extent of practice change sometimes falls short.

Less research has been conducted in understanding why change is so difficult to implement.

Agriculture has a long history of research into improving production systems. More recently, attention is also being paid to value chains beyond the farm gate.

Yet every production system and value chain is first and foremost a social system, comprised of people with individual and collective behaviours. In this neglected arena lies the potential for greatest gains, socially, economically and environmentally.

The CRDC has recently identified Capacity Building - and fostering a culture of innovation and learning as one of three programs in its new Strategic Plan 2008-2013.

The Plan says fully realizing the potential of people throughout the industry is a key to enhancing the capacity of the Ausralian cotton industry to adapt and respond to change.

Organisational Psychologist, facilitator and social researcher Ian Plowman explained to conference attendees why people tend to be naturally conservative and resistant to change and suggested new behaviour that will help overcome this unconscious conservatism.

Sources of Behaviour and Individual Difference

All humans are similar to each other, yet our differences are far more interesting and those differences are important in aiding human survival.

Patterns of similarity and difference throw light on our ability or otherwise to embrace change.

These patterns occur within and between individuals; within and between groups.

Genetics as a determinant of behaviour and individual difference

There are genetically mediated individual differences within and between people, differences which aid species survival. A critical characteristic of these strategies is that they are instinctive and unconscious. For example, in a rapidly changing world, the wisdom of the elders might be less relevant than it was in the past. Yet we instinctively defer to it.

Recommendation 1: That older members of the industry, who may regard themselves as knowledgeable and who may gravitate to positions of leadership, be partnered with younger members to ensure that appropriate knowledge and competence can be brought to contemporary issues.

Formative years as a determinant of individual difference

(i) Niche Differentiation

As well as genetics, formative year experiences are also a source of individual differences and are also an aid to survival. They have implications for willingness or otherwise to embrace change. Those who leave the establishment are also often those with a propensity to risk and a willingness to initiate new industries and new practices. In contrast, those who naturally gravitate to positions of leadership in the industry might unconsciously also be the most conservative. Further, those most likely to inherit the farm may be those least able to bring in creative ideas.

Recommendation 2: It is recommended that the cotton industry adopt a strategy of diversity by deliberately including 'mavericks' in all levels of governance, people with the capacity to think outside the square and the willingness to challenge conventional wisdom. These same people should be encouraged to take up positions of leadership, a responsibility they are unlikely to seek. Further, those who gravitate naturally and willingly to positions of leadership should not necessarily be encouraged.

(ii) Human Motives

Motives developed during formative years are unconscious and are also highly resistant to more recent influences. Creative people and those with an entrepreneurial bent are likely to be driven by achievement via independence. As the cotton industry matures into a second generation industry, those at the helm of industry structures are less likely to be driven by achievement via independence, and more likely to be motivated by achievement via conformity and need for power, both of which serve to maintain the status quo and inhibit creativity.

Recommendation 3: Since motives have implications for willingness or otherwise to embrace change, it is recommended that the cotton industry adopt a strategy of populating its systems of governance with people driven by a need for achievement via independence. At the same time, any new projects should be shielded, for at least the first half of their developmental life, from those driven by a need for achievement via conformity and need for power.

Contemporary influences as a determinant of behaviour and individual difference

Cultural norms are invisible yet have the effect of maintaining the status quo. Any change has cultural consequences and therefore may be fiercely, even unconsciously, resisted by those negatively affected.

Recommendation 4: Since cultural norms and other contemporary influences are unconsciously maintaining the status quo, then change efforts that do not take them into account are destined to fail. One way of avoiding this failure is to adopt an R&D strategy of force field analysis, thereby identifying all of those cultural forces that will be negatively influenced by the proposed change and which will therefore resist it. Change is more easily influenced by working on the less apparent restraining forces than on the more apparent driving forces. Another way of identifying issues to which cotton industry insiders might be blind is to deliberately populate decision-bodies with outsiders as well as insiders, people who can fill the role of 'critical friend'.

Creativity as a determinant of behaviour and individual difference

People are not equally creative. Further, creative sparks are very fragile and are easily snuffed out.

Recommendation 5: Include in developmental projects people who are perceived as 'mavericks', for new ideas are more likely to come from them. Place them in some form of innovation incubator, where there is shelter from criticism, such shelter being necessary for those creative ideas to gather some momentum before subjecting them to rational critical analysis.

The combined effect of sources of individual difference on capacity to embrace change.

The capacity of any individual to embrace change is a function of the alignment or otherwise of the four determinants of behaviour. Further, at a collective level, change will only occur if enough individuals support it.

Recommendation 6: If alignment across determinants influences which creative ideas find favour and which do not, a suggested strategy is to subject new ideas to the 'four determinants' test as part of any critical assessment. Further, individual members of any developmental project team will be more valuable if their personal four determinants are pro-change, rather than conservative.

Mobility Choice

People's mobility choices are not random. People who are more innovative are also more mobile. Industries with net outflows are increasingly more conservative.

Recommendation 7: The cotton industry should explore mechanisms to broaden the experience and expertise available to it. Producers having the capacity to shift to whatever commodity will bring the highest prices is both a strength (broader mindsets) and a weakness (less crop and hence less political and financial clout). More effort may be needed to open up the industry, its governance and its decision processes to those with higher and more diverse levels of professional expertise and experience. In particular, industry decision bodies would benefit from inclusion of people from the arts, from international business, from law, from social science, and from tertiary education, to name a few.

Industry structures and their consequences for innovation

Hierarchical industry structures tend to form into three clusters of personality types, each operating on an unconsciously different mind-set. The separation of these three distinct clusters into different roles renders that structure far less capable than it otherwise might be. Hierarchy blocks upward flows of strategic information. Further, division of an industry into specialist sectors can lead to the pursuit of sectoral interests over and above the interests of the industry overall.

Recommendation 8: It is recommended that those who hold senior positions in industry structures be educated to understand how their unconscious attributes of motives, language and mental models, together with hierarchy itself, can be detrimental to the industry as a whole. Further, it is recommended that they be trained in adopting alternate and more constructive ways of operating, such as those outlined in the latter part of this paper.

"We cannot manage what we do not understand," Mr Plowman said.

"The human species is generally conservative, not innovative. As a result, industry structures are also conservative and become increasingly so with each generation.

"Resistance to change is normal. It is also unconscious.

"Individual differences between people and the causes of those differences offer a means of understanding resistance to change and, alternatively, a vehicle for consciously and successfully bringing about appropriate change.

"The cotton industry will meet with greater success if it adopts a strategy of deliberately taking into account the ideas offered in this paper."

Next edition: The 'How To' with Ian Plowman, including his Meetings without discussion method.

Can't wait? If you were a conference attendee, go now to www.australiancottonconference.com.au login and read Ian Plowman's entire presentation.

John and Juanita Hamparsum know the value of human capacity and said in their presentation that it was vital to train and retain good staff, which is becoming increasingly difficult in agricultural sectors - but there are solutions. They are moving toward employing on the basis of attitude rather than skills – which can be learnt.

At the Wincott luncheon were guest speaker Leith Boully and newly elected chair Barb Grey.

Wincott welcomes new chair

Wincott held its AGM and luncheon at the Conference, with about 60 guests, who welcomed Mungindi cotton grower Barb Grey as the new chair, as well as six new committee members: Meg Kummerow (Bongeen), Georgie Carrigan (Gunnedah), Fleur Anderson (Theodore),Louise Hill (St George), Sally Ceeney (Warren) and Elissa Wegener (Dalby).

Barb takes over from Hillston grower Jo Begbie. In another changing of the guard, Meg Kummerow took over as secretary from founding member Kate Schwager.

Guest speakers at the luncheon included Leith Boully, (a director of the Cotton Research and Development Corporation and cotton grower from St George) who spoke about Women in a Climate of Change and also about her role as a facilitator on the ARLP course. Barb Grey (cottongrower from Mungindi) spoke about her innovative overseas workers program and also about being a participant on the ARLP and what it means for her skills development and subsequent impact on her life and business. Ausafe Super, a Wincott gold sponsor, also explained how they are developing superannuation packages for rural people.

New Wincott chair Barb Grey said she was thrilled with the appointment and was looking forward to her role.

Barb is considered one of the most progressive people in the industry, she is the first woman to receive the Australian Rural Leaders Program scholarship from the cotton industry and won (with husband Ralph) the 2007 Industry Innovation Award.

The role of Wincott is to strengthen the linkage between industry and the community; provide information to rural women in a relaxed environment and via website and newsletters about cotton issues. Networking and information dissemination are the key strengths of Wincott.

? For further information contact Meg Kummerow, meg-kummerow@bigpond.com www.wincott.net.au

Seeing what the cotton industry has to offer at the 2008 Cotton Conference were Farrer students, back; Beau Brummell, Mitchell Douglas, Scott Grace, front; John Hayden, Hugh Pursehouse.

Farrer students meet the industry

CRDC sponsored five students to attend this year's conference through the pre-vocational program Cotton Seed, with all participants praising the benefits of the trip for the students.

Beau Brummell of Rowena, Mitchell Douglas of Tamworth, Scott Grace of Quirindi, Hugh Pursehouse of Breeza and John Hayden of Moree are Year 11 students at Farrer Memorial Agricultural High School who are part of the Cotton Seed vocational education initiative.

Farrer Memorial Agricultural High School is a specialised agricultural high school with strong links to the sheep, beef and grains sectors which has now expanded its VET program to include cotton.

As part of the Farrer Higher School Certificate studies, students spend time on cotton farms, experiencing first hand the various stages of the planting, growing and harvesting cycles.

The cotton industry recognised that there was a need to address the skills shortage and in 2005 Cotton Australia initiated a project to help overcome this.

The Cotton Industry Skills Development Pilot Project, aimed at training qualified cotton industry workers and providing pre-vocational training opportunities for potential employees.

Farrer's Agricultural Head Teacher Graeme Harris played a significant role iin collaboration with industry to develop the schools component of this project.

Mr Harris said "the need to keep rural kids in agriculture and develop skill sets which are required by industry has been made possible through the Cotton Seed/ Cotton Basics initiative.

"It uses competency based training to accredit students on skill sets contained within the national training package in Agri-Food. To achieve these ends staff had to have their qualifications assessed and where required their skills upgraded."

National Cotton Training Coordinator with DPI&F and Cotton CRC, Mark Hickman developed a professional development program for teachers who were engaged with the Cotton Basics curriculum. The professional development was delivered utilizing the facilities of Auscott's Narrabri operation, CSD, ACRI and the Australian Cotton Centre.

"It was a great opportunity to further engage the industry with training to meet industry demands. Previous graduates of the program are already working at Boggabri and Thallon," Mr Harris said.

One of the students, Hugh Pursehouse said "the cotton conference which I was lucky enough to attend due to the support of CRDC was a great learning experience, learning about where the industry is and where it is heading, and all aspects of growing cotton.

"I gained a wider understanding of the industry and also the career paths available to us in the cotton industry. I appreciated the sponsorship and it was a great learning experience."

CRDC Program Manager Helen Dugdale said that it was a worthwhile investment in sponsoring the five students to attend the 2008 Cotton Conference.

"We were extremely pleased with the feedback, both from the students, their supervisors and the people they interacted with at the Conference," she said.

"The contacts they made and the career opportunities that they became aware of will be useful when they start to consider their employment and study options.

In particular she said the students were impressed by the diverse range of employment within the industry that they became aware of as a result of attending the conference.

She said the opportunity for the young men to interact with adults from all sectors of the industry over the three days had matured their outlook.

Louise Adcock

Many degrees of BMP

Australia's world-best practice in cotton production was rewarded with inaugural industry awards announced at the Australian Cotton Conference.

Jason Sinclair

BMP Program General Manager Louise Adcock, recipient Brian Strand, Cotton Australia Chair Joan Grainger, QLD DPI&F National Cotton Training Coordinator Mark Hickman, and recipients Stu Higgins and Jason Sinclair after the award ceremony at the Conference.

Three growers have been awarded the industry-first Best Management Practices (BMP) manager certification and vocational Diplomas of Agriculture in recognition of their ability to improve their approach to managing natural resources through farming practices.

The BMP program is the Australian cotton industry's commitment to the world's best practice in cotton production. Certification of growers and the Diploma in Agriculture from Tocal College in New South Wales acknowledges current and acquired skills developed during BMP farm certification and years of life-long learning. In the past BMP certification was attached to the farm.

Stu Higgins from Jandowae, Jason Sinclair from Condamine and Brian Strand from Dalby were presented with their awards by Cotton Australia chair Joanne Grainger - herself a cotton farmer from Mungindi on the Queensland/NSW border.

They are three of the first six managers who have qualified for the award, while an additional nine producers are currently undertaking the certification.

To qualify, the growers provided documentation and evidence of practices adopted during BMP certification and also completed a Recognition of Prior Learning (RPL) interview followed by a farm tour.

The awards add value to the existing program and provide a pathway for individuals to receive BMP acknowledgement for their personal skills.

In January, the Australian Cotton Industry Council BMP committee formally endorsed the qualification, which culminated with the presentation to the growers at the conference.

BMP is a voluntary farm management system that provides self assessment mechanisms, practical tools and auditing processes to ensure that cotton is produced with best practice across a range of focus areas including : land and water; soil health; biodiversity; climate change and energy; biosecurity and chemical and Integrated Pest Management.

"Certifying the grower as well as the farm adds even more value to achieving BMP and I encourage all certified BMP growers to consider this opportunity," said Louise Adcock, general manager of the BMP program.

"The BMP status is a marketable asset recognised by future employers and people in and outside the cotton industry.

"This initiative demonstrates the industry's focus and commitment to recognise the skills and the knowledge of cotton farmers who are improving their approach to managing natural resources through farming practices."

Jason Sinclair agrees, saying the certification and diploma certainly makes people more employable.

"I would recommend all farm managers undertake the award," he said.

"When you are undertaking BMP on a day-to-day basis anyway, why not become accredited yourself.

"BMP is part of our natural management plan, so this was not a big task - it is not time consuming.

"Especially when you are receiving a Diploma in Agriculture without having to spend days away at university while trying to run a farm at the same time - that is a real bonus."

Jason had much praise for Mark Hickman and all those involved in the program, saying "it is well worth the effort they have put into it".

Jason has been involved with cotton farms for over a decade, firstly near Goondiwindi and now manages "Lakeland Downs" at Condamine, where BMP has always been a part of life.

"In the past the farms were accredited and we weren't - I have been part of the BMP initiative since about 2000, so this is the next step," he said.

Stuart Higgins said he had been on the BMP journey for the past five years and completed BMP in 2006.

He said although he already had a degree in Agricultural Science, it was important to continually improve oneself and take advantage of opportunities.

"It's a bit confronting having someone look at the farm under a microscope, but it's worth it, another string to the bow that makes you more employable," he said.

National cotton training coordinator from the Qld Department of Primary Industries and Fisheries, Mark Hickman said the certificates demonstrated that it was possible to have a linkage between an industry program and vocational education and training qualifications.

"More importantly this program acknowledges and demonstrates the skills sets obtained by the individual when implementing BMP into our modern farming systems," Mr Hickman said.

"I encourage producers to have their staff and themselves recognised and rewarded by this new industry award."

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Research & Development Showcase

australian cotton conference

The trade hall was abuzz as attendees took time to catch up, discuss, and network.

Awan Everleigh and Robyn Smith, both of Narrabri relaxing at the welcome drinks on Tuesday evening.

The Conference was an opportunity for growers to talk face-to-face with leading researchers. Emerald grower Neville Brownlie and CSIRO Chief Scientist Peter Gregg

All cotton growing regions were represented, with industry people coming together such as David Parlato of Horcott Pty Ltd Emerald, cotton grower Rob Holmes of Moree and Scott Campbell of Dupont based in Toowoomba.

Millie Pearse of Boggabri and Andrew Wilson, Wee Waa

AWH National Logistics Manager Cotton Graeme Wood, Cargill Cotton's Phil Sloan, Anz Foreign Exchange Dealer Rob Geurin of Sydney found time to compare notes and share a cool drink.

Scott Arthur, grower Boomi and St George grower Rob Jakins

All the way from St Louis USA was Monsanto's Dr John Purcell, who spoke at the Future Decision Makers' Forum with Dr Stephen Allen of CSD

Cotton grower Patrick Hilliar and CSD's John Marshall deep in conversation

In the Conference back-room, Step Communications' Brooke Summers and ACGRA chairman Ben Stephens go over plans for the Cotton Industry Awards dinner

CSD general manager Steve Ainsworth and Mark Buckingham of Monsanto

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The Darling Downs region was the source of many attendees, with Bernie Caffery - Crop Management Services, Dalby, Ros Cameron Bongeen and Jamie Grant, Jimbour

Science meets the paddock - David Brodrick, Ozforecast Narrabri, Hillston grower Malcolm Pritchard and Gerard Lonergan of CSD Wee Waa

Enjoying some time off farm - industry leaders James Kahl, Phil Firth and Jono Phelps of Wee Waa

From the north: Emerald cotton growers Wayne Reeves, Craig Slack, Barb Bishop and Ian Burnett

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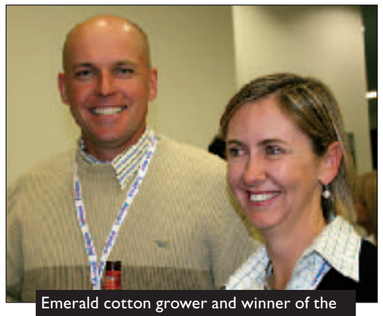
Peter D'Esposito of Rabobank Dubbo, Andrew Armstrong, Rabobank Moree

Tony Geitz General Manager Paul Reinhaart, Rabobank's Emerald Branch Manager Craig Slack



Emerald cotton grower and winner of the Young Aciever of the Year Award Hamish Millar with Monsanto's Bec Diprose

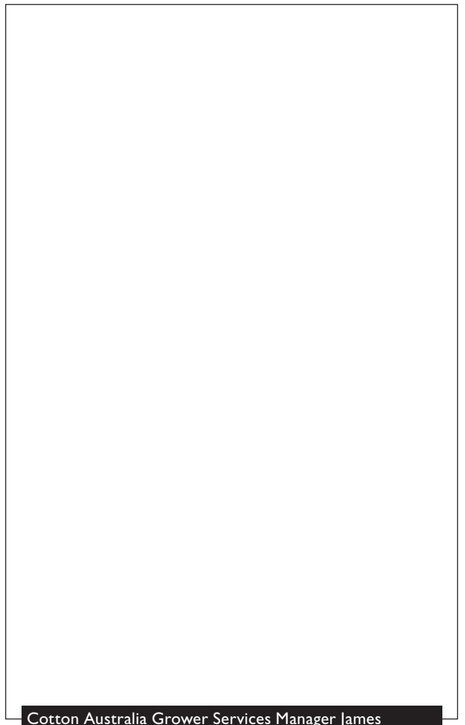
Colin Moyes Anz Sydney, Lionel Henderson CSIRO Plant Industry Canberra

The Future Decision Makers' Forum held on Monday afternoon was well supported

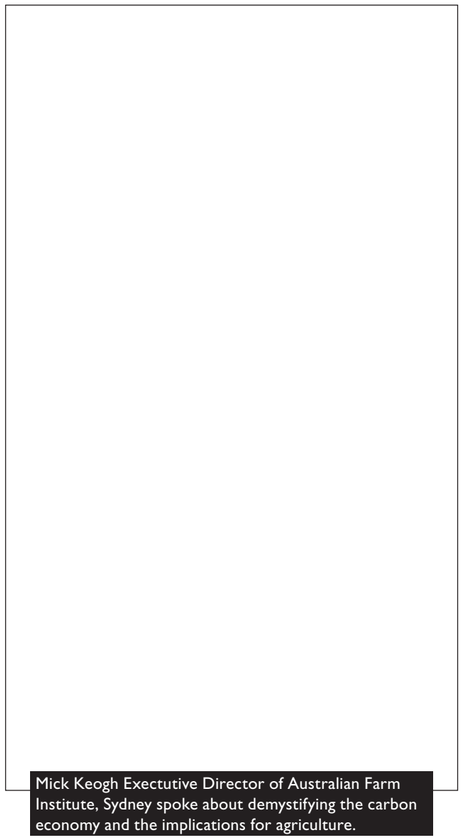
The plenary area - a congregation of world-leading researchers - Dr Greg Constable, Dr Michael Bange, Mick Keogh (speaking), Dr Mark Howden and Professor Peter Grace

The Hands-On sessions on Thursday, which was free for growers and their staff this year, provided a chance for Farrer Memmorial Agricultural High School students to interact with researchers

Jim Purcell offering practical advice in the Hands-On sessions about improving Water Use Efficiency



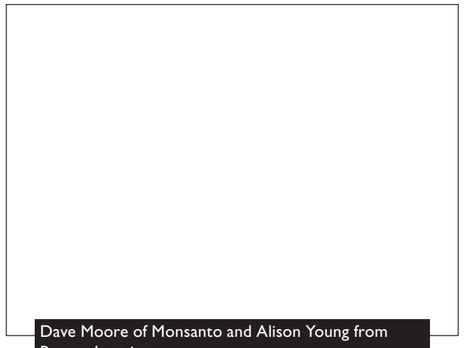
Cotton Australia Grower Services Manager James Houlahan inspects some of the Japanes 'Good-I' BMP cotton garments which were given away.



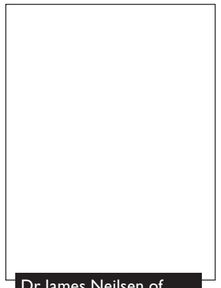
Mick Keogh Exectutive Director of Australian Farm Institute, Sydney spoke about demystifying the carbon economy and the implications for agriculture.

Indian visitor Gopal Jawahar and Peter Gall of Keytah Moree toast a successful conference

PrimeAg's John Stewart and Cotton Australian CEO Adam Kay

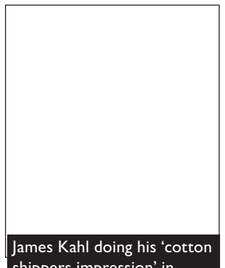


Dave Moore of Monsanto and Alison Young from Burren Junction



Dr James Neilsen of CSIRO Plant Industries

Stuart Armitage



James Kahl doing his 'cotton shippers impression' in his closing speech at the Decision Makers' Forum

Jim O'Connor, Border Rivers Consulting, Goondiwindi, grower Jeff Bidstrup of Warra on the Darling Downs and John Murphy of Suncorp Toowoomba.

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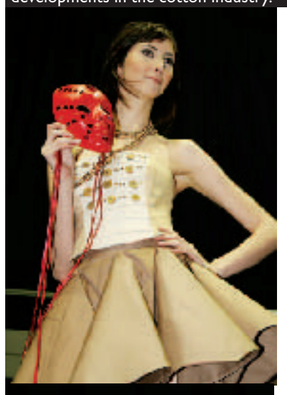
australian cotton conference

"The cotton Conference is a welcome opportunity to catch up with suppliers and grower friends and show our commitment and friendship to the Australian cotton industry," says Urs Riederer, pictured centre, President of Sunrise Resources Limited, sponsores the fashion parade. Mr Riederer says the conference is also an opportunity to promote Australian cotton and learn of the latest developments in the cotton industry.



Talented young designers from Australia's highest award winning college, Academy of Design showcased their 100% Australian cotton garments at this year's Australian Cotton Conference Fashion parade, thanks to Sunrise Resources Ltd.

This year will be the second year the Academy of Design has worked closely with the Australian Cotton Conference and the parade rounds off the theme of "From field to fashion".

Parade co-ordinator and designer Rycki Symons said "We have a great history of working with cotton and the natural fabric is and always will be an essential part of fashion design training.

"Over the years students make garments, collection and ranges based on the diversity, colour choices and practical aspects with cotton fabric. It is a great training ground for designers to learn about the natural fabrics and integrate the fabrics into their professional designer life as well."

He said this years' fashion parade highlighted the diversity of the textile, from casual daywear right through to couture evening and bridal.

"The young designers are also creating daywear and racewear based on a global trend emerging for Spring and Summer at the end of this year. These will include bright and hand painted florals and bright bold and graphic printed fabrics with the gowns visually stunning," he said.

The parade featured an award winning 100% cotton calico bridal gown (pictured) by Samatha Spano, awarded by Queensland Bridal Awards in 2007 and an award winning 'jeans' gown.

Achievements this year by Academy of Design students include Big Brother 2008 costumes, garments shown in the Gold Coast Fashion Week, 5 awards at fashion Bash 2008 and an NRA Australian fashion Design Awards - Finalist 2008.

Cotton clothes more environmentally friendly initial research shows

By Mary Ann Day

Initial research has shown that clothes made from cotton are more environmentally friendly than some other materials, and that washing clothes less frequently would also benefit the environment.

A research project funded by the Australian Greenhouse Office in collaboration with the Cotton Research and Development Corporation on the environmental impact of cotton and other materials is still in its early stages, but is expected to be complete by the end of the year.

As part of the Life Cycle Assessment (LCA), the cotton industry in Denmark was examined and indications showed that the total energy of cotton production was much less than that of polyester. (13.514 KWh/kg of final product or roughly 6 kg CO2/kg of final product as against 43.65 KWh/kg of final product, roughly 19 kg CO2/kg of final product).

Francisco Javier Navarro, Research Assistant with the Institute for Sustainable Resources (ISR), Queensland University of Technology, who is carrying out the LCA, explained: "The Institute for Sustainable Resources is currently developing a case study on the cotton industry which examines the impact of the textile industry over the environment, specifically focusing on Australia's biggest challenges: climate change, water availability and land use.

The Denmark study was of value in providing background information, but "The position in Denmark is not the same as in Australia - the conditions are different as is the nature of the cotton industry here," Mr Navarro said.

"On top of that, you have to consider the transport factor, whilst organic cotton is being produced in India and South America, their greenhouse gas footprint increases because they are travelling thousands of kilometres to be sold in Europe, the USA and Australia. So we need to carry out our own studies."

Mr Navarro said he had also been comparing cotton and polyester, and other material.

"I would say that polyester and cotton are economically related-you could argue that both rely on each other," he said.

"However, we also found that polyester tends to smell more!

"And most controversially, we have found that washing clothes frequently can be environmentally damaging. The washing and tumble drying cycles that are carried out at home have the highest energy consumption and therefore generate the most greenhouse gases.

"Several researchers have claimed that people need to start using their clothes more times before washing them.

"However we realise this would only be possible with those fabrics that are 'smell-friendly' and only under non-intensive usage."

So, production is not the most significant impact of the textile industry.

"We also looked at dyeing - the environmental impact of clothing production depends a lot on the fibre used, such as cotton, polyester, and wool - because of the ways they are manufactured, pre-treated and finished. The chemicals that are involved in those processes vary with the fibre used," Mr Navarro said.

"We found the fibre being dyed, such as polyester cannot be dyed below 100 celsius, which means a higher energy consumption and thus more GHG emissions than dyeing other fibres."

Dyeing is not necessarily the most contaminating process in fabric manufacturing. There are many other chemicals used when pre-treating and finishing fabrics - chemicals used to protect the fibres during the manufacturing or chemicals to provide the fabric with easy-care properties, water-repellents, softening treatments, flame-retardant treatments, mothproofing treatments, antibacterial treatments, and others. A study by the European Commission found that "sizing" chemicals, those used to protect the fibre during the manufacturing process, account for a huge proportion of the waste water emissions (somewhere between 30-70 percent).

"Other important factors include the actual process used for dyeing and the type of dyeing," Mr Navarro said.

"Batch dyeing uses a lot of water and has low-concentration water emissions, whereas semi-continuous/continuous dyeing has no water emissions and low air emissions.

"In reactive dyeing, one of the most typically used for cotton and other cellulose fibres, the amount of non-fixed dye that may end up as waste water emissions is about 50-60 percent.

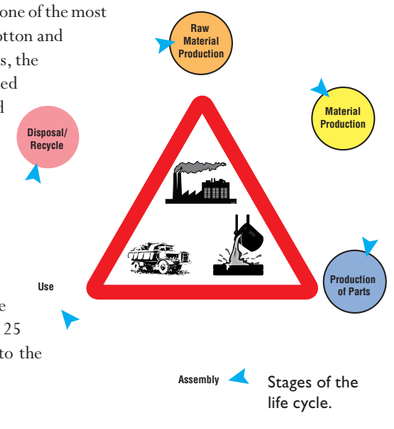
"Vat dyes and direct dyes, both useful for cellulose fibres, only discharge around five to 25 percent of the dye to the effluent.

"There are also factors such as the auxiliary chemicals in dye formulations, dispersants, salts, thickening agents and anti-freeze agents. And then there is the question of where the fabric has been grown and manufactured, because of different environmental and health and safety laws.

"For example, in India, cotton growers use pesticides that are prohibited in Australia, and many countries don't control waste water emissions properly."

In conclusion, Mr Navarro suggested that a solution would be a global eco-label system for the textile industry.

"However at this moment the concept is a bit unrealistic," he admitted.



Stages of the life cycle.

Francisco Navarro

In an increasingly changing climate, the cost of energy will continue to rise and cotton growers can learn to adapt by reducing farm energy consumption.

Energy costs can be reduced

Key points:

- Record direct energy use (eg diesel, electricity) on your farm to determine where significant energy inputs occur and identify areas for potential energy savings.
- Improve the set up of farm equipment such as pumps and tractors to improve performance and reduce energy costs.
- Look at reducing the number of farm operations by investigating alternative practices.

By Tristan Viscarra Rossel

Recently the National Centre for Engineering in Agriculture (NCEA) at the University of Southern Queensland conducted research into on-farm energy efficiency. This work has included a combination of desktop assessments and field work involving 14 case study farms, seven of which were irrigated cotton and mixed cropping farming enterprises.

NCEA Deputy Director, Mr Craig Baillie, said that the farm energy assessments showed a variation of energy usage within the cotton case studies due to different production systems. Energy usage was 3.7-15.2 GJ/ha at a cost of $80-310/ha, generating 275-1404 kg CO2 equivalent/ha greenhouse gas emissions.

"We found a significant difference in direct energy costs across the farms that was related to management practice," he said.

"A key driver of the energy use across each of the farms was irrigation."

The study showed that 40-60 percent of total direct energy cost was attributed to irrigation if there was some sort of pumping involved, including pumping water from bores, into dams or infield pressurised irrigation systems.

The researchers, led by NCEA's senior research engineer Dr Guangnan Chen, broke down each farm's total energy use into key processes within the farming system (see Table 1).

Mr Baillie said that harvesting operations were also significant.

"We found that harvesting operations were another significant component of total energy cost, accounting for about 20% of the overall inputs," he said.

In comparison to cotton, other crops grown on farm such as grains had significantly lower energy inputs due to less farming operations (ie 10 passes, compared to 17-18 for cotton).

By itemising farm energy usage, Mr Baillie said that farmers could identify where they were consuming the most fuel or energy and explore ways to reduce energy use.

Making changes to farm systems or farming practices could reduce energy use, thereby saving money and reducing greenhouse gas emissions that contribute to climate change.

Mr Baillie explained that the key to reducing farm energy consumption was to focus on high energy input areas and investigate opportunities to reduce energy inputs by changing practice or by doing the same operation more efficiently.

"From the results of this study and others I'd recommend that growers investigate the performance (ie energy efficiency) of current practices and look towards reducing the number of operations to reduce energy inputs," Mr Baillie said.

"Measure the performance of your pump - maybe it's not set up as well as it could be - if it's running inefficiently you're actually using more power than you need for that operation.

"In other studies we've monitored tractor performance and found that by changing gear selection and engine revs you can reduce energy use by about 30% for the same power output."

The research has also identified that at least 10-20% energy was saved where growers had moved from conventional tillage to a minimum tillage farming system.

It's certainly food for thought. Monitoring and measuring direct energy use and identifying ways to reduce energy consumption is not only good for the environment, but it can pay for itself in real dollar terms.

For further information, download the CRDC-funded report, Development of EnergyCalc - a tool to assess cotton on-farm energy uses (2007) and the QFF-funded report, Opportunities to enhance energy efficiency and minimise greenhouse gases in Queensland's intensive agricultural sector, from the NCEA website (www.ncea.org.au).

? More information – Craig Baillie,
National Centre for Engineering in Agriculture
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Table 1: Percentage of total energy costs for different cotton farming processes

	Farming system	Fallow	Harvest	In crop	Irrigate	Plant	Post harvest
Farm A	Conventional tillage, diesel pump, surface water	15%	24%	8%	40%	4%	9%
Farm B	Conventional tillage, diesel pump, surface water	14%	27%	3%	39%	7%	10%
Farm C	Minimum tillage, gravity feed, surface water	4%	54%	21%	0%	5%	16%
Farm D	Conventional tillage, diesel pump, ground water	7%	14%	4%	70%	1%	3%
Farm E	Minimum tillage, diesel pump, ground water	5%	19%	4%	62%	2%	7%
Farm F	Conventional tillage, electric pump, surface water	32%	38%	7%	9%	7%	7%
Farm G	Minimum tillage, electric pump, ground water	12%	21%	4%	51%	4%	8%
Average		8%	20%	5%	57%	3%	7%

Key points

- Reduce energy use and save money by optimising pump efficiency.
- Take simple measurements to calculate energy use, pump efficiency and running costs.
- In terms of energy saved, repairing a pump may pay for itself in one season.

Peter Smith, NSW DPI
Irrigation Officer for the North West Region

Pump efficiency under the microscope

Reducing pump energy use

By Tristan Viscarra Rossel

A new training module is available to irrigated cotton growers that can help reduce farm energy use and greenhouse gas emissions.

The Cotton Catchment Communities CRC Water Focus Team is delivering, through registered training organisations, the Cotton and Grains Irrigation Workshop Series in New South Wales and Queensland to help improve farm practices related to irrigated cropping.

Irrigation Officer with the NSW Department of Primary Industries in Tamworth, Peter Smith, explained how the Pumps workshop shows farmers how to assess the efficiency of their own pumps to optimise performance - saving energy and money.

"The training package is helping farmers understand the basics of pump operation; explaining what makes up total dynamic head and flow requirements, how to maximise efficiency, and matching the drive unit to the pump," Peter said.

"If the pump doesn't match the job it's supposed to do then you've got problems."

Peter explained that course participants will gain an understanding of how their pumps and drive units should operate, how much energy is being consumed by their installation, how to calculate running costs, whether any improvements need to made and how to estimate the cost-benefit of making improvements, like repairs or replacements.

Pump efficiency is calculated by taking simple measurements of electricity or diesel consumption, along with the flow rate and the pumping head, then comparing the energy used by the prime mover to the energy used to move the water. By comparing the measured pump efficiency to the theoretical efficiency from the pump curve for that particular installation, farmers can determine if there is room for improvement.

"We can work out whether it is cost effective to repair or replace the pump or drive unit," Peter said.

While it may seem costly to address poor energy efficiency, Peter said it's quite common to find that it's actually costing more not to repair or replace the pump.

"We commonly find that the repairs are paid for within one season; and replacing a pump is paid for within two or three seasons - so it is usually quite worthwhile," he said.

"In some cases, potential savings of $20 000 to $30 000 per season for fairly cheap improvements have been identified. It's very often just dollars burning out of their pockets for want of some very simple maintenance. It's a waste of money and it's a waste of energy.

"We could make quite a big improvement towards reducing greenhouse gas emissions if we got all pumps and motors running at their optimum efficiency."

Growers can find further information about the Pumps workshop on the Irrigated Cotton and Grains website (www.cottonandgrains.irrigationfutures.org.au) - look under 'Workshops and training'. Other half-day workshops in the series include Benchmarking and Water Budgeting, Scheduling I, Scheduling II, Storage and Distribution Systems, Surface Irrigation Performance Evaluation, and Metering.

? More information
Peter Smith, NSW DPI, Phone: 02 6763 1262
Email: peter.smith@dpi.nsw.gov.au

"It would be like comparing expensive women's underwear to a hessian bag - that's the difference in the feel of the raw cotton," says St George grower Glenn Rogan of the Sicala 350B cotton. Glenn has been growing the variety as part of trials for two years and describes it as 'remarkable cotton' compared to standard Australian varieties, but added that it would be nice if the price of the cotton reflected its quality.

Answering the premium fibre call

By Tristan Viscarra Rossel

Late last year, a collaboration of six organisations – the Cotton Research and Development Corporation, Australian Cotton Growers Research Association, Cotton Australia, Australian Cotton Shippers Association, Cotton Seed Distributors (CSD) and CSIRO – launched the Premium Cotton Pilot Project to develop a niche product that would compete with the world's best cotton fibre.

The idea for the project was sparked by CSIRO Plant Industry's release of Sicala 350B, Australia's first commercial long staple LS Upland variety. It is a specialist high quality Bollgard II variety that exhibits extremely long fibre lengths (> 11/4 inches) compared with regular upland varieties. The fibres of Sicala 350B are also typically finer and have excellent breaking tenacity (~ 32 grams per tex).

CSIRO's breeding objective is to develop a suite of products which optimise the combination of long, fine, mature cotton fibres and high yield potential - and there are many candidate varieties in the CSIRO breeding program that are starting to meet that challenge.

In fact, Sicala 350B was released more to provide fibre of novel properties for spinning tests than as a long-term variety. The long-term goal is to produce new varieties with genuine premium fibre quality attributes and high yield.

CRDC Manager, Value Chain Investment, Dallas Gibb, described Sicala 350B as "a supreme quality variety in terms of fibre length" which the project collaborators thought could provide some advantages over the standard Australian cotton varieties.

Premium fibre project

There's an innovative project underway that aspires to create a premium class of cotton fibre with optimal fibre qualities - and its supporters think that they might just get what they're bargaining for.

Blending potential

"CSIRO initiated research to see what type of yarn could be produced from Sicala 350B - over and above the standard cotton - and whether it could be blended with other cotton types," Mr Gibb said.

Initial results show that it can be blended with Pima-type cotton to produce a high quality yarn without significantly affecting the overall quality of the yarn. Potentially that would allow spinners to reduce their input costs because the Sicala 350B – and fibre produced from similar cotton varieties – would be considerably cheaper than Pima cotton.

Mr Gibb said that CSIRO textile research also demonstrated that the crucial cotton fibre measurements of fineness and maturity can be now separated out, opening the way to providing a new class of premium cotton blends based on Australian-originated fibre of known processing performance.

The collaborators are forming an alliance with international spinners so they can trial the Sicala 350B from paddock to yarn and then to fabric, investigate potential savings for spinners, and determine how any savings could be shared back down the pipeline - offering growers a premium to grow the high quality fibre.

It's still early days but CSD general manager, Steve Ainsworth, said that he expected to see some good results within three to five years.

Farm results

"We have supplied Sicala 350B planting seed to six cooperating growers for the trial," he said.

"It demonstrated good quality in terms of fineness, maturity and length and has insect resistance with the Bollgard II gene. However good quality doesn't always come easy: Sicala 350B has a yield penalty when compared with the stable of high-yielding CSIRO varieties."

Mr Ainsworth said the growers in the trial had found that Sicala 350B performed well in terms of fibre consistencies but they had experienced a yield reduction, especially when grown under irrigation. He added that Sicala 350B looks promising under dryland conditions, especially given its unique fibre length.

Mr Gibb highlighted that a new premium type of Australian upland cotton would have greater appeal when produced on Best Management Practice (BMP) accredited farms.

"An international survey commissioned by CRDC, Cotton Australia and the Australian Cotton Shippers Association has found that cotton spinning mills using high quality cotton have greater appreciation of the benefits offered from environmental management programs such as the industry's BMP program, and were often better linked to consumers demanding environmental values in their fabric and clothing purchase decisions," he said.

Growing Sicala 350B

St George grower, Glenn Rogan, has grown Sicala 350B for a couple of years as part of the trial. He said that during picking he could see a visible difference in the quality of the raw cotton compared with other varieties he is growing.

"In the 2007-08 season we grew enough Sicala 350B to make up a container load - we ended up with 117 bales at about nine bales per hectare," Mr Rogan said.

"We grew it in a paddock with (Sicot) 71B and the Sicala 350B was down about 15 percent on yield."

Mr Rogan was quick to point out that yield was not the reason why he grew it. He described Sicala 350B as 'remarkable cotton' compared to standard Australian varieties but added that it would be nice if the price of the cotton reflected its quality.

"It would be like comparing expensive women's underwear to a hessian bag - that's the difference in the feel of the raw cotton," Mr Rogan said.

"It's very soft and silky, it's got a very nice lustre to it, like wool, and it's certainly got the length."

Mr Rogan is very keen to see a premium price negotiated with the merchants or directly with the spinning mills because - with the current yield drag – he said, "there's only so long that we can afford to have a net result disadvantage, no matter how good the quality."

Spinning Sicala 350B

Textile researchers with CSIRO Materials Science and Engineering in Geelong have been spinning some of the Sicala 350B grown in the trial to evaluate its performance.

Pima-type cottons can command a premium in the marketplace because they are finer and longer, producing finer yarns and lighter fabrics that might go into lingerie, for example. CSIRO researcher Geoff Naylor explained that the Sicala 350B spinning trial was 'quite exciting' because it was starting to bridge the quality gap between Pima-type cottons and the Australian Upland cotton varieties.

The spinning trial at CSIRO's commercial short staple spinning mill has found that blending up to 30 percent Sicala 350B with Pima cotton produces a commercially acceptable product that would save the mill significant costs – a saving that could be passed onto the grower as a premium.

"If you start with 100 percent Pima, it spins beautifully and you can make a really fine yarn," Dr Naylor said.

"If you blend in 10 percent of ordinary Aussie cotton it'd be a disaster but if you blend in 10 percent of Sicala 350B, it blends well and you can produce a good product that is only slightly lower in quality to a 100 percent Pima yarn.

"If you blend in 20 or 30 or 40 percent of Sicala 350B, you begin to see that the yarn quality drops off slowly from a scientific perspective but from a commercial perspective, a blend of up to 30 percent is still commercially acceptable."

Dr Naylor said that the project is now liaising with "a significant mill overseas that uses Australian cotton and Pima cotton" to undertake commercial spinning trials with Sicala 350B, and then they will begin to negotiate on the price-quality mechanism to try and obtain a premium for Australian growers.

Trial phase continues

"We've seen the potential of the cotton and now we need to determine how best to exploit that opportunity for growers. We will publish our results and if it looks promising, we'll be encouraging more growers to become involved with the trial," Mr Gibb said.

"At this stage, we can't achieve the premium to compensate for the yield drag associated with Sicala 350B but will continue to work with the spinners overseas, to develop the premium fibre specifications that meet their demands and offer acceptable premiums back to growers."

Ultimately, once the fibre specifications have been developed it is hoped that a range of new varieties will be available for growers to meet them.

Mr Ainsworth concluded that the group doesn't forsee the new premium cotton fibre becoming the bulk of the Australian cotton crop; they aspire for 10-15 percent of the crop producing a high product that will 'sit quite well' beside other premium cotton fibres like Pima types.

? More information

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CSD General Manager Steve Ainsworth.

Scott Dunbar reading soil probe in cotton in December 2007. For the past five years the Dunbars have been using sensor probes to detect moisture in the soil. They now have four probes on the property allowing them to dial in from their computer to the probes via a digital SIM card.

Water budgets pay off

By Megan James

Farmers and business owners all understand the importance of preparing financial budgets, but when it comes to our most vital resource – water – planning is often much more haphazard.

Growers Scott and Alicia Dunbar, at "Kingower" 20 kilometres north west of Emerald, have taken much of the guesswork out of water planning by developing detailed water budgets.

Over the past two years, the Dunbars have prepared water budgets once every quarter to ensure efficient water use. The budgets guide their decisions by recording storage levels, and estimating crop water usage and evaporation and seepage losses. The data is then translated into a crop gross margin table showing the financial impact of various water use scenarios.

With a total of 8100 acres made up of 1500 irrigation, 4100 cattle country and 2500 dryland, Alicia says the water budget has become "the most critical ingredient" in the protection of their water.

"Kingower" is not attached to the Emerald irrigation scheme, relying instead on rainfall and overland run-off. It boasts three large water storages cells – 1100 megalitres, 1500 megalitres and 3000 megalitres – all at a 7.5 metre depth.

It's been a tough year at "Kingower". It was one of the worst hit properties in the Emerald district during the January storms, with hail and flooding wiping out 308 hectares of fully-matured cotton (that was only about three weeks off defoliation), infrastructure damage and cattle lost.

"When the big storms hit, our main storage cells were already full. The rain came so hard and fast – something like 30 inches falling in just three days in the catchment above us – that our two surge dams breached and we weren't able to harvest any additional water."

Now that most of the irrigation infrastructure has been rebuilt, the Dunbars are tending to their sunflower crop and fallow country in readiness for wheat.

Alicia says they have about 12 months' water supply in storage at present. With the region experiencing dry conditions once again, budgeting that water is essential.

According to Lance Pendergast, Water Use Efficiency Field Extension Officer with Queensland Department of Primary Industries and Cotton Cotton Catchment and Communities CRC, Alicia's water budget is a very impressive system for recording and planning for water use.

In fact, through her work in this area, she is well on her way to achieving a Diploma in Rural Business Management and a Diploma of Agriculture in Cotton Production.

"Alicia is a self taught at spreadsheeting, and I was astounded as to the amount of detail she had included," Lance said.

Using the DPI evaporation charts for the Emerald region, storage meters and a seepage and evaporation meter, Alicia and Scott calculate the evaporation rates and are able to accurately predict anticipated water levels and act accordingly.

The water budget and the Dunbars' willingness to try out new ideas have led to a number of changes in their crop practices - all geared towards improving water use efficiency.

Alicia gave Spotlight a quick snap shot of some of the practices put into place at "Kingower":

Be efficient with water storage

The Dunbars will move water from one storage to another to minimize evaporation losses.

"We always try to use the largest cell first and as we're irrigating we'll top up the other cells. We concentrate on having water stored in a smaller area," Alicia said.

Don't hold water for future crops

The Dunbars have 'a use it before you lose it (to evaporation)' philosophy.

"We don't tend to hold water in particular for cotton, we will use it on whatever is in the ground. It just comes back to using the water budget to determine the most valuable use of the water in terms of dollars per megalitre."

Try larger siphon sizes

The Dunbars have changed siphon sizes from an inch-and-a-half – taking 24 hours to water a crop – up to two-and-a-half inch siphons allowing the watering to be complete in just six to eight hours.

"We have found the larger siphon size to work well for us. It means we are not chasing as much tail water, and my understanding is that quicker irrigations reduce the likelihood of stress because of water logging and helps to have better cotton quality."

Use water capacity probes

For the past five years, the Dunbars have been using sensor probes to detect moisture in the soil. They now have four probes on the property allowing them to dial in from their computer to the probes via a digital Sim card. The 80cm probes have sensors every 20cms (four on each probe) to show the variances at different depths. Crop water usage calculated by the probe and its associated software is updated every 15 minutes.

Having this technology in place means that the Dunbars can assess the soil profile more accurately – which can sometimes result in being able to delay watering.

But Alicia stresses the probes are just one tool used to make better irrigation decisions.

"It's a very useful tool in terms of helping us make better irrigation decisions, but it's definitely not the be all and end all, we still go out and physically check the crop looking at nodes above the white flower.

"Technology is great, but a good farmer still needs to go and dig in the dirt."

Use mulch and stubble

"We put our trash back into the fields to help retain moisture. Depending on what they crop is, when we can, we will leave stubble standing," Alicia said.

Keep exploring new ideas

According to Lance, the Dunbars have always been very open to suggestions and new ideas.

"They have been flying in the face of industry investing heavily in infrastructure and new methods to ensure they have the optimum set up for improving water use efficiency," said Lance.

Alicia agrees that trialing new methods and learning from each other is an important way to improve your farming practices. The Queensland DPI, through the Australian Government's RWUE3 funding, is running water efficiency workshops in the central Queensland region.

"I would really encourage people to attend workshops like this," said Alicia.

"Not only are they full of some good information and tips, but when you get a group of farmers together in one place the real benefit is in the networking and sharing of ideas."

Plan water use

Above all, Alicia highly recommends developing a water budget process for efficient planning.

Water budgets can be done by developing your own spreadsheet or by accessing some of the software packages available for this type of planning.

"Using the water budget allows you to make the right choices when it comes to deciding what crop to plant and the timing of irrigation. It can help you have a much better understanding of what your water situation is at any time and how the decisions you make will alter your position."

And when it comes to planning, Alicia should know. With an intensive role in the farm business and four sons aged between seven and fourteen, planning is an essential part of every day!

Guide takes guesswork out of choosing irrigation tools

The new Grower Guide to Plant Based Sensing for Irrigation Scheduling will assist farmers and industry advisers to make more informed decisions in relation to the choice and use of plant based sensing technology.

The adoption and use of plant based measurement sensors in agriculture has increased in recent years as a result of technological advances and a greater focus on the spatial management of crop inputs.

The array of new tools being released onto the market each season and plant monitoring sensors which were originally developed for research applications are increasingly being used for commercial irrigation scheduling.

However, with the wide range of scheduling tools available and the reputed benefits of each tool sometimes makes it difficult for farmers and researchers to identify the appropriate technology to use.

The new guide is a first reference point for people who are new to plant based sensing and to make sure farmers and advisors have the information they need to choose the right tool for the job.

The guide covers measurement options for scheduling irrigation and the benefits associated with plant based approaches.

It will enable easy comparisons of different sensing methods, as well as methods of operation, maintenance requirements, typical purchase costs and the advantages and disadvantages of the method for commercial irrigation scheduling.

There is also contact information for manufacturers and/or dealers.

The guide, by Simon White and Steven Raine, is a National Centre for Engineering in Agriculture (USQ) publication, with support from the Irrigation Futures CRC and CRDC.

Copies are available from NCEA, Irrigation Futures CRC and CRDC.

A Grower Guide to Plant Based Irrigation Scheduling take the difficulty out indentifying the appropriate technology for farmers and advisers.

The December 2008 *Spotlight* will publish a pratical review of plant-based sensing technology.

"Finding the right balance between autonomy and accountability is essential if we are to foster a culture of innovation."

Celebrating the Importance of R&D Collaboration

By Bruce Finney

On the 18 September this year the Australian Cotton Research Institute (ACRI) celebrates its 50th Anniversary. We can all be very proud that the ACRI is world leading in the nature and quality of the research undertaken. This has been recognised through awards to researchers and confirmed by independent assessments of the cost/benefit of research investments. And more broadly the role of research in enabling Australia to become a world leader in the sustainable production of high yielding and premium quality cotton is recognised by environmental groups, our customers and competitors.

Further examination of the impact of research has seen the Rural RDCs, including CRDC, examining the collective impact of their investment in research and development over the last year. A report summarising the results and conclusions from this initiative is scheduled for release by end of September.

But what is apparent from this exercise is the value of collaboration. Collaboration with research providers and other investors, including sister RDCs. This extends from back room administrative processes and individual research projects to national programmes addressing cross cutting issues such as climate change.

The challenge is to improve this further. Can we make investment in rural R&D even more efficient and valuable in its impact?

The Australian cotton industry research model based on levies from production which are matched by government matching contributions builds efficiency through having predominantly centralised national research at the Narrabri-based ACRI facility. This facility is supported by investments in regionalised development and extension services. CRDC, Cotton Catchment Communities CRC and research providers actively make this model work. In fact nationally this model is now being seen as the framework for review and consolidation of all primary industries R & D and extension. CRDC and our research partners are participating in this core review within the national Primary Industries Ministerial Council (PISC) initiative.

What about effectiveness?

It is arguable that collaboration in R&D is currently driven by the investors in research rather than the providers. This is critical from a perspective of setting the strategic direction and priorities for research at a time when the industry operating environment is responding to emerging issues that appear certain to determine a new future. Dealing with these pressures effectively will require greater research collaboration across industry sectors and particularly with the grains industry in developing resilient and adaptive irrigated farming systems.

Beyond investment how much importance and effect is given to collaboration in the actual conduct of the research? The importance of this to improving the quality of the science and the value of the research results through building connections and integration as well the future capacity of the research community.

A number of questions remain. What structures we create to support scientists from different organisations to actively work together and how would new structures exchange ideas and research findings? Do these work well or do scientists succeed in spite of the structures we establish? Could research providers allow scientists from different organisations to work together on projects? Does research management in organisations best serve these outcomes?

In summary collaboration is not an endpoint in itself. It does come with transaction costs that need to be weighed up. But collaboration is a key means to minimise duplication of research effort, engage end users in the research process, make most efficient and effective use of limited research resources, build critical mass, share risk, tackle cross sector issues, avoid restructuring costs and apply multi-disciplinary perspectives. All of which drive greater value from investment in research.

A new future beckons for the Australian cotton industry and its research. Whilst celebrating our past and present success let's also challenge ourselves to achieve more from collaboration.

Collaboration is a key means to minimise duplication of research effort to drive greater value from investment in research

The Australian Cotton Research Institute has clocked up 50 years of world leading cotton production research.