Australian Cotton Cooperative Research Centre

National Cotton Extension Network

EXTENSION WORKSHOP 2001

O'Reilly's, Lamington National Park

18-21 June 2001

Supported by the Cotton Research and Development Corporation

Notes Compiled by Ingrid Christiansen, National Cotton Extension Coordinator

Participants:

Evan Brown
Ingrid Christiansen
Bill Dalton
Craig Dunn
Julie Ferguson
Bill Gordon
Dallas Gibb
Raelene Greenslade
Graham Harris
Jenelle Hare
Mark Hickman
Peter Hughes
Rachel Holloway
Sarah Hood
Leigh Jenkins
David Kelly
Mascha Korteweg
Sarah Kerlin
David Larsen
Geoff McIntyre
John Okello-Okanya
Bruce Pyke
James Quinn
Kirrily Rourke
Greg Salmond
Gus Shaw
Peter Smith
Andres Spragge
Annie Spora
Darren Springer
Barry Swann
Chris Watson
David Williams
Simon White

Phil Goyne, Mike Bange and Paul Tindall attended for the water meeting.

Contact details in Appendix 1

Please Note: ***These notes are the record of an internal, staff planning and review meeting for the Cotton Extension Network – they are not intended for general circulation. Please contact Ingrid Christiansen or the relevant author if you would like to use any of this information.***

CONTENTS

EXTENSION FOCUS TEAM UPDATES

Activities 2000-01 and plans for 2001-02

In the past the extension focus teams have held their review and planning meetings at the extension workshop. The one drawback with this is that the ACGRA representatives on the teams have not attended. To overcome this, most extension focus teams met (face to face or by teleconference) prior to the workshop to discuss activities to date and set plans for the coming season. ACGRA representatives on each team were included in the discussions and the ACGRA R&D priorities were discussed with regards to those that applied to extension.

Attached are notes presented at the workshop and also notes from the meetings held prior to the workshop.

Disease Team Update

Greg Salmond

Cotton CRC/Fuscom (Fusarium Committee)/ACGRA workshop held in Goondiwindi, Feb 2001 – notes have been distributed. Second Fuscom meeting in September.

Washdown designs have been compiled and will be included in the IDM guidelines.

NRA is proposing that Farmcleanse should need registration.

Black Root Rot update written and circulated.

Students from UQ Gatton will be conducting interviews with growers on the Downs to gain information about growers' awareness of and attitudes to Fusarium.

Environment Team Update

Peter Hughes

Workshops held at Gatton to update IDOs and DAs on spray technology issues.

Regional 1 day or night workshops have been conducted – about 15 activities with over 300 attendees.

SPRAYpak is currently being revised.

An advanced model for Chemcert is under development.

Delivery of a segment of the Cotton Production course.

Where to next?
Asking IDOs to identify needs for workshops in each district.

Redo the IDO training workshop?

SPRAYpak is soon to be re-released – need for an extension program around this.
- the format has changed. Draft soon to be circulated.

COTTON EXTENSION FOCUS TEAM – ENVIRONMENT

Notes of Planning Meeting
NSW Ag Moree, 30 May, 2pm

Bruce Pyke, Nicholas Woods, Simon White, Bill Gordon, Peter Hughes, Gavin Inglis, John Watson, Rachel Holloway

John W

- Background to ACGRA Committees and discussion of the ACGRA R&D Priorities list with regards environment research areas;
- Need for collaboration;
- C-PAS – large investment - keen to see outputs from this;
- Salinity - investment through John Triantifilis's work. If we have achieve little leaching from cotton soils, how do we deal with high salinity irrigation water?
- BMP - much information is being collated into this form.

Background of environment team

- When initiated spray application was a major issue
- Team evolved to become problem a spray application Technology team due to the specifies focus of the members of this team

Peter H – update on activities

- Two training workshops have been held at Gatton on spray technology for the extension team.
- Will need to re-do this to include newer staff. Some staff have attended both and are now confident to run regional workshops themselves.
- Keeping the extension team up to date: Update at extension workshops, Website?, regular contact
- Regional workshops conducted – the areas where these are held each season varies depending on interest/priorities
- Spray Pak is being rewritten
- A Code of practice developed for applicators
- Run 1 1/2 days for UNE Cotton Production course

Chemcert courses for cotton & grain's:
In Qld these are run by private providers and TAFE
In NSW Chemcert if only offered through private providers (TAFE no longer involved) – a separate course is being developed by TAFE and NSW Ag

Bill G - update

- Funded by NHT to work on Cotton and Grains – primarily Goondiwindi and the Downs.
- To date have held 16 Grower workshops, 10-12 Consultant workshops – groundrig based but also have questions about aerial
- benchmarking (more detail on spray issues than the CRC Survey)
- trail techniques being developed
- replicated trials conducted on farms with commercial applications
- several articles prepared
- delivered training with Dalby Ag for chick pea & mungbean agronomist accreditation (also with Pulse Australia, DPI – Tim Nehl)
- Kim Broadfoot conducted a phone survey about what growers want in spray training.

Potential Gaps

– *increase understanding among growers and consultants of what the aerial operators do and vice versa*

Peter H - shed meetings were held on the Downs for aerial operators, consultants and growers – agreed on approaches but once the season got busy, most forgot about this.

Bill G - CCA have been very supportive but it is difficult to get aerial operators involved. Many operators came to the insect resistance meetings but many don't.

Current difficulties include the changing usage of aircraft with Ingard /Twingard (generally later season use of aircraft only) and the rapid turn-over of people in companies

➔ Opportunities for shed meetings with aerial and grounding operators?

Gavin – Cotton Australia are providing recognised training in BMP for resellers

Chris Wicks' work indicates that it is the growers with the best relations with their consultant/applicator who are performing better.

C-PAS at UQ

- mostly aerial but also some groundrig research
- Wind tunnel research facility
- Can test drift from huge range of nozzles/adjutants, etc
- Nozzle calculator - developed - ready to go to manufacturer
- Large drift studies at Auscott Narrabri - to look at the benefits of changing to Endo LDP to minimise drift and efficacy, this had worked with chlorpyrifos to reduce drift, not as good efficacy as expected
- Effects of adjuvants
- Dr Jamie Nichols is soon to join team and will be working on cotton issues
- Extension: some work is industry commercial in confidence work so limited in extension to date
- C-Pas info is included in the 2 day workshops held for IDO's
- Spray Pak
- GRDC funded review of nozzles
- Chemcert
- Commercial applicators technical manual
- National Guidelines/principles for spray Application/Drift - AFFA - with technical manual
- Expect complete by mid year
- CRDC funded review (Steve Parkin) of spray application research
- Industry advisory committee to be estab for C-PAS
- Keen for an information feedback loop.

General

Staff changes in industry has caused a limit of information/knowledge among industry

- How do we get the information through?

Bill G – Nature of work has been adhoc – a strategic approach is needed to best to use limited resources.

➔ Develop a training course?
With a structured delivery approach? For growers / consultants / operators?

ACTION:

Run a series of spray technology workshops in conjunction with the launch of the revised SprayPak. ie regional launch of the new SprayPak.

SprayPak will form the basis of these workshops and associated extension activities (including newsletter articles, field day demo's, etc) – establishing SprayPak as the reference material for spray information

Debate as to whether workshops are best run for growers/consultants and operators together or separately.

Target groups (need all people who are part of it to be involved at some stage)

- Growers - perhaps could be done through IDO'S
- consultants
- operators - AAAAs
- chem. distributors/reps
- IDO'S

Spray Pak could provide the basis of a more strategic approach to spray tech training which may include:

- A series of workshops
- Spray Pak information
- Additional information (detail)
- Fly ins

Eg the endosulfan training exercise –

- 1 week solid of training
- 40 workshops held

➔ Need to talk with each of the target groups to determine the best approach.

Bruce will talk with the AAAAs to progress this further. Bruce will send a letter from CRDC to ask people to indicate their interest and ID priorities. Possibly then a SprayPak review workshop – similar to the IPM Guildelines review – to determine best method of enhancing adoption, and to create greater industry ownership and commitment.

Rachel will talk with CCA about including a talk about spray technology from Peter, Bill or Nicolas at one of the forthcoming CCA winter meetings.

Salinity Issues

- the farming systems extension team will consider this issue in the coming year.

Environment Focus Team Membership

- This team will remain as the "environment" extension team – other skills may need to be drawn in as needed for other issues.
- The Griffith IDO will join the team once appointed.
- Jamie Nichols (new C-PAS research scientist) to also be a member
- Link with UNE PhD work about the impact of spray drift on native trees

The "GO AHEAD" Insect Team

- What has been achieved in 2000-2001.
  - IPM Guidelines
    - IDO Cotton Tales
    - IPM Guidelines Poster
  - Benchmarking Awareness
    - Power Point Presentation (In Progress)
  - Extra Activities
    - Bill Dalton x 4 on IPM
    - Julie Ferguson x 1 on AWM

The "GO AHEAD" Insect Team

- Feed back from focus team meetings
  - Pretty happy with the way things are going.
  - Outstanding Project is the Benchmarking Awareness PowerPoint
  - Once completed all targets met plus 4 extra posters

James Quinn, Insects Focus Team Leader

The "GO AHEAD" Insect Team

- Proposed Activities 2001-2002
  - Resistance Monitoring
    - Summary Sheet for release of the 2001.2002 IRMS
      - Result of this season resistance testing
      - Explain key parts of the strategy
    - Helicoverpa Resistance Flyer, 2nd Edition
    - Aphid Resistance Management Update
  - Summer Trap Cropping
    - Gary Fitt's Glossary of Terms
    - Fact Finding Mission (What crop are most valuable as refuges/trap crops

The "GO AHEAD" Insect Team

- Proposed Activities 2001-2002
  - AWM Groups
    - List of valuable activities for groups
      - Standard core activities which tie in with national or Industry Issues
    - AWM Compatibility with CottonLOGIC

James Quinn, Insects Focus Team Leader

The "GO AHEAD" Insect Team

- Proposed Activities 2001-2002
  - Pest and Beneficial Insects
    - Beneficial display case for IDO's X referenced with chemical group BDI
  - Food for Thought
    - Introduction of TWINGARD in couple of years
      - May need to re-invent the IPM/INGARD support groups
      - TWINGARD introduced on smaller scale - demo - could build grower groups around this

James Quinn, Insects Focus Team Leader

COTTON INSECT TEAM MEETING

31st May 9.00 am
NSW Agriculture, Moree

Tony Heckendorf (ACGRA), Bruce Pyke, Sandra Deustcher, Julie Ferguson, James Quinn, Chris Watson, Bill Dalton, Ingrid Christiansen, Dallas Gibb (by phone)

Projects from the 2000/2001 Season

IPM Guideline awareness		- IDO Cotton Tales.
		- IPM Guidelines Poster.
Benchmarking Awareness		- Power Point Presentation (in progress).
Extra Activities	4 posters	- Bill Dalton X3 on IPM; Julie Ferguson X1 AWM.

Once we get the benchmarking power point done we will have completed all tasks agreed upon at last season's extension workshop, plus some extra posters developed for this season's trade show.

ACGRA Priorities

Tony H and Bruce P explained the background of each of the ACGRA Insect Research Priorities to start discussion of what can be done by the insects extension team. This is not an exclusive list of priority activities.

2001/2002 Cotton Insect Extension Team Projects

Resistance Monitoring
New person to co-ordinate egg collections - will need to link with this team.
There is a need to get information back to industry in a timely fashion – currently there is no incentive to collect eggs due to the long time lapse before results are received. Quicker data feedback will be valuable for AWM groups.
Summary sheet for the release of the 2001/2002 IRMS.
Results of this seasons resistance testing
Explain key parts of the strategy and why features have been done?

Who – JQ/BD/BP

Helicoverpa Resistance Flyer, 2nd edition of the one produced in 1996/1997.
Who – JQ/BD

Aphid Resistance Management Update.
Who – Lewis W / Annie S

Summer Trap Cropping:
Glossary of terms – some confusion over the terms refuge and trap crop.
Who – Gary F has started this

What crops are most valuable as refuges / trap crops
Fact Finding Mission – Address the question
Are we at the stage to do anything about summer trap cropping yet?
Pigeon pea agronomy note being prepared – CW
Add to agenda for IPM guidelines review
Some will be included in IPM training video
Who – GF/MD/JF/BD/CW

AWM compatibility with CottonLOGIC
Martin Dillon and James Quinn to submit a written report of what is needed for CottonLOGIC team.
Discuss concept with Fisher/Wicks Consulting.

Who – MD/JQ

Pest and Beneficial Insects:
Beneficial display case (insect collection) for each IDO which will be cross-referenced with chemical groups (matching the colour coding of the insects guide).
Feasibility of project as it will require a budget.

Who – JF

Pesticide Odour Ranks
Bruce to follow up with AAAAs

AWM
We need a list of valuable activities for groups for those involved in groups – not a recipe approach but ideas for successful activities.
Standard or core activities that will tie in with National or Industry issues.
This is to be discussed at the extension workshop.
Request from GRDC for list of AWM groups – compile at workshop

Who – IC

Evaluation of AWM
focus groups exercise (similar to that done for IPM 5 years ago) – CRDC are proposing to do this again – look at changing attitudes to IPM - AWM groups that have worked and those that haven't.
Incl. adoption of IPM guidelines

Who – BP, JF, IC, IMc

Heliothis Hotline and Stateline
Distribution, funding, frequency?
Some of it is used on Cotton tales
Keep Downs focussed but make it more broadly available (otherwise to difficult to compile) – perhaps via Cotton CRC web – Lars' links

Food for Thought

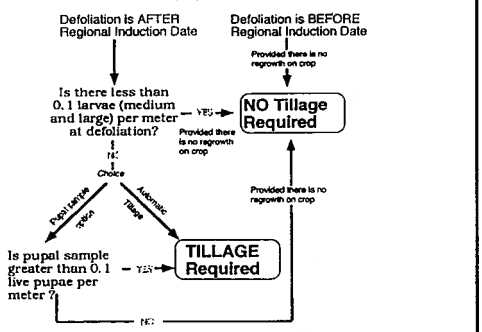
Tony mentioned the need for forward thinking in regards to the TWINGARD release in a couple of years.
We may need to re invent the INGARD/IPM support group process to assist people in the adoption of this technology.
TWINGUARD will be introduced on a smaller scale – demo's – could build grower groups around this

Farming System Team Update

Dryland Pupae Busting

- November : Researcher meeting held
- Document in the draft stage and will be circulated to researchers for comment.
- Team comment will then comment on package
- Printed under the FS CRC Banner before the start of 2001-02 season

Do I need to Till or Sample ?



Rotation Document

- Gus Shaw and Helen Dugdale + input from the FS Team
- Outlines Adv and Disadv of rotation crops on the subsequent cotton crop
- Currently at CRDC (Tim Lester) for pilot printing
- Circulation to 10 selected growers / valley for comment
- Release target before 2001-02 season

Other Extension articles

- Dave Kelly- Irrigated Cotton and Wheat Stubble, CRC publication
- James Quinn- Twin Row Cotton Poster at the Moree Cotton Trade show

Future Directions : Certains

- Teleconference held with ACGRA member and FS team
- Alternative Insecticide Options available for winter pulse crops to avoid SP use: Leigh Jenkins / Cameron Tonkin

Future Directions - Possibilities: Yet To Be Decided On

- Strategies to manage resistance in Roundup Ready Cotton- Weed Pak nominated?
- Salinity in Cotton areas- extending information of John Triantafilis and Ian Gordon via a series of valley information nights. FS to facilitate

Possibilities: Yet To Be Decided On

- Investigating the extension messages available for
  - Impact of farming system on microfauna
  - Gin trash for Org Matter Vs disease issue
  - Soil sodicity and Water Quality of irrigation water

Cotton CRC

Farming Systems Extension Team

Mark Hickman
PO Box 546 GUNNEDAH 2380
Ph: 02 67429279 or mobile 0427 007 422 or Fax 02 67422940

Members :
Mark Hickman
David Larsen
Jenelle Hare
Leigh Jenkins
Cameron Tokin
John Marshall (CSD)
Peter Morrison
(ACGRA)

FARMING SYSTEM TELECONFERENCE
8, June 2001

Present on the teleconference:

Peter Morrison (ACGRA Representative), John Marshall (CSD)
Ingrid Christiansen, Gus Shaw, David Larsen, Leigh Jenkins, Mark Hickman
Apologies ; Cameron Tonkin and Jenelle Hare

Agenda items

Overview of current projects for the Farming systems team.

Pupae Busting in Dryland

Dave Larsen reported on the pupae destruction guidelines for dryland cotton. This document has been put together as a result of a November researcher meeting and it is at the stage of being passed back to the researchers involved in that initial meeting for comment. Once cleared, this will then be circulated among the Farming system team for layout comment etc. then released to the public under the CRC banner.
The aim is to address the conflict between min till / zero till farming and cotton dryland re resistance management. The document establishes a series of checks and criteria and if these are met then no tillage maybe required by the farmer. While other cases will show they have to cultivation.
Time frame for release: prior to the season but dependent on comments.

Rotation – Advantages and Disadvantages Document

Gus Shaw and Helen Dugdale are working on this and it is with Tim Leister at CRDC for lay out. The document is targeting what are the adv. and disadv. Of a rotational crop on the subsequent cotton crop. It outlines lots of areas ranging from WUE to soil structure. Leigh asked if the document accounts for the alternative insecticide options available to a rotation crop say like chickpeas. To ensure SP chemistry is not sprayed in stage 1 of the cotton season. Answer was No, so this is a project to be done by team members Leigh Jenkins and Cameron Tonkin (see Cameron if you are not present you get a job jokes!!).
Time frame for release:
Pilot document will be sent to IDO or the nominated 10 growers in each region for valuation prior to mass release. Pilot document will be distributed and comments back to Gus by end of July. Mark H will investigate getting a Draft Draft from Tim Leister for the extension workshop.

Dave Larsen commented on **Wheat stubble document** and this is almost signed off by the CRC and ready for industry release. This document is an overview of how to sow cotton into standing Wheat stubble . This document is the information known today and this

technology will certainly evolve with time. It is not a recipe to grow the cotton in this manner rather a set of guidelines. This topic was an ACGRA priority in relation to soil structure, reduce pesticide movement, growth rates of cotton and the early season insect benefit report in the northern areas.

ACGRA Priorities

Peter Morrison gave an overview of the thoughts behind the 5 main priorities. These priorities were a result of a mid December 2000 phone conference that was after the Dalby Farming System Forum and before the CRDC project review.
Areas:

1. Impact of farming system on Micofauna
2. Methods to ameliorate the soil – Gin trash and disease concerns, increasing Organic matter
3. Planting of twin row wheat (future cotton row free for cotton planting) and associated benefits : Nutrition, insects and soil
4. Narrow row systems – refine both twin row and UNR
5. Soil Sodicity and irrigation influence. Future management options.

Other issues raised included: Area wide Management of insects, and precision agriculture.

ACGRA Extension priorities

1. Griffith IDO position this should be filled ASAP due to growth of the industry is to the south. Ingrid informed the group that the position is currently being processed and the applicant has yet to sign on. Except this person to join the extension workshop in June.
2. Extension activities to align with research- ensure there is communication flow. Further comment from Bruce Finney (Chairman of this group) is to be sought on the matter to ensure this was the message.
3. Water balance Extension- what was the state of play- Sunil Tennakoon and Stephen Milroy are developing this and this needs to be identified to the Water Team to ensure this extension is being developed. (Mark H to contact the Team Leader for Water)

Future Direction Topics:

Of the topics below give some thought to these as the next farming systems project, the final decision on the selected topic will occur at the extension workshop. If any member has other topics just circulate them to the team members.

a. Salinity in the Cotton System

This is the work of Dr John Triantafilis (Syd Uni): suggestion that a seriues of regional shed meetings to be organised to outline his work and what finding he has to date. The farming system team to be the co-ordinators of this tour (Ingrid). Different points of view for and against were expressed and it was raised that the extension message at this point may be as simply as a "monitoring and watching brief" (Gus). Mark H suggested Ian Gordon should be involved and this may mean that the two researchers need to meet with Ingrid and Mark to sort out what the best extension message is to be delivered, if this was the Teams preferred option of task. Leigh J raised the concern that Dept Land and Water dealt with this in the Macquarie and this lead to the idea to link in with the Dept to develop the extension message. Especially given there are to be 6 salinity teams developed in NSW soon. Cotton needs to tap into this.
Ingrid to contact Dr JT and suggested Ian G to talk about the viability of this.

b. Investigation to occur with Researchers into the topics of
~**Microfauna and impacts** – Mark H to contact resaerchers and see if there are any extension messages or is it still in resaerch mode.
~**Gin Trash vs Disease risk** – no nominated person to investigate
~ **Sodicity**- Ingrid to contact Nilantha on the issue
Once these 3 sub topics are incvestigated they will be reported on at the latest to the members at the extension workshop for voting

c. **Sodicity / Water quality of irrigation water**: Extension messages ? Oiutside of soil pak. This was to be futher investigated by Ingrid when she speaks to Nilantha.

Topics Under way:

a. **Alternative Pesticide Options in Rotation Crops;** As mentioned this is to be tackled by Leigh and Cameron. Once drawn together and checked with cotton and other industry researchers then it is to be circulated among the group and develkoped into a CRC information flier. Leigh to email copy of work to date to mark to see if there is a fit in the Rotation document. Mark H to send copy of DPI Crop Link brochure called "Know Your enemy" to Leigh

b. John Marshall: **Strategies for the resistance and general management of Roundup Ready cotton.** This topic is to be past onto the Weeds Team, and should be addressed in the weed pak document.

Other matters:

~ Cotton CRC Web site to have an over haul soon- Dave Larsen for future updates
~ C PAS extension – series of workshops planned
~Ground rig training and certification – Peter Hughes (Environment Team) developing
~ Water team developing HYDROpak to support Hydrologic

Australian Cotton CRC Weeds Team

Progress and Plans 2000-01

Australian Cotton Cooperative Research Centre

ACGRA Priorities

- Management of RR Cotton
- Weed management in UNR, min till, trap crops
- Role of weeds in Fov spread
- Research on specific problem weeds
- Development of extension packages for weed ID and mgmt

Australian Cotton Cooperative Research Centre

WEED TEAM

- Research
- Extension
- ACGRA

Australian Cotton Cooperative Research Centre

WEEDpak / ID Guide

- Correct identification
  - Identification Guide
- Management Options
  - Link with management (research + best bet)
- Best Practice
  - IWM/ Sampling/ Thresholds
  - Resistance
  - Farm Hygiene

Australian Cotton Cooperative Research Centre

WEEDpak / ID Guide

- Time Frame
  - First edition by next year's conference
  - Only some species - starting point

Australian Cotton Cooperative Research Centre

WEEDS EXTENSION FOCUS TEAM MEETING
Narrabri, 16 May 2001

Present: David Kelly, Gus Shaw, Sarah Kerlin, Annie Spora, David Larsen, Ingrid Christiansen, John Watson, Graham Charles, Ian Taylor, Stephen Johnson

Apologies: Grant Roberts, Nicky Schick

Agenda: ACGRA priorities (as listed below)
Activities underway with the research team (brief update)
Set priorities for activities for the weeds extension team for the coming year - eg management guide.
Should we merge the research and extension teams?

WEEDpak / ID Guide

There was, and has been to date, considerable discussion regarding the development of a weeds information kit for growers.

A few key points of the discussion:

- Weed identification has not been seen as a major issues by growers (GC);
- Generally there exists a poor knowledge of weeds species (GC);
- Need to be able to identify mature and seedling stages (GC);
- Several existing guides are good but do not cover all weeds of cotton (GC);
- ID is a priority and then biology, ecology and management (GC);
- Focus of WEEDpak on ID (SJ);
- Internet based (SJ);
- John personally favoured the web based ID guide but ACGRA support was for a hard copy Ute guide (JW);
- ID is crucial (JW);
- Need an ID guide with easy reference back to control measures (JW);
- The same can be used to produce a hard copy as to publish on the web (DL);
- A hard copy could be produced in an updatable format so that it can be added to/modified as is currently done with ENTOpak, etc
- A WEEDeck is produced by the national weeds team. Currently the cards available are primarily environmental/noxious weeds rather than crop weeds. The Cotton CRC could sponsor pages to be produced for this WEEDeck (and then obtain those cards desirable to put together a cotton weeds deck). However, this is considerably costly. Look up http://www.weeds.org.au/identification.htm for more info.
- WEEDpak will need to include ID, Integrated Weed Management and Control measures/management options;
- Currently we (research) don't have management strategies for most weeds (GC);
- We can't say to do nothing simply because we don't have the research – need something now. Cotton industry publications are reviewed every 2-3 years so this would be a start that can be updated. (GS)
- Gather the anecdotal and corporate farm knowledge of weed management together with research knowledge to compile some "best bets" (GS);

Action: A WEEDpak will be developed which will include – a Weed ID guide, IWM guidelines and best bet management options

Format

- Several options are possible;
- An ID guide will be produced which will complement a management guide;
- Management notes will not be included with the ID photo guide due to the rapid changes in weed management advice – with the cost of producing a colour ID guide we would like to see it valid for a longer period.
- Both hard copy and web based will be needed;
- Possible to include more photos per spp (~ 6) on the web based version than in the hard copy (2-3);
- Preference is for something that is updateable
- Select actual format by taking copies of several possible options to growers to gauge their response to each;
- The format may be for a folder that then includes the ID guide and the management information.

Management Guidelines

Dave and Sarah will arrange workshops in collaboration with other IDOs to gather information about best management options for a selection of the most common weeds. These will seek to have participation from growers, consultants, agronomists and resellers.

Timeframe

- GC: plan to do 10/yr – eventually will do 50-60 (ie 6 years to complete)
- JW: ACGRA would like to see a Weed guide by the next cotton conference **(August 2002)**

Who?

- The following table indicates components of the WEEDpak and the people suggested as responsible for each (those of you not at the meeting please let the rest of the Weeds team know if you don't think you will be able to do this).
- Photos are available of a number of weeds species (GC, SJ, IT)
- To make it possible for this to be ready by next August without excessive loads on weeds team members, it is suggested to outsource some aspects:
    - Scanning of images – send slides away to be scanned commercially to CD;
    - Obtain assistance in desktop layout to prepare the ID guide (perhaps Tim Lester can help here?);
    - Additional funds will be needed to cover these costs;

Notification of New Weeds

Identified as a concern by ACGRA was the need for a system of notifying growers of new weeds.
Annual weed surveys are currently undertaken by the Weeds research Team.
From these surveys, Ian Taylor can identify weeds that are becoming more of a problem.

Action: Ian will contact Dave and Sarah to discuss weeds that are emerging as a problem from the surveys. Dave and Sarah will then prepare news articles for Cotton tales, Local news, Australian Cottongrower and the Cotton CRC Web site to highlight and describe these weeds.

Cobbler's Peg / Bishop's Weed

No work currently planned for these weeds.

UNR/ Minimum Tillage / Trap Crops

Graham has done some work in pigeon pea.

Weed management in chickpea in a cotton rotation needs attention as some of the herbicides recommended in chickpea are not advisable if cotton is to be planted into the chickpea block in the same season. Work has been done on weed control in chickpea elsewhere and it may not be too difficult to get the info related to managing chickpea as trap crops / rotation crops with cotton.

Weeds management in UNR systems is a specific research need. Good early weed control is essential in UNR systems and Roundup ready cotton is forming the basis of this. A 3 year post-doctoral program could be undertaken in this area.

Nutgrass is a problem in wheat stubble – there is a need for a nut grass demonstration trial around the Brookstead / Dalby area. John Marshall from CSD may be doing this.

Impacts of wheat stubble systems on weeds – Graham's trials cover this area.

Weeds Teams

It was agreed that the Weeds extension and research teams be merged as a single Cotton CRC Weeds team.

WEEDpak Development

Component	Coordinator / Primary Author
ID Guide	Steve & Graham together with Ian & Anne
IWM Outline – Shorter version in ID guide; Longer version in WEEDpak + Web	Grant & Graham
AgFacts– Weed Control in Cotton; Nutgrass	Available
Species specific management (Best bets)	Dave, Sarah & Ian
Management of volunteer cotton – esp. in dryland	Grant & Sarah
Roundup Ready Management	Ian & David Moore
Herbicide Resistance / Herbicide Groups	Annie
Weeds chapter from the dryland production guide	Available – review – Gus
Farm Hygiene – incl. case study	Annie, Steve, BMP, Disease team
Weeds + Fusarium	Disease team
Link to Spray guidelines (1 page scan of front cover + brief comment)	
Leaching / Run-off risk and management	Ian & Ingrid – info from Ivan Kennedy, David Waters and Bruce Simpson + BMP

WATER TEAM MEETING

O'Reilly's, 19 June 2001

Graham Harris (Facilitator), John Okello-Okanya (Scribe), Andres Spragge, Peter Smith, Raelene Greenslade, Darren Springer, Phil Goyne, Rachel Holloway, Barry Swann, David Williams, Sarah Hood, Paul Tindall, Michael Bange

Main Agenda:

A. Situational briefs:

- current status
- what worked well
- what not worked well
- what resources are available
- water group extension mission &mission

B. Where to from here:

- future plans and focus
- issues and concerns
- closing issues

C. Joint issues

RWUEI (Water) Team - Queensland: Phil Goyne

Queensland DPI has a specific WUE team for each major industry (Cotton +grains; Dairy, Horticulture and Sugar cane - each team with a well-defined structure and representation in the field.

NB: Project milestone report has just been completed (June/01) - Phil Goyne to circulate copies to members. It provides detailed update of regional activities including the project's operational linkages with other related institutions such as Cotton Australia, NSW Ag; NCEA – Toowoomba; and also research centres like CRC; CRDC etc.

NSW Ag. Water Team: - Peter Smith

Water team structure in NSW Ag is not well defined (on industry basis) as in Queensland – instead - involvement covers all irrigated enterprises altogether under one umbrella (including cotton). The cotton crop is also restricted more to the north eastern section of the State (or next to the Queensland border) – giving it relatively little leverage in the entire irrigation industry as compared to Queensland

NSW Ag. however has a team of Technical Irrigation Officers to deal with particular aspects of irrigation including farmer training (ie actual *Waterwise on the Farm* course delivery); whilst WUE Officers mainly collect and collate data plus benchmarking. Another set of officers – Regional Waterwise on the Farm Facilitators
who work jointly with Irrigation officers to train irrigators on voluntary and free basis. Facilitators run the program campaigns (promotion), recruit the course participants (irrigators) and organise venues, actual schedules and facilities for the training etc

Course format:

Day 1- Soils	Day 3 - Scheduling
Day 2 – Systems	Day 4 - Planning

(Copy of detailed course manuals may be obtained from Peter Smith)

Particular areas of focus by NSW Ag. Water team include:

- further development and promotion of the Waterwise on the Farm course – surface/pressurised systems - Peter Smith and Garry Giddings).
- development and promotion of information on Irrigation Systems (pumps and pumping efficiencies + centre pivots etc – Barry Swann and Garry Giddings)
- development and promotion of information on on and off farm measuring gear (Barry Swann)
- compiling irrigation list and manual – equipment and services directory - dealers/suppliers (David Williams)
- development of a water use BMP module (Allan Williams)
- data collection and benchmarking (WUE officers)

Project performance and Failures/Hindrances

WHAT WORKED WELL

- pilot pump courses (NSW)
- irrigation workshops -in field (Qld)
- shed meetings particularly (focussing on scheduling (Qld)
- post-harvest meetings (Qld)
- WUE awareness field days (Qld/NSW)
- joint operation with consultants and agribusiness (Qld/NSW)
- informally catered sessions (Qld)
- something new! (Qld/NSW) (eg *morning breakfast sessions)
- grower receptiveness to/acceptance of trial results (Qld)
- farm walks and bus tours (Qld)
- WUE grower awards night (Qld)
- *Waterwise on the Farm* courses (NSW)
- Laboratory evaluation of equipment (NSW)
- EM 31 for storage - workshop (NSW)

WHAT DID NOT WORK WELL

- adoption training (Qld/NSW)
- in-door type of presentations – workshops, seminars and information sessions (Qld/NSW)
- farm competitions! (Qld/NSW)
  - *needs support from growers
  - *nomination of field days etc
- benchmarking – *politics!* (Qld/NSW)
- incentives!(Qld/NSW)
  - *Qld – new conditions and amounts being reviewed
  - * NSW - scheme still non-operational (3yrs)
- equipment issues! (availability, quality + failures)

Available resources to the team(s) – include:

- Farm cooperators and sites
- Trials and data
- Water teams (QDPI and NSW Ag)
- Specialised Technical Officers (such as Pat Weldon – NSW Ag)
- *Waterwise on the Farm* courses and notes
- Specialised technical information on irrigation (eg pumps and pump efficiencies; on and off farm run-off measurements etc)
- Strong links with groups such as NCEA (USQ Toowoomba); IDOs; TAPs; etc
- Scheduling tools manual (being developed – NSW Ag)
- Irrigation software (eg. Watersched; SILO; Rainman-from *Met. Bureau*; or Hydrologic - *from CSIRO* etc)
- R&D projects
- Websites (eg RWUEI- Qld; Waterwise on the Farm (NSWAg.); IAA; APEN etc)
- Discussion groups (eg WUE discussion groups - both Qld/NSW)
- DNR Library (Donna Beattie – Qld; WUAU –at Dubbo NSW)
- Consultants, Agribusiness; researchers
- Tele-conferences

Where gaps seem to exist:

- training resources for growers (time; quality human power and material)

Grower-training

Paul Tindall RWUE (DNRM Qld)

Major focus:

1. Develop appropriate farmer irrigation management training packages – based on/similar to the *Waterwise on the Farm* courses in NSWAg. and/*or River Management and Care* in SA.
   Plan is for 5 packages – regionally based and basic to irrigation management
   Need for quality packages and delivery techniques (special training may be required)
   Water use team members (likely) to be heavily involved

2. Promote BMP program – for land management planning
   Need to achieve simulation/consistency with National requirements.

BMP program

Rachel Holloway (CRDC-BMP)

- Water use BMP module draft (to be included in the BMP manual is ready and in final review.

- Need to circulate copies to the water team – (Phil Goyne to contact Allan Williams)

- The Water module has been developed with support from EPA - although it also requires contribution from general public

- Final copy to be ready by August'01

Hydrologic program – as a water budgeting tool

Michael Bange (CSIRO/Cotton CRC)

- developed at Narrabri (CSIRO/Cotton CRC)
- based on water balance - based on Sunnil approach
- whole-farm/paddock (water management)

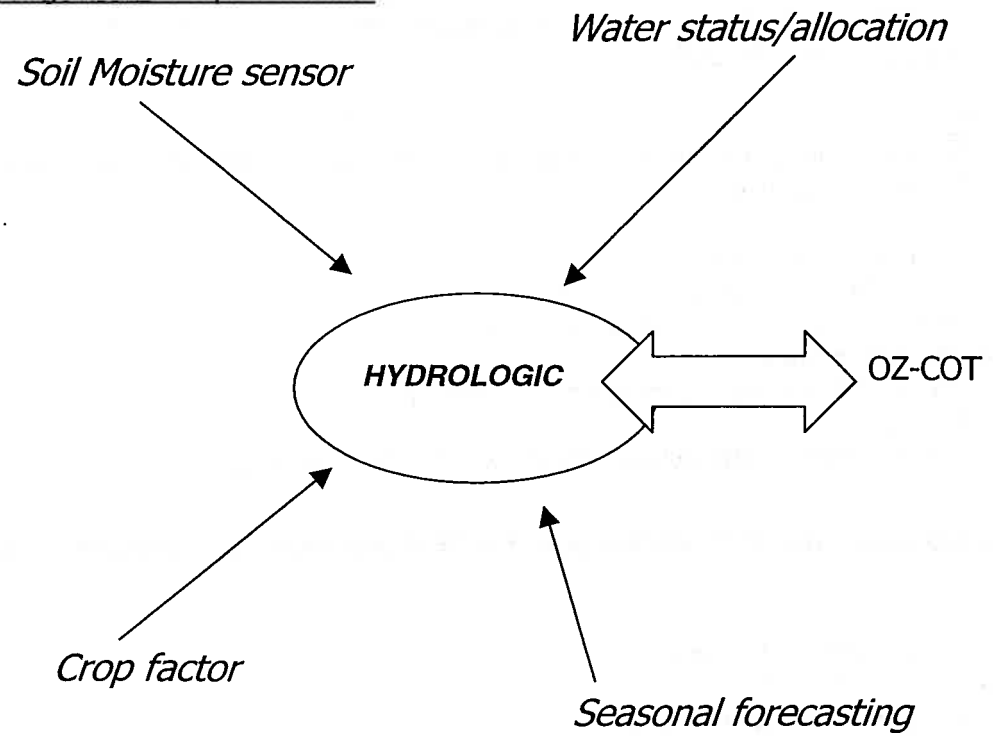
Component areas:

Water budgeting
Soil plant relations - hydropak
Interaction with Oz-cot

Water-use related research projects

Hydrologic works in similar manner as weather stations – but cost is much less – particularly for farmers and management + maintenance is easy.
What is important is proper training – to acquire confidence!

Diagrammatic representation:



Time table or (timelines) for implementation:

June'01	Sunnil's Water budgeting tool/package completed/ready Handed over to the WUE teams (Phil Goyne) to look through and for (testing if possible)
Dec'01	"SILO" completed and ready for application
Dec'01	Hydrologic completed and ready

NB: Important for prototypes of these tools to be first tested in the field by technical staff (WUE team) before recommending for grower adoption.
*Team training to be arranged

There is great opportunity to develop/generate new soil-plant relationship models with hydrologic - opening new area of research completely in irrigation management – and a need for a Senior Research Position

Also a great opportunity for water use - related research projects to be put into/integrated with Oz-Cot

Concern from the Water group:
Lack of and untimely Level involvement of Extension component in whole of the above

Future plans/activities

WUE team (Qld) met in Biloela (April'01) - plan details for new season are described in the milestone report. NSWAg group have their plans largely on individual level (see below); however, they need to get/come together to share and plan together (if possible).

NSW Water team also needs strong support and endorsement - from CRDC etc – to participate in all activities – such as courses, conferences; field days etc (attention: Ingrid Christiansen; Dallas Gibb and Bruce Pyke)

Most importantly:
Need for joint planning/sharing/operation (ie extension activities) between the water teams - (QDPI and NSW Ag.) – especially:

- review of past season(s)
- plans and strategies for new season
- information and data sharing from trials etc
- staff development; conferences and courses etc
- new trials and benchmarks
- literature, education material; courses and equipment
- project evaluation
- grower training; functions and events (eg field days, workshops etc)
- software

Particular focus-activities planned by some – NSW Ag water group members:

David Williams:
Site storage trials
Pump flow rate calibrations and recycling
Scheduling equipment list/manual
Short season strategies for water management

Barry Swann:
"Measure water to manage the Project"– field day (August'01)
Special software to collect and process data
Flumes for application rates; in and off-field flows (*total in and out-flows*)

Rachael Holloway:
Finalise water use efficiency BMP module. Draft copies to be supplied to team members – (Phil Goyne to contact Allan Williams)
Also need for Phil Wright's replacement in the BMP sub-group – (*suggestion Jim Purcell*)

Raelene Greenslade
Deep drainage under limited water supply trial with Mark Hickman
Plant mapping in relation to water

Closing Issues

Set up a coordinator for the NSWAg and QDPI water teams.
Meantime - Phil Goyne to be interim

More technical interaction and communication required between the two water teams (through various ways) for:

- share information
- avoid duplication/conflict/time waste
- coordinated activities

More regular meetings/get together between the teams (in and out of season)
Proposals:

28th Nov'01 – IAA field day at Moree (*Peter Smith to confirm*)
4/5/6th Sept'01 – Water Budget tools (SILO and Hydrologic) training for the 2 water groups – at Narrabri (*Michael Bange to arrange*)

Visions and Missions

The group did not have adequate time for this item in the program – however the few that came up were:

- more integrated research approach (all aspects of production considered)
- ability to make impact in the Irrigation Industry
- sustainable irrigated cotton
- matching water use and productivity
- more locally/regionally-based research/trials for better guidelines
- integration of content and process
- etc

Australian Code of Practice in Irrigation – completed and released

WUE Plans 2001-02

QUEENSLAND

- review and plan with grower groups
- Each DEO to establish 4 sites for this coming season
- WaterSCHED developed for early season evaluation. Training in its use developed and delivered.
- work with NR&M Project "Measuring the Influence of Water Quality on Drainage through Irrigated Cotton Soils"

- mid-term evaluation report (August 2001) followed by external audit (September 2001).
- Benchmarking and systems analysis with overhead irrigators

NEW SOUTH WALES

•Storage sites (David)

•Pump flow calibration for recycling (David)

•Scheduling (David)

•Short season strategies for water management (David)

•Measure Water to Manage It Project (Barry Swann)

•Development of software for collect and processing of data from flow metering devices (Barry Swann)

- Developing flumes for determining application rates and flows in and off fields on farms (Barry Swann) Complete development of BMP module (Rachael)
- Limited water trial and deep drainage (Raeleen and Mark Hickman)
- Plant mapping in relation to water supply (Raeleen)

Training

- RWUE DEO training through Irrigation 2001 and the APEN Conference
- Training activity at Narrabri for NSW/Queensland Team members on:
  - Whole Farm Water Budgeting tool of Sunnil Tennakoon's
  - SILO
  - HydroLOGIC
- Activity planned for 4,5 and 6th September 2001 at Narrabri.

Australian Cotton CRC Technology Resource Centre Distribution

David Larsen

Distribution of minor packages and fliers

- *Industry Mail List 2750*
- *Depends on importance*
- Industry wide special mail (pest management guide via NSW Ag and TRC mail list)
- To industry list via piggyback on other publication. Black Root Rot IS

Distribution of minor packages and fliers cont'd

- Direct mail to issue group
  - Consultants
  - ENTOpak registered users
- Email notification of PDF on web
  - all CRC e-news recipients (800 ^)

The Major Packages -'paks

- not distributed industry wide
- users have to register
  - gives some ownership seeing that there is no payment
  - allows updates to registered users
    - ENTOpak users have received 3 or 4 additions
    - SOILpak users updates on workshops
    - NUTRIpak will receive a manual!!!

'paks distribution to date

- Packages promoted
- Packages distributed free within cotton industry via
- Mobile TRC
  - field days
  - CottonLOGIC TRC workshops
  - Major conferences and trade shows
- Individual requests to TRC

Resources currently available - paks

- ENTOpak 872 registered users (most consultants)
- SOILpak, 532 registered users
- MACHINEpak, a lot
- NUTRIpak 115 orders, hopefully distribute at CCA major conference Dalby- CCA to distribute to other members
- (cottonLOGIC 1112 registered users)

How do we (as a team) best distribute and promote the paks

- Issues
  - Mail for the paks a significant cost
  - ENTOpak frequently updated better to distribute from a single source to maintain current content
  - Registration very important
  - handling registrations etc another job

Issues cont'd

- Distribution- a Good excuse for new IDOs to meet clients?
- A burden for established IDO's
- CottonTales? Breakdown of user numbers in region to promote awareness
- Leave existing structure

Is training workshopping needed?-

- NUTRIpak- perhaps a good candidate for shed meeting launch in regions AWM groups -& distribution Introduction would be of use
- IPM guidelines. Yes- some complex issues - part of IPM course (overlap)
- WEEDpak - don't promise until in our hot hands!!!! when it gets here as per NUTRIpak

IPM COURSE UPDATE

Bill Dalton

See PowerPoint presentation.

Notes from discussion:

Aim to have 70% of growers participate in the course by 2005.
12-15 growers per workshop.

Note that learning dynamics (the retention of knowledge from different activities) is likely to be very different with growers compared with other learning groups.

Course structure
2 day inside session and then 2 days in field during the season.
(This has been cutback from the original plan of a 3 day course after feedback from IDOs)

Will growers attend a 2 day course? Some consider yes, others no.

Can IDOs present some sections of the course?
Generally IDOs were not keen to present sections on cotton pests if many consultants are present – ask a well respected consultant in the region to present?
Don't want to present the pre-prepared information but would be happy to present a local angle on some sections.

Target group
The course is not targeted to consultants – it is a grower focussed course.
It is too basic for consultants.
Risks that consultants could find it too basic and not support it / downgrade it.
Need to approach carefully to ensure that consultants are supportive of it as a grower-focussed course – Bill to make presentation at CCA seminar in Goondiwindi.

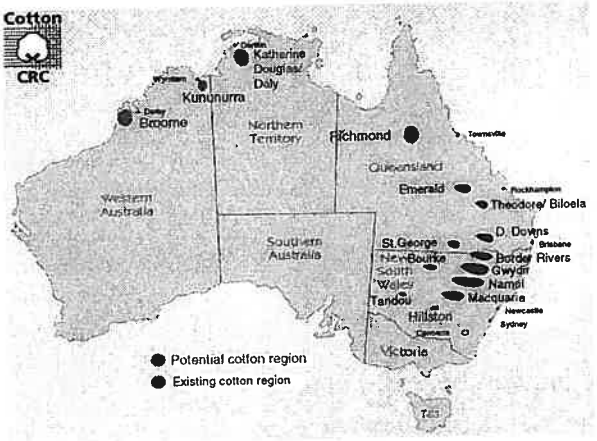
Australian Cotton CRC IPM Training Workshops

Cotton CRC

Bill Dalton
IPM Training Coordinator

Australian Cotton Industry

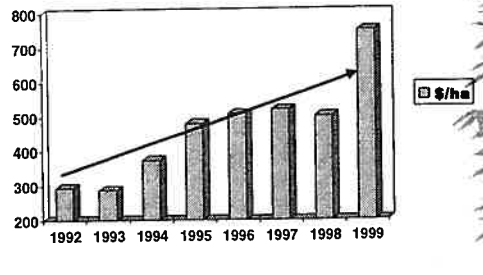
- Cotton production in Australia is a high-value industry with about 90% of fibre produced being exported to Asia, primarily to Indonesia
- The Australian Cotton Industry contributes about $1.2 billion annually to the Australian economy



Concerns for the Cotton Industry

- The need for heavy usage of insecticide sprays to combat *Helicoverpa*
- Increasingly higher cost of pesticide sprays and lack of new chemistry
- Development of insecticide resistance
- Public view of the cotton industry regarding its real / perceived impact on the environment
- Cross industry contamination

Escalating costs of Production



Source: Pyke, 2000

Concerns for the Cotton Industry

Cattle vs cotton in endosulphan row

Integrated Pest Management (IPM)

- Seeks to maintain pest populations below economic (action) thresholds by making use of all available, effective and compatible methods of control without dependence on any one method
- Is system that best meets the requirements of sustainable development and sustainable agriculture and is a component of Integrated Crop Management (ICM)

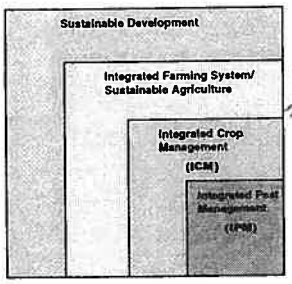
Defining IPM

IPM as defined by the FAO:

'Integrated Pest Management (IPM) means a pest management system that, in the context of the associated environment and the population dynamics of the pest species, utilises all suitable techniques and methods in as compatible a manner as possible and maintains the pest populations at levels below those causing economically unacceptable damage or loss'.

IPM's place in Sustainable Development

IPM in the context of ICM and sustainable development



Components of an IPM Program

1. Prevention
Indirect Measures:
- Location
- Crop rotation
- Cropping pattern
- Plant breeding
- Crop husbandry and hygiene
- Fertiliser
- Irrigation
- Habitat management
- Trap crops
- Inter-cropping
- Harvesting and storage

2. Observation
Decision Tools:
- Crop monitoring
- Decision support systems
- Area-wide management

3. Intervention
Direct Measures:
- Cultural and physical control
- Pheromones
- Biological control
- Chemical control

Cotton IPM

Can be defined as a system that integrates all means of managing pest populations with the aim of reducing pesticide use while maintaining profitability, yield, fibre quality and crop maturity

IPM for the Australian Cotton Industry

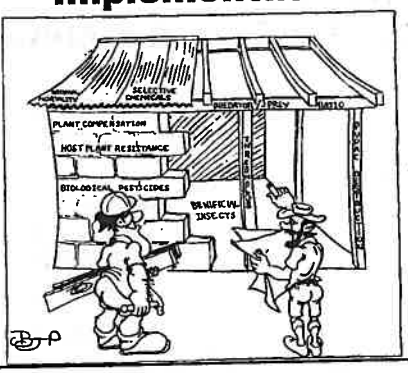
- Is a continuously evolving pest management philosophy
- The implementation of appropriate management strategies for both conventional insecticides and transgenic plants is critical if the industry is to survive in the long term

IPM is about Planning

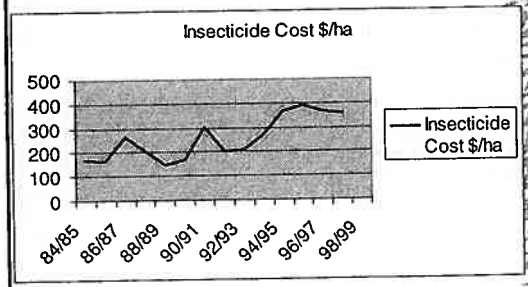
IPM is about Decisions

IPM is about Balance

IPM is about Implementation



Insecticide Expenses



Source: Michael Boyce & Co

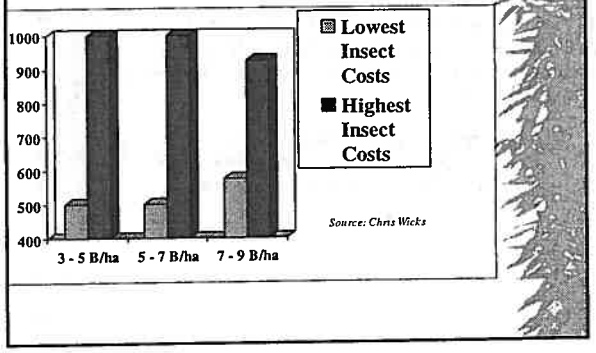
Transgenetic *Bt* Cotton Management

- Is an important strategy for the sustainability of the cotton industry
- There are already some early disturbing signs that *Helicoverpa* may be developing 'tolerance' to transgenetic *Bt* cotton

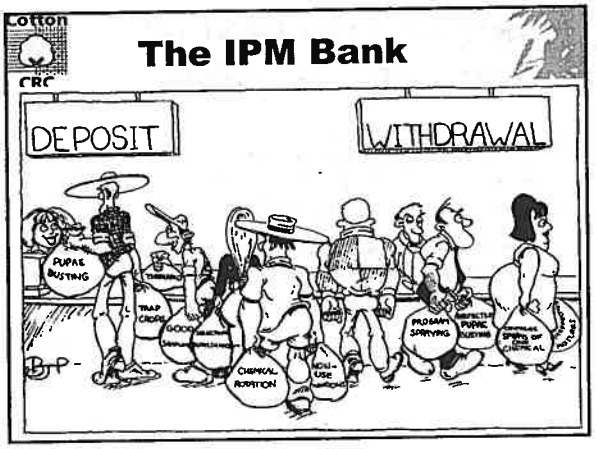
Industry Benchmarking

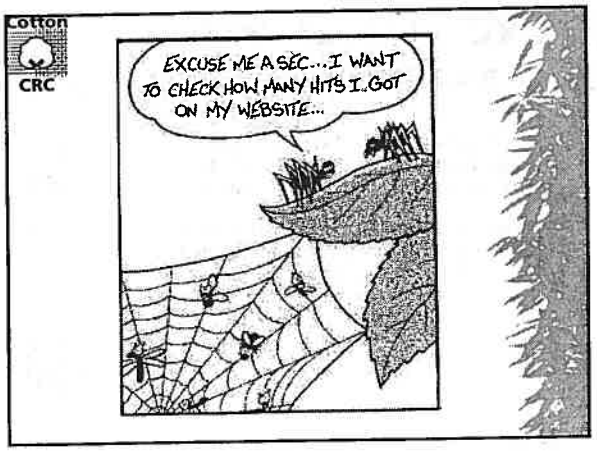
- Has provided strong evidence of a large variation existing within the Australian cotton industry of the real cost of insects per hectare
- The use of *Bt* cotton and the adoption of IPM strategies within the industry has resulted in significant cost reduction variance per hectare of cotton grown

Variable Insect Costs

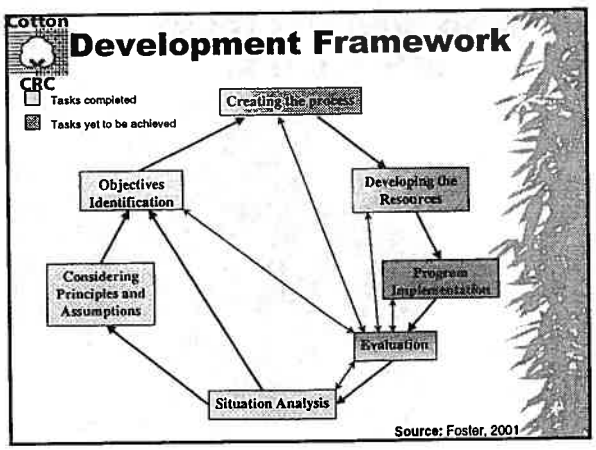


The IPM Bank

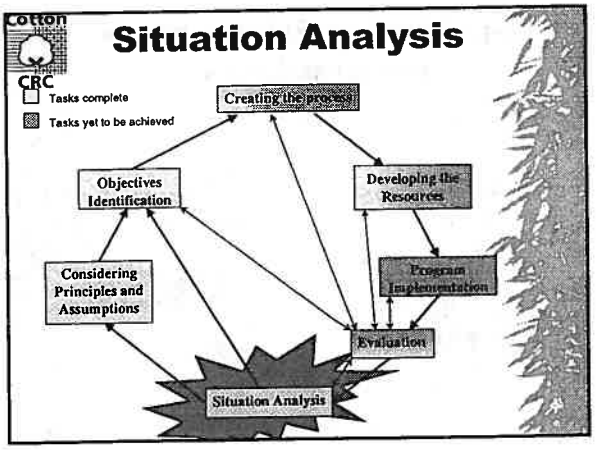




Development Framework



Situation Analysis



Situation Analysis

- The third year review of the CRC for Sustainable Cotton Production recommended investigating the development of a IPM short course to improve technology transfer
- During 1997 the Cotton Extension Team conducted a subjective attitudinal evaluation of the adoption IPM within the Australian cotton industry

Emerging Key Issues

- There is a positive environment for the acceptance and adoption of IPM strategies in the industry
- There is a lack of clarity about the current best-practice IPM comprehensive strategy
- Economic issues remain the chief determinants of management strategies and yields remain the primary indicator considered for a successful crop

CRC 3rd Year Review Recommendations

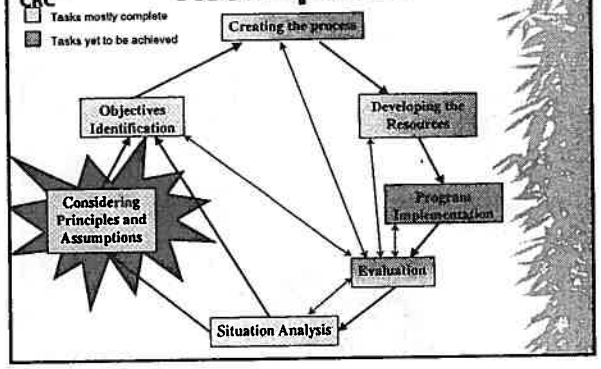
- A comprehensive educational package is needed which clarifies the latest best practice for IPM as identified by industry experts
- Economists should be contracted to develop economic links to IPM strategies with a short, medium and longer-term time frame

Continued/...

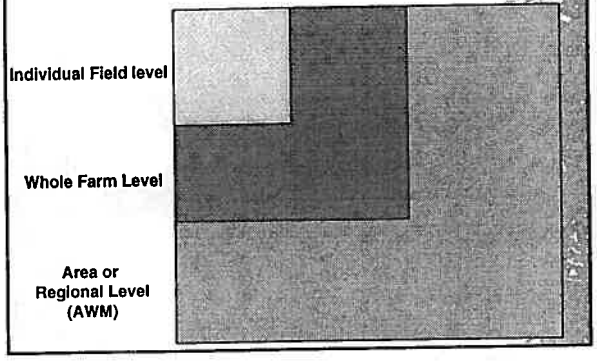
CRC 3rd Year Review Recommendations

- An extension program (including grower best practice groups) assisting growers to 'take responsibility' for management decisions should commence and be given a wide profile
- Emphasis needs to be placed on economic sustainability rather than yield

Considering Principles & Assumptions



Management focus affects IPM



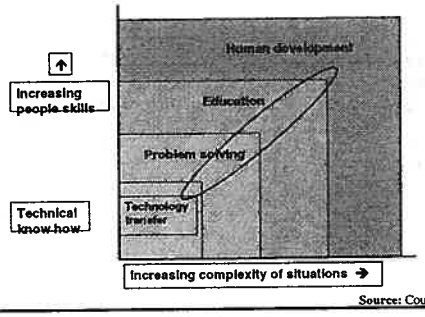
Interactive Extension

- Extension activities are a process that involves a level of interaction between the extension agent and those with whom they are working and/or;
- the facilitation of interaction between a number of people to achieve a positive outcome

Interactive Extension

- **Persuasive extension** *implies that there is a predetermined 'correct course of action' that needs to be taken by extension's target(s)*
- **Facilitative extension** *implies that given the right conditions, information, mutual interaction, and opportunity, people can develop solutions to problems and take steps in directions that improve their situation*

The Four Paradigms of Extension



Source: Coutts, 1994

Adult Learning Principles

- **Pedagogy** is the art and science of training children
- **Andragogy** is the science of teaching adults
- This difference between adults and children as learners has profound implications on the way IPM training workshops need to be prepared and delivered

Barriers to Adult Learning

- Adults tend to bring a lot of worries with them to learning activities
- Barriers to learning may need to be considered while planning, designing and delivering the IPM training workshops

Internal Barriers to Adult Learning

- Adults are afraid of participation
- Adults are afraid that they might lose their dignity
- Adults often resent authority
- Adults worry about keeping pace with the demands made upon them
- Social forces & Illiteracy

External Barriers to Adult Learning

- Time of year/inconvenient workshop scheduling
- Transport/geographical isolation/limited location
- Workshop duration
- Exorbitant fees & unnecessary prerequisites to workshops
- Inappropriate learning methods
- Child care availability

Conflict

'incompatible behaviour between people who have different interests'

4 Basic Rules

- Make a distinction between the people and the problem
- Concentrate on your and the other party's interests, not on defending your position
- Try to find options that satisfy both parties
- Bargain to develop objective criteria

Conflict

Australian Qualifications Framework

- As a part of the cotton industry self-regulatory quality assurance process, the cotton industry has decided that the IPM training workshops should endorse national competency standards
- Sets out the competencies required at the each level, and the standards serve as benchmarks for assessment of the competency

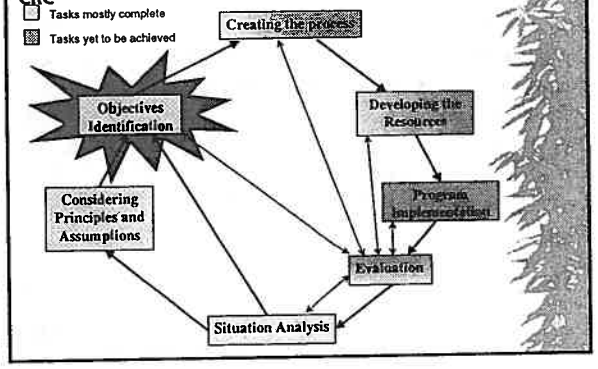
Australian Qualification Framework		
Doctoral Degree	Higher Education	Level 8
Masters Degree	Higher Education	Level 8
Graduate Diploma	Higher Education	Level 8
Graduate Certificate	Higher Education	Level 7
Bachelors Degree	Higher Education	Level 7
Advanced Diploma	VET & Higher Education	Level 6
Diploma	VET & Higher Education	Level 5
Certificate IV	VET	Level 4
Certificate III	VET	Level 3
Certificate II	VET	Level 2
Certificate I	VET	Level 1
Secondary Education	School Education/VET	Level 1

Source: Murrumbidgee College of Agriculture (2001)

Recognition for the IPM Training Workshops

- Formal Recognition
  - Recognition = Accreditation
  - Qualification Nationally Accredited (Subject to Audit)
  - Administered by an RTO (NSW Ag)
- At least one presenter must have Certificate IV in Assessment and Workplace Training and ideally all other presenters 'Train Small Groups' qualified

Objectives Identification



Cotton Industry Reference Group

- Including:
  - growers (8)
  - consultants (2)
  - industry development officers (2)
  - CRDC (1)
  - CRC (3)
- Met in Goondiwindi in September 1999 and in May 2000 and by using a facilitative approach the aims and objectives of the IPM training workshop were developed

IPM Training Workshop Objectives

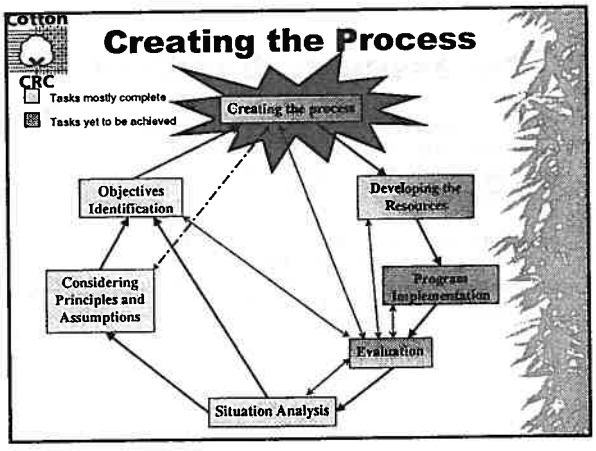
- ✓ Develop and implement a nationally accredited (National Competency Standards – RTCA & VETAB approved) grower short course in IPM for the Australian cotton industry
- ✓ Develop a comprehensive grower focused IPM reference manual for the Australian cotton industry

Continued/...

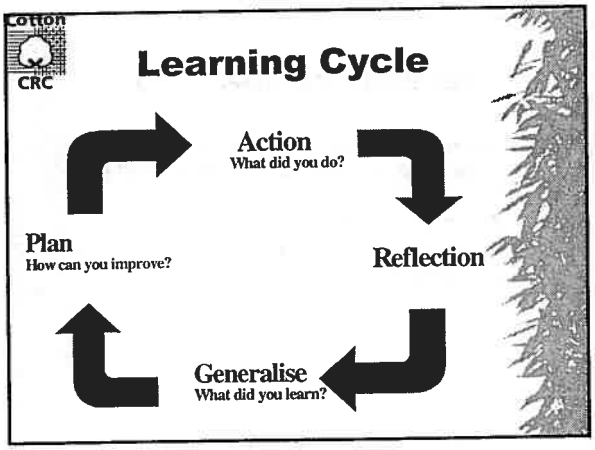
IPM Training Workshop Objectives

- ✓ Have 70% of all Australian cotton growers attend the IPM course by June 2005
- ✓ Work with industry researchers and extension staff to improve the transfer of information to growers and consultants, which aim to increase the level of adoption of IPM strategies within the Australian cotton industry

Creating the Process



Learning Cycle



Learning Styles

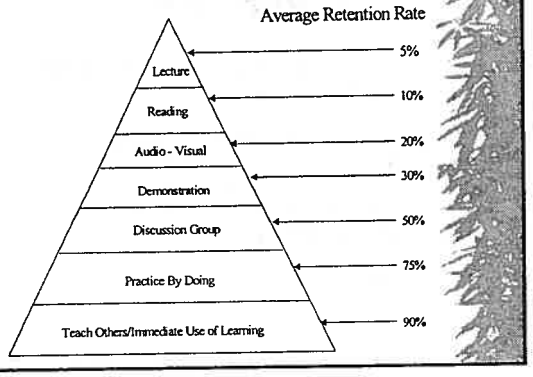
- ***Activists*** - will learn best from activities where they can engross themselves in short here-and-now activities such as business games and competitive teamwork tasks
- ***Reflectors*** - learn best from activities where they are able to stand back from events and listen and observe

Continued/...

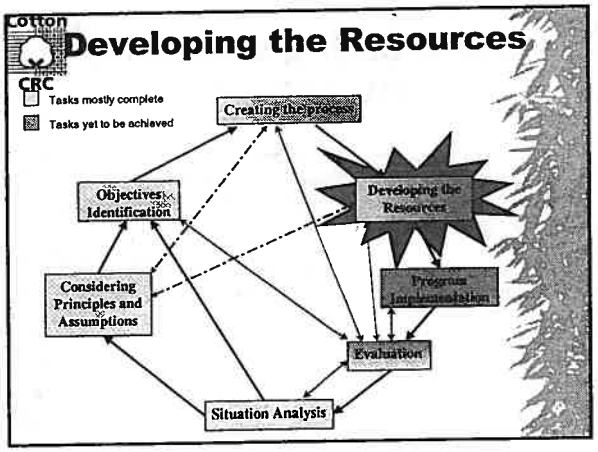
Learning Styles

- ***Theorists*** - learn best from activities where what is being offered is part of a system, model, concept or theory
- ***Pragmatist*** - learn best from activities where there is an obvious link between the subject matter and the problem or opportunity on the job

Learning Pyramid



Developing the Resources



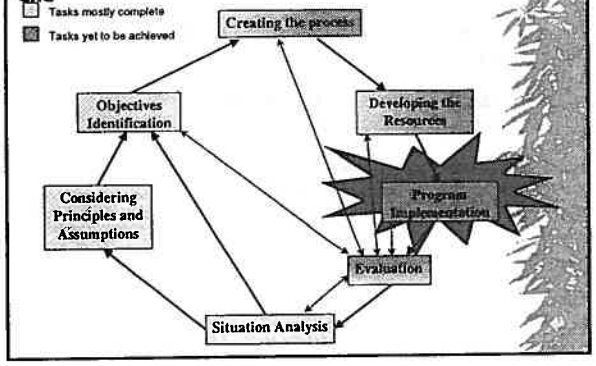
Reference Manual

- **The draft reference manual currently consists of 10 chapters and basically outlines the following 3 broad sections:**
  - **Where are we now?**
  - **Where do we want to go?**
  - **How do we get there?**

Assessment Workbook

- **The development of the participants workbook is being undertaken in collaboration with (NSW agriculture) staff at Murrumbidgee College of Agriculture at Yanco in NSW (The RTO)**
- **Assessment for the course is based on a workbook that contains exercises that when satisfactorily completed will fulfil the learning outcomes for each section of the course**

Program Implementation



The IPM Training Workshops

- Cotton production is an annual activity
- It is planned that the workshop program will be sympathetic with the cotton production cycle
- An 'extended learning program' over a period of approximately 6 months will allow learning activities throughout the cropping season and a review of progress towards nominated goals

The IPM Training Workshops

Structure	Duration	Broad Content	Broad Objective
Winter Workshop	2 days	Define IPM & IRM and establish an understanding of its importance and knowledge of components	Understanding how components of IPM can be utilised in Australian cotton production
Early Summer Field Day	½ day	Early squaring practical - plant growth, pests, predators and crop management	Knowledge of the role of effective monitoring and confidence in early season IPM practices
Late Summer Field Day	½ day	Post flowering practical - plant growth, pests, predators and crop management	Knowledge of the role of effective monitoring and confidence in late season IPM practices
Evaluation Workshop – Next Season	1 day	Post season evaluation of individual IPM programs	Evaluate the implementation of changes in pest management

Winter Workshops

Day 1

Time	Topic	Presenter	Comments/Reference
0830	Register/Welcome/Intro	Bill Dalton (BD)	Coffee
0900	Understanding IPM -	BD	IPM Training Video
		BD	
0945	IPM Guidelines	BD	5 min Break?
	Case Studies		
1030	Morning Tea		
1045	Resistance and IPM	BD	Discussion/Group work
	Case Studies		
1130	Options and Planning	BD / Martin Forbes (MF)	
1215	Lunch		
1315	Communicating & Recording	MF / BD	Farm Plan / Pesticide Application Management Plan
1400	CottonLogic / BMP	IDO / BD	5 min Break
1500	Afternoon Tea		
1515	Options and Planning	IDO / Bill Dalton	Case Studies
1630	Close		

Winter Workshops

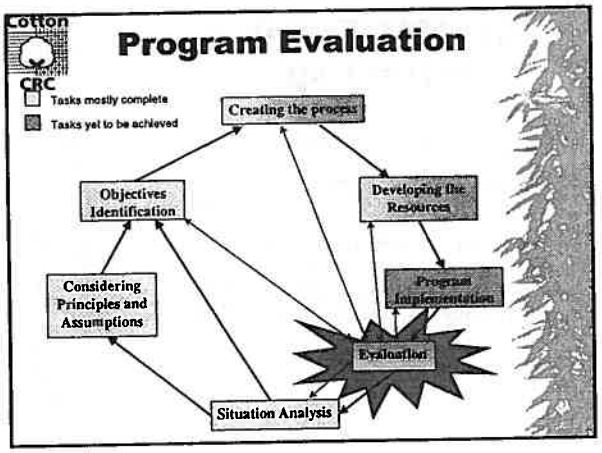
Day 2

Time	Topic	Presenter	Comments/reference
0830	Review	BD/MF	
0900	The Cotton Plant	BD	Theory – know your plant
			5 minute break
0945	Crop Management Principles	BD/ IDO	Case Study/Trials Chemical Selection Applied IRMS
1030	Morning Tea		
1045	Pesticide Selection	BD	Discussion/Group work
1130	Cotton Pests	BD/ IDO	*Helicoverpa spp* Thrips/mites/aphids GVB/Aphids
1215	Lunch		
1315	Predators/Beneficiaries	BD	Introduction / Main groups Decision making
1400	Decision Making	IDO BD	5 min Break Case Studies
1500	Afternoon Tea		
1515	Implementing IPM	IDO/ BD	
1630	Close		

Workshop Risks

- Will growers be prepared to attend a workshop of more than one day in duration
- 'Workshop Fatigue'
- Timing is critical
- Will growers choose to leave the responsibility of IPM decision making with entirely with the consultant

Program Evaluation



Evaluation

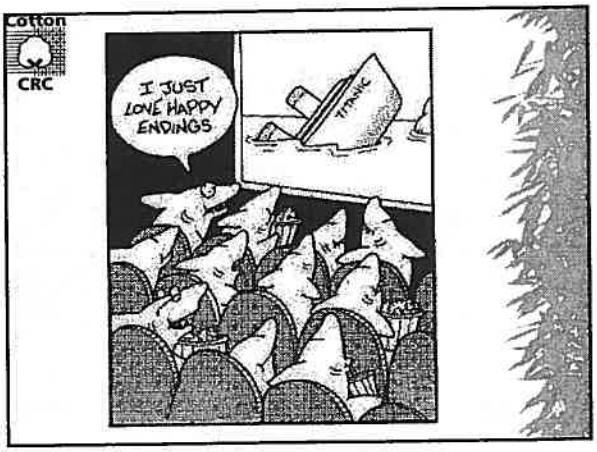
- The Australian cotton industry and the practice of IPM are both dynamic systems
- It is essential to ensure that the workshops remain relevant, current and focused
- There is a need to design the IPM training workshops to allow ongoing review and evaluation

Evaluation

- Can be defined as *'the systematic collection of information to assist in decision making'*
- Before any evaluation process can be developed, it is important to first focus on why the evaluation is being conducted and what is it trying to achieve (Owen's, Bennet's, etc)

Conclusion

- Growers will benefit from a clear definition of IPM and the knowledge of what has been achieved by others will encourage further innovation and adoption
- It is anticipated that the shared learning environment of the IPM training workshops will develop an interest and motivation in growers to implement IPM strategies



EXTENSION TEAM TRIALS

Facilitated by Mark Hickman

What trials are currently being done in each valley?
We have a large investment (time/resources) in trial work – how can we maximise the effectiveness of trials in achieving extension goals?

	2000-2001	Trials planned for 2001-2002
Farming Systems		
UNR and Twin Row	DK JQ MH JackC	MH – Twin/UNR? DK
Vetch	MK DK	DK
CRC Farming systems site	JH GS	
Wheat Stubble	DK CD JQ	DK
P Nutrition	CD MH	
Tillage	CD	
Herbicide options	MK	MH – Herbicide damage
Insect Management		
Earliness	MK	
Plant compensation	KR DK JQ SK JH GS MH	DK
Fruit retention	KR DK JQ MH	MH DK Gwydir (+ fruit removal)
Trap cropping	KR CD MH JQ	MH Gwydir (case study on chickpeas and early sorghum) R Sequiera
Predator release	DK	DK (with Paul Grundy)
Late Season threshold	DK JQ MH	MH DK
IPM System	JQ	Gwydir – Ingard, Traps, Conv in wheat DK – with predator release
Late Season Gemstar	DK JQ MH	Gwydir DK (+Paul Grundy)
Area wide R&D	CD MH	MH
Crop Oils		Rob Mensah – Gwydir, Warren
Disease Management		
Fusarium management	KR SK GS	
Disease Focus groups	GS	
Defoliation		
Cutout Pix	JQ CD MH	
In season Pix	MK-Aventis	
Spray Technology		
Spray Spectrum	SW	
Biopesticide application	SW	
Aerial Application of gemstar	PH	
Air Assisted technology	PH	
Deflectors	PH	

Varieties

Variety site	JH	
Variety trial inspections	IDO's	IDO's

Water Management

WUE	JO SH AS BS DS SC DW RG
Polyacrylamides (PAM) for WUE	JO SH
Scheduling tools	JO DW RG DS SC SH AS
Distance uniformity - irrigation	JO DS SH BS
Application rates in furrow	JO SC SH DS
Storage site (EM)	DW
Benchmark WUE	water team
Deep drainage	AS CD
Subsurface drip vs furrow	DS SH AS
Capacitance vs Neutron probe	CD BS
Callibration/test Mano	BS
Buddy	BS
Drip system	JO AS
Centre pivot in corn	AS
WUE in Faba bens	SC

MH = Mark Hickman (Upper Namoi)
DK = Dave Kelly (CQ)
JQ = James Quinn (Gwydir)
KR = Kirrily Rourke (Macquarie)
MK = Mascha Raymond (Korteweg) (Macintyre)
CD = Craig Dunn (Bourke)
GS = Greg Salmond (Downs)
SK = Sarah Kerlin (St George)
JH = Jenelle Hare (Downs)
PH = Peter Hughes (Spray technology)
SW = Simon White (spray technology)
JO = John Okello-Okanya (Emerald)
DS = Darren Springer (Biloela)
AS = Andres Spragge (Downs)
SH = Sarah Hood (St G)
SC = Sandy Cameron (ex Goondiwindi)
BS = Barry Swann (Dubbo)
DW = David Williams (Griffith)
RG = Raelene Greenslade (Gunnedah)

Jack C = Jack Cooper (NSW Ag, plant density research)

Maximising the Effectiveness of Extension Trials

Purpose of extension trials: *Demonstration*
To gain local data
Develop grower confidence in new ideas

Activities to involve growers and maximise the impact of trials and demonstrations:

Grower based trials – use of local direction

On-farm participatory trials

Link existing sites with grower groups

Use smaller group (eg AWM) to run localised demonstrations/trials

Feedback essential

Field days 20-200 people – at end of something – timeliness

Workshops – broader awareness of trials before they're done (eg spray application)

Focus groups / shed meetings

Results/outcomes (interim or final) extended through:

- Newsletters - Cotton Tales / Waterworks
- Trial book
- Media
- Meetings

Improve recording of what innovative growers are already doing

Increase cross linkages to enhance effectiveness

Will always have some apathy – how do we involve the bulk of growers?

- Apathetic and Lagards / Bulk / "Go ahead" team

Questionnaire / Phone poll

One-on-one consultation

Similar problems *vs* grower needs – can a common thread be raised – eg wheat/cotton

Issues to consider:

- Every valley is different and will benefit from different styles.
- All are individuals – a range of methods are needed to meet all needs.
- Timeliness and clear purpose
- Relevance
- Group dynamics play a role – match the method / process to the group
- Balance between industry need and local priority
- Volume does not = effectiveness
- Overall coordination of group/team – updated through the season
- Protocols will help with coordination
- Communication within the extension team needs to increase.

AREA WIDE MANAGEMENT

A brainstorming and group session gathered ideas about facilitating area wide management groups – from each other's experiences: what works well and what doesn't work?

This session raised a lot of different ideas, issues and options. Key topics raised are listed below. More information on these is detailed in the document "Area Wide Management for Cotton Growing Regions" which has been compiled from this session (contact Ingrid for a copy).

Activities that work well with AWM groups

Benchmarking

Coordinated Trap Cropping

Group Trials – eg Gemstar, Pupae Busting, Trap Crops

Guest Speakers

Grower Presentations

Farm Walks

Beneficials ID and sampling

Release of Beneficials

Pupae Sampling techniques

Results of sampling

Information Package delivery eg BMP, ENTOpak

Issue specific meetings – eg Water, Nutrition

Bus trips – Local / other regions

Spray Application Courses

Training – email/internet

Discussion about what's working and not working – growers discussing how they approach difficult situations.

Setting goals for the group eg. Delay pyrethroid use until 1st Feb

Discussion about whether goals were achieved or not, why, revise and reset for following season

Two gene cotton demonstration sites / support groups

Updates from rep's / Reseller's product updates for future shortfalls

Discussion around IPM Guidelines

Use of virus in sorghum

Good management in grain crops (eg. Checking, spraying on economic thresholds, using selective products to preserve beneficials)

DISCUSSION!!!

Planning / meeting operation

Set program at end of each meeting

Input from everyone present at start of meeting – about a question everyone will know the answer to

Rotate venues

Good grower coordinator

Breakfasts, beers, sausage sizzle

Good communication

Objectives / Mission statement for group (goals)

Venue / Hosts

Difficulties to overcome / avoid

Dominators – including consultants / rep's

Self managed – is it possible?

Weather

Poor communication

Number of rep's

Perceived alliances

Pushing issues that the group aren't interested in

Feeling among some growers of being there because "have to be"

Non-attendees (including other growers with crops)

Idea that it is a "silver bullet"

Pushing non-AWM issues

NATURAL RESOURCE MANAGEMENT ISSUES

Demonstrated sustainable management of natural resources will increasingly become a major part of any land management activity.

What are the major issues in natural resource management at a national scale? Which of these issues impact on the cotton industry/ which issues may the cotton industry impact on? What is our role as extension agents in this area?

Australia's Major Environmental Issues identified by the extension team

Pollution trading
Salinity
Air quality
Fertility decline
Soil biota
Soil structure
Sodicity
Water quality – riverine – including pesticides
Monoculture impacts
Erosion
Resistance
Pesticide residues
Catchment WUE
Disease
EMS (Environmental Management Systems)
Water allocation – diversions
Native vegetation
Flora and fauna
Biodiversity loss
Weeds
Rural communities
GMO impact on soil/cropping systems
Groundwater decline
Deep drainage
Economic sustainability
Urban pressure
Land rights
Market forces
Coordination and implementation of catchment strategies
Greenhouse
Community perceptions
Energy – non-renewables
Ethical production^
Effluent^
Acid sulfate soils*
Tourism*

* These were not considered to be an issue for the cotton industry

^ These are regarded as potential opportunities

Small group feedback on each of these issues

Fertility Decline

Understanding the Issues

Loss of productivity – yield/profit

Rising costs of fertiliser

Long term sustainability of soil/farm

Use rotations

Acidity – availability of nutrients

Management tools – fertiliser replacement

- liming, replace small nutrients
- Soil test max/micro

Accepted that problem exists

Managed by using fertiliser (limited understanding of impacts of long term use of fertilisers)

Role of Extension team

- Advice
- Awareness
- Encourage rotations that reduce fertility decline
- Training
- Access information
- Alternative use – fertiliser, cropping
- Long term strategies other than phosphorous
- Strategies match application of fertiliser on demand
- Improving efficiencies in application of fertiliser
- SOILpak

Disease

Grower understanding

- Not fully aware of the implications.
- Only become aware once disease is present on their own place.

Role of Extension

- Increase awareness
- Develop management strategies for rural community

Energy

Grower understanding

- Driven by hip pocket

Role of Extension

Not much that can be done

Ethical Production

Grower understanding

- Not high – more driven by economics
- Will become more aware once premium becomes available

Role of Extension

- Improvements of BMP
- IPM based production

Soil Structure

Growers are very aware.

Grower understanding is varied

Some management techniques being implemented eg minimum tillage

We need to extend to growers the need to conserve soil structure and biodiversity in the soil as it related to structure and fertility

Understanding the Issue

Conservation farming	*vs*	Diseases related to hardpans
Minimum tillage		Poor moisture conservation
Controlled traffic		Poor nutrition
Stubble retention		Lack of soil health (OC%, worms, etc)
Deep ripping		"Rip, bash and burn" farmers
		Conventional cultivators

Role of Extension

Trials

Farm walks

Focus farmer / case study

Develop BMP

Interact with other dep'ts (eg DLWC, QDPI, universities, researchers)

SOILpak

Catchment management planning

Impacts on future and further farm development

Role of irrigation in catchments – limited, reduced / capped

Impacts on wetlands / natural ecosystems

Impact on infrastructure development

Consultative process including growers/irrigators and other stakeholders – community, NGOs, Gov't

Role of Extension

- Aware of policies impacting development and irrigation and farm practices
- Links with other stakeholders and agencies (Landcare, DLWC, etc)
- Good information of impacts of different farming systems and irrigation practices – access to information for different organisations

Water Allocation

Growers are very aware

Growers' understanding of the environmental impacts of this is limited. Eg to river health, environmental flows, turbidity

Need to implement management to maximise water use efficiency – better storages, use of high flows

Role of Extension

We need to extend all relevant info and a balanced approach

Extend not just economic importance to grower and communities but also impacts downstream

Deep Drainage

Salinity, sodicity, groundwater residues (pesticides and nutrients)

Role of extension

- WUE improvements
- Assist with managing reduced water allocation

Water Quality

Farmers in denial – facts exist

Not managing the issue

Role of Extension

- Education – awareness of problems and potential impacts
- Moving water to better soil types - we can assist them to identify soil types
- Improve irrigation management so there is no excess deep drainage (above the leaching fraction) that mobilises salt that can be transported into rivers.

Pesticide Residues

Growers very aware of it – being forced to become more aware due to economic issues – residues in beef, etc. (Helix, Endo, DDT)

Management of Issue:

BMP – Spray drift management

Legislation eg Endo

AWM groups and education and/or promotion of options.

Industry researchers – ACRI & multinationals

Role of Extension

Projects such as AWM – targeting identified problems, economic benefits.

BMP – will help with facilitation

Dissemination of relevant/updated information

Community Perceptions

Most growers very aware of community concerns, a large proportion are not concerned ie participate in BMP, etc

Management of Issue

Yes, some do – ie BMP, community involvement, AWM, education program – pushed by/from industry

Role of Extension

Exchange information between community and growers

Promote the "good things" the industry does

Educate community / initiate forums

Promote interaction / facilitate interaction

Land Rights

- Western leasehold land

Access to land

Production region being limited

Those impacted on are aware

Conflict between who actually owns the land *vs* using the land – watchdog *vs* owner

Role of Extension?

No

Government level at legal level control the issue when the problem develops

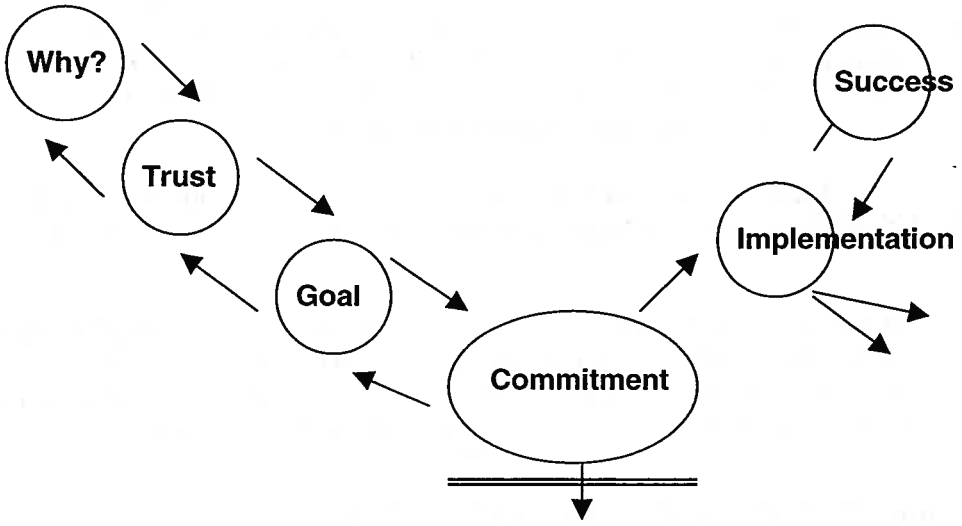
TEAM DYNAMICS

Dallas led a discussion to revisit some team concepts introduced at last year's workshop.

Teams vs working groups as a mode to consider team performance.

Is the cotton extension team a self-managed team – some in the team consider yes, others no.

The "bouncing ball" theory!
Each stage is needed for a team to achieve its desired outcomes.



Think about what teams we work in...

- Cotton extension team
- National Focus teams
- Local teams
- Management team
- Area Wide Management
- etc

ROLE OF EXTENSION TEAM

Several members of the team had asked prior to the workshop for clarification of what the role of the extension team is – what is expected of us from our funding bodies and management?

In an attempt to clarify this, a strategic planning session was included in the extension workshop. Before this could be done, it is important to be clear about the activities undertaken by individuals in the extension team in different regions and with different roles.

What are the Key Activities of Cotton Extension Team?

In many ways the activities of the cotton extension staff have changed considerably since the first industry development officers started. Initially the roles were very much trial based - conducting local trials to ground test the research from ACRI and elsewhere to overcome the "my valley's different" barrier and to gather localised information. Refer to Cotton Extension Review 1995 CRDC/CRC – distributed by Bruce post workshop.

Some members of the team asked - Has the focus of the role of IDO changed in this time? Is the industry / CRDC /CRC expecting different things from IDOs and the extension team as a whole?

Feedback from key stakeholders prior to the workshop indicated NO - the focus is still the same but the technique that is best used may be different. With a greater move towards IPM we are now dealing with more complex systems, in these cases group based activities (such as AWM groups) may prove to be more effective than trial work alone.

Some key points from discussion with R&D leaders:

- **Choose the technique that will best achieve the outcome for each issue** (ie trials, information delivery or groups). This also means taking into account which techniques you personally are most effective at delivering.

- **Local ownership of your extension activities is crucial.** Ensure that local cotton growers have input into what activities you are doing each year.

- **Close the loop** – ensure your are providing feedback to researchers about what research needs are being identified in your valley, emerging issues, etc.

The specialised roles generally have more specific objectives. Since the National Extension Team commenced the water team has been included. These programs have their own specific objectives but the same principles apply. Local industry involvement, appropriate selection of techniques and feedback to researchers will help ensure the roles are effective.

Cotton Extension Roles
Industry Development Officers
District Agronomists
Water Extension team
Specialised support – CottonLOGIC, Technology Resource Centre, IPM Training and support, Spray Technology, BMP, Coordination

Key Activities of extension staff identified at extension workshop

Area Wide Management groups
Benchmarking
Trials
Data Collection and Coordination eg Pheremone traps
Field Days
Workshops
One on one
Information exchange
- Cotton Tales
- Media
- Pak's
- Trial Books
- Courses
- etc

National Extension Focus Teams
Meetings
Visitors
Professional development / training
Technical updates

These key activities can be broadly grouped into:

- Trials and Demonstrations
- Meetings and Field Days
- Information Exchange
- Groups (incl. AWM)
- Your own skills development

How is time allocated between tasks/issues?

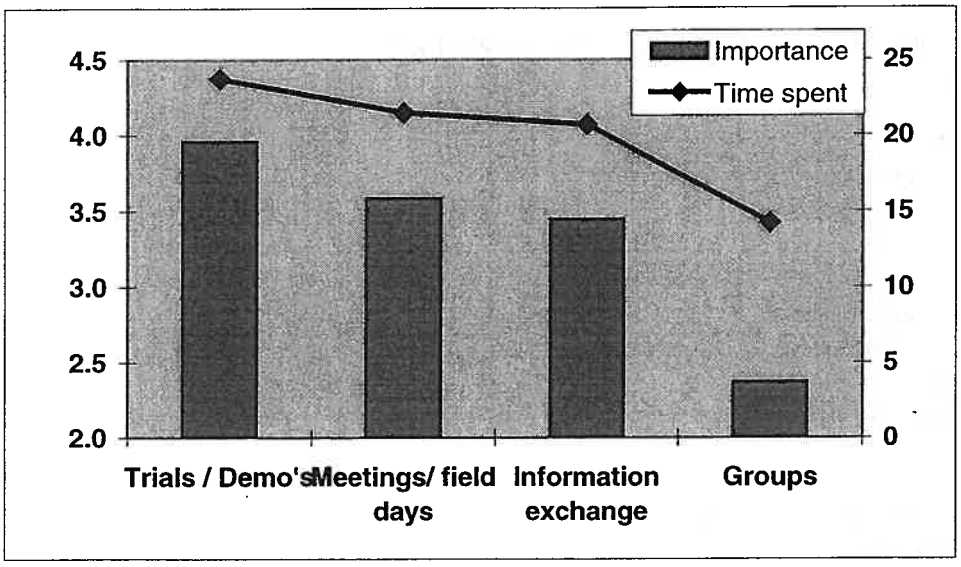
Dallas asked everyone to individually complete a form indicating the proportion of time spent on each activity and how important (relatively) they consider the industry in their valley perceive that issue. Everyone was also asked to rank how relevant they consider different extension methods to be in promoting information about each key issue. Results included on the following page.

The form also gathered feedback about how the extension team as a whole can help individuals with these activities. As summarised overleaf.

Extension Focus and Activities

Compiled by Dallas Gibb from feedback from Cotton Extension Team members

Extension Activity



National Focus Activities

	Importance	Time spent
Insect Management	4.6	44
Farming Systems	4.0	20
Disease Management	4.4	19
Weed Management	3.5	9
Environmental Managem't	3.7	6
Water Management	4.1	3

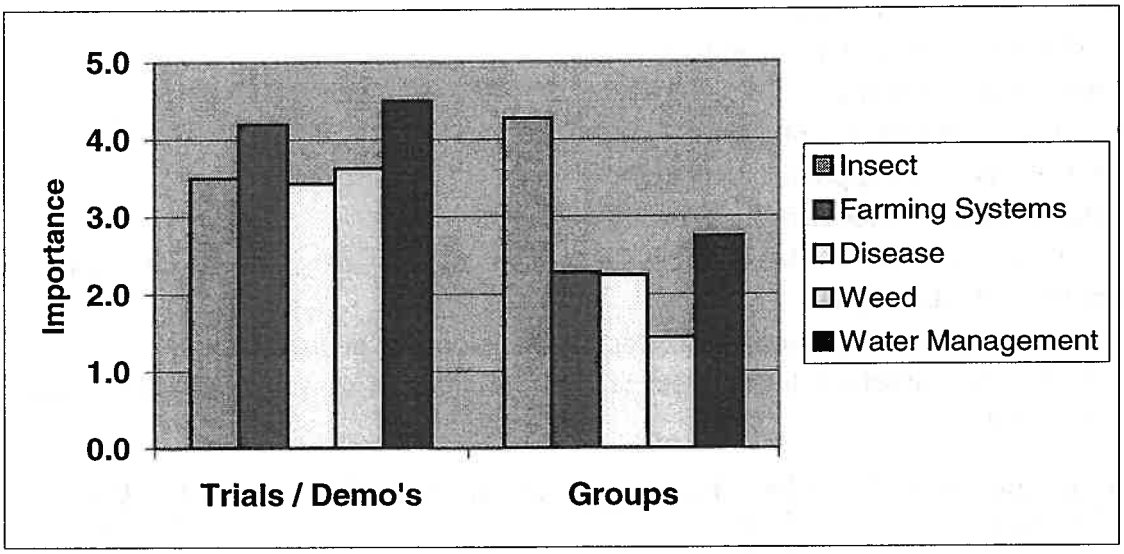
Note: These figures do not include members of the water extension team as many of this group had not been present at this time/filled out the forms. Therefore the actual time spent on water issues by team as a whole would be far greater.

"Importance" is a ranking 1-5
Time spent is a % of time spent on the issue.

Extension Activities

	Importance	Time spent (%)
Trials / Demo's	4.0	24
Meetings/ field days	3.6	22
Information exchange	3.4	21
Groups	2.4	14

Activities by National Objective



Ranking of each style of extension method with respect to its relevance in promoting the key issues.

Key Issues, Extension approaches and help with activities

How can we as a team increase our performance?

Insect Management

Regional Insect Management
Resistance Management
Resistance testing
IPM techniques
Number of growers adopting IPM
Beneficials
Hard/soft alternatives
Adoption of AWM
Research on application techniques for ground application – refer envir. section for detail
Reduction of pesticide dependence
IPM – individual farms and area wide scale
Dynamic control thresholds
Exploring suite of management options in IPM
Growers with improved appreciation of IPM
Adoption of AWM / IPM tools in insect management
Range of tools available for IPM – importance of these and reasons behind decisions made
Increased use of trap crops
Area wide management – non-cotton growers cooperating with cotton growers
Pesticide efficacy, Targeting / timing / techniques, Condition monitoring, Application selection (details in envir section)

Extension Approach	Help from group for your activities	By Who?
TRIALS/DEMONSTRATIONS	Trial protocols Beneficial sampling and ID Sampling of wheat stubble trial Not seen as the vector unless growers want assistance Large scale IPM system trial Pupae busting comparisons Info Resources Access to researchers Need various ideas acceptable to local group	Researchers Julie F - - Insect team
MEETINGS AND FIELD DAYS	Materials to show at field days & meetings Guest speakers from successful groups to get the ball rolling Evaluate pupae busting Info resources Guest speakers Coordination of when each valley is holding meetings/field days	Insect Team Insect team eg Lewis W, Julie F

Insect Management Cont'd

INFORMATION EXCHANGE	Pro-formas for Cotton Tales As new R&D evolves direct info link to IDO, etc Info for Cotton Tales Trial book Info resources Approval of Cotton Tales Available info Provide results from other districts and research Happen at AWM group meetings Need newsletter	Insect team - Insect team Insect team
GROUPS (AWM)	Support for comparative analysis work Guest speakers – successful valley grower Info on IPM adopted by other AWM groups Info resources Guest speakers Funding for benchmarking? Network with other AWM groups On farm group demo's Need support staff for the extra AWM groups that are forming 1 group established in Hillston – need IDO to coordinate in all areas – Hay, Condobolin, Hillston with DAs & Scott Hardwick Attend meetings as guest speakers on spray application	Upper level management Insect team
YOUR OWN SKILLS	Increase knowledge of beneficials – ID and role of each ID what other AWM groups do and what my role is Confidence, process of running a group Comparative analysis – how to? Learning all the time Cotton Course, CCA meetings, etc	
OTHER	Tap into existing BMP groups for AWM Growers want more input to IRMS - Some growers need to realise importance of IRMS Protocols, Labour, Guest speakers Employ another economist to help Ziaul	CRDC/Cotton CRC

Farming Systems

Pupae control techniques

Cotton into wheat stubble

Soil structural decline

Trap crop agronomy

Rotations (link with disease management)

Wheat stubble trials

Nitrogen rates

Improved production system for cool season areas – UNR/Wheat/Twin

Salinity management

Fertility management

Local Farming Systems Explored and developed to suit local conditions and needs

Adoption of sustainable rotations in the dryland cotton system

Soil structure

Soil fertility – roles of P, K and N

Benefits of rotations

Sustainable farming practices that don't promote increase in diseases, weed problems and insect pressure

UNR, Twin row

Sowing into stubble

Farming Systems Cont'd

Issue / Extension Approach	Help/coordination required	By Who?
TRIALS/DEMONSTRATIONS	Assist with finding cooperators Protocols and handy hints to get around problems. Rotation crops – focus farm/grower case study Labour for running trials & data collection – NOT causal $ eg shared Tech. Assistant Info resources Researcher cooperation Many years needed for rotations trials – bus trips to other areas may be best Many trials running in area – need to be documented – a trial book may be priority for new IDO – consult with growers	Farming Systems team Farming Systems team Farming Systems team
MEETINGS AND FIELD DAYS	Guest speakers, experts to explain how Field day on trial site – guest speakers Info resources Ideas from the focus group for field days A lot more info to share Trials are not currently being utilised for extension (Hillston)	Researchers Farming Systems team
INFORMATION EXCHANGE	Help in distribution of information Communicate with other DAs ~rotations Fact sheets / Media Industry wide info sheet eg DK's wheat stubble Guest speakers Info resources At meetings	TRC Farming systems team
GROUPS (AWM)	Groups need kick starting if to do this Guest speakers	
YOUR OWN SKILLS	What are the implications of rotation crops – previous research More interaction with farming systems researchers in both Qld and NSW Constant development Cotton Course	
OTHER	Some presentations for IDOs to access to share with growers	

Disease Management

Observing what's happening in the field – in crop monitoring by growers and agronomists for early recognition.

Fusarium hygiene

Fusarium and Black Root Rot management

Adoption of disease management strategies to minimise spread of Fusarium wilt and BRR

Create awareness of disease precaution

Create awareness of disease management

Farm hygiene

Disease prevention

BBT management

Protocols to minimise spread of Fusarium wilt & adoption/use of these

Black Root Rot control/management

Other disease prevention

Number of farms with disease – prevention protocol

Disease Management

Issue / Extension Approach	Help/coordination required	By Who?
TRIALS/DEMONSTRATIONS	Be told what's going on before season starts – sharing of info relating to trials Demo of available equipment Continue collaboration with Natalie Moore in regards to monitoring spread/incidence of Fusarium & trials which look at products & rotations to reduce Fusarium levels Group informed about research trials – better communication between researchers/extension	
MEETINGS AND FIELD DAYS	Most effective in raising interest in disease mgmt Collaborate with Cotton Australia (BMP) & CGAs Baseline info Guest speakers Disease management options from latest research Promote info on washdown bays, products, designs – sponsorship to run Need experts/pathologists to talk Run a disease wrap up every year – winter Researchers/gurus visiting area for field day	Disease Team
INFORMATION EXCHANGE	Good info available More one sentence messages to promote DISEASEpak Best Practice Updates – Fusarium management, BBT Promote info on washdown bays, products, designs Need precise info on disease to extend – still a bit fuzzy "Cotton Sheet" (newsletter) resurrected by IDO	Disease team Disease team + research Pathologists
GROUPS (AWM)	Disease has been discussed but focus is on insects, farming systems & water Work with CGA Baseline info Possible vector if group wants Videos?	Disease team
YOUR OWN SKILLS	Teach us to ID diseases to provide diagnostic service Aim to improve all the time Disease identification skills and other disorders What is available – eg equipment, literature	
OTHER	One-on-one available to identify problem areas/sources Link into BMP working groups Most problem fields rotated out of cotton until answer is found	Researchers

Weed Management

Application techniques

Overuse of residual herbicides

Host weeds for Fusarium control – ID and control

Adoption of sustainable crop rotations to control / limit the development of problem / resistant weeds in the cotton production system

National issues

WEEDpak development

Local increased awareness of IWP

Identification of key species

Herbicide and farming options to reduce RR cotton volunteers

Integrated approach to weed control

Weed ID and management guide

Control of volunteer cotton (including RR)

Best management of weed species

Trap crop weed management

New growers brought up to speed in weed control

Pesticide efficacy, Targeting / timing / techniques, Condition monitoring, Application selection

Control of weeds coming up on new cotton soil that in the past has only been used for grazing

Bathurst Burr

Weed Management

Issue / Extension Approach	Help/coordination required	By Who?
TRIALS/DEMONSTRATIONS	Researcher cooperation No real help – more grower involvement for this Herbicide trials, in crop and fallow + other management options – biocontrol Demo plots Need to document what new growers are already doing for benefit of new growers	
MEETINGS AND FIELD DAYS	Roundup trial used in field day - guest speakers Speakers – researchers Visits by researchers Relay to researchers and Monsanto the need to have this info to be extended Field day at trial sites– tap into ACRI weed team Nutgrass control	
INFORMATION EXCHANGE	Not getting much info Grant R good help with writing up a trial WEEDpak Brochure for ID of hosts weeds & methods of control Weed ID & management guides Links with researchers 1-2 page CRC news note on options ie if rotating with sorghum use Starane, etc Cotton Tales Media Options for growers	Weeds team
GROUPS (AWM)	Focus farm	
YOUR OWN SKILLS	Don't have anything which will help growers Always aiming to improve Ensure those IDO/DAs not accredited become accredited – notes are good Options available for control Need help on herbicides & rates & weed ID	
OTHER	-	

Environmental Management

Research on application techniques for ground application – refer envir. section for detail

Pesticide application – drift issues *vs* coverage needs

River health – importance of flows

Riparian zone

Salinity

Water quality

Generate and nurture applied knowledge of growers and pesticide applicators in ground application technology

Salinity management

High risk systems/areas

Herbicide and insecticide drift reduction

A lot of the other issues are Cotton Australia & BMP related

Water quality

Spray drift/odour problems

Water availability

Environmental quality under sustained irrigated cotton and grains production

River quality – no residues

Spray drift management – no breaches, fish kills, etc

Pesticide efficacy, Targeting / timing / techniques, Condition monitoring, Application selection

Environmental Management

Issue / Extension Approach	Help/coordination required	By Who?
TRIALS/DEMONSTRATIONS	Funding for ground application trials Cooperation of researchers Protocols for trials Simulated herbicide drift trial Funding for extensive application trials – create interest & support info.	
MEETINGS AND FIELD DAYS	More extension personnel to extend ground application research findings Cooperation of researchers Baseline info (SPRAYpak) Spray application workshops Coordination of when each valley is holding meetings/field days	Environment Team Peter Hughes
INFORMATION EXCHANGE	More extension personnel to extend ground application research findings Baseline info (SPRAYpak) Cotton Tales on Spray drift Newspaper articles Ranking of insecticides by odour Confidence in non-smelly chemicals Big issue for product selection More updated technical application info from trial work	Environment team Environment Team
GROUPS (AWM)	Identify growers currently implementing relevant management practices and share this info – they may be able to act as guest speakers Attend meetings as guest speakers on spray application	
YOUR OWN SKILLS	OK – always try to get better Consult with envir groups eg EPA, spray group Improved presentation skills	
OTHER	Need new, useful info generated that is relevant to applicators and growers and fills current gaps in our own knowledge and skills Have run some small spray app'n workshops on my own Due to not being involved with spray rigs on a regular basis do not have a good knowledge of system. Tie in with survey work being done ie Janelle Montgomery Investigate efficacy with the use of LDP in each area – if achievable control, holds beneficial attributes in relation to drift, etc	

Water Management

You can improve your WUE!

Stored soil water can be an important part of this

Liase/collaborate with WUE officer

Best local irrigation management practices

Evaluate efficiency of current systems

Trialing limited water options for the Breeza plain

Irrigation scheduling practices adopted in grains & cotton

Measurement of all aspects of water on-farm as a basis of objective assessment & improvement

Declining water resources (mainly groundwater)

River/groundwater salinity & potential impacts

Irrigation strategies to improve WUE

Recycling

WUE

Issue / Extension Approach	Help/coordination required	By Who?
TRIALS/DEMONSTRATIONS	Practical solutions or monitoring equipment in the field is an essential component As per WUE officer No good without extending through workshops/field days/meetings Liaise with water team – IDOs facilitate Casual staff Timely equipment availability Working equipment Local demo sites Interested farmer groups Training in monitoring equipment for water on/off field If it is to be industry specific – need industry funding support Limited water experiment to assess alternative irrigation strategies – BMPs Mark Hickman already assisting with trial/demo work that enables a holistic approach to cotton Irrigation officer	Andres, NCEA
MEETINGS AND FIELD DAYS	In conjunction with trials Irrigation course for cotton Paul Dalton or Peter Smith to assist Light pro with OHT / Multimedia projection unit Forward planning Promotional facilities Cooperation of Cotton IDO in organisation of events	Stuart Bray/Peter Smith

Water Management Cont'd

INFORMATION EXCHANGE	Water works not promoted enough? NSW grower in Border Rivers region not aware of project (due to Border issues QLD RWUE was not able to work in NSW part of valley) IDO may need to do this if water is an issue that valley is unsure if acceptable? Pro-forma for use Decision support 1 to 1 or group approach Information access (research & trials) Support from ACRI on HydroLOGIC, water budgeting tools Funding of technical interchange sessions with extension/research people Production regrading water use Mark H helps with communication via Cotton Tales, Cotton Trial Book, etc and communicating with growers	
GROUPS (AWM)	Format for Comparative Analysis Information to be presented at meeting Involve in group activities of water team Potential link for extension meetings (use of existing structure)	Raelene/water team Water Team
YOUR OWN SKILLS	Water issue of WUE more focussed around WUE officer – will help facilitate. Training in information technology Training in group facilitation Decision support Professional training in extension & communication & irrigation Formal training in irrigation management through Charles Sturt University Cotton agronomy skills – UNE &/or cotton IDOs Assistance required to produce manual & pass on skills To educate & increase awareness of riverine salinity and impacts on cotton production – need info on salt impacts on cotton	Casual assistant
OTHER	Put main research results in water section of BMP manual? Growers asking about pre-watering *vs* watering up on seedling vigour and yield Integrated approach – to come with time Regular phone interview Regular Cotton Tales from other areas Regular monthly reports from other areas Evaluation Clerical assistance required to convert knowledge "in head" to digital format	Casual Assistant

Strategic Planning

Bruce Pyke introduced CRDC's new Strategic Plan and Annual Operating Plan:

- CRDC is under increasing pressure to report on "outcomes" (ie change) as opposed to "outputs" (eg field days, etc);
- In recent years investment in extension has grown substantially;
- The framework for the extension program is based on the 1995 Review of Extension (copies of which Bruce has subsequently mailed to everyone);
- Role of IDOs is regionally driven – coordination, validation and education;
- The review identified a need to improve coordination and synergy at a national level – reason for creation of the NCEC role;
- Links between researchers and extension officers expected to be strong – a two way loop with the questioning of research by IDOs as now occurs.
- TRC to be a strong resource provider.

References: CRDC Strategic Plan
CRDC Annual Operating Plan
Cotton CRC Strategic Plan
Cotton Extension Review Aug/Sept 1995

Cotton Extension Team Vision

(ie what future would we like to see for the cotton industry?)

A brainstorming session to gather a united view for where the extension team would like to see the industry in the future came up with the following ideas:

A competitive, profitable and environmentally sustainable cotton industry
...receptive to change
...valued part of the Australian economy and community
...satisfying market demands

A economically, environmentally and socially sustainable cotton industry...
A sustainable, profitable and environmentally conscious Cotton Industry...
A cotton industry that has...
... responsible and efficient management of resources
...contributing to the Australian economy
...valued by an accepting community
...meeting a market need.

After discussion about the wordsmithing (and frustration over how involved this can be!), it was decided that the following words capture the above vision of the extension team:

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

(CRDC Vision statement - CRDC Strategic Plan 1998-2003)

So the logical step was taken and the extension team chose to adopt the CRDC Vision Statement. This is ideal as it means that the members of the extension team share the same vision as the industry has determined with CRDC.

Mission of the National Cotton Extension Network

(ie what is our role in achieving the vision?)

The extension team broke into smaller groups based on their roles (IDOs; DAs, Spray Application & IPM and Water) to develop a clear picture of the role of the extension team. With a member of each group taking on the role of a key stakeholder (grower, consultant, environmental/community rep, Regulator, Buyer/ginner) the aim was to develop a rounded, agreed view of our role.

Feedback from this session:

Ensure we access and generate all the information and support stakeholders/the cotton industry to ensure the sustainable rate of adoption for management techniques to gain desired change.

- Communicate
- Change – responsive to stakeholders – initiate and facilitate change
- Participatory
- Content
- Pivotal (central link)
- Proactive
- Seek and evaluate

Access, generate and promote information and tools necessary to support the active participation of all stakeholders in the ongoing adoption of improved management practices.

Mission Impossible!!
Assist the cotton industry to continually improve profitability and sustainability through:

- coordination of extension and research
- education
- implementation

To facilitate a more sustainable, competitive, profitable cotton industry providing increased economic, environmental and social benefits to regional communities and the nation.

A team of resource providers and facilitators who are independent conduits for change for the Australian cotton industry and the broader community.

Role of extension team in industry?

- Resource provider, adapt/dovetail research into production systems.
- Provide and environment condusive to change.
- Conduit, facilitator, link, vehicle, deliverers.
- Independence, non-biased, uncorrupted, immune to bribery.
- Concern for community issues.
- Keep out of regulatory processes
- Production of high quality cotton.
- Educators of growers, industry and community.
- Trial facilitator.
- Promote industry in local community.
- Support industry network.
- Encourage communication between growers.

View of Grower Perspective:

- Timely and relevant support and information
- Sensitivity
- Not waste my time
- Coordination of resources, information and activities
- Facilitation of leaning and progress
- Two way process
- Up to date
- Not biased
- Help me to grow cotton more profitably
- Secure info for future (resources, market access)
- What's "New"
- Listen to my problems/needs
- Link to researchers
- Be GOD!!
- Do trials for us
- Funding submissions
- A wealth of knowledge
- Grower's employees
- Local contact – 1st point of call for independent info
- Cheap consultant
- Too national outcome focussed

View of Environmentalist/Community Perspective:

- Stop cotton producers polluting
- Stop sucking rivers dry!
- No cotton farms near towns
- But want your money for the community
- Natural (organic) cotton
- What do they think of us/who are we?
    - Part of the problem / biased
    - Shield to industry
    - Tool to changing attitude/practices
    - Non tree hugging land rapists
    - Public servants
    - Biased industry reps
- What do they want from us:
    - Relay concerns about environmental issues
    - Recognition of environmental concerns
    - Transparency of auditing process and industry
    - Be part of regulatory process
    - Be part of education process
    - What are you doing about the rogues?

View of Regulator/Government Perspective:

- Conforming to CAPS, WAMPS, LWMPs
- "Improved efficiency"
- Mandatory legislation
- We want to licence
- Whole of government – everyone

- Want us to implement promises the industry made RE self regulation – BMP, PAMPs, IPM
- Industry is abiding by current legislation

Extension Perspective:

- Targeted group, well defined
- Method of presentation – suitable target group
- Aids used need to be suitable to target audience
- Message is regional results – gather data
- Suggested changes that fit in with the vision
- Continuity of staff
- Keep of jobs (trust)

View of Buyer/Ginner Perspective:

- Grower to be shareholders
- Secure premiums $
- Sponsorship/funding
- Quality product

Cotton Extension Network Mission Statement

Needs further comment from extension team and R&D leaders but something along the lines of:

Through close links with industry and with research providers, access, generate and promote relevant information and coordinate activities as suited to local conditions to enhance management practices in each cotton growing region.

By maintaining close links with industry and with research providers, access, generate and promote locally relevant information and practical knowledge, coordinate activities and facilitate communication between stakeholders to enhance cotton growing practices in each region.

Comments on this????

TRAINING NEEDS

- Workplace Certificate IV Training – NSW Ag (Martin Forbes) Toowoomba TAFE

  What RPL do we qualify for? *Quite a bit often – need to discuss individually with trainer.*

  The course is offered in many regions, and differently in each – best to organise locally.

- Adult learning / extension (brief)
- CottonLOGIC
- Masters course
- Microsoft Access – *check local options*
- Cotton Production course (UNE)
- Irrigation management certificate course (CSU) – Distance Ed.
- BMP updates

RESOURCES

- Time
- $$ to attend training courses *NB in NSW AG professional development courses are offered free of charge to extension staff. In Qld, a range of courses may be funded through your existing project provided you have the funds available.*
- IDM guidelines
- IPM guidelines
- Another fax line
- Different IDO at Emerald! (vote for Quinny!)
- Video/Internet linkups
- IPM extension officer for NSW
- Visual aid equipment
- Data projectors for each RWUE valley

COORDINATION

- Spray workshops
- CottonLOGIC workshops
- Organic cotton tour
- IPM workshops/training
- Knowledge of other district trials and group activities.

EVALUATION ACTIVITIES

Evaluation of extension activities provides a mechanism to gain feedback about the effectiveness of extension activities. Are they achieving their goals? Can they be improved. This is important both at a personal level for us to be able to continually improve our activities and also at a program level. CRDC and the Cotton CRC are making a significant investment in extension and it is important for the boards to be able to gauge how effectiveness this investment is.

A few months before the workshop, each member of the extension team was asked to conduct a simple evaluation of an extension activity. These were done with quite some interest – congratulations to everyone for the effort that went into these. The feedback at the extension workshop was a popular part of the workshop as it gave us all an opportunity to hear about specific activity that each member of the team has conducted and also how effective it was. It also gave us all an opportunity to improve our evaluation skills by hearing about the approaches each person took and their feedback on that technique.

Presentations of these at the workshop outlined:

- The extension activity evaluated;
- The style of evaluation used and;
- The results of the evaluation.

These evaluations provide excellent feedback about how different extension activities have been received and improvements that can be made. The next phase of evaluation is to research how effective our extension programs are at achieving change – attitudinal and practice change. The extension team will undertake a study of the Cotton Industry attitudes towards IPM and area wide management in October 2001 together with the Rural Extension Centre. This will compare against the similar study conducted in 1997 to assess how much has changed in attitudes towards IPM and what are some of the things that have helped this to occur.

Main topics evaluated by the team this year:

- Trials
- Field day
- Crop Judging
- AWM group
- Comparative analysis
- Newsletters / information delivery (fax/website)
- Focus group analysis
- Pheremone trap network
- Workshop effectiveness
- Current practice

Evaluation techniques used:

- Surveys (written questionnaire)
  - fax out
  - mail out
  - At group meeting
- Group discussion (reflection on activities)
- Narrative
- Personal reflections
- Internet hits
- Formal and informal
- Constant evaluation during workshop delivery
- Opinions
- Meeting notes

Evaluation of an AWM group

Macquarie Valley (Gin Gin AWM) 18/5/01

Kirrily Rourke

Group discussion session – everyone was asked to comment on their views of the group, what has been achieved and what hasn't, future of the group. Led by Rob McCutcheon

FEEDBACK/COMMENTS

- Communication good
- Still early days
- Involve dryland farmers also
- Meetings worthwhile
- Good process
- Sprays not reduced
- Varietal selection and Ingard (better expression) = spray reduction
- Need to involve larger farms/corporates nearby vs area already too big
- Include aerial operators to improve timing of sprays & application
- Need to develop strategy for winter crops and pupae control
- Communication re spray failures – consultants important
- Some people in the area do not get on – mediation required
- Cotton area next year 12300ac, 130ac spring trap crops planned

Season review survey (completed at the end of the meeting)
See summary survey for responses (pages 3-4).
Not all group members completed the survey
Not all survey respondents included comments on the back.

Evaluation technique

- People responded well to group discussion
- Each member was asked to comment while notes were taken
- Main points put on whiteboard as discussion progressed
- Different view points were raised
- Main focus appeared to be on the communication process
- Survey completed at the end of the meeting – some had to leave early so this was rushed (not ideal)
- General agreement with general functioning of the group
- Some differing views on how the group should be run in terms of leadership/facilitation and composition of group
- Some saw a need for more time in the field
- More than just a catch-up session
- Some valuable insights regarding "what does AWM mean to you?"
- Dryland farming seen as a limiting factor to achieving goals, also lack of science.
- Generally group was keen to review the season and look forward to future involvement and working together.
- A very positive process generally

Gin Gin Area Wide Management Group

REVIEW OF SEASON 2000/2001

Please reflect on the following aspects of this AWM Group:
1 strongly agree, 2 agree, 3 undecided, 4 disagree, 5 strongly disagree
Please circle one

Meetings generally:	***Range of responses***	***Average***
Were known about (did you get the faxes)	**1 2** 3 4 5	*1.1*
Were held at convenient times/locations	**1 2** 3 4 5	*1.1*
Were well organised	**1 2** 3 4 5	*1.5*
Were of appropriate length	**1 2 3** 4 5	*1.6*
Covered relevant topics	**1 2** 3 4 5	*1.5*
Involved group members well	**1 2 3** 4 5	*1.8*
Included appropriate detailed information	**1 2** 3 4 5	*1.8*
Utilised appropriate handouts	**1 2 3** 4 5	*2.0*
Incorporated enough field visits	1 **2 3 4** 5	*2.9*
Were attended to have a few beers and catch up	1 **2 3 4** 5	*2.7*
Were worth attending	**1 2** 3 4 5	*1.5*

Your suggestions on how meetings could be improved

- *Outline focus of meetings on fax out (prior to meeting)*

The Group as a whole:	***Range of responses***	***Average***
Interacts well together	**1 2** 3 4 5	*1.5*
Shares leadership responsibilities	**1 2 3 4** 5	*2.3*
Needs an external facilitator (NSW Ag)	**1 2 3 4** 5	*2.3*
Needs contributions from all members	**1 2 3** 4 5	*1.4*
Is capable of working together	**1 2** 3 4 5	*1.4*
Sets relevant and achievable goals	**1 2 3** 4 5	*1.8*
Contains a range of skills and experience	**1 2** 3 4 5	*1.5*
Is able to achieve a consensus when required	**1 2 3** 4 5	*1.8*
Has an appropriate make-up of members/area	**1 2 3 4** 5	*2.3*
Has a commitment to achieving its goals	**1 2 3** 4 5	*1.9*
Has a commitment to IPM	**1 2 3** 4 5	*2.1*

Your suggestions on how the group could be improved

- *Get all parties to attend*
- *Guest speakers – short and relevant*

What does "area wide management" mean to you?

- *Reducing reliance on chemical; eventually cheaper, more sustainable way to grow crops*
- *Strategic planning – growers aware of what agronomists are trying to achieve*
- *Cooperation for financial and physiological rewards*
- *More than what you do on your own farm*
- *Synchronising management and implementing best techniques*
- *Uniting together*

What do you see as the major benefits of AWM

- *Higher yields; greeny control*
- *Improving*
- *Achieving goals and meeting with other growers*
- *Communication, reduced pesticide use*

What do you see as the major limitations to successful AWM?

- *Not doing what we set out to do*
- *Renegade growers; drylanders*
- *Involving all growers*
- *Dryland cropping in area; need for financial benefits*
- *Lack of science behind what we're doing; commitment to AWM goals*

Do you want to be part of this group? *Everyone said YES*

What would you like to see happening in this AWM group next season?

- *More cooperation between agronomists*
- *Regular meetings involving all growers in the area*
- *Start now (not 'next' season)*
- *Similar to this season*

Any other comments? *N/a*

Extension Evaluation Of The Upper Namoi Valley Crop Competition 2000-01 Season

Mark Hickman

Format

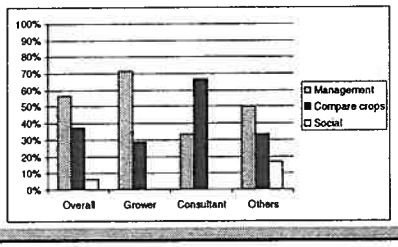
- ✓Bus tour of growers to judge finalist
- ✓Each site : Crop inspection 20min and grower discussion 20min
- ✓Score sheets completed
- ✓Winners announced at the end of the day

Survey details

- ✓Attendance poor due to rain postponement and sorghum harvest Total=22
- ✓Growers(10), Consultants (4) Others (8)
- ✓Survey Questions targeting:
  - Reason to attend the day
  - Has the day stimulated change
  - Format of the day and future support

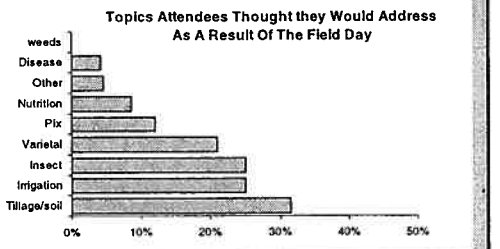
Motivation

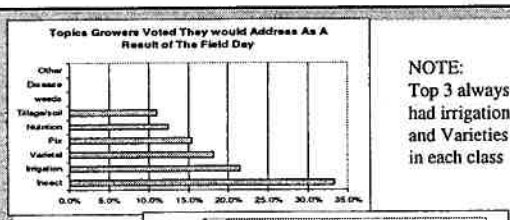
- ✓100 % agreed the day was an informative use of there time



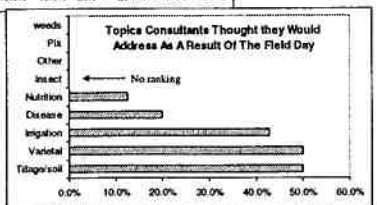
Change

90% of people felt the day provided ideas for management change

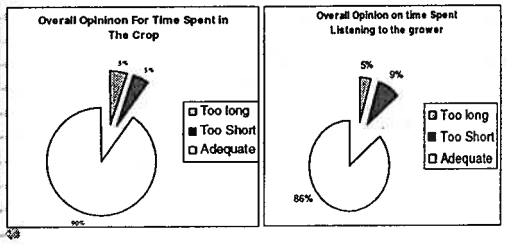




NOTE:
Top 3 always had irrigation and Varieties in each class



91 % of people were happy with the format



Comments

- ✓91 % will support this type of day again
- ✓Overall themes were positive comments about content and faciliation
- ✓1 common negative theme was the day was too long
- ✓To counteract this, either reduce finalist entries since distance is set by farms OR start early morning and finish earlier

Conclusion

- ✓The day was a success , I achieved my goals
- ✓Minor changes will be made
  - Length of day
  - Timing in the season to avoid clashes with sorghum

EVALUATION OF CROP JUDGING FIELD DAY

Mark Hickman IDO Gunnedah

I have chosen to evaluate the Upper Namoi Crop judging bus tour that was held on April 3rd 2001. In previous years, the judging of local crops had been conducted by a small panel of agronomists and independent assessors. However, following a grower survey, the respondents wished to change the format for the 2000-01 competition.

The aim of the new format was to encourage a higher level of grower involvement, as well as providing the members on the day an opportunity to exchange management experiences. This would then provide the bases for growers to adopted new practices and challenge their own farming practices.

The actual tour format involved growers on the bus judging the entries that made the final division in both the irrigated/dryland division. Each grower on the bus tour judged the crop using the attached judging sheet. The process involved each final entry to have an estimation yield and examining of the crop. Following the crop walk, the growers had the opportunity to interview the owner of the crop and raise issues related to the management of the crop. Each session was 15-20 minutes.

The aim of my evaluation of the filed day was focused on a few key areas. Firstly, what motivated the participants to attend? What did the participants get from the exercise? Finally, I wanted an evaluation people's thoughts on this format for future competitions.

RESULTS

The questionnaire handed to growers on the day is attached as Appendices.

The results were broken into several classes. The first class was an overall category that contains the responses from each person that returned the survey. After these answer very grouped together, a further investigation of the answers was conducted. These responses were divided into the classes of grower, consultant/agronomist and "other".

On a negative note the day was only attended by 22 people due to clashes with sorghum harvest and other industry events in the valley. This was unavoidable, since the day had been already postponed due to rainfall the week prior. Despite this, the participants on the day provide good feedback to the survey questions.

Effective Use of Time

Was the bus tour an informative use of your time?

Results: An overwhelming 100% of people thought the day was very informative.

Motivation

This question required participants to rank a list of 3 possible reasons for what motivated them to attend the day. A score of 1(highest) was the primary reason for the applicant to 3(lowest).

Overall the main priority for attending was to look at management of crops across the district, followed by comparison of crops and finally as a social day (figure 1).

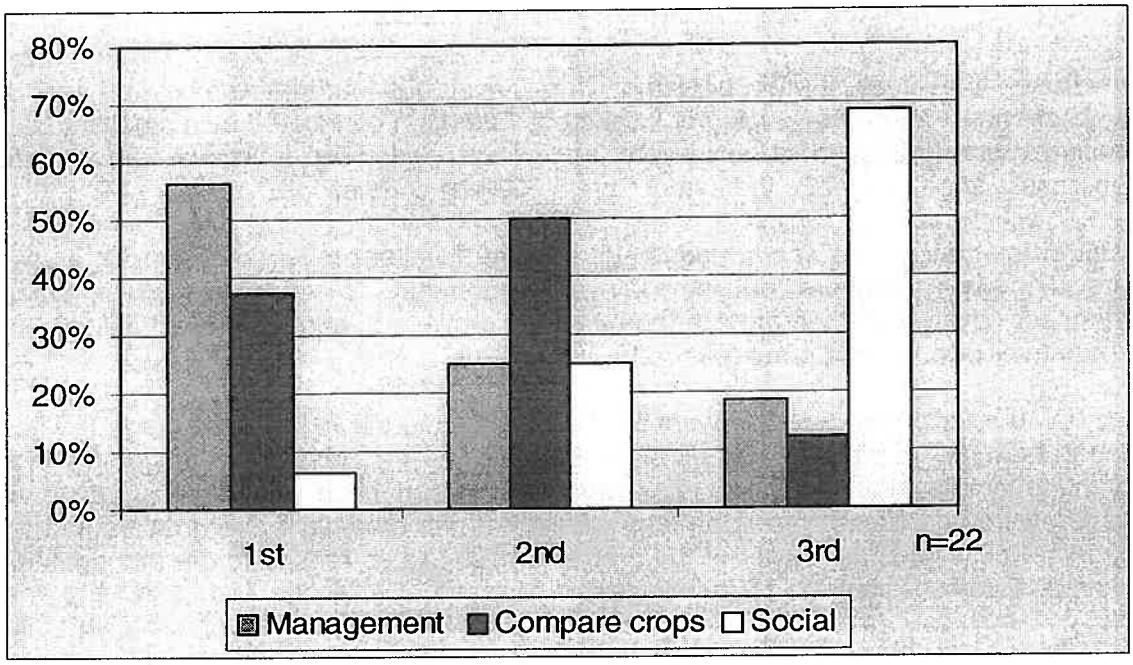
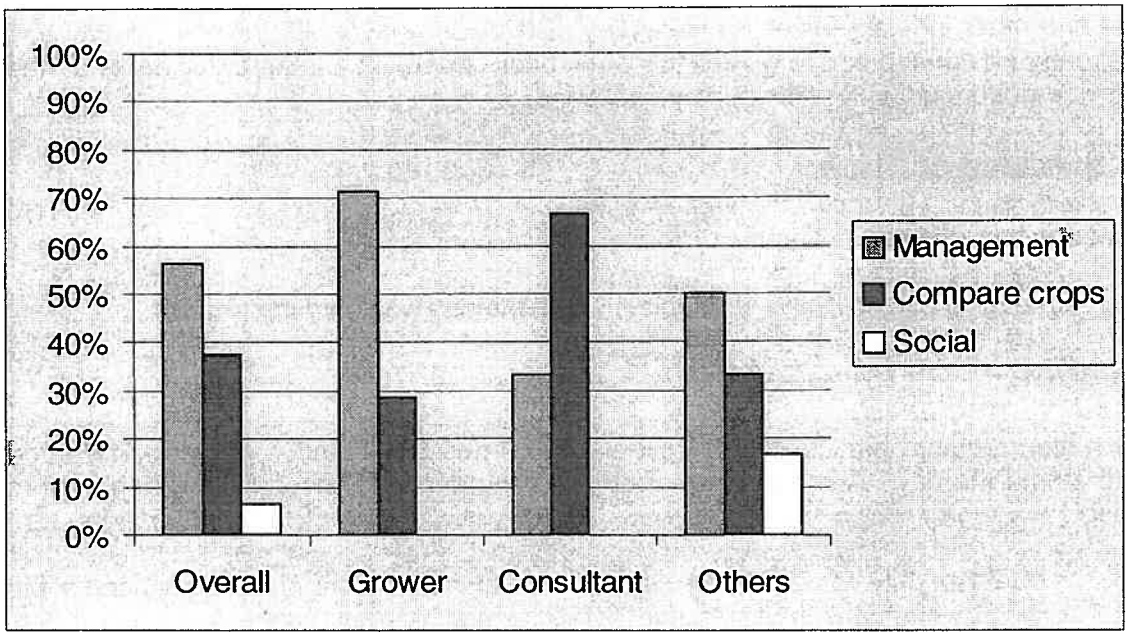


Figure 1: Motivation to attend field day

The growers attending the field day numbered 10, the consultants numbered 4 and other categories had 8 people attend the day. Figure 2 shows the growers and other people (workers etc) that attended were more interested in management ideas. Consultants were primarily there to compare the district crops. Figures 1 and 2 highlights the need to ensure you identify all the target audiences and where possible catered for them the design of a field day. I feel the balance between the crop inspections and the grower addresses to the group met a significant proportion of motivation of each person.

Figure 2 – Reason to attend by group



Field Days Ability to Initiate Change

This evaluation tried to establish if the day of crop judging provided any participants with the stimulation to change or at least investigate changing management practices on their farm. The result indicated 90% of people felt the bus tour had provided them with ideas which they were willing to investigate for their own farm or business.

A follow on question, was to identify which particular topics these ideas could be classed as. The results appear in figure 3. The main topics these ideas were in the area of tillage/soil, followed by irrigation, insects and varietal choice.

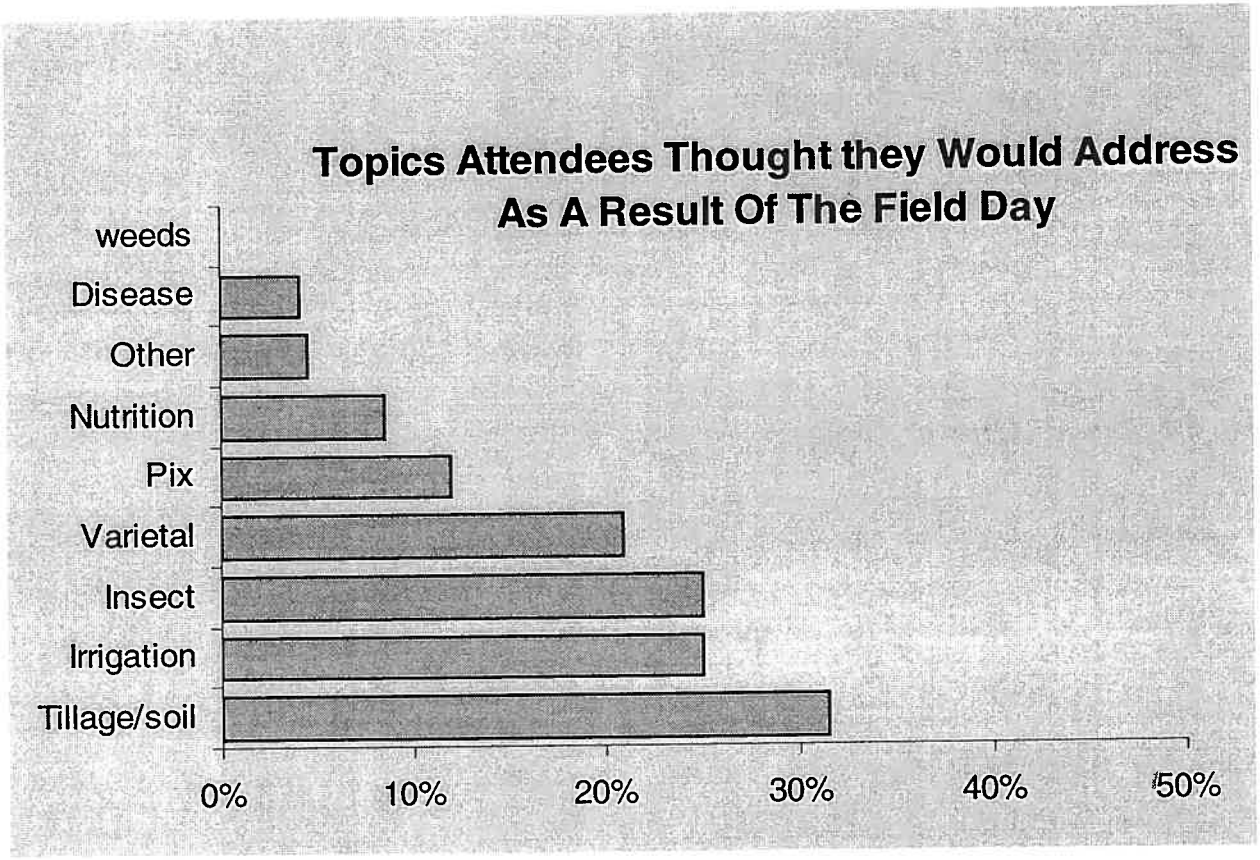


Figure 2: Overall topic breakdown

When the same question was broken into the categories, it was found that growers were primarily focused on insects, followed by irrigation topics and varietal choice (figure 4). While consultants (figure 5) and other people (figure 6) were more focused on tillage/soil issues.

A noteworthy point is, in all 3 classes the variety and irrigation topics constantly ranked within the top 3 topics. Surprisingly, insects did not rank at all in possible issues the consultants might try next season, as a result of this day. The actual farms that were visited ranged significantly in their pest strategies. Either the consultant group dismissed the information or already they have adopted similar pest strategies as seen on the day.

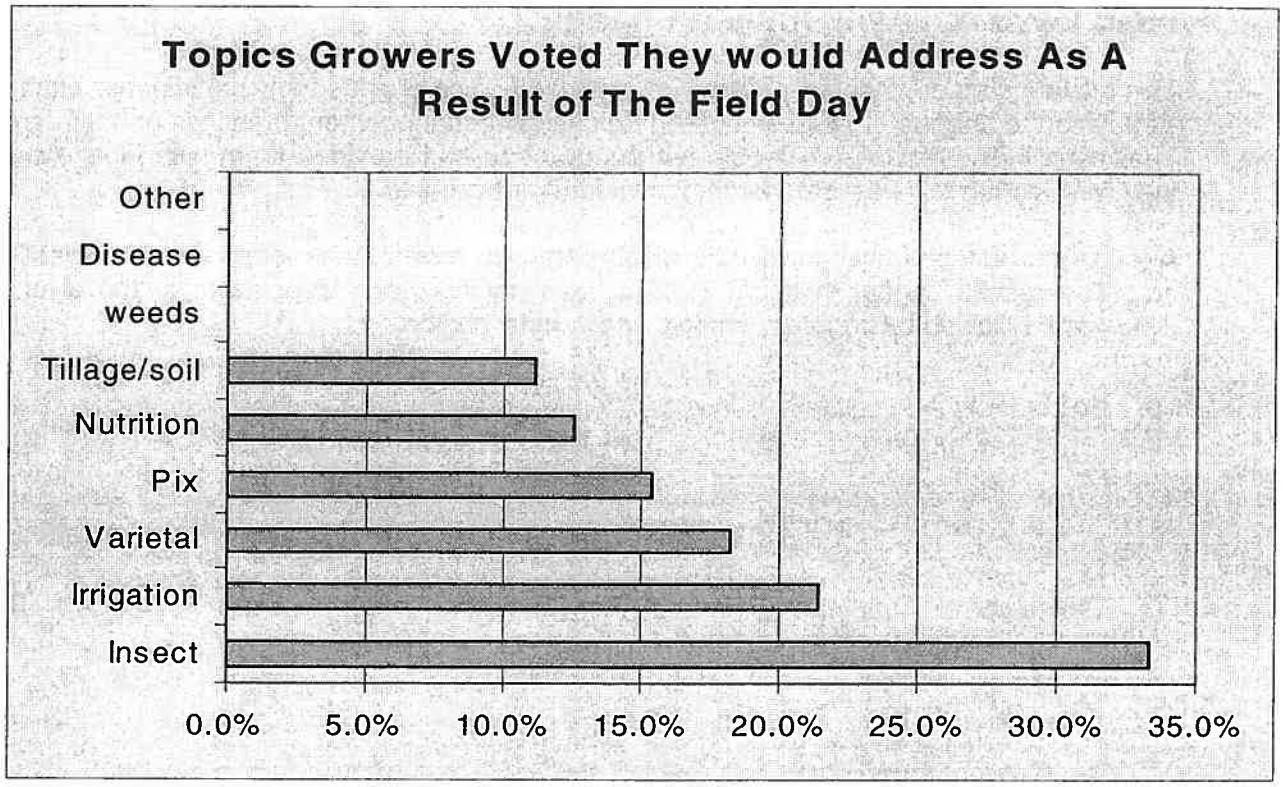


Figure 3: Grower Topics

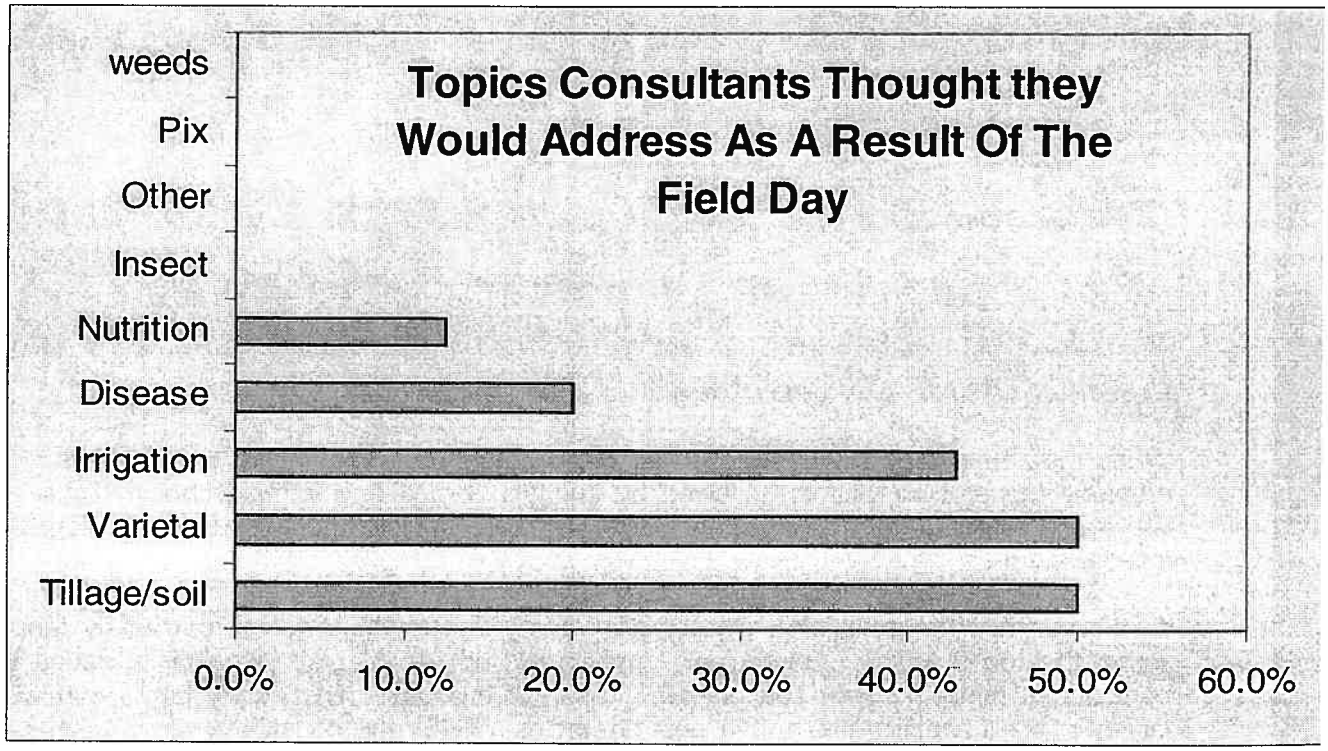


Figure 4: Consultant Topics

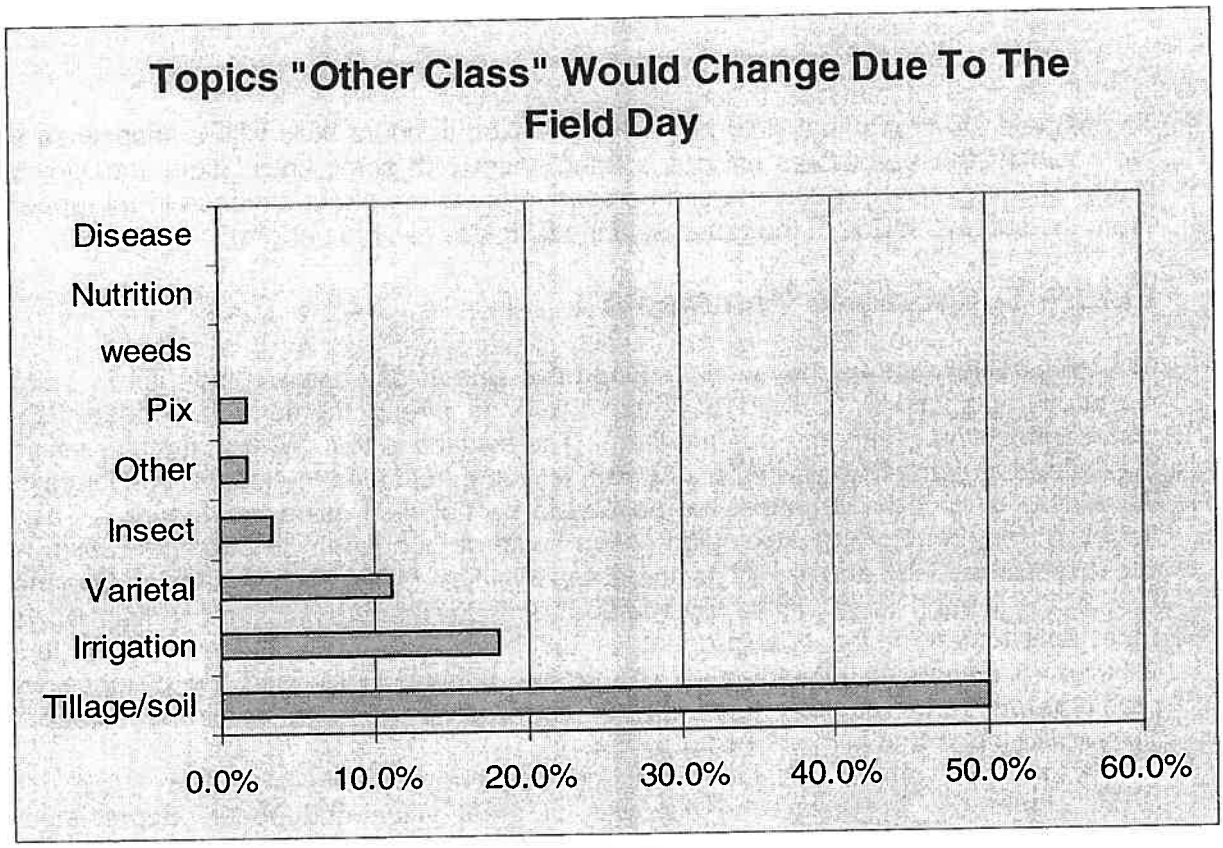


Figure 5: Remainder of people

Format of the Field Day

A series of questions within the survey were focused on the format of the bus tour and time that was allocated to each entry site. The results showed 90.5% of participants were happy with format of the day. When asked, what they thought of the time spent at each site in relation to the in-crop inspection and grower presentation session the majority of growers felt it was adequate. As seen in figures 7 and 8

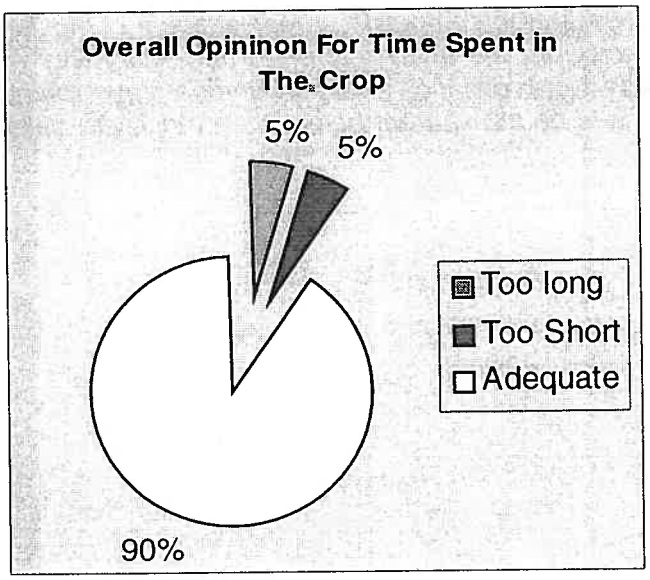


Figure 6 Time in the crop

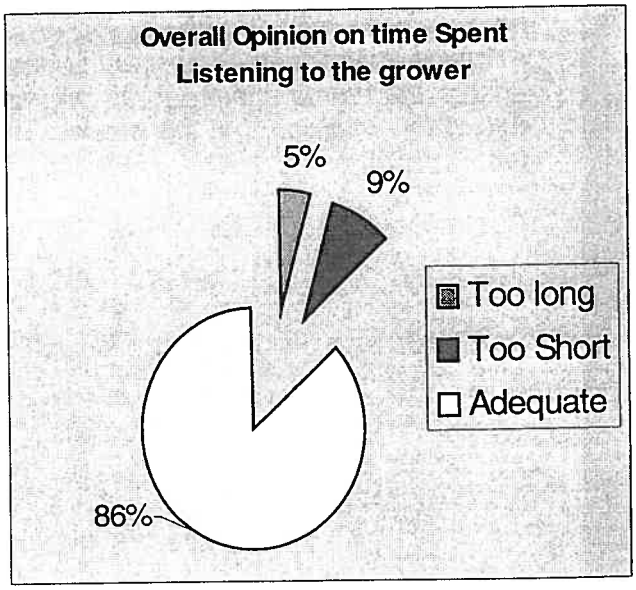


Figure 7 Time talking to growers

To estimate the crops final yield judges were asked to count bolls with a linear metre and then convert these numbers using a scoring sheet with some calculations into points for yield. These simple calculations can be seen in the score sheet attached in the appendix. From the survey, 95.2% of the group said the task was easy to perform.

Future Support and Comments

91% of participants said they would support this type of day again in the future. This was an encouraging result. However, there was one strong theme that appeared in the comment section. "The day was too long". The actual bus tour covered a major section of the valley, since the finalists in the crop competition determined the locations. Hence it was impossible to limit the distance that needed to be travelled using this format. This tour travelled from the Goran Lake region (70km south of Gunnedah) to Boggabri (35km North West of Gunnedah) and finally to the Breeza plains (15km South East of Gunnedah). Overall the judging panel visited 5 properties. The day started at 10am and finished with a roast split dinner at the final property at 6.30pm with growers being returned to their vehicles in Gunnedah by 8.30pm. The grower comments realised the distance was a problem, but felt the day was too long. Suggestions were to "start early and finish earlier" This would then remove the need for dinner.

Other comments suggested the day was of great value and people appreciated the opportunity to share ideas with other growers. One comment reinforced the low numbers were a result of the harvest in the valley, some grower apathy and not the field day format.

Conclusion

In analysing the questionnaire I feel the day was well received. I was particularly interested as to why people attended the day and was happy to identify the differences between the growers and consultants. This is important when designing a field day to know what motivates your target audience.

The next crop judging event to be held in the valley will follow a similar format. However, if possible I will start the day earlier or see if the crop competition organisational committee will allow only 2 entries for the irrigation and 2 for the dryland to be in the final. This will ensure the day is shortened as requested. Note: distance between entries plays a large role in this decision, but this process needs to be transparent before the entries are called for.

UPPER NAMOI COTTON CROP JUDGING
Bus Tour Questionnaire

Please mark one box only per questions unless specified.

Q1 Occupation ☐ Grower ☐ Agronomist / Consultant ☐ Other .....

Q2 Did you find attending this field day an informative use of your time Yes ☐ No ☐

Q3. What was your motivation to attend this field day?
Please rank these from most to least important , with 1 = most important.

☐ To compare crops within the region with your own crop

☐ To observe management strategies which you may use to refine your own crop management

☐ Social Interaction

Q4. Has this bus tour provided you with ideas to improve your own production system?

☐ Yes ☐ No , please explain .....

.....

Q5 If the answer to Q4 is Yes, then what aspects of your operation are you considering changing as a result of the information you have received today? (you can tick more than one)

☐ Weed Management ☐ Tillage / Soil management

☐ Nutrition ☐ Insect Management

☐ Irrigation ☐ Disease Management

☐ Varietal Choice ☐ Use of Growth Regulator

☐ Other (please specify).....
.....

Q6. What is your opinion of the bus tour format? Liked ☐ Disliked ☐ Uncertain ☐

Please turn over

Q7. In general, what was your opinion of the balance between the time spent doing the crop examination and listening to Grower management comments?

	Crop Examination Time	Grower Management Comments
Too Long	☐	☐
Too Short	☐	☐
Adequate	☐	☐

Q8. How did you find the process of judging the crops using the point system ?

☐ Easy ☐ Hard

Q9. Would you support future bus tours to judge local crop competitions?

☐ Yes ☐ No

Comment Section.

Are there any positive or negative comments you would like to make concerning the day ?

.....
.....
.....
.....

Thankyou for your assistance .

Please ensure you hand this form in before you leave

OR

fax it back to Mark Hickman fax : 67422940.

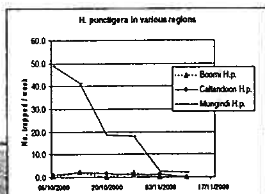
PHEROMONE TRAPS
An evaluation

- What was it?
  - Pheromone traps to catch Helicoverpa moths
  - Both *H. armigera* and *H. punctigera*
  - Two traps per site
- Where was it?
  - BORDER RIVERS
    - Texas/Bonshaw (1 site)
    - Boggabilla (12 sites)
    - Goondiwindi - Boomi (6 sites)
    - Mungindi (6 sites)

PHEROMONE TRAPS: An evaluation

- Who was involved?
  - Consultants/Agronomists/Bug checkers
  - Growers
  - Department of Primary Industries
  - Total Ag Services
- How much did it cost?
  - 25 traps at $23.72 each
  - 50 lures at $7.65 each
  - Initial cost to set up was $975.70
  - Additional lures later in season $244.70
  - TOTAL COST $1220~

Pheromone trapping results Example of presentation.



Booral, Callandoon & Bonshaw — Helicoverpa spp. Pheromone Trap Counts 2000/01

Week	[illegible]		[illegible]		[illegible]		Average		[illegible]		[illegible]		[illegible]		Average		Bonshaw		[illegible]	
	H.a	H.p	H.a	H.p	H.a	H.p	H.a	H.p	H.a	H.p	H.a	H.p	H.a	H.p	H.a	H.p	H.a	H.p	[illegible]	H.p
06-Oct	0	1	2	0	0	0	0.7	0.3	2	3	0	0	0	0	0.7	1.0				
13-Oct	1	1	3	0	4	5	2.7	2.0			1	1	2	3	1.5	2.0			8	26
20-Oct	1	0	1	0	0	0	0.7	0.0	2	1	0	0	5	4	2.3	1.7	1	2	9	7
27-Oct	1	1	1	3	0	0	0.7	1.3	7	2	1	0	0	0	2.7	0.7	1	0	5	11
03-Nov	1	0	0	0	5	0	2.0	0.0	6	0	0	0	3	4	3.0	1.3	1	2	4	1
10-Nov	0	0	0	0	5	0	1.7	0.0	1	0	2	0	0	0	1.0	0.0	2	1		
17-Nov					2	0	2.0	0.0					0	0	0.0	0.0	0	0		
24-Nov					0	0	0.0	0.0	3	0			0	0	1.5	0.0	0	0	4	0
01-Dec	2	0	0	0	0	0	0.7	0.0	5	0	0	0	0	0	1.7	0.0	0	0	6	1
08-Dec	0	1	2	0	0	0	0.7	0.3	0	0	5	2	0	0	1.7	0.7	0	0	20	2
15-Dec					3	0	3.0	0.0	1	0			1	0	1.0	0.0	1	0	12	1

- Personal evaluation
  - From feedback during season & observations.
- Results came in regularly at the beginning but slackened as season progressed.
- Interest in results diminished as season progressed.
- Consultants' results not correlating with field events
- Survey evaluation
  - From fax out survey of consultants.
  - 11 questions on survey.
  - 8 responses (the main consultants in the Border Rivers responded).
  - Varying views.

RESULTS

1. Were the pheromone trap results worthwhile to you?

Yes 4 No 1 Sometimes 3

2. Was the data presented in an easy to understand format?

Yes 8

3. Was the data timely?

Yes 5 No 1 Sometimes 2

4. Did the data reflect what was happening in the field?

Yes 2 No 2 Sometimes 4

5a. Did you use the results in making recommendations to your clients?

Yes 3 No 3 Sometimes 2

5b. Did you share the results with your clients?

Yes 6 No 1 They were interested 2 They were not interested 2

6. Do you consider it valuable to continue collecting trap results?

Yes 6 No 1 Don't know 1

7. Would you use Pheromone trap results in conjunction with other crops?

Yes 5 No 3

Which crops? Corn, Chickpeas, Sorghum, Faba beans, Pigeon peas.

8. Should there be one person or company to collate data & coordinate monitoring?

Yes 5 No 1 No opinion 2

9. What is the best month to begin monitoring?

July 1 Aug 3 Sep 2 Oct 1 All year 1

10. What is the best month to stop monitoring?

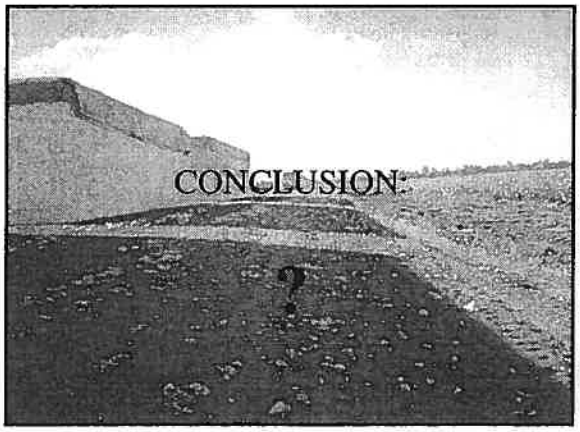
Feb 1 March 4 April 1 Don't stop 1

11. Will you monitor next year, and if so, when will you start?

Yes 6 No 2 Starting times varied July - Sep

Only half of the consultants said the trap results were worthwhile, yet most will continue to monitor traps. Trap results coming into the DPI were not regular or consistent, making it difficult to get data out every week. The most consistent and dedicated of the consultants is also the only one who has firmly decided to discontinue with trap monitoring, believing it to be irrelevant.

Which leads to my conclusion...



An evaluation on the use of PHEROMONE TRAPS in the Border Rivers Region

Mascha Korteweg

(This is a shortened version of the presentation with the main points and a conclusion added.)

What was it?

Pheromone traps to catch *H. armigera* and *H. punctigera* moths

Two traps per site

Where was it?

BORDER RIVERS

Texas/Bonshaw (1 site)

Boggabilla (12 sites)

Goondiwindi - Boomi (6 sites)

Mungindi (6 sites)

How much did it cost?

TOTAL COST $1220~

Survey evaluation of consultants:

8 consultants in the Border Rivers responded

MAIN POINTS FROM SURVEY

Were the pheromone trap results worthwhile to you?

Yes 4 No 1 Sometimes 3

Was the data presented in an easy to understand format?

Yes 8

Did the data reflect what was happening in the field?

Yes 2 No 2 Sometimes 4

Did you use the results in making recommendations to your clients?

Yes 3 No 3 Sometimes 2

Did you share the results with your clients?

Yes 6 No 1 They were not interested 2 They were interested 2

Do you consider it valuable to continue collecting trap results?

Yes 6 No 1 Don't know 1

Would you use Pheromone trap results in conjunction with other crops?

Yes 5 No 3

Which crops?

Corn, Chickpeas, Sorghum, Faba beans, Pigeon peas.

What is the best month to begin monitoring?

July 1 Aug 3 Sep 2 Oct 1 All year 1

What is the best month to stop monitoring?

Feb 1 March 4 April 1 Don't stop 1

Will you monitor next year, and if so, when will you start?

Yes 6 No 2 Starting times varied July – Sep

In conclusion:

Only half of the consultants said the trap results were worthwhile, yet most will continue to monitor traps. Trap results coming into the DPI were not regular or consistent, making it difficult to get data out every week eg. during flooding. The most consistent and dedicated of the consultants is also the only one who has firmly decided to discontinue with trap monitoring.

This evaluation lead to the conclusion that there are varying views on the benefits and use of pheromone trap results across the region. There may be a need for some informal education on how pheromone trap results should be interpreted. The need to assess cost and time versus gain has also become obvious.

Cotton CRC Central Queensland COTTON TALES Queensland Government Department of Primary Industries 2000-01 33 26 May 2001

David Kelly DEO Cotton - DPI Emerald Ph 07 49637411 Fx 07 49 837459

AN EVALUATION

David Kelly
Development Extension Officer
Qld DPI/ Australian Cotton CRC

One of my main extension tools

- Up-to-date "industry" information
- Information on current crop events
- Provide a 'base line' of information within local industry.
- Save researchers time

Get research information flowing

Present Distribution:

Growers	66%
Research/ Extension	14%
Agribusiness (resellers, chemical reps, banks)	11%
Consultants	5%
Applicators (Ground & Air)	2%
Other (Cotton Aust, CCA, media, Uni Students)	2%

Present Distribution:

Local	87%
Outside CQ	13%
Fax	65%
E-mail	30%
Mail	5%

It takes a lot of time, effort & cost

15% of time
130 faxes

Need to make it relevant
- good use of resources

Aims of survey

- Simple/ quantitative
- Provide opportunity for comment
- Answer some major Questions

KEY QUESTIONS

- 1 How valuable/ useful do the target audience find it?
- 2 Is it being sent too often/ not often enough?
- 3 What topics are most useful?
- 4 Presentation- is it easy to read?
- 5 Can I get more people on the e-mail?

Method:

- Questionnaire sent out with Cotton Tales (200)
- Promoted as being quick to complete.
- 9 Questions
- No follow-up

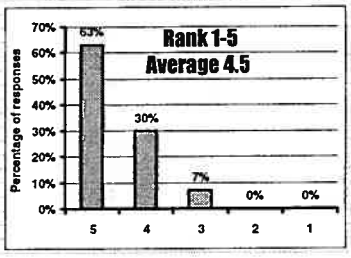
Responses:

Total 34%

(68/200)

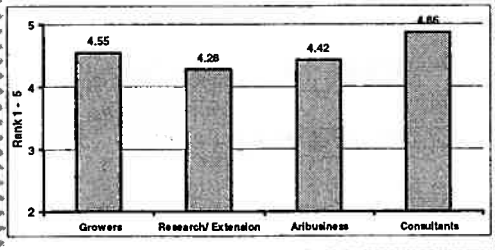
	Responses	(ToTaL)
Growers	66%	66%
Research/ Extension	10%	14%
Agribusiness	10%	11%
Consultants	10%	5%
Applicators (Ground & Air)	1%	2%
Other	1%	2%

"How useful is Cotton tales to you?"



"How useful is Cotton tales to you?"

- Target Audience

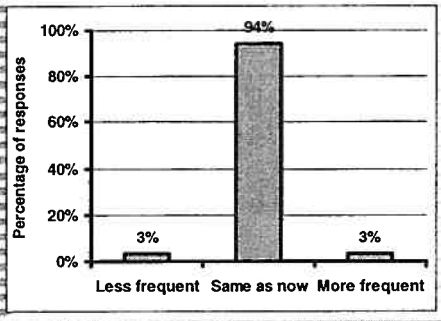


"How useful is Cotton tales to you?"

Comments

- "Overall its very good"
- "I feel its very useful the way it is"
- "This is one of the main ways I keep up with what is happening around CQ."
- "Useful, up-to-date stuff in a small dose that can be read and taken in easily in a few minutes"
- "Tends to bond the district I reckon because everyone has the same opportunity to be informed"
- "Good as it is- short and to the point- only a couple of minutes to read- Ideal"

Distrubution- How often?



Distrubution- How often?

Comments:

"When there is a need and relevant issues (eg trap crop timelines, problems to be aware of etc)

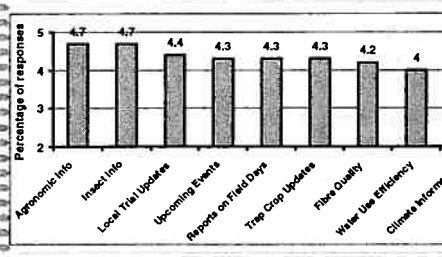
"If they become more frequent they loose impact"

"It keeps thing up to date when weekly"

"The timeliness of information is the most useful aspect of the newsletter"

"Timing is generally good as it matches major decision points in the season"

Content- what is most useful.



Content- what is most useful.

Comments

"Nutrition info"

"Topical comments on what is happening currently"

"Green manure crops"

"Crop progress"

"District updates"

Content- what is most useful.

SUGGESTIONS

"Should provide day Degrees and ETc rates for Emerald for the week gone during the season"

"Should provide insect pressure updates during the season- eg. Numbers of sprays and what chemicals"

"Some topics not useful for dryland"
"Include raingrown cotton data, more field reports of raingrown"

"More information on Dawson area"

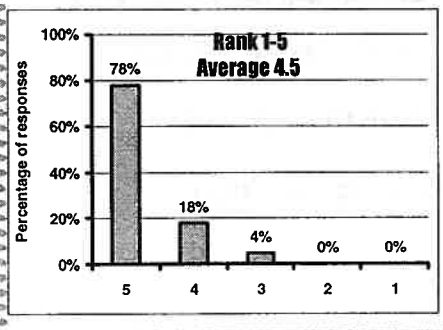
"List day degrees for each month"

"more charts comparing heat units for this season against the average of all seasons"

"Small section for wanted to buy/ sell/ hire"

"More info on pre/ post herbicides"

Presentation- is it easy to read?



Presentation- is it easy to read?

Comments

"Current format is informative and concise"

"One page format is easy to read and well set out"

"Small pieced of information- easy to read"

"The new PDF format has been excellent- much tidier and easier to print"
"The PDF files is much better than word"

"I particularly like the use of the PDF format to get around problems with MS Word changing page numbers etc"

Presentation- is it easy to read?

SUGGESTIONS

"Would like to see it remain as one page"

"Make it 2 pages long"

"Colour"

"Lose the boxes"

"Have a section on top for key dates that need attention (eg trap crop planting timing etc)"

More People on E-mail

- No-one wanted to be taken off list
- Extra 14 people on e-mail
- 8 fax numbers less

Conclusion

- Generally positive
  - usefulness
  - frequency
  - presentation
- Good suggestions
  - Important dates
  - More crop progress data
  - More dryland
- Validates that it is a valuable tool

Evaluating the Evaluation

- Answered all questions I wanted
- Validation for current system
- Allowed positive feed back

Other Comments

"More pictures of nude models in it"

"Should have your picture on it"

"Should have competitions and giveaways in it"

"Have joke of the week"

"Easy to read unless [drunk]"

EVALUATION OF

David Kelly

Cotton CRC Central Queensland **COTTON TALES** Queensland Government Department of Primary Industries

2000-01
33
26 May 2001

David Kelly DEO Cotton – DPI Emerald Ph 07 49837411 Fx 07 49 837459

Preamble

Cotton Tales is a newsletter designed for the CQ Cotton industry, principally targeted at growers and consultants it is distributed on a needs basis during the year.

Why Evaluate CQ Cotton Tales

1. **It is one of my main extension tools, serving the following purposes:**
   - Up-to-date "industry" information
   - Information on current crop events
   - Provide a 'base line' of information within local industry.
   - Save researchers time
   - Get research information flowing

2. **It requires a high amount of input from me and other people:**
   - A lot of time and effort (eg 15% of time)
   - Cost (130 faxes)

Need to make it relevant- good use of resources

Distribution:

At present it is distributed directly to 200 recipients.

These can be categorised as follows:

Occupation:

Growers	66%
Research/ Extension	14%
Agribusiness	11%
Consultants	5%
Applicators (Ground & Air)	2%
Other	2%

Location:

Local	87%
Outside CQ	13%

Distribution Method:

Fax	65%
E-mail	30%
Mail	5%

Aims:

The aims of my survey were as follows

- To be simple
- To provide some quantitative data
- Provide opportunity for comment/ suggestions

There were some key questions that I wanted answered:

- How valuable/ useful do the target audience find it?
- Is it being sent too often/ not often enough?
- Can I get more people on the e-mail?
- What topics are most useful?
- Presentation- is it easy to read?

Method:

- Questionnaire sent out with Cotton Tales (200)
- Promoted as being quick to complete.
- 9 Questions
- No follow-up for responses.

Responses:

- Total 34% (68/200)

Of responses:

	Responses	(total)
Growers	**66%**	66%
Research/ Extension	**10%**	14%
Agribusiness	**10%**	11%
Consultants	**10%**	5%
Applicators (Ground & Air)	**1%**	2%
Other	**1%**	2%

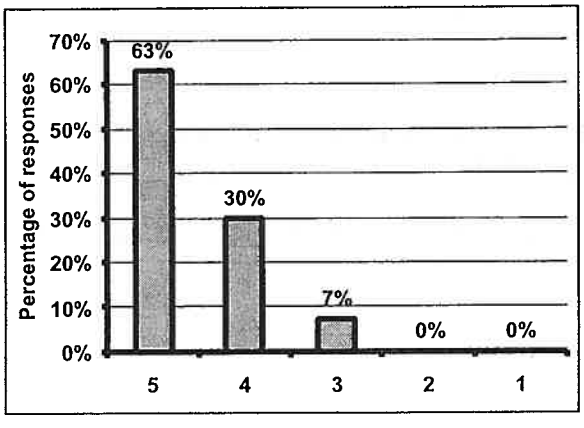
Results:

Usefulness:

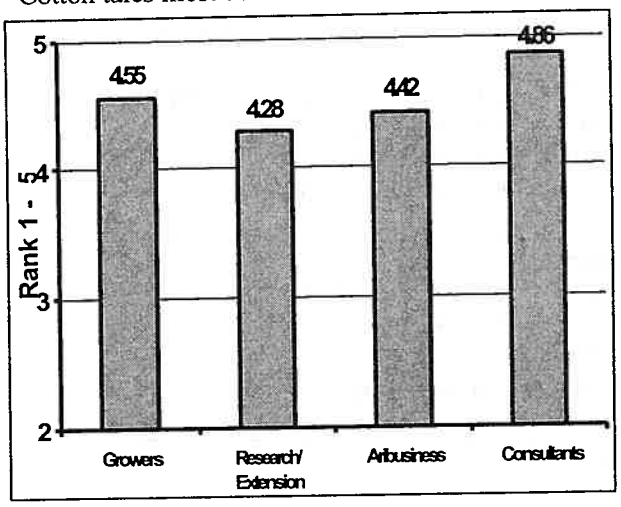
"How useful is Cotton tales to you"

Respondents were asked to Rank 1-5
(5 being most useful)

Average of all scores was **4.5**.
Breakdown of each rank is as follows.



It is important to also consider this question in relation to the occupation groups as stated earlier, especially considering that I considered my primary audience to be Growers & Consultants. The results show that these 2 groups are the ones that found Cotton tales most useful.



Comments regarding usefulness
"Overall its very good"

"I feel its very useful the way it is"

"This is one of the main ways I keep up with what is happening around CQ."

"Useful, up-to-date stuff in a small dose that can be read and taken in easily in a few minutes"

"Tends to bond the district I reckon because everyone has the same opportunity to be informed"

"Good as it is- short and to the point- only a couple of minutes to read- Ideal"

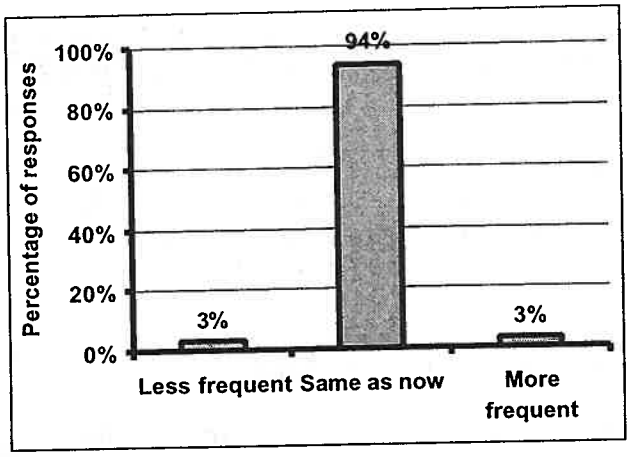
"Useful, up-to-date stuff in a small dose that can be read and taken in easily in a few minutes"

Distrubution- How often

At present Cotton Tales is distributed every 1-2 weeks during the cotton season, depending on need. During the off season the distribution is less frequent. In the year 2000-01, at total of 34 issues were distributed.

"How often do you think Cotton Tales should be distributed?"

The following graph shows most people are generally happy with the current distribution frequency.



Comments regarding frequency:

"When there is a need and relevant issues (eg trap crop timelines, problems to be aware of etc)"

"If they become more frequent they loose impact"

"It keeps thing up to date when weekly"

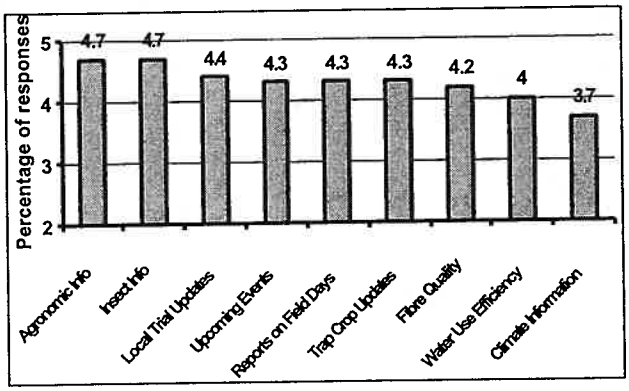
"The timeliness of information is the most useful aspect of the newsletter"

"Timing is generally good as it matches major decision points in the season"

Content- what is most useful.

Cotton Tales covers a broad range of issues.

"What aspects do you find useful?"
Respondents were asked to Rank 1-5 (5 being most useful)



Other aspects that people found useful::
"Nutrition info"
"Topical comments on what is happening currently"
"Green manure crops"
"Crop progress"
"District updates"

Suggestions regarding content:

"Should provide day Degrees and ETc rates for Emerald for the week gone during the season"

"Should provide insect pressure updates during the season- eg. Numbers of sprays and what chemicals"

"Some topics not useful for dryland"

"More content on dryland if possible"

"More information on Dawson area"

"List day degrees for each month"

"more charts comparing heat units for this season against the average of all seasons"

"Include raingrown cotton data, more field reports of raingrown"

"Small section for wanted to buy/ sell/ hire"

"More info on pre/ post herbicides"

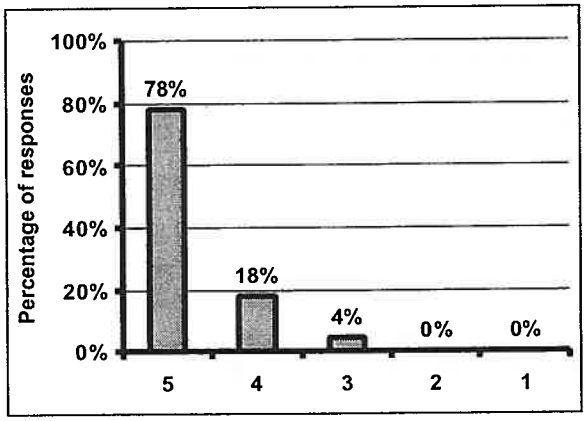
Presentation/ Format

Being a 1-page newsletter that provides up- to date information, presentation is very important.

"How easy is Cotton Tales to read?"

Respondents were asked to Rank 1-5 (5 being easiest)

Average 4.7



Comments regarding presentation

"Current format is informative and concise"

"One page format is easy to read and well set out"
"Small pieced of information- easy to read"

"The new PDF format has been excellent- much tidier and easier to print"

"The PDF files is much better than word"

'I particularly like the use of the PDF format to get around problems with MS Word changing page numbers etc"

Suggestions regarding presentation:

"Would like to see it remain as one page"

"Make it 2 pages long"

"Colour"

"Lose the boxes"

"Have a section on top for key dates that need attention (eg trap crop planting timing etc)"

"Should be printed as a small book at the end of the season as well"

"Put in book form at the end of the season and distributed to growers and consultants"

Changes in distribution:

The question was asked if people wanted to be taken off the distribution list or change the way that they received cotton tales:

- Nobody wanted to be taken off the distribution list
- An extra 14 people wanted to receive it on e-mail.
- This allowed 8 people to be taken off the fax list.

Conclusion:

The feedback was generally positive regarding the usefulness, frequency, content and presentation of Cotton Tales.

I received many good suggestions, particularly:

- Important dates (reminders)
- More crop progress data (ie day degrees)
- More dryland content.
-

Validates that it is a valuable tool

Was the Evaluation useful?

Yes!

- It answered all questions I wanted
- Validation for current system
- Allowed positive feed back

NB. Some other quality suggestions received in the survey.
"More pictures of nude models in it"
"Should have competitions and giveaways in it"
"Have joke of the week"
"Should have your picture on it"
"Easy to read unless [drunk]"

Activities Evaluation - CRC Dryland Farming Systems Trial, Warra, QLD.

by the 'Bunny' and 'The Duck'

Background To Our Evaluation

- '98/'99 Season - *Loss of Staff; Trials suffered*
- Prior to '99/'00 Season - *J.Hare transferred to Project*
  - Research Background
  - *"Learn the Trial"* - (3x2.5 ha plots of cotton)
  - Prepare for Big '00/'01 season - steep learning curve

'99/'00 Cotton Season

- Followed previous trial protocols in great detail
  - Realisation - Much data collected but for what reason????
    - Research, Extension - What????
  - Huge time and effort was invested at the trial site - Return????
  - Relevance of our activities????
  - Past trial records - many were found to be unusable

Vibes From Co-operator

- Concerns from trial cooperator were expressed verbally
  - *Perceived lack of interest in the trial from all concerned; Bidstrups could see benefits for their own farm by maintaining the trial*
- Our great efforts were aimed to re-establishing confidence and commitment with a new CRDC Board Member

Trial Protocols Defined

- Farming Systems Project meeting - August 2000 (Brisbane)
  - For '00/'01 Season (9x2.5 ha plots of cotton)
    - Determined data was required & to be collected
    - Timetable for site activities
    - Extra funds for site/crop management

Evaluation

- *Two Purposes*
  - 1. Our Project Team (ie JH & GS)
    - Measure of performance; plan future activities
  - 2. Extension Workshop Activity - June 2001

Evaluation

- Two Parts
  - Farming Systems Trial
  - Extension Activities ie the use of the trial/results

Part One - Warra Trial

- *Narrative from Jeff Bidstrup:-*
  - *"Good to see that the trial is back on track, and the interest being shown in it again. I'm very happy with how things are now progressing."*

Part Two - Brigalow Topcrop Group

- Two Activities *(T. Neale - EO Dalby)*
  - *Farmwalk - 8/2/01*
    - CRC Farming Systems Trial Warra, ESD Trial Jandowae
  - *Shed meeting - 12/6/01*
    - presentation and discussion of season's results
    - Evaluation sheet

Results of Evaluation

- 70% respondents - Dryland cotton producers > 5 years
- 60% respondents - planned rotation to address soil fertility decline
- 80% respondents - Farming Systems Trials assist planning rotations
- 80% respondents - Paddock records to evaluate economics of rotations
- 33% respondents - Grain legumes regularly in rotations

Results of Evaluation (continued)

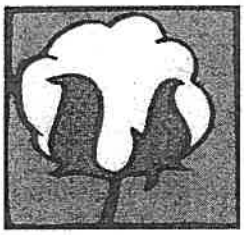
- 80% respondents - sucessfully controlled weeds with rotations
- Problem weeds - (1) sesbania, (2) barnyard grass (3) regrowth cotton
- Preference - information from Warra Trial - (1) Farmwalk at site (2) Group meetings/guest speaker (3) Trial booklet
- Farmwalk Topic - Soil nutrition/soil fertility

Where to From Here

- Brigalow Topcrop Group:
  - *Targetted extension activities for 2001/02*
  - *On farm demonstrations - Group members*
  - *Group discussions and farmwalks*
- Farmwalks - Farming Systems Trial with other regional groups
  - distribution of results and information
    - Economics of rotation options.

COTTON GROWERS GROUP

- INSECTICIDE USAGE COMPARATIVE ANALYSIS EVALUATION 1999/2000



- James Quinn, Cotton Industry Development Officer - Gwydir Valley. Australian Cotton CRC, NSW Agriculture

INTRODUCTION

- 5 Cotton Growers
- Approached by Grower Group (already a member)
- Needed to be very simple and easy
- Highest and Lowest yielding fields selected from Conventional and INGARD fields
- Wanted to look at the usage of insecticides between group members

INTRODUCTION

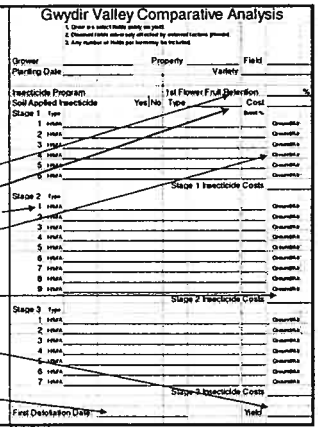
- Only insecticide data collected
- Also needed to incorporate insect pressure
  - (Borrowed from Cotton Conference Proceedings)
- Average egg density per IRMS Stage and the season.

INTRODUCTION

- Published
  - Comparative Analysis Booklet
  - Summary Sheet
  - Summary Presentation Meeting
- Short survey in summary meeting
- 10 respondents replied to survey (100%)

DATA SHEET

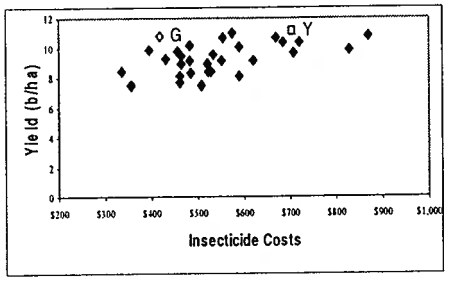
- Points of Interest.
  - Retention figure
  - Soil applied separate
  - Type of insect targeted
  - How applied
  - Only stage costs are recorded
  - Only yield, no discounts
  - Only first defoliation date recorded



GROSS MARGIN

- Taken from the NSW Agriculture Budget Booklet.
- Substitute Actual Insecticide Costs and Yield into this table.
- Insecticide Cost/Yield figure shows slight positive trend. Encouraging, if it didn't then we would be in real trouble.
- There is some variation in these results.

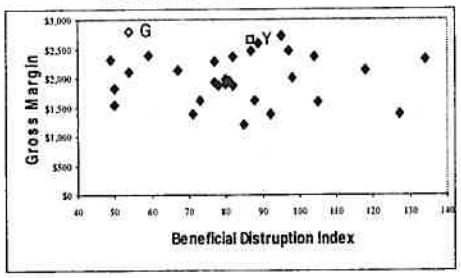
GROSS MARGIN



GROSS MARGIN

- Different story once gross margin is estimated.
- Highest GM has 2nd Lowest IPM BDI.
- Shows the benefit of IPM.
- LHS- high yield low IPM BDI.
- RHS- high yield high IPM rank and costs.

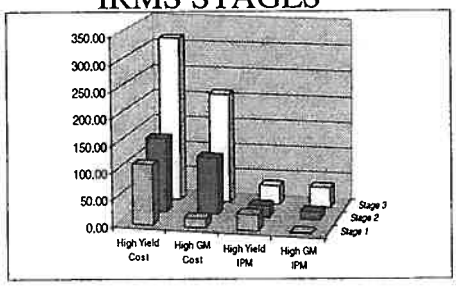
GROSS MARGIN



DIFFERENCES BETWEEN IRMS STAGES

- High GM vs High Yield fields.
- 1st flower retention (HGM-70%/HYF-45%)
- 33 IPM BDI points difference, stages 1&2
- $287.34 difference in insecticide costs.
- Difference by Stage
  - Stage 1= $122.65 and -27 IPM rank
  - Stage 2= $ 31.74 and -7 IPM rank
  - Stage 3= $104.45 and +1 IPM rank

DIFFERENCES BETWEEN IRMS STAGES



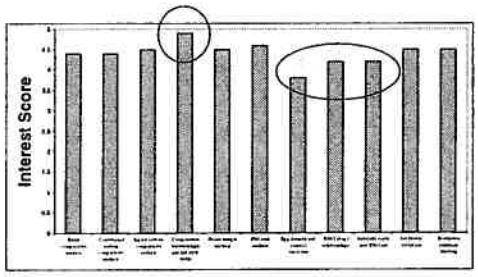
EVALUATION SUMMARY

- Aims of the survey
  - The interest the comparative analysis generated
  - If it met grower expectations
  - The value of aspects of the comparative analysis
  - If the comparative analysis challenged insecticide usage
  - If they wanted to continue with the comparative analysis
  - Comments on how the comparative analysis can be improved

EVALUATION SUMMARY

- Grower Expectations
  - Soft and Hard Programs comparative yields
  - Soft and Hard Programs and insecticide number
  - Gross margins of both Soft and Hard Programs
  - Compare insecticides with neighbours
  - Relationship between IPM and retention
  - Assess value for money in insect management
  - Compare insect pressure and IPM Programs

EVALUATION SUMMARY

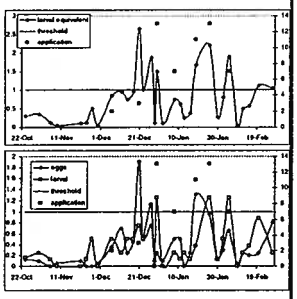


EVALUATION SUMMARY

- Challenging Insecticide Usage
  - All but 1 - Yields are OK
- Improvement comments
  - Get variables more uniform
  - Quantify figure on insect pressure
  - Increase size of data set
  - More variables (N & H20)
  - Address the reason why a spray is used

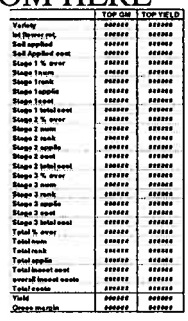
WHERE TO FROM HERE

- Continue for the 2000/2001 season
  - Increase the data set size
    - Eliminate one off occurrences
  - Use Larval equivalent to replace egg density
    - Based on CottonLOGIC threshold
    - application BDI superimposed



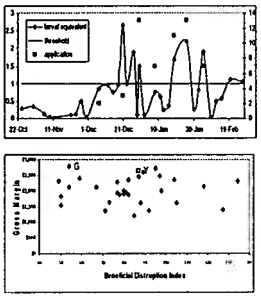
WHERE TO FROM HERE

- Reporting back
  - Table
    - Allow growers to see their results compared to Highest GM and Highest Yielding Fields in data set
    - Compare the farm average with the group average



WHERE TO FROM HERE

- Reporting Back
  - Figures
  - Larval Equivalents
    - enable comparisons between individual fields insect pressure and application number and type
  - Beneficial Disruption Index verus GM and Yield



COTTON GROWER GROUP INSECTICIDE USAGE COMPARATIVE ANALYSIS EVALUATION.

A comparative analysis type report was conducted on the insecticide usage of five cotton growers within the Gwydir Valley in the 1999/2000 season. The group selected two fields from each property based on yield. Both the highest and lowest yielding fields were submitted from each property to enable a variable range of results to be analysed. Both INGARD and conventional cotton fields were entered to examine these production systems.

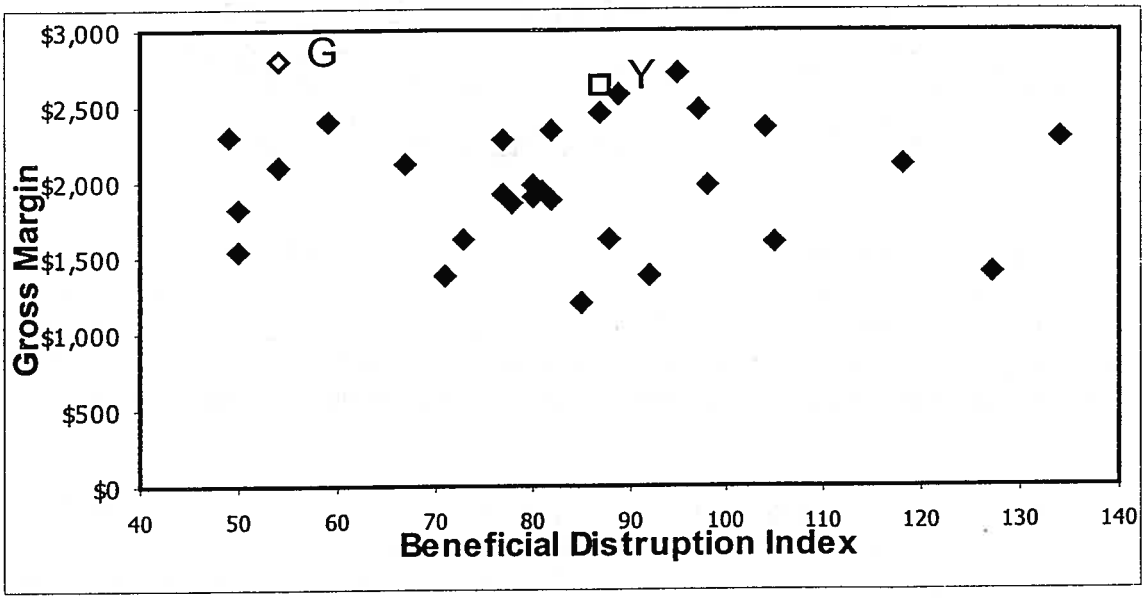
The Beneficial Disruption Index (BDI) was applied to insecticide application and fields compared on average egg densities per Insecticide Resistance Management stage. Economic data was substituted into the NSW Agriculture cotton gross margin budgets for 2000.

Presentation of the Pesticide Usage Comparative Analysis consisted of a summary booklet published by the Cotton CRC and NSW Agriculture. This comprised a comparative analysis sheet, which enabled the growers to compare the values for their fields with the top yielding, the highest gross margin and the group average. Finally, a summary meeting was conducted which explained aspects of the insecticide usage comparative analysis, as well as allowing for evaluation and group discussion of the comparative analysis.

Results seen in the comparative analysis were similar to those seen in other benchmarking and comparative analysis studies done in the cotton industry, with more Integrated Pest Management friendly insecticide programs having greater gross margins than those that followed a harder spraying program.

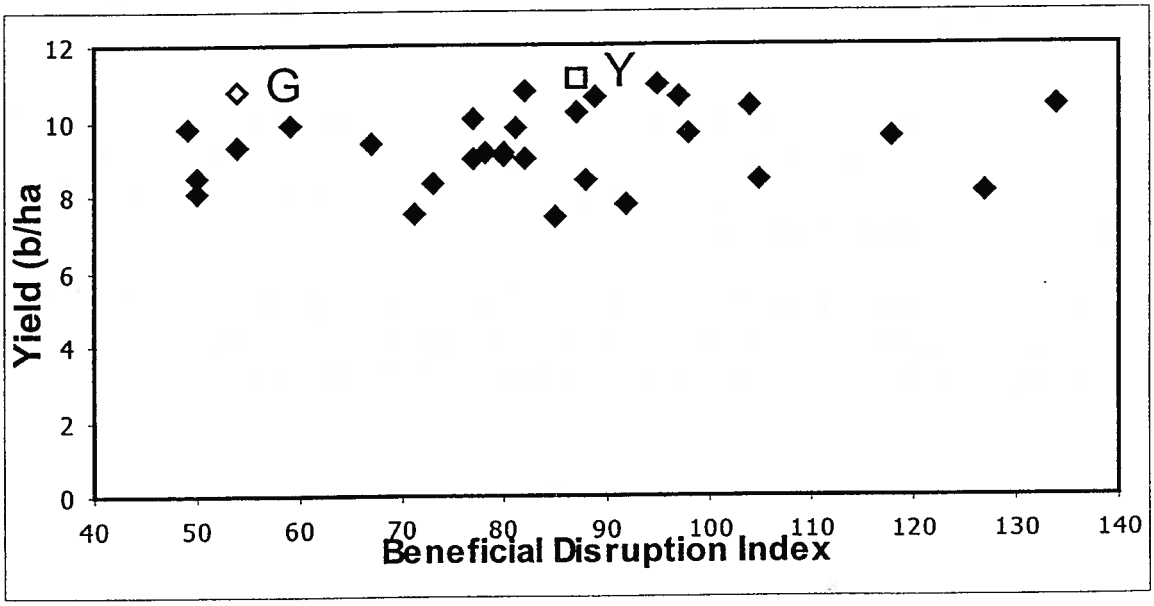
The data is presented graphically in figure 1 below, in which gross margin is plotted against the Beneficial Disruption Index. There is a slight negative trend seen, showing the decrease in gross margin as the Beneficial Disruption Index increases.

Figure 1 **Gross Margins compared with Beneficial Disruption Index**



This analysis did a great deal to help dispel beliefs that Integrated Pest Management friendly production systems meant that yield was sacrificed. It was seen in this comparative analysis that there was no relationship between yield and Beneficial Disruption Index. This can be seen in figure 2.

Figure 2 **Yield compared with Beneficial Disruption Index**



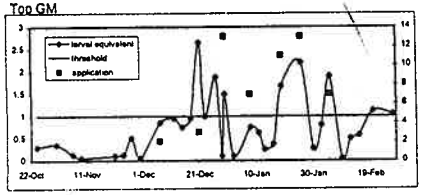
GROWER "PROPERTY" CONVENTIONAL

	TOP GM	TOP YIELD		field 1	field 2	field 3	field 4	field 5	field 6	field 7	field 8		Average	Your Average
Variety	######	######		######	######	######	######	######	######	######	######		######	######
Ist flower ret.	######	######		######	######	######	######	######	######	######	######		######	######
Soil applied	######	######		######	######	######	######	######	######	######	######		######	######
Soil Applied cost	######	######		######	######	######	######	######	######	######	######		######	######
Stage 1 % over	######	######		######	######	######	######	######	######	######	######		######	######
Stage 1num	######	######		######	######	######	######	######	######	######	######		######	######
Stage 1rank	######	######		######	######	######	######	######	######	######	######		######	######
Stage 1applic	######	######		######	######	######	######	######	######	######	######		######	######
Stage 1cost	######	######		######	######	######	######	######	######	######	######		######	######
Stage 1 total cost	######	######		######	######	######	######	######	######	######	######		######	######
Stage 2 % over	######	######		######	######	######	######	######	######	######	######		######	######
Stage 2 num	######	######		######	######	######	######	######	######	######	######		######	######
Stage 2 rank	######	######		######	######	######	######	######	######	######	######		######	######
Stage 2 applic	######	######		######	######	######	######	######	######	######	######		######	######
Stage 2 cost	######	######		######	######	######	######	######	######	######	######		######	######
Stage 2 total cost	######	######		######	######	######	######	######	######	######	######		######	######
Stage 3 % over	######	######		######	######	######	######	######	######	######	######		######	######
Stage 3 num	######	######		######	######	######	######	######	######	######	######		######	######
Stage 3 rank	######	######		######	######	######	######	######	######	######	######		######	######
Stage 3 applic	######	######		######	######	######	######	######	######	######	######		######	######
Stage 3 cost	######	######		######	######	######	######	######	######	######	######		######	######
Stage 3 total cost	######	######		######	######	######	######	######	######	######	######		######	######
Total % over	######	######		######	######	######	######	######	######	######	######		######	######
Total num	######	######		######	######	######	######	######	######	######	######		######	######
Total rank	######	######		######	######	######	######	######	######	######	######		######	######
Total applic	######	######		######	######	######	######	######	######	######	######		######	######
Total insect cost	######	######		######	######	######	######	######	######	######	######		######	######
overall insect costs	######	######		######	######	######	######	######	######	######	######		######	######
Total costs	######	######		######	######	######	######	######	######	######	######		######	######
Yield	######	######		######	######	######	######	######	######	######	######		######	######
Gross margin	######	######		######	######	######	######	######	######	######	######		######	######

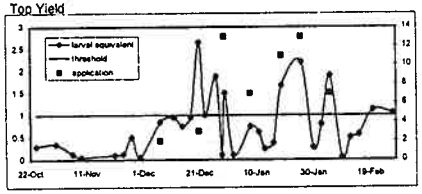
Comments:

LARVAL EQUIVALENTS

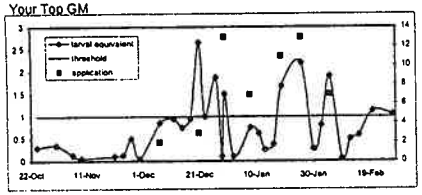
Top GM



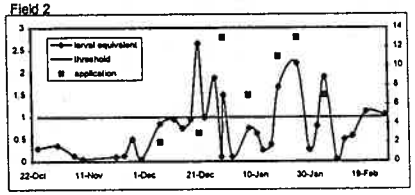
Top Yield



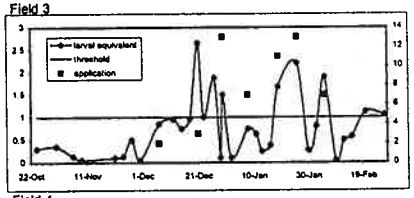
Your Top GM



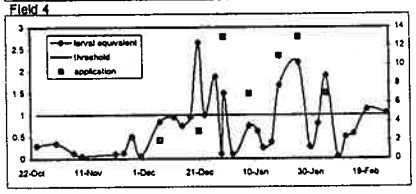
Field 2



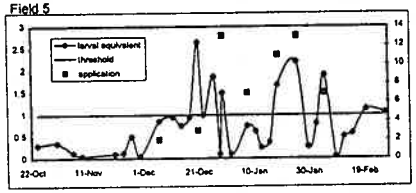
Field 3



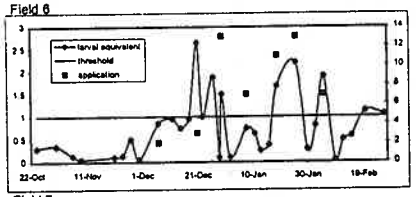
Field 4



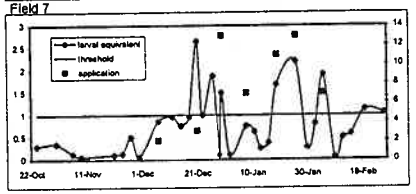
Field 5



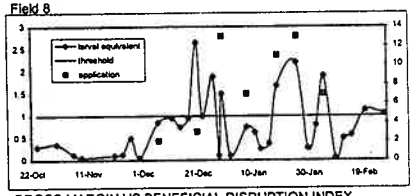
Field 6



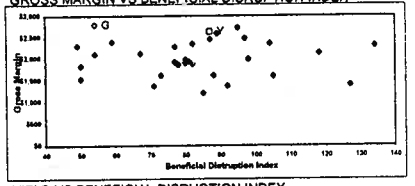
Field 7



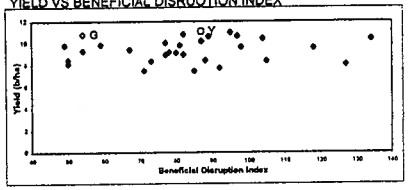
Field 8



GROSS MARGIN VS BENEFICIAL DISRUPTION INDEX



YIELD VS BENEFICIAL DISRUOTION INDEX



Evaluation of Project

A short survey of growers and consultants/agronomists was conducted to evaluate the comparative analysis. This was done after the summary meeting. The major aims of the evaluation survey were to ascertain thoughts on:

1. The interest the comparative analysis generated
2. If it met grower expectations
3. The value of the aspects of the comparative analysis
4. If the comparative analysis challenged insecticide usage
5. If they wanted to continue with the comparative analysis
6. A comments section on how the comparative analysis can be improved

In sections 1 and 3 of the survey, growers were asked to score their thoughts and comment on a sliding scale of 1 to 5, 1 being the lowest and 5 the highest. Sections 2, 4 and 5 were straight Yes or No answers, with explanation required if a No answer was recorded. The 6th section asked for comments or suggestions to improve the comparative analysis in future years.

In the first question, respondents were asked to rank how interesting they found the Comparative Analysis. An average rank of 4.7 was recorded which was very encouraging.

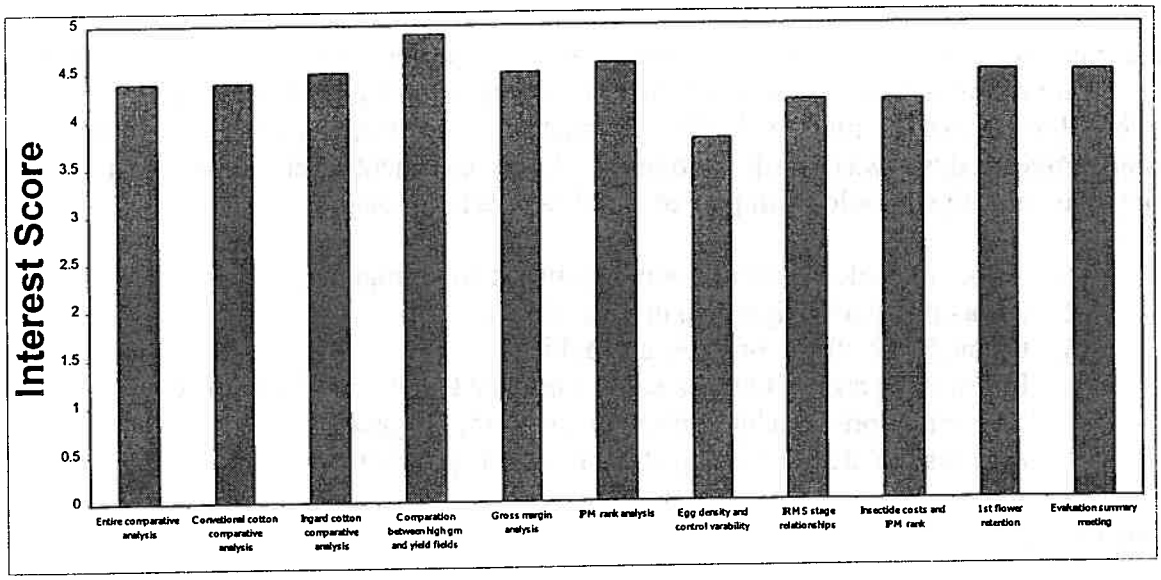
The second question asked whether or not the comparative analysis met the expectations of the growers and consultants. Respondents said that the comparative analysis met their expectations.

These expectations were:

1. To find out if soft insecticides yielded more or less than harder insecticides
2. To look at number of insecticide applications in soft and hard options
3. To look at the gross margins of soft options versus hard options
4. Compare insecticide strategy with the neighbours
5. To see the relationship between IPM and 1st position retention
6. Assess whether we are getting the best value for money in insect management
7. Being able to compare insect pressure with IPM programs

Section 3 of the evaluation broke down the components of the comparative analysis. Figure 3 below shows how each of the components scored in the comparative analysis.

Figure 3 **Ranking of Components of the Comparative Analysis**



There are a couple of sections that did differ from the norm. Firstly, the comparison between the highest yielding and highest gross margin fields. This analysis helped explain many aspects of the comparative analysis. Both fields were of the same variety but had two different management regimes. There were large differences in both insecticide costs and BDI points in Stages 1 and 2 of the Insecticide Resistance Management Strategy.

There are three components that did not rate as highly as the other sections. These were the egg density and control variability, IRMS stage relationships and insecticide costs and BDI.

There was much discussion and argument with regard to the egg density and control variability. Many in the group thought that the average egg density did not fully represent the insect pressure of fields. Group members thought a new insect pressure system needed to be developed, as larval pressure was not taken into account.

There was little interest in the IRMS stage relationship. Growers and consultants felt that different varieties and planting dates negated dates within the growing season.

It was taken for granted that as the BDI increased and insecticide costs increased, growers were more interested in the relationship between the BDI, yields and gross margins.

These three sections could be dropped from the comparative analysis, with greater emphasis placed on other sections.

A major aim of the comparative analysis was that the results would challenge the insecticide usage patterns used by growers in the group. All but one of the respondents

said that the comparative analysis has challenged their current insecticide usage. One grower said it did not challenge his insecticide usage because his yield results were still OK and therefore his insecticide usage was adequate to achieve these yield results.

The final question in the evaluation survey was to assess the feeling in the group that the comparative analysis was worthwhile continuing and what aspects would make it better or be able to extract more valuable information. All respondents agreed that the comparative analysis was worth continuing. Many comments were given on how the comparative analysis could be improved and these are listed below.

1. To get variables more uniform, planting date, nitrogen
2. Put a quantitative figure on insect pressure
3. Quantify the effects of mites and aphids
4. Increase the size of the data set to eliminate the effects of one off events
5. Compare more variables, nitrogen levels and irrigation
6. Address the idea of looking at the reason a spray is used.

Conclusion:

The insecticide usage comparative analysis was an interesting project, which has, began to develop an interest in benchmarking and comparative analysis within the group. Encouraging results were achieved in the conventional cotton section for the promotion of IPM friendly practices. INGARD results were not as desirable and will have to be carefully managed and further analysis in the future. All respondents wish to continue the use of comparative analysis in the future and in many cases to expand the data set to include more fields and variables.

Like many projects, the comparative analysis has generated a lot of new questions from the growers to further develop it into a powerful tool. Taking a quote from one of the growers, "Excellent report that has asked many questions and began to offer a few answers."

It has been highlighted in the final comment section that there are a few areas that could be improved in the future. Notably, the method in which insect pressure is represented and the incorporation of other variables such as nitrogen and irrigation into the comparative analysis.

James Quinn
Cotton Industry Development Officer
PO Box 209
Moree, 2400.

Dear Group Member,

The booklet accompanying this letter is the result of the comparative analysis done on last season's insecticide usage. I hope you find it an interesting read as it was very interesting compiling this report. Also included is a copy of your four fields and how they ranked against other fields in the comparative analysis. This will allow you to gauge where how you compared amongst your peers. Obviously the average refers to the group average and the Top 25% is the average of the top fields in the comparative analysis.

Major Points:

Conventional Cotton

- Large variation in insecticide usage, although egg pressure densities were very similar across all fields entered.
- Insecticide costs increased as the IMP rank also increased, however it should be noted that the highest yielding field did have the highest insecticide costs.
- The field with the highest gross margin had the second lowest IPM rank.
- There was no relationship with IPM rank and gross margin, but there was a positive relationship between insecticide cost and yield.

INGARD Cotton

- The inclusion of fields of Variety Sicot 189I clouded results, as this variety was managed for its lack of efficacy of the Bt gene.
- The reduced number of insecticides applied and also better efficacy of applied insecticides allowed the highest yielding field to be the highest gross margin field in INGARD Cotton. Therefore the extra yield gained from applying insecticides compensated for the extra cost involved.

Continuing this comparative analysis into this season will allow you to compare not only yourself with your peers for the coming season but will enable you to compare this years to last seasons results. This could be useful in determining your progress compared to your peers through subsequent cotton growing seasons.

If you require further copies of the report please inform me and I will forward you extra copies.

Regards,

James Quinn
Cotton Industry Development Officer
Australian Cotton CRC
NSW Agriculture

Cotton Growers Group Insecticide Usage Comparative Analysis.

EVALUATION SURVEY

(This survey should not take more than 10 Minutes)

The insecticide usage comparative analysis was a very interesting and enjoyable project, I hope you also found it interesting. This survey is designed to provide information and feedback to be used in future years to refine and develop the comparative analysis to fully meet your needs.

	Very Interesting				Not interesting
Did you find the comparative analysis interesting:	5	4	3	2	1

Did the comparative analysis meet your expectations: Yes / No

What were your expectations:

1. _____
2. _____
3. _____
4. _____

What aspects of the comparative analysis did you find interesting:

	Very Interesting				Not interesting
Entire comparative analysis:	5	4	3	2	1
Conventional cotton comparative analysis:	5	4	3	2	1
INGARD cotton comparative analysis:	5	4	3	2	1
Comparison between high gm and high yield fields:	5	4	3	2	1
Gross margin analysis:	5	4	3	2	1
IPM rank analysis:	5	4	3	2	1
Egg density and control variability:	5	4	3	2	1
IRMS stage relationships:	5	4	3	2	1
Seed treatment analysis:					
Insecticide costs and IPM rank:	5	4	3	2	1
1st flower retention:	5	4	3	2	1
Evaluation and summary meeting:	5	4	3	2	1

Did the comparative analysis challenge your current insecticide usage: Yes / No

If No: Why? _____

_____

Do you feel it would be worth while to continue examining insecticide usage amongst the group: Yes / No

If No: Why? _____

_____

Comments, How do you think the comparative analysis be changed to make it more interesting: _____

_____

_____

_____

_____

Gwydir Valley Comparative Analysis

1. Growers select fields solely on yield.
2. Discount fields adversely affected by external factors (floods).
3. Any number of fields per farm may be included.

Grower _____ Property _____ Field _____

Planting Date _____ Variety _____

Insecticide Program 1st Flower Fruit Retention _____ %

Soil Applied Insecticide Yes | No Type _____ Cost _____

Stage 1 Type Band %

1 H/M/A _____ _____ Ground/Air
2 H/M/A _____ _____ Ground/Air
3 H/M/A _____ _____ Ground/Air
4 H/M/A _____ _____ Ground/Air
5 H/M/A _____ _____ Ground/Air
6 H/M/A _____ _____ Ground/Air

Stage 1 Insecticide Costs _____

Stage 2 Type

1 H/M/A _____ _____ Ground/Air
2 H/M/A _____ _____ Ground/Air
3 H/M/A _____ _____ Ground/Air
4 H/M/A _____ _____ Ground/Air
5 H/M/A _____ _____ Ground/Air
6 H/M/A _____ _____ Ground/Air
7 H/M/A _____ _____ Ground/Air
8 H/M/A _____ _____ Ground/Air
9 H/M/A _____ _____ Ground/Air

Stage 2 Insecticide Costs _____

Stage 3 Type

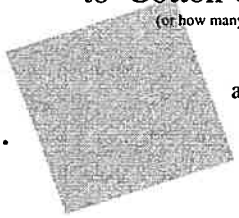
1 H/M/A _____ _____ Ground/Air
2 H/M/A _____ _____ Ground/Air
3 H/M/A _____ _____ Ground/Air
4 H/M/A _____ _____ Ground/Air
5 H/M/A _____ _____ Ground/Air
6 H/M/A _____ _____ Ground/Air
7 H/M/A _____ _____ Ground/Air

Stage 3 Insecticide Costs _____

First Defoliation Date: _____ Yield _____

Cotton CRC web site & response to Cotton CRC eNews

(or how many horses drink)



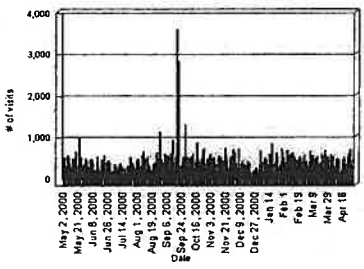
Dave Larsen with assistance Tony Pffiefer

Some Terms

- **Visit**
  - A series of consecutive requests from a user to an Internet site
- **User**
  - Anyone who visits the site at least once
- **Hit**
  - Access to a single page

Overall picture:

Daily visit trends May 2000 to April 2001



27 February 2001

- A crc enews was posted to over 600 industry email addresses
  - What was the background level of use of the site
  - Did the posting of the email affect hits to the site?

Publications mentioned in Cotton CRC eNews No. 3

- BLACK ROOT ROT UPDATE MARCH 2001
  - http://cotton.pi.csiro.au/Assets/PDFFiles/BRRUpd01.pdf
- PUBLICATIONS PAGE RE ORGANISATION
  - http://cotton.pi.csiro.au/Publicat/
- GVB Update
  - http://cotton.pi.csiro.au/Assets/PDFFiles/GVB00.pdf

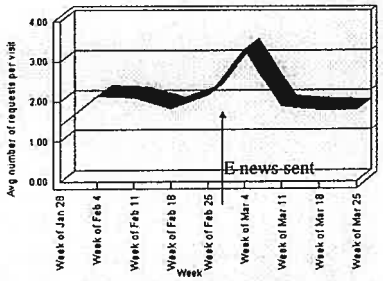
Reminders mentioned in Cotton CRC eNews No. 3

- Regional Cotton Tales by cotton industry IDOs on line since last November
  - http://cotton.pi.csiro.au/Publicat/Tales/00_01/index.htm
- USEFUL COTTON CRC WEB SITE BROWSING TIP
  - http://cotton.pi.csiro.au/News/changes.htm

Detailed look at 2 months data

- **First date analyzed** 02/02/2001
- **Last date analyzed** 31/3/2001

Weekly requests per visit



Black Root Rot access

- /Assets/PDFFiles/BRRUpd01.pdf 107 0.21%

Publication page (re organised)

- /Publicat/index.htm 1,167 2.31%

Green Vege Bug access

- /Assets/PDFFiles/GVB00.pdf 51 0.10%

Changes/updates Page

- /News/changes.htm 206 0.41%

Media releases top 10

/Publicat/Articles/NUTRIpak.htm	109	0.22%
/Publicat/Articles/Salin01.htm	105	0.21%
/Publicat/Articles/FungDise.htm	96	0.19%
/Publicat/Articles/NthRes.htm	78	0.15%
/Publicat/Articles/BRRRes.htm	72	0.14%
/Publicat/Articles/crc00rev.htm	70	0.14%
/Publicat/articles/ITAward.htm	70	0.14%
/Publicat/Articles/Yeatapp.htm	70	0.14%
/Publicat/Articles/EcoSoft.htm	69	0.14%
/Publicat/Articles/crseAwd.htm	66	0.13%

Some Cotton Tales Information

/Assets/PDFFiles/Tales/

/Assets/PDFFiles/Tales/00_01/jq0023.pdf	69	0.14%
/Assets/PDFFiles/Tales/00_01/JQ0019.PDF	48	0.09%
/Assets/PDFFiles/Tales/00_01/jq0020.pdf	34	0.07%
/Assets/PDFFiles/Tales/00_01/JQ0016.PDF	25	0.05%
/Assets/PDFFiles/Tales/00_01/jq0022.pdf	18	0.04%
/Assets/PDFFiles/Tales/00_01/KR0011.pdf	14	0.03%
/Assets/PDFFiles/Tales/00_01/Dk0024.pdf	12	0.02%
/Assets/PDFFiles/Tales/00_01/Jq0012.pdf	12	0.02%
/Assets/PDFFiles/Tales/00_01/KR0005.pdf	12	0.02%
/Assets/PDFFiles/Tales/00_01/Dk0023.pdf	11	0.02%

Conclusions

- CRC enews is stimulating a segment of those notified to visit the site

For the future look into reporting tools in order to make more meaningful reports

- follow through on next e news
- eg strike per day /week on a given file
- include question in grower survey -access to CRC page

Early season tipping out trial evaluation

The original survey was to evaluate a field day held at Dirranbandi to look at among other subjects, the early season tipping out trials.

It ended up being more of an overall evaluation of growers opinions and attitudes to a number of issues including

- pest thresholds

- the value of the tipping out trial

- whether the same or similar trials should continue

- IPM and growers willingness to be involved with AWM

Survey design

When designing the survey the objective was to keep it simple so that it would be easy and quick to answer.

The survey was faxed to Dirranbandi growers with the option of faxing the completed survey in or waiting until I followed up with a phone call.

Even those that received a follow up phone call did not complete the survey over the phone but still said that they would complete it and return it later.

The survey was sent to 17 growers of which only 11 attended the field day. Of these 11 only 6 replied.

After consultation with Ingrid the following set of questions was included in the survey.

It is not a comprehensive set of questions about any one issue. But in order to get a response I didn't want anything too detailed as growers would not fill it out.

Responses to questions

Question 1.

A look at **heliothis thresholds** revealed

- 85% used the industry standard of 2 very small-small/m

- 15% used 1/m

I also found that a number of growers still rely on their consultants and were unaware of the thresholds that they used.

Question 2.

Mirid thresholds

- thresholds ranged from **0.5 - 5/m**

- one grower relied totally on visual effect with no number recorded

- another stated that mirids had never been a problem on his farm

- all said that **decisions were made in consultation with tip damage**

Question 3.

Spraying for thrips

- **half of the growers** said that they **never sprayed for thrips** during the early season stage

- the other responses were sometimes depending on visual effect or not usually

- only one stated that they usually sprayed for thrips

Question 4.

The majority of growers in the area viewed last seasons results and samples of this years damage trial.

Question 5.

Two growers replied that the trial results challenged their current approach.

The others that responded 'no' may be already practicing the idea of allowing greater tip damage or have no intentions of it.

Question 6.

In response to whether you **would do anything differently next season** only two responded with the type of response I was after, ie a positive response.
Responses were:

- **-be prepared to accept a greater amount of tipping out**
- **-AWM**

A third response - be more aware of potential threat to yield.

Question 7.

100% said that the early season tipping out trials are very useful.

Question 8.

The majority saw **value in repeating the early season tipping out trial.**

One responded 'no' to repeating this particular trial as it has been conducted for two years with similar results.

The second half of this question was directed at whether there were **different trials** they would like to see conducted.

The **majority answered 'yes'** but not all gave a suggestion of a trial. Those that did **suggested the following:**

- **-IPM**
- **-A look at beneficial insects**
- **-Fruit retention trials**

Question 9.

What **benefits** growers saw **from allowing a higher level of tipping out** or allowing a higher threshold to be used.

Responses **included**:

- **-less chemical/pesticide usage**
- **-more benficials/ higher predator levels maintained**
- **-keeping softer chemistry for later in the season**
- **-improved cotton industry image**

Question 10.

The **majority responded 'yes' to practicing integrated pest management.**

Those that responded 'yes' used the following **components of IPM:**

- **-Ingard cotton**
- **-Pest:predator ratios**
- **-Soft insecticides**
- **-Holding off sprays**
- **-Pupae busting**
- **-Resistance management strategy**
- **-Follow strict IPM guidelines**
- **-Delaying use of hard chemistry**

Question 11.

100% of responses **saw a benefit in working as an area** as opposed to an individual farm **when it came to pest management.**

Question 12.

100% of growers said 'yes' to being interested in being involved with AWM with other growers and consultants.

These last two questions gave a positive outlook to the idea of developing area wide management groups this season. This hasn't been the case.

From the survey all responses indicated that they would like to be involved with AWM but after two meetings an actual AWM group will not go ahead this season.

Instead interested growers will implement measures but will not be involved in actual group meetings to discuss. Although there are several growers who will be involved with the benchmarking study being conducted by Chris Wicks for the season just finished.

Outcomes

It will still be valuable to continue plant compensation trials/demonstrations and to expand them to look at fruit retention.

For future trials should also to set up on different properties to allow greater involvement from growers.

A look at beneficals also seems to be a common interest.

A comment from one of the trial cooperators in relation to the trial results,

"believes it will be integral to insect pest management next season"

Early season tipping out trial evaluation

Sarah Kerlin

An overall evaluation of growers opinions and attitudes to a number of issues including
- pest thresholds
- the value of the tipping out trials
- whether the same or similar trials should continue
- IPM and growers willingness to be involved with AWM

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See attached for survey format.

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A comment from one of the trial cooperators in relation to the trial results,
"believes it will be integral to insect pest management next season"

Survey - Early Season Tipping Out Trials

This survey relates to the presentation of the tipping out trial held at "Trafalgar" Dirranbandi on Tuesday 6th March. The survey is being used to evaluate the usefulness of the trial, to gauge grower's opinions and to determine possible directions for future trials or demonstrations.

1. **What heliothis threshold do you usually use during the planting to squaring phase** (circle one)
   1/m
   2/m
   4/m
   Other (please state) _____

2. **What threshold do you usually use for mirids during the planting to squaring phase** (circle one)
   0.5/m
   1/m
   2/m
   Other _____
   Is this in consultation with tip damage?
   _____

3. **Do you spray for thrips during the early season stage** (circle one)
   Usually
   Never
   Sometimes (explain)_____
   _____

4. **Did you view last years trial results and samples of this years damage treatments** (circle one)
   Yes
   No

5. **Do these results challenge your current approach** (circle one)
   Yes
   No

6. **Will you do anything differently next season** (circle one)
   Yes
   No
   If yes what _____
   _____

7. **Do you think that it is valuable having these trials** (circle one number)

Very useful				Not useful
5	4	3	2	1

8. **Is there value in repeating this early season tipping out trial next season** (circle one)
   Yes
   No
   Are there other trials you are interested in seeing conducted (circle one)
   Yes
   No
   If yes what _____
   _____

9. **What benefits, if any, do you see from allowing a higher level of tipping out or allowing a higher threshold to be used**
   _____
   _____
   _____

10. **Do you currently practice any aspects of Integrated Pest Management**
    Yes
    No
    If yes what _____
    _____

11. **Do you see any benefit in working as an area as opposed to working as an individual farm when it comes to pest management** (circle one number)

Benefit				No Benefit
5	4	3	2	1

12. **Are you interested in becoming involved in area wide management with other growers and consultants** (circle one)
    Yes
    No
    Unsure

Thank you for completing the survey.

You can either fax the completed survey back to me on 4632 3892 or send it to DPI, PO Box 310, St George 4487.
Alternatively I will contact you later in the week or next week and you can answer it over the phone.
Sarah Kerlin

Evaluating Focus Group Analysis as a Catalyst for Participation by the Stakeholders of the Water Use Efficiency Initiative in the St George Area.

Farmers at an Overhead Irrigators Shed Meeting discuss continuous soil moisture monitoring.

Background

- The RWUEI Cotton and Grains Adoption Program has 4 distinct but overlapping phases.
- Participatory Action Management is a directive.
- The first two phases (Stocktake & Benchmark) are all but complete in my area with relatively minimal stakeholder participation.
- Hold several post harvest meetings throughout the region so stakeholders can view the results and use Focus Group Analysis (FGA) of these results to encourage wider participation.
- Need to evaluate something so I evaluated the first of these.

Setting the Objectives and Designing the Evaluation

Aims

- ~ Consolidating current and generating wider participation in the RWUEI in the St George Area.
- ~ Use stocktake/benchmark results to create the opportunity for stakeholders to direct further research both at the process and content levels. Focus Group Analysis (FGA).

Design

- ~ Ensure all stakeholder groups are present.
- ~ View results and set some research directives for future seasons. Explore and allocate responsibility for these directives.
- ~ Informal, shed meeting on neutral ground.
- ~ Have experts on hand to clarify issues.

Conducting the FGA

All stakeholder groups represented.

Good discussion with growers talking about their experiences both in front of the group and from their chairs. Experts called upon as needed.

A range of issues identified for further consideration. Some future activities organised.

Opportunities to explore these issues were identified for individuals, the group and the region.

Evaluating the FGA

Design a short (7 question) phone interview.

Survey 100% of participants as soon as possible after the meeting.

OUTCOMES

For myself.

1. Evaluation can be easy and should consider some form either during or post all group activities.
2. Evaluation doubles as a written record of reflection and progress both for myself and for the participants of this project.

INTERVIEW OUTCOMES

Evaluation of Focus Group Analysis

Sarah Hood

Stakeholders in the St George Irrigation Area appreciate being part of the research, development and extension of water use efficiency in their area. They are also willing to take a proactive role by suggesting activities that would be of assistance to this process.

- *100% of respondents would attend further group focus analysis.*
- *Stakeholders at the meeting suggested soil Pits and Pre Irrigation workshops and 100% of respondents would support such events.*

Stakeholders in the St George Irrigation Area would support a more intense group focus analysis of the benchmark results that were presented.

- *100% of respondents found the benchmark data useful and 71% of the respondents went on to request more information about the current data. I have listed some of these requests.*

- *"Divide the information up into soil types and management practices. More replication is needed."*
- *"Provide details on trial sites, like row length etc."*
- *"I would like to know more about the one that seemed odd. I have been thinking about it more and may be you metered the water into the head ditch but did not factor in head ditch losses."*

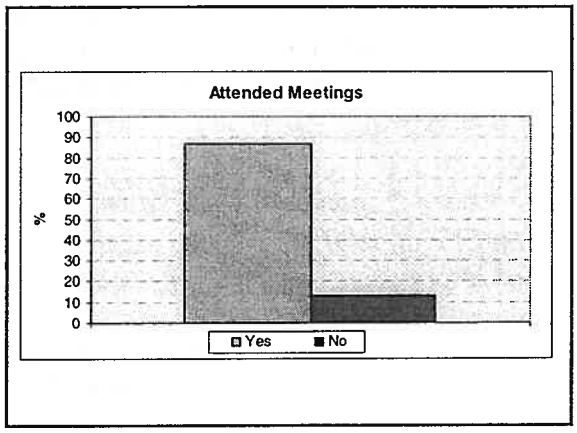
This has implications for data presentation in further focus group analysis. It may even be useful to suggest to the trial site cooperator if he /she could give a run down of the farm, paddock, irrigation system and management prior to the presentation of the individual, aggregated and averaged results.

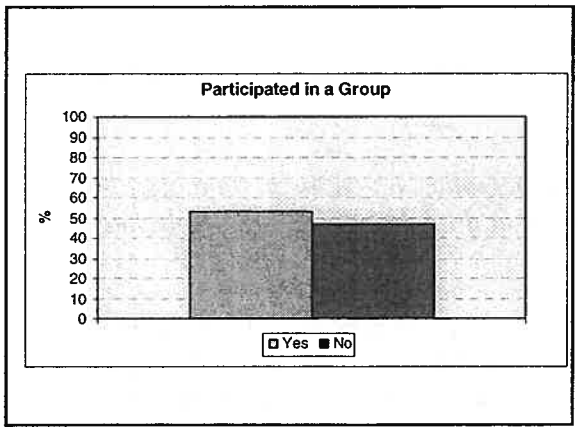
Stakeholders in the St George Irrigation Area see value in the project and are beginning to take ownership of it.

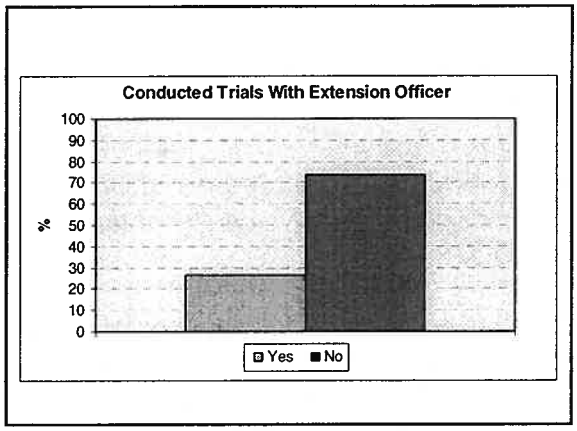
- *54% of those invited attended the meeting. 31% had a legitimate reason for non-attendance (ie picking/holidays/breakdown/sick). 15% did not provide a reason.*
- *86% of respondents believe that the irrigation issues generated through the meeting are applicable to them. The other 14% added two extra issues.*
- *"The most important thing for me next season is to try and do more measurement...Measure more so I can work out which of the above (Issues List) that I need to know more about." This response demonstrates some ownership of and participation in the issues identified.*

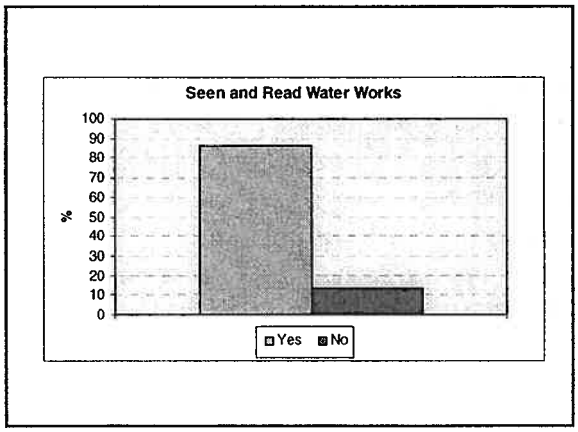
Rural Water Use Efficiency
Season 00/01
Dawson/Callide

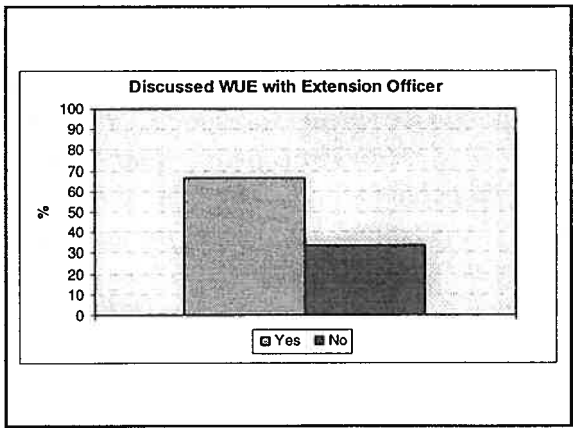
Evaluation
Darren Springer











Evaluation Exercise

Extension Workshop
18- 21 June 2001

Spray application workshop and fluoro dye night show

All participants are surveyed through a written questionnaire

- **A two page survey is handed out at the start of each workshop as we are introducing**

Preliminary Aim of Survey

1) **Develop database of participants**

- **Enable send out of info updates and future activities in their area**

2) **Develop benchmark of current practises**

- **Long term evaluation of change in practice**
- **Info gained including; type of rig used, operating speed, volume, pressure, nozzle configurations, nozzle type used during the season etc.**

Main Aim of Survey

Workshop Evaluation

(effectiveness of workshop from growers feedback)

1) Formal Evaluation

- **Reverse side of survey sheet**
- **Broad, open ended (general) questions**
  - → **maximise feedback of participants**
  - → **will become specific in time**

Q1. **What did you like about the workshop?**

Q2. **What didn't you like about the workshop?**

Q3. **What suggestions do you have for improvements in the future?**

Q4. **What other info or exercise would you like to have seen/undertaken in this workshop?**

2) Informal Evaluation

- **Noted how participants acted (through body language) and the way they interacted with each other**

→ **Gauge what was of interest to them and their level of understanding of concepts and theories which were explained**

What did we find?

Warren Workshops (24th, 25th & 26th)
Daylong workshops conducted. Demo displays were carried out using WSP due to wet weather- and therefore unsuitability of UV dye.
Feedback from surveys- from 26 returned

What did you like about the workshop?
Very useful info from a bloke that knows, useful practical info
Well presented
Good audience participation
Relaxed atmosphere, allowing everybody some input/good communication both ways x 3
Interesting inter- discussion
Able to discuss whatever we liked
Small group size x 4
Informal and informative x 10
Grass roots level
Broad range of subjects/covered all topics well x 2
Nozzle types, selection, pro's and con's discussed x 5
Seeing different nozzle setups x 3
Demo with sprayers on water sensitive paper
Options for conditions
Good review of water rates and drift management
Well informed on all issues
Efficacy work interesting
What didn't you like about the workshop?
Too long
Introduction a little long winded
Rain x 3
No beer at lunch
There were no aerial operators present
What suggestions do you have for improvement in the future?
Shorter
Keep the up to date trial work maybe in the handout notes x 2
No Rain x 2
Follow with night check with fluoro dye
Continue running these workshops with updates on new technology
Trial data on twinjet 015
Don't invite Tucky
Too many field days happening (3 this week), suggested amalgamation
What other information or exercise would you like to have see/undertaken in this workshop?
More broadacre advice for ground rig not just cotton
Spray rig set-up (Accepting that this was unable to happen due to weather conditions)
Night show with UV dye in small groups x 2
Manual more related to workshop topics- helps in note taking
More information, from maybe different contractors on different spray application and nozzle setups for band spraying etc
Have a look at patterns for different nozzles

Q1. **What did you like about the workshop?**

A

- → **Informal but informative (X10)**
- → **Nozzle types, selection, pro's & con's discussed (X5)**
- → **Viewing different nozzle setups (X3)**
- → **good communication both ways (X3)**

Q2. **What didn't you like about the workshop?**

A

- → **Too long**
- → **Intro little long winded**
- → **No aerial operators present**
- → **Rain (X3) and no beer at lunch**

Q3. **What suggestions do you have for future improvements?**

A **Manual which relates more to workshop topics (X2)**

Shorter (sessions with more hands on activities)

Continue running with updates on new technology

Trial data on twinjet nozzles

No rain (X2), more beer and don't invite Tucky!

Q4 **What other info/exercise would you like in workshops?**

A **Most answers where based on not being able to view setups with UV dye due to rainy weather (X4).**

Info from contractors on various setups they currently use.

Evaluation as a whole was quite positive, but this did not mean we couldn't improve

What we gained and what worked best for us.

1) Gain list of participants from IDO, DEO or consultant who is organising.

Contact sample of and get background on what their farming system involves (cotton, mixture, dryland, irrigated, ute mounted, 3 point linkage or self propelled etc)

Develop list of topics of interest (fulfil their identified needs)

2) At start of workshop, hand out survey and discuss list of topics gathered and ask for any further additions.

Include issues we consider important but may have been overlooked and explain why.

3) During workshop work through each of the topics listed and keep informally evaluating if we are on the right track.

If a full day workshop, plan time and activities to gain balance between theoretical topics and practical exercises

4) Return to shed after viewing UV dye to discuss as a group what we have seen and asker further questions from the field inspection

5) Encourage the completion and return of the second half of the survey so we can be in constant improvement in how we conduct our workshops/UV demos.

Possible suggestion in future-

Split survey from evaluation to enable anonymity of feedback.

Change of questions to be more specific and clearer

By wording and by topic

e.g. What suggestions do you have for future improvements?

to How could this info have been presented to you better

or Is there any further information you would have liked to of received on nozzle types.

NOTE: The size and time spent on the survey reflects the type and extent of questions asked.

Spray Workshop Evaluation

Simon White

Currently we survey all participants though a written survey form which is handed out at the start of each workshop when we are getting things organised or during the barbecue when people are eating before the night show.

Initial aim of Survey

1. To develop a database of all participants contact details whom have attended a Spray Application Workshop. This would enable us to send out updates and also inform them of other activities in their area which they may like to be involved with.
2. To obtain benchmark of current practises used in cotton. Details include the type of machine they have and the various setups they use during the growing season. Setup details outlined nozzle type, pressure, volume, speed and configuration.

Main Aim (evaluation): To increase the effectiveness of our workshop from growers feedback.

Our evaluation exercise of workshops came through two main methods.
1. Informal evaluation. During the workshop and during the dye display we noted the way participants acted (through body language) and the way they interacted. This enabled us to gauge what was of interest to them and their level of understanding of concepts/theories which were explained.

Outcome
What we noted was, once out in the paddock, we were approach mainly by individuals because by nature, people tend to spread out over the paddock to view the dye. It was often that various participants ask us the same question and also asked questions by individuals which maybe of benefit to the whole group.

2. Formal evaluation. This came after the dye display as the reverse side of our survey sheet. Although the questions which were given were broad and open ended. This was intended by us to maximise as much comments and feedback as we could out of the participants. Questions asked to complete were:

What did you like about the workshop?
What didn't you like about the workshop?
What suggestions do you have for improvement in the future?
What other information or exercise would you like to have seen/undertaken in this workshop?

Outcome

Warren Workshops (24th, 25th & 26th)
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Feedback from surveys- from 26 returned

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What other information or exercise would you like to have see/undertaken in this workshop?

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Night show with UV dye in small groups x 2
Manual more related to workshop topics- helps in note taking
More information, from maybe different contractors on different spray application and nozzle setups for band spraying etc
Have a look at patterns for different nozzles
Formal feed back from these workshops as a whole was quite positive, but this did not mean we could not improve.

What we gained and what works best for us.

Rewording of questions – What topics were of least benefit to you.
This would enable us to spend more time on important issues and less or no time on unimportant or irrelevant issues.

We decided to started each workshop by listing issues which had previously been flagged as important by the sample of growers which we spoke with prior to the workshop on the phone. In doing this we also added any other issues which we raised as important. We believe this small edition to the workshop format worked well and enabled us to ensure we covered all issues important to the participants. We still discuss

issues which may not have been mentioned but believed to be of importance to us – such as drift. At the end of the workshop we would revisit the list to check we had covered all the issues and everyone was satisfied with the discussion.

The informal evaluation noted there was much discussion once we have gone out into the paddock and looked at the UV dye steps. In the past we have broken as a group from the paddock at the end of the workshop. In the latest workshop we conducted we all returned back to the growers shed and continued discussions on what we had seen. This we believe worked well and allowed growers to individually question what they had seen and allow the whole group to benefit from the response. Also because of the open nature of our workshops it allowed discussion to develop among the participants. It also allows us to suck down an extra beer before going home!

As a result of our evaluation exercise it is intended at each workshop we will:

1) Prior to the workshop, gain a list of contact details of participants from the IDO, DEO or consultant who is organising. From these people gain a broad background of the growers attending and what their farming system involves. Such as cotton, grains, dryland, irrigated, main spray rig used (ute mounted, 3 point linkage, self propelled etc).
2) Contact a sample of the participants coming and develop a list of topics of interest from them.
3) At the start of the workshop hand out the survey as previously and while people are filling in the front page, discuss the list of topics we have gathered and ask for any additions to the list by the participants.
4) Add to the list developed any issues that were overlooked which we believe are important and explain why.
5) During the workshop we would methodically work through each of the topics listed and keep informally evaluating if we were on the right track .
6) Once we have viewed the UV dye in the paddock we return to the shed were we can discuss as a group what we have seen and other questions that have risen as a result of the field inspection.
7) Encourage the completion and return of the second half of the survey for so we may be in constant improvement in how we conduct our workshops/UV demos.

An Exercise In Meta-Evaluation Of Logical Framework Approaches (LFA)

(As A Part Of Conducting A Clarative Evaluation).

Bill Gordon

Abstract:

A meta-evaluation of logistical framework approaches (LFA's) was used to develop the key questions for conducting a clarative evaluation based on a project proposal. The meta-evaluation conducted involved triangulation of evaluators, and of LFA's (by manipulating the levels of horizontal and vertical logic within the frameworks).

The major outcomes were two-fold;

- the process demonstrated the impact of manipulating logic within the framework and identified 'gaps' within information provided in the proposal, and
- identified a number of different approaches that evaluators actually employ in completing logistical frameworks.

1.0 Context of the Evaluation.

The intent of the learning project was to conduct a clarative evaluation (Owens Form B) to assist in developing a planning and evaluation framework for the National Heritage Trust funded project 'Keeping Pesticides on Farm in the Upper Condamine and Border Rivers Catchments.' To facilitate this outcome a meta-evaluation of logistical framework approaches (LFA's) and a quasi-experiment were conducted to assist in identifying the key questions used to focus the evaluation. At the time of writing, the project had gained funding based on the objectives outlined in the proposal, however it had not commenced.

2.0 Introduction.

Scriven (1991), as cited by Dart (1995) stated that evaluation is about determining the merit or worth of the object that is being evaluated. The object can be a program, project, a product, a policy or a one of event. More specifically, van den Ban & Hawkins (1996,p.202) suggest that evaluation is about determining whether we have achieved goals and whether these goals could have been achieved more effectively in a different way. In line with these definitions a meta-evaluation may be seen as the determination of the value or worth of an evaluation strategy.

2.1 Logistical Framework Approaches (LFA) to Evaluation

A popular approach for identifying whether project goals have been achieved is the Logistical Framework Approach (LFA). LFA's have been utilised for project planning and evaluation in a number of situations, ranging from international aid projects through to evaluation of extension activities with farmers.

A logistical framework typically consists of a matrix with category headings on the vertical and horizontal axes. The vertical columns relate to the inputs and objectives of the project and the horizontal categories incorporate how each of the objectives or inputs are measured (see appendix one for examples of logistical frameworks). At the intersection of each of the horizontal and vertical categories details are recorded, eg. what the objective is, how it will be achieved, and how the outcome will be measured.

2.1.1 Strengths and Weakness of LFA's

Gasper (1997) stated that LFA was "a good servant, but a bad master." As a tool the LFA is useful for developing and evaluating projects – it can act as a good servant. However if the framework dictates the outcome of the evaluation it can easily become the bad master.

According to Gasper (1997) some of the strengths of the LFA are it:

- "Is visually assessable,
- Gives measurable reference points
- Provides a concise overview of project objectives.
- Can encourage examination of the interconnections and assumptions
- Is adaptable to a range of situations, and it
- Provides reference points for monitoring and appraisal"

He further points out that some of the problems with using a LFA are:

- "The Objectives can be oversimplified
- It may downgrade less quantifiable objectives
- The indicators may be poorly applied or misused, and
- It may result in difficulties in separating the influences of complementary factors."

2.1.2 LFA's and Evaluation Theory.

Evaluation theory (and practice) has undergone numerous changes in recent decades, with new 'generations' of theoretical and practical approaches arising. At the same time logistical frameworks have also evolved, and aspects of each phase of development in evaluation are reflected in their format and usage.

Shadish et.al. (1995) reviewed the various approaches, identifying developmental phases in program evaluation and the main 'actors' involved in each phase. These include:

First 'Generation' Evaluation, described as essentially logic driven and based on measurement. It included the use of strategies such as program logic to test the implicit assumptions, advocated by individuals such as Wholly (1979). The use of logic links is essential in assigning the levels in the vertical logic, and also the horizontal logic within logistical frameworks.

Second 'Generation' Evaluation, described as predominantly theory driven and largely objectives based. The emphasis was placed on the use of social science theory, initially

advocated by individuals such as Chen & Rossi (1987), who later modified their approaches.

Third 'Generation' Evaluation included the segregation of aspects of the evaluation, such as implementation theories and program theory, and was regarded as largely judgement driven. Chen (1990), as cited by Shadish et.al (1995), further refined this approach to incorporate normative and causal theory. This approach is also reflected in the works of Carol Weiss and to a certain extent Owen and Rogers (1999).

Information gathered during the investigation outlined in this report has demonstrated that LFA's are useful for developing both normative models for project planning and causal models for evaluation frameworks. Similarly, meta-evaluation techniques proved useful for developing a clarative evaluation.

Fourth 'Generation' Evaluation. Described as a tailored approach to evaluation, as advocated by Rossi and Freeman (1993), with less emphasis on the theory driven aspects of evaluation. The idea of a tailored approach is easily incorporated within LFA's, as the vertical and horizontal logic can easily be manipulated to suit the purpose of the evaluation.

Note: The term "generation' in this report is applied as a descriptor for a general group of similar theories and approaches, not in the same context as Guba and Lincoln (1989) whose application of the term in forth generation evaluation refers to a constructivist approach to evaluation, which in itself may be considered a partly theoretical and partly tailored approach.

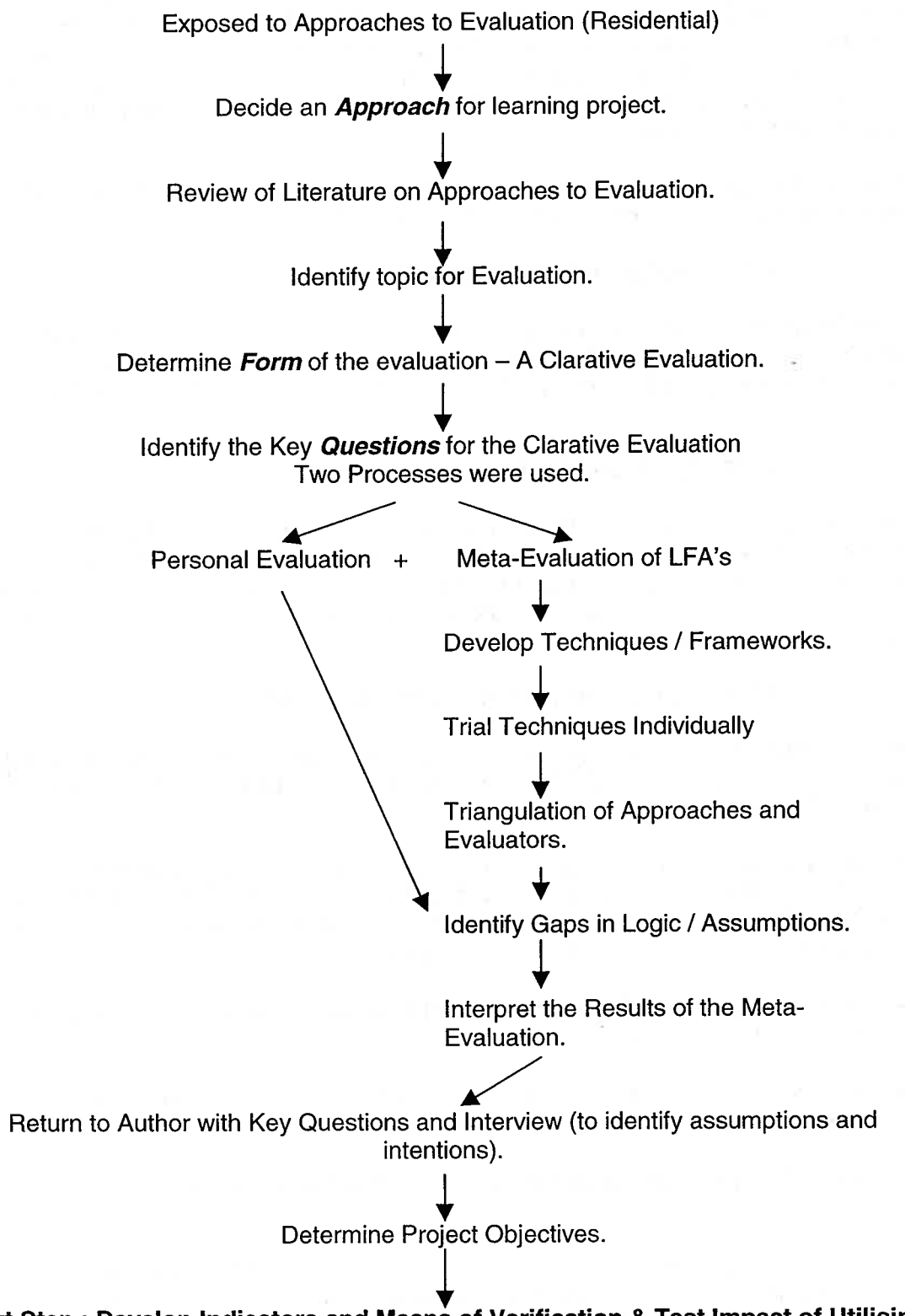
3.0 Objectives of the Evaluation and Meta-Evaluation.

The evaluation and meta-evaluation (including quasi-experiment) were employed to facilitate outcomes at several levels, these include:

- To utilise a LFA for planning and evaluation.
- To conduct a meta-evaluation of LFA's, examining the impact of manipulating the horizontal and vertical logic on the attribution of project objectives.
- To conduct a quasi-experiment to triangulate the meta-evaluation (both methods and evaluators).
- To utilise the results of the above processes in developing the key questions for a clarative evaluation, and
- To conduct a clarative evaluation to facilitate the development of a project plan and evaluation strategy.

4.0 Methodologies Employed in this Learning Project.

Figure 1: **Approach Used in this Learning Project.**



Next Step : Develop Indicators and Means of Verification & Test Impact of Utilising Different Indicators.

4.1 The Meta-Evalution:

A logistical framework approach was employed, which was conducted as a personal activity and triangulated using six other evaluators. The logframe model was used as the base design for the activities undertaken (see appendix 1 for example). The logframe model consists of four levels of vertical logic; inputs, activities, purpose and goals, and four levels of horizontal logic; goal or activity statement, narrative summary, means of verification and assumptions.

Three other frameworks were developed by making alterations to either the vertical logic or the horizontal logic, or a combination of the two (included in appendix 1).

4.1.1 Manipulating the Vertical Logic.

The four levels vertical logic in the logframe model were replaced with the 8 levels of Bennett's hierrachy as identified by van den Ban and Hawkins (1996,p.206). The horizontal logic remained the same as the original logframe model (see appendix 1).

4.1.2 Manipulating the Horizontal Logic.

The horizontal logic in the original logframe model was replaced with categories developed by Funnell (1997). This expanded the horizontal logic to include additional categories, such as: internal and external factors affecting the evaluation and success criteria. The expanded horizontal logic was applied to the original logframe model and to the framework incorporating Bennett's hierarchy.

4.1.3 The Quasi-Experiment: Triangulation.

In an attempt to maximise the rigour and validity of the meta-evaluation was triangulated in two ways, firstly by methods (LFA's mentioned above) and secondly by the evaluators completing the activity.

Each evaluator was to asked to use the project proposal for the NHT project 'keeping pesticides on farm' to complete each of the four logistical framework models. For each 'box' (intersection between vertical and horizontal logic) in the framework the evaluators were required to complete one of the following tasks:

- Where possible identify and transcribe the relevant information from the proposal into the appropriate box,
- If unclear make a comment about the information available in the appropriate box, and,
- If no information was available / apparent place a cross in the box

Each of the six evaluators included in the quasi-experiment had been exposed to evaluation techniques through attendance at the residential component of the 'Evaluation' subject conducted by the Rural Extension Centre, University of Queensland, Gatton Campus.

4.1.4 The Clarative Evaluation – Identifying the Objectives.

At the completion of the personal evaluation and the meta-evaluation exercise a 'gap' analysis was conducted. The 'gap' analysis consisted of collating the results of the quasi-experiment to identify areas ('boxes') within each of the frameworks that individual evaluators found information lacking or not available in the project proposal.

The information obtained as a result of the 'gap' analysis was used to formulate the key questions for the clarative evaluation. Each time an evaluator identified an area within the horizontal or vertical logic where information was unclear or absent a question was formulated. The subsequent questions then formed the basis of a semi-structured interview that was held with the author of the project proposal.

5.0 Outcomes of Methodologies Employed.

The overall process proved extremely valuable in providing additional insights and perspective's for the clarative evaluation. The inclusion of differing levels of vertical logic within the LFA's helped identify a number of possible outcomes that can result from manipulating the vertical and/or the horizontal logic. A summary of the outcomes achieved from the meta-evaluation are included in table one below.

Table 1 : The influence of Manipulating the Vertical and Horizontal logic within LFA's

Approach	Description.	OUTCOME
Basic LogFrame	Contains 4 levels of vertical logic. (1 input, 3 Output)	• Inputs can be accounted for, but higher order goals can become confused. • Some gaps detected due to confusion
Basic Logframe Using Bennett's • **Increase vertical logic**	Contains 7/8 levels of vertical logic. (3 input, 4/5 Output)	• Can lead to greater distinction between the types of inputs and outputs. Hence more specific indicators and validation. • Gaps still appear, but clarification is simplified.
Basic Logframe adapted from Funnell • **Increase in horizontal logic**	Contained 4 levels of vertical logic, but with additional categories in the horizontal logic. E.g. Internal and External factors, Activities and resources for each level.	• This can assist in identifying assumptions and factors not considered in the basic logframe. • Again, more gaps appear, but this can lead to greater clarification.
Increasing both vertical and horizontal logic.	Combines both the 7/8 levels of Bennett's with the increased number of horizontal categories.	• A difficult exercise that tends to produce overlaps in the gaps identified. • It is quicker and easier to increase the vertical and horizontal separately for the purpose of clarification.

5.1 Outcomes of the quasi-experiment and personal evaluation.

Key questions identified as an individual conducting a personal evaluation greatly differed from those generated in the meta-evaluation. They were fewer and typically related to the experience of the evaluator, eg. different evaluators had different assumptions and prior knowledge of the topic and the author.

The use of a number of other evaluators to triangulate methods also identified a number of different approaches that individuals can use to complete logistical frameworks. These approaches are outlined in table 2 below.

Table 2: Approaches to Evaluation Using LFA's

Approach	Description of Approach.	OUTCOME
Too Hard Basket.	Individual does not understand some / all of the jargon or concepts in the framework or the project proposal.	The evaluator needs further instruction to proceed.
Peripheral	Individual only looks at the document at a superficial level, and only translates information that is clearly stated under similar headings to the evaluation framework.	Will probably conduct and measure the activities without considering the higher order objectives.
Read Between the Lines.	Individual uses all of the information available in the project proposal to make their own assumptions as to what the objectives mean.	May result in the selection of inappropriate indicators and intended goals not achieved.
Question and Consult.	Individual reads document, identifies gaps in logic or assumptions and consults with others and the author to develop the planning and evaluation framework.	Project is implemented and evaluated as intended –perhaps with additional insights.
Creative License.	Individual reads the proposal, and develops activities and evaluation based on their own interpretation of the objectives.	Project may not achieve the intended outcomes.

6.0 Implications for Logistical Framework Approaches for Clarative Evaluation (My Learning's).

A number of implications for the use of LFA's for planning and evaluation were identified as a result of the processes undertaken. My learning's about evaluation have taken place at two levels; the first level it concerns the approaches that individuals take to evaluation, and the second is how 'tailoring' an approach can lead to different outcomes

Learning's About Evaluation and How People Approach it.

- I believe the keys to successful evaluation are:

  Having the Motivation to conduct the evaluation,
  Knowledge of the various approaches to evaluation,
  Having an understanding of evaluation theory and the topic being evaluated,
  The flexibility and skill to modify approaches or techniques as required.

- Individuals conducting an evaluation need to have motivation to complete the task.

  Without having a legitimate motivation for conducting an evaluation it is likely that the evaluation will not fulfil its purpose. This fact was demonstrated by the variety of outcomes arrived at by the individuals involved in the quasi-experiment. Apart from skill and understanding, motivation plays a large role in the potential outcomes of an evaluation.

- Potential evaluators need to be exposed to, and understand , a range of techniques and evaluation theories before they can adequately conduct an evaluation.

  Mere exposure to techniques does not necessarily imply an understanding of what evaluation is about, or the implications of using different techniques. The example of conducting the meta-evaluation highlighted the inexperience and or lack of understanding of some of the evaluators included in the quasi-experiment.

  Evaluators need to have a variety of evaluation tools at their disposal, and the ability to select the most appropriate one for their purpose from these. If the evaluator feels comfortable and confident with a single approach, they should have the skill and knowledge to be able to modify or adapt this approach to suit their needs.

  Manipulating the vertical and horizontal logic in the LFA's used in this activity reinforced the fact that no single approach is suitable for all purposes. It also illustrates that tailoring the evaluation can lead to more valuable and meaningful information being obtained.

- It is essential to have a clear idea of what it is you are going to evaluate.

  Without some understanding of what the project or program you are going to evaluate is about, there is little chance of the evaluation providing useful information. Hence one of the most important forms of evaluation has to be the clarative evaluation, since it identifies and clarifies what the project or programs aims and objectives are.

Learning's About the Impact of 'Tailoring' an Approach.

By the term 'tailoring' the evaluation I am referring to the entire process, not just the modification of individual techniques.

- I believe evaluation and meta-evaluation should not be seen as separate and discrete processes when conducting a clarative evaluation (and perhaps all evaluations).

The meta-evaluation activity conducted in this project yielded the most valuable information, since it assisted in identifying many of the key questions used in the clarative evaluation, which was the original aim of the project.

- Evaluation should not be about merely filling in boxes, which is often the outcome of utilising a logistical framework approach.

  Evaluators should not be dictated to by the evaluation framework.

  By using a single evaluation framework and concentrating solely on the categories present it is possible to miss many of the intended outcomes of a project or program. Manipulating the various levels of vertical and horizontal logic in the quasi-experiment clearly identified information that would have been overlooked had a single logframe model been used in the meta-evaluation.

- For the purpose of conducting the initial stages of the clarative evaluation increasing the vertical logic was more beneficial than increasing the categories within the horizontal logic. Since the vertical logic directly corresponds to the project's inputs, outputs, goals and objectives it provides an excellent basis for developing the key questions necessary for conducting a clarative evaluation.

  However, once the objectives have been clarified the additional horizontal categories can lead to a clearer explanation of the logic links between the objectives and ultimately the indicators that measure their implementation. This may also be the case with monitoring activities undertaken in established projects, where once the vertical logic is established, then the horizontal logic assumes greater importance.

- I do not believe that there is a single framework that is suitable for all purposes, hence I would not attempt to propose one. Rather I tend to think that a tailored approach, which should include meta-evaluation, is a practical solution for many situations.

Recommendations.

- Authors of project proposals should consult widely before developing project objectives to ensure more than one perspective is reflected in the project proposal.

- A situation analysis should accompany project proposals to avoid misinterpretation of the projects intended goals and objectives.

- A clarative evaluation should be undertaken to develop a planning and evaluation strategy for a project before any other activities commence.

- Evaluators must have the skill and motivation to complete the task.

- No single framework is applicable to all situations.

- A tailored approach to evaluation, which may include activities such as meta-evaluation and triangulation, is useful in gaining alternative perspectives.

References:

Chen, H. & Rossi, P.H (1987) " The Theory Driven Apporach To Validity' *Evaluation and Program Planning* 10:95-103

Dart, J (1995). *Review of Evaluation in Agricultural Extension.* RIRDC Pub.No.98/136. RIRDC. Barton ACT.

Funnell, S (1997). 'Program Logic: An Adaptable tool for designing and Evaluating Programs'. *In Evaluation News and Comment.* Vol.6.No.1.

Gasper, D (1997). '*Logical Frameworks: A Critical Assessment'* Working Paper No.264. Institute of Social Studies, The Hague.

Guba, E.C. & Lincoln, Y.S. (1989). *Fourth Generation Evaluation.* Sage Publications. London.

Owen, J & Rogers, P.J (1999). *Focusing Evaluation: Evaluation Forms and Approaches.* Allen & Unwin. St Leonards. NSW.

Rossi & Freeman (1993) *Evaluation : A Systematic Approach – 5.* Sage Publications, Newbury Park.

Shadish, J.R., Cook, T.D. & Leviton, L.C. (1995). *Foundations of Program Evaluation.* Sage Publications. Newbury Park.

Van den Ban, A.W. & Hawkins, H.S. (1996) *Agricultural Extension 2nd Ed.* Blackwell Scientific Ltd. Carlton Victoria.

Wholly, J. (1979) Evaluation: Promise and Performance: Urban Institute. Washington DC.

Bibliography (Additional Readings not cited).

Mortiss, P. (1993) *Extension for Rural Change 2nd Ed.* QDPI. Qld Gov. Brisbane.

Patton, M.Q. (1987) *How to Use Qualitative Methods in Evaluation.* Sage Publications. Newbury Park California.

Scriven, M (1987) 'Validity in Personal Evaluation.' *Journal of Personal Evaluation.* 1:9-24.

EFFECT OF DROPLET SPECTRUM (NOZZLE SELECTION) ON THE EFFICACY OF CERTAIN INSECTICIDES AND FUNGICIDES.

By

Bill Gordon

Senior Development Extension Officer (Pesticide Management).

Background

This work has been completed as a part of a *National Heritage Trust* funded project,

'Keeping Pesticides on Farm in the Upper Condamine and Border River Areas.'

Background

- We know that larger droplets help in reducing off target losses, the question we have set out to answer is how will the use of a larger droplet spectrum effect product efficacy ?

- Currently information about the types of droplet spectrums produced by various hydraulic nozzles at differing pressures is available from nozzle manufactures.
- The droplet spectrums produced are classified according to the British Crop Protection Council (BCPC) standards.

What are the BCPC classifications?

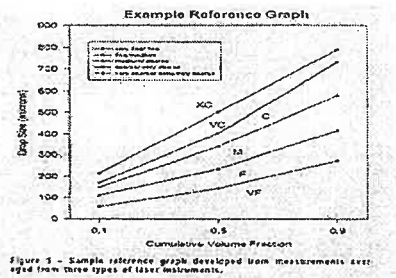


Figure 1 – Sample reference graph developed from measurements averaged from three types of laser instruments.

Example of BCPC classifications

- We have used this information to select the nozzle types and droplet spectrums used in a series of trials.
- Trials were designed to see if different droplet spectrums produced any differences in efficacy.

Some Trials conducted during 2000 - 2001

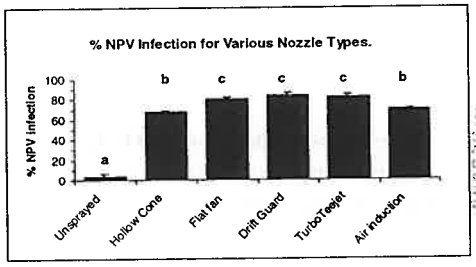
- Effect of Nozzle Type (Droplet Spectrum) on Gemstar® Efficacy against Heliocoverpa sp. in Chickpeas.
- Effect of Nozzle Type (Droplet Spectrum) on Ergot Control in Sorghum using Bayfidan.® + Bond ®
- Effect of Nozzle Type (Droplet Spectrum) on the Efficacy of an ingestion active insecticide (Rimon) against Heliocoverpa sp. in Cotton.
- Effect of Nozzle Type (Droplet Spectrum) on the Efficacy of an ingestion active insecticide (Steward) against Heliocoverpa sp. in Cotton.

Queensland Government

Some Trials conducted during 2000 - 2001

- Effect of Nozzle Type (Droplet Spectrum) on Gemstar® Efficacy against Heliocoverpa sp. in Chickpeas.

Queensland Government



Queensland Government

Main Implications from Gemstar Trial

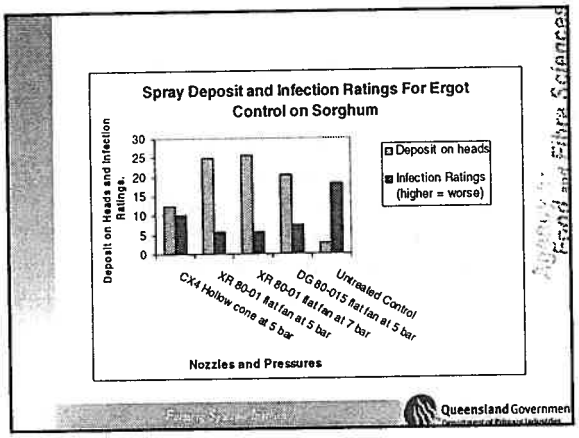
- Fan type nozzles used in this trial provided significantly higher levels of infection than a hollow cone nozzle.
- No significant differences in the fan type nozzles used. - very fine, fine and medium spectrums.

Queensland Government

Some Trials conducted during 2000 - 2001

Effect of Nozzle Type (Droplet Spectrum) on Ergot Control in Sorghum using Bayfidan.® + Bond ®

Queensland Government



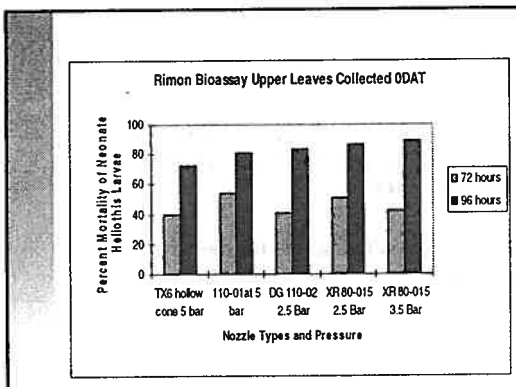
Queensland Government

Main Implications from Ergot Trial.

- Fan type nozzles provided significantly lower levels of ergot infection than the hollow cone nozzle.
- Increasing pressure from 5 bar to 7 bar did not significantly improve levels of spray deposit or control.

Some Trials conducted during 2000 - 2001

Effect of Nozzle Type (Droplet Spectrum) on the Efficacy of an ingestion active insecticide (Rimon) against Heliocoverpa sp. in Cotton.



Main Implications from Rimon Trial.

Field mortalities (based on total larvae) were not significantly different with different nozzle setups.

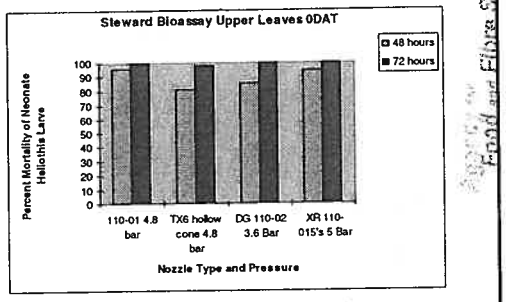
Main Implications from Rimon Trial.

Mortality in bioassays conducted on leaves showed significantly lower mortalities on leaves sprayed with hollow cone nozzles when compared with some of the fan type nozzles (with fine and medium droplet spectrums).

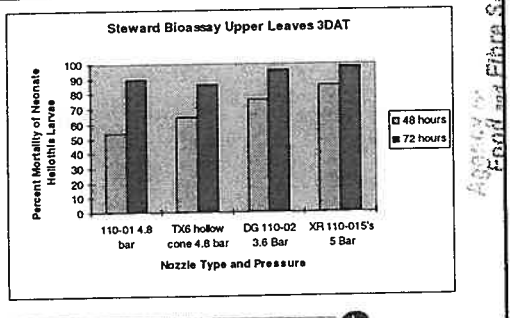
Some Trials conducted during 2000 - 2001

Effect of Nozzle Type (Droplet Spectrum) on the Efficacy of an ingestion active insecticide (Steward) gainst Heliocoverpa sp. in Cotton.

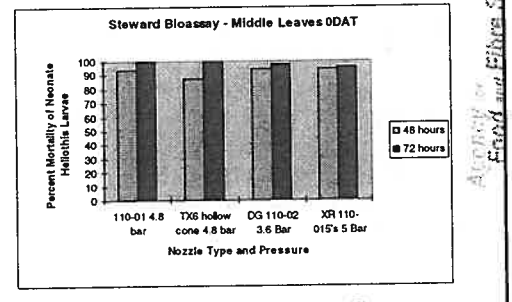
Results From Steward Trial in Cotton



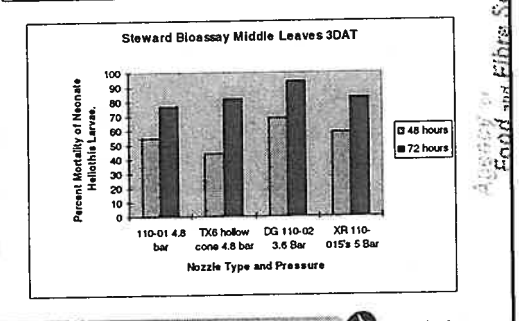
Results From Steward Trial in Cotton



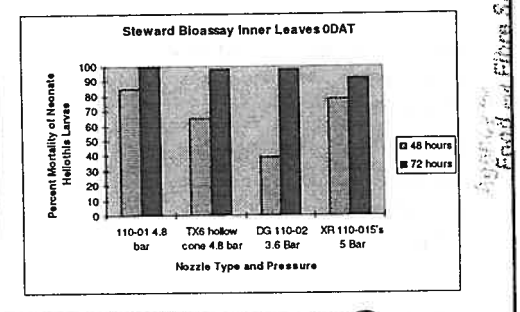
Results From Steward Trial in Cotton



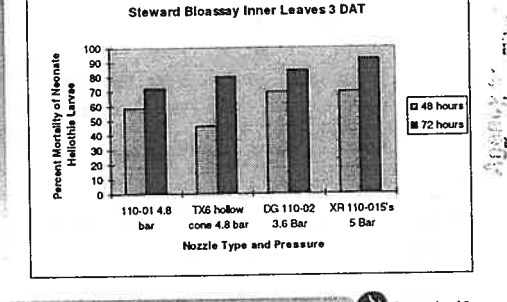
Results From Steward Trial in Cotton



Results From Steward Trial in Cotton



Results From Steward Trial in Cotton



Implications from Steward Trial.

- **Field mortalities were not significantly different with different nozzle setups.**

Implications from Steward Trial.

RESULTS FROM BIOASSAYS

- For leaves collected **immediately after spraying** … some differences in mortality after 2 days, but no differences after 3 days.
- After 2 days higher mortalities were seen when product was applied with a fine droplet spectrum.

Implications from Steward Trial.

- RESULTS FROM BIOASSAYS SHOWED..
- For leaves collected **3 days after spraying** … some differences in mortality after 3 days, with the larger droplets (medium, and larger fines) showing higher mortalities.
- These results suggest larger droplets may be providing a greater residual on crop.

TAKE HOME MESSAGES

- **Flat fan type nozzles have consistently outperformed hollow cone nozzles.**
- **When using flat fans, both Fine and Medium Droplet spectrums have provided equivalent levels of control in the field……**

(provided that application volumes are in line with manufacturers' recommendations.)

TAKE HOME MESSAGES

Suitable conditions for pesticide application are essential…However…

Given…... that both medium spectrums and fine spectrums are providing equivalent levels of control over time….

With some products we may have some options to minimise losses due to evaporation and drift by using a medium droplet spectrum.

TAKE HOME MESSAGES

- **But remember…... with some products, a fine droplet spectrum may provide a more rapid mortality,**

whereas persistence on crop may be improved with the use of a medium droplet spectrum.

VARIOUS ISSUES RAISED

Privacy Act

This was raised by Raelene as it is causing difficulties with access to and use of databases (in particular concern regarding contact details for growers). Need to clarify with NSW Agriculture regarding the use of CGA databases. There have been some comments from NSW Agriculture that names on databases need to be contacted to ask if they still wish to be on that list.

⇨ *Dallas to clarify.*

Beneficial Disruption Index (BDI)

This is the new name for the Spray rank/IPM Score developed by Lewis Wilson, Rob Mensah, Martin Dillon and Dave Murray as an estimate of the level of disruption to beneficials.
The name has been changed to overcome confusion about a higher "score" being better.

Industry List

- Keeping it up to date

Lars to send a copy of the list to IDOs for feedback / updates
Included with this will be a list of who (growers, managers, consultants, etc) has what information resources from the TRC

Extension Notes for INFOpaks

A set of training/facilitator's notes to be developed for new INFOpaks
Including summaries, Cotton Tales articles, etc
Ingrid will work with relevant researcher on these.

Industry Benchmarking Survey

Geoff McIntyre

Data being input at the moment at DPI Brisbane.
Issues with different product names for pesticides – group to allocate.

COTTON EXTENSION WORKSHOP 2001

WHEN	WHAT	ISSUES / WHY?	WHO
Monday 18 June			
12:30	***LUNCH***		
1:30	**Welcome / Introductions / Expectations**		
2 pm	**Focus team reports**	What has been achieved in 2000-2001. Feedback from focus team meetings. Proposed activities 2001-2002.	James Quinn Greg Salmond Mark Hickman Dave Kelly Peter Hughes
3:15	***AFTERNOON TEA***		
3:30	**Evaluation – General**	General feedback on evaluation activities	Whole team
4 pm	**Evaluation feedback**	Explain: the extension activity you evaluated - the response to this activity - the evaluation technique you used and ideas about - feedback from another team member on presentation style	Each team member will do one over the 4 days
4:20	***SUNSET DRINKS – the Crag***		
Tuesday 19 June			
8 am	**Evaluation Feedback**		2 @ 15 mins
8:30	**Evaluation feedback**	Comp. Analysis	Jim Q
8:45	**Benchmarking and Comparative Analysis, BDI**		Jim Q, Ingrid, team
9:15	**Catchment Management and Natural Resource Management**		Bobbie Brazil
10am	***MORNING TEA***		

IDOS / DA'S / SPRAY TEAM

WHEN	WHAT	WHY/ISSUES	WHO
10:30	**Trials 2000-2001**	What trials did you do? How did they go? How did you involve growers? % of time spent on trials? Can results be of value to other areas – coordination? Links to other extension activities (AWM / focus teams/etc)?	Whole team – esp. IDO's and Water – brief overviews
11:15	**Difficulties / challenges** Your season in summary – what went well, what not so well? What can we do differently? How much time to you spend on each type of activity? What can be better coordinated? ☺ / ☹		
12 pm	**Objectives for extension – "Mission"**		
12:30	***LUNCH – WALK TO MORAN'S FALLS***		
1:30	**AWM Groups – Develop an AWM "toolkit"**	How did they go? What worked/what didn't? Challenges / achievements. Where to next year? Resistance discussions	
3:30	***AFTERNOON TEA***		
4 pm	**Evaluation Feedback**		X 2 @15 mins
4:30	**IPM Short Course**		Bill Dalton
5:30	**Evaluation feedback**		X 2 @15 mins
6 pm	***CLOSE DAY 2***		

WATER TEAM (+ Mike Bange)

WHEN	WHAT	WHO
11:15	**Water Extension activities** **Situtation Analysis** **– what has worked well?** - **what not so well?** - **What resources (incl training) are available?** **Objectives for water extension – "Mission"**	
1:30	**Where to now?** **Links with HYDROpak, HYDROlogic and training materials** **Water BMP** **Watersched**	
4 pm	**Water Extension activities for 2001-2002 – opportunities for collaboration.** **Coordination planning**	

Wednesday 20 June

WHEN	WHAT	ISSUES / WHY?	WHO
8 am	**Water team feedback on activities to date and plans**		Water team to nominate
8:30	**Evaluation Feedback**		4 X 15 mins @
9:30	**VISION for Extension team**	What are our core objectives? Industry Priorities? What do the CRDC and CRC board consider to be our key objectives? How can we best achieve the goals? Where do we focus our efforts?	Whole team Facil: Ingrid
	Your aspirations for 2001-2002	What would you like to achieve?	
10:30	***MORNING TEA***		
11 am	**NSW Ag / QDPI Progression criteria**	To ensure aspects are incorporated into each team member's work plan will help them meet their progression requirements.	Dallas / Geoff
11:30	**Strategic planning for extension team cont'd**		
12:30	***LUNCH***		
1:30	**Evaluation feedback**		4 X 15 mins
2:30	**Spray trial updates**		Bill Gordon
2:45	**TEAM BUILDING EXERCISE**		Arranged by O'Reilly's
5 pm	**Plans for 2001-2002**	Whole team plans + individual plans. Match to industry priorities (incl your local priorities) Linkages/collaboration. Training needs.	

Thursday 21 June

WHEN	WHAT	ISSUES / WHY?	WHO
11:45	**Training Priorities**		Ingrid
8 am	**Trials 2001-2002**	Where to next year? Set priorities. Coordinate between districts.	
9 am	**Evaluation feedback**		4 X 15 mins@
10am	**Evaluation wrap up**		Bruce
10:15	**Focus Groups – AWM/IPM + Water?**	Evaluation of changing attitudes to IPM and AWM	Bruce / Ingrid
10:30	***MORNING TEA***		
11am	**TRC** **+** **CottonLOGIC**	Resources currently available How do we (as a team) best distribute and promote the pak's Is training/workshopping needed? Eg NUTRIpak, IPM guidelines, WEEDpak	Lars & Sandra
11:45	**Wrap up**		
12:30 pm	***LUNCH / Close***		

Note: We will ask 2 people from the group to provide constructive feedback (individually) on presentation style following presentations.

COTTON CRC EXTENSION TEAM 2001

Updated 17 Oct 2001

FirstName	LastName	Office Phone	MobilePhone	Role	Host Organisation	Addres	Address 2	Town	State	Postcode	Fax	EmailAddress
Evan	Brown	(02) 6960 1353	0427 107 057	Industry Development Officer	NSW Agriculture		PO Box 1087	Griffith	NSW	2680	02 6963 0255	evan.brown@agric.nsw.gov.au
Ingrid	Christiansen	(02) 6799-2402	0428 195 485	National Cotton Extension Coordinator	Cotton CRC / QDPI	ACRI	Locked Bag 59	Narrabri	NSW	2390	02 6799 1582	ingridc@mv.pi.csiro.au
Bill	Dalton	(07) 4671-6715	0407 113 096	IPM Training Coordinator	QDPI		Locked Bag 2	Goondiwindi	Q	4390	07 4671 2782	bill.dalton@dpi.qld.gov.au
Sandra	Deutscher	(02) 6799-1589	0427 254 103	Cotton Logic	CSIRO Plant Industry	ACRI	Locked Bag 59	Narrabri	NSW	2390	02 6799 1582	sandrad@mv.pi.csiro.au
Craig	Dunn		0427 269 993	District Coordinator	Consultant		PO Box 654	Bourke	NSW	2840		cdunn@lisp.com.au
Julie	Ferguson	(07) 4693-2486	0428 323408	Development Extension Officer - IPM grains	QDPI		PO Box 160	Pittsworth	Q	4356	07 4693 1847	fergusjm@dpi.qld.gov.au
John	Francis	(02) 6895-1012		District Agronomist	NSW Agriculture		PO Box 300	Condobolin	NSW	2877	026895 2688	john.francis@agric.nsw.gov.au
Dallas	Gibb	(02) 6799-1547	0413 278 592	Program Leader - Plant Fibres + CRC Program L	NSW Agriculture		Locked Bag 59	Narrabri	NSW	2390	02 6799 1503	dallasg@mv.pi.csiro.au
Garry	Giddings	(02) 6881-1278	0427 201 890	Irrigation Officer Engineer Asst	NSW Agriculture		PO Box 865	Dubbo	NSW	2830	02 6881 1295	garry.giddings@agric.nsw.gov.au
Bill	Gordon	(07) 5460 1289		Senior Research Officer in Pesticide Application	CPAS, University of Queensland - Gatton			Lawes	Q	4343	07 5460 1283	b.gordon@mailbox.uq.edu.au
Phil	Goyne	(07) 4661-2944	0408 711 140	Princ Res Scientist - RWUE Coordinator	QDPI	Hermit	MS 508 Yangan Rd	Warwick	Q	4370	07 4992 3468	goynep@dpi.qld.gov.au
Raelene	Greenslade	(02) 6742-9234		WUE Officer	NSW Agriculture		PO Box 546	Gunnedah	NSW	2380	02 6742 2940	raelene.greenslade@agric.nsw.gov.au
Jenelle	Hare	(07) 4669 0825	0427 372 331	Development Technical Officer	QDPI		PO Box 993	Dalby	Q	4405	07 4662 4966	harej@dpi.qld.gov.au
Graham	Harris	(07) 4688-1559	0427 929 103	Senior Extension Agronomist	QDPI		PO Box 102	Toowoomba	Q	4350	07 4688 1199	graham.harris@dpi.qld.gov.au
Mark	Hickman	(02) 6742-9279	0427 007 422	Industry Development Officer	NSW Agriculture		PO Box 546	Gunnedah	NSW	2380	02 6742 2940	mark.hickman@agric.nsw.gov.au
Rachel	Holloway	(02) 6792-4088		Project Coordinator BMP	CRDC		PO Box 282	Narrabri	NSW	2390	02 6792 4400	rachel@crdc.com.au
Sarah	Hood	(07) 4625 3299	0417 722 407	Development Extension Officer - RWUE	QDPI		PO Box 310	St George	Q	4487	07 4625 3892	hoodso@dpi.qld.gov.au
Peter	Hughes	(07) 4688-1564	0417 723 259	Snr Development Extension Officer	QDPI		PO Box 102	Toowoomba	Q	4350	07 4688 1199	hughesp@dpi.qld.gov.au
Leigh	Jenkins	(02) 6847-4507	0419 277 480	District Agronomist	NSW Agriculture		PO Box 183	Warren	NSW	2824	02 6847 3664	leigh.jenkins@agric.nsw.gov.au
David	Kelly	(07) 4983-7411	0409 499 691	Industry Development Officer	QDPI		LMB 6	Emerald	Q	4720	07-4983 7459	kellydg@prose.dpi.qld.gov.au
Sarah	Kerlin	(07) 4625-3299	0408 710 969	Industry Development Officer	QDPI		PO Box 310	St George	Q	4487	07 4625 3892	kerlins@dpi.qld.gov.au
Mascha	Raymond	*Maternity Leave from 28 Sept 2001*										
David	Larsen	(02) 6799-1534		TRC Coordinator	Cotton CRC / NSW Ag	ACRI	Locked Bag 59	Narrabri	NSW	2390	02 6799 1582	davidl@mv.pi.csiro.au
Geoff	McIntyre	(07) 4669-0801	0419 667 451	Principal Extension Officer + CRC Program Lea	QDPI		PO Box 993	Dalby	Q	4405	07 4662 4966	Mcintyg@dpi.qld.gov.au
John	Okello-Okanya	07 4983 7433	0428 151601	Development Extension Officer - RWUE	QDPI		LMB 6	Emerald	Q	4720	07-4983 7459	okelloj@dpi.qld.gov.au
Myles	Parker	(02) 6960-1320	0427 007 418	District Agronomist - Hillston	NSW Agriculture		PO Box 1087	Griffith	NSW	2680	02 6963 0255	myles.parker@agric.nsw.gov.au
Bruce	Pyke	(02) 6792-4088	0418 328 775	Research and Extension Manager	CRDC		PO Box 282	Narrabri	NSW	2390	02 6792 4400	bruce@crdc.com.au
Gwydir Valley IDO		(02) 6752-5111	0427 401 543	Industry Development Officer	NSW Agriculture		PO Box 209	Moree	NSW	2400	02 6752 4859	quinnj@agric.nsw.gov.au
Course Coordinator		(02) 6773-3758	0417 223 179	Lecturer - Cotton Production Systems	UNE	School	Agronomy and Soil Sci	Armidale	NSW	2351	02 6773 3238	groth@metz.une.edu.au
Kirrily	Rourke	(02) 6847-4507	0408 447 483	Industry Development Officer	NSW Agriculture		PO Box 183	Warren	NSW	2824	02 6847 3664	kirrily.rourke@agric.nsw.gov.au
Greg	Salmond	(07) 4669-0815	0427 035 793	Industry Development Officer	QDPI		PO Box 993	Dalby	Q	4405	07 4662 4966	salmong@dpi.qld.gov.au
Nicky	Schick	(02) 6799-1511		Research Liaison	Cotton CRC / CSIRO F	ACRI	Locked Bag 59	Narrabri	NSW	2390	02 6799 1503	nickys@mv.pi.csiro.au
Gus	Shaw	(02) 6742-9236	0427 401 473	Technical Specialist	NSW Agriculture		PO Box 546	Gunnedah	NSW	2380	02 6742 2940	gus.shaw@agric.nsw.gov.au
Peter	Smith	(02) 6763-1262	0411 128 437	Irrigation Officer	NSW Agriculture		RMB 944	Tamworth	NSW	2340	02 6763 1222	peter.smith@agric.nsw.gov.au
Anne	Spora	(07) 4671-6711	0428 879 900	Trainee Industry Development Officer	NSW Agriculture		Locked Bag 2	Goondiwindi	QLD	4390	07 4671 2782	sporaa@dpi.qld.gov.au
Andres	Spragge	(07) 4669-0824	0418 189 582	Technical Officer - RWUE	QDPI		PO Box 993	Dalby	Q	4405	07 4662 4966	spragga@dpi.qld.gov.au
Darren	Springer	(07) 4692-9148	0408 703 783	Development Extension Officer - RWUE	QDPI		LMB 1	Biloela Researc	Q	4715	07 4992 3468	springd@dpi.qld.gov.au
Barry	Swann	(02) 6881-1281		Irrigation Advisory Officer	NSW Agriculture		PO Box 865	Dubbo	NSW	2830		barry.swann@agric.nsw.gov.au
Cameron	Tonkin	(02) 6828-1288	0427 401 996	District Agronomist	NSW Agriculture		PO Box 249	Walgett	NSW	2832	02 6828 2274	cameron.tonkin@agric.nsw.gov.au
Chris	Watson	(02) 6799-1548	0427 007 495	District Agronomist	NSW Agriculture	ACRI	Locked Bag 1000	Narrabri	NSW	2390	02 6799 1582	chrisw@mv.pi.csiro.au
Simon	White	(07) 4669-0817		Development Extension Officer	QDPI		PO Box 993	Dalby	Q	4405	07 4662 4966	whitesc@dpi.qld.gov.au
Olivia	Whiteoak	(07) 4671-6714	0428 886 723	Development Extension Officer - RWUE	QDPI		Locked Bag 2	Goondiwindi	Q	4390	07 4671 2782	olivia.whiteoak@dpi.qld.gov.au
David	Williams	(02) 6960-1322	0427 401 651	Irrigation Extension	NSW Agriculture		PO Box 1087	Griffith	NSW	2680	02 6963 0255	david.williams@agric.nsw.gov.au
Stephen	Yeates	(08) 8944-8484		Research Liaison/Coordination Officer	CSIRO Plant Industry	TERC	Private Bag 44	Winnellie	NT	0821		stephen.yeates@terc.csiro.au