Australian Government
Cotton Research and Development Corporation

CROP CONSULTANTS AUSTRALIA

QUALITATIVE REPORT

on the 2015–16 cotton season:
A survey of consultants

CONTENTS

PURPOSE

The Cotton Research and Development Corporation (CRDC) commissions this survey each year to provide current and longitudinal knowledge of on-farm practices and attitudes, to aid the research, development and extension effort within the Australian cotton industry.

COVERAGE

Data was collected by Crop Consultants Australia Inc. (CCA) from 63 cotton consultants, who answered most or all of the questions about their own practices and attitudes, as well as those of their grower clients.

The consultants represented 444 cotton growers, and covered 193,601 hectares: 62% of the Australia cotton production area for the 2015-16 season (not adjusted for row spacing). This is based on the 2015-16 production figure of 311,571 hectares (Cotton Australia).

METHODOLOGY

The survey consisted of 68 quantitative and qualitative questions, which sought to draw out both the details of actual agronomic practices and consultants' views of those practices. It was conducted in June and July 2016, with questions referring to the 2015-16 cotton season. Questions that collected data on clients or areas were only made available to one participant from a consultancy to avoid duplication.

DATA COLLATION

The online Cvent survey program (www.cvent.com) was used to compile the data. Interpretations are up to the user. An asterisk indicates questions that are recurrent over time to identify trends.

ACKNOWLEDGMENT

Thank you to the consultants who took the time and effort to complete this survey. The data in this survey provides valuable information for researchers and industry organisations in planning and carrying out projects. Thank you to Crop Consultants Australia and Black Canvas graphic design for the compilation of this report.

DISCLAIMER

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Editor Liz Todd Crop Consultants Australia
Design Black Canvas

Australian Government
Cotton Research and Development Corporation

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THE CONSULTANTS AND THEIR CLIENTS

ABOUT THE CONSULTANTS

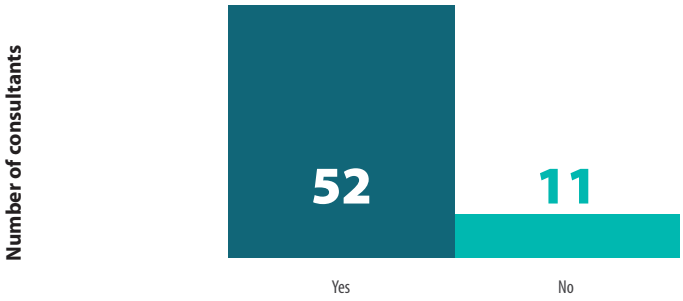
1

Are you completing the survey on behalf of the business or business unit?*

63 respondents

52 consultants completed the survey on behalf of their business or business unit, which involved completing the specific questions relating to staff, hectares and clients. 11 consultants completed the survey questions only relating to individual practices and attitudes.

PRIMARY BUSINESS PERSON COMPLETING SURVEY

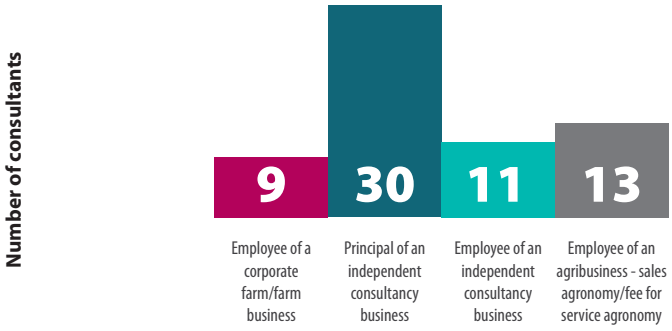


2

Which of the following best describes your employment as a consultant?*

63 respondents

NATURE OF CONSULTANCY

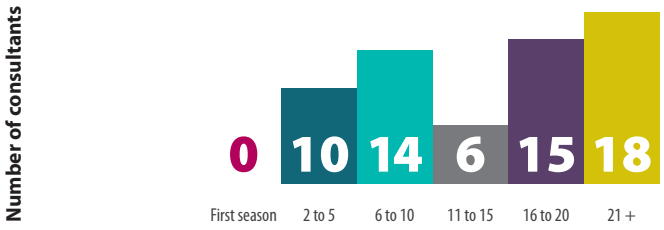


3

For how many seasons have you worked consulting in cotton?*

63 respondents

NUMBER OF SEASONS CONSULTING IN COTTON



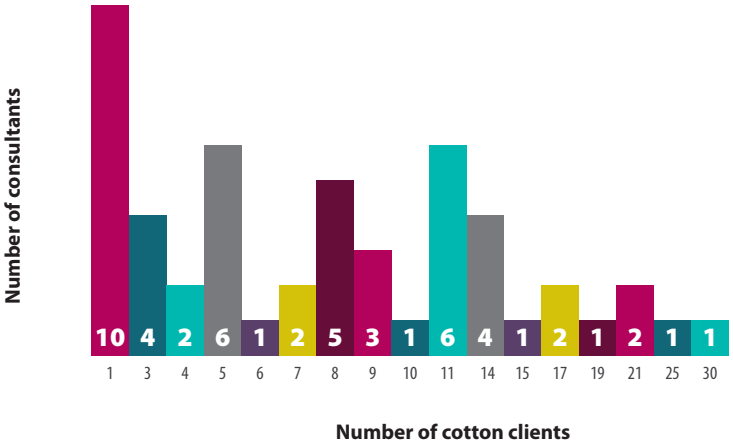
ABOUT THE CLIENTS

4

How many cotton clients did the business (or business unit) service in 2015-16?*

52 respondents

CLIENTS SERVICED PER BUSINESS



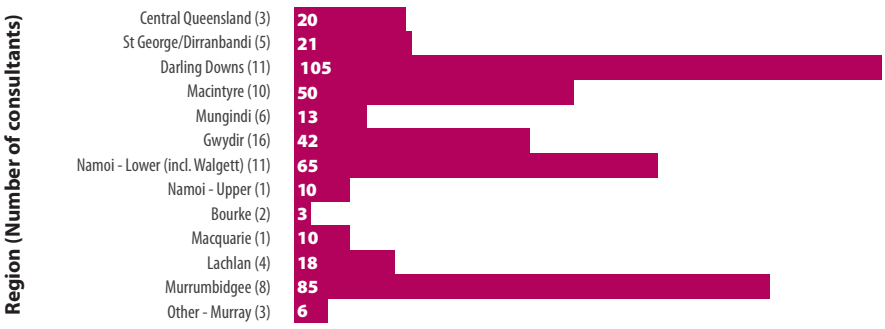
5

In which region/s are your cotton clients based?*

63 respondents

Note Some consultants have clients in more than one region, hence the total number of consultants is higher than the 63 respondents across the regions. A total of 444 clients were represented in the survey.

LOCATION OF CLIENTS

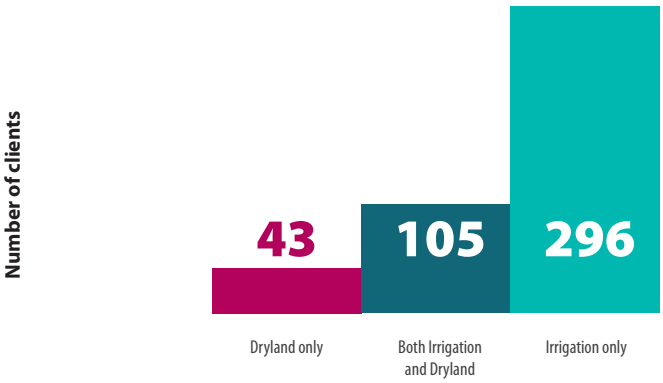


6

How many of your cotton clients have dryland only, irrigation only, or dryland and irrigation?*

52 respondents

IRRIGATION STATUS



ON-FARM PRACTICES AND ATTITUDES

COVERAGE

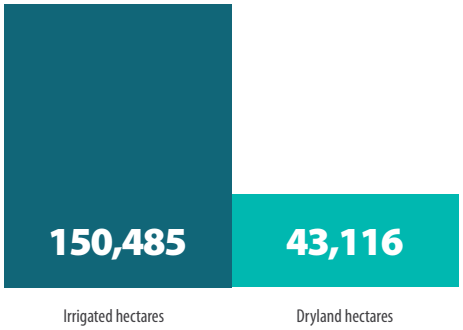
7

How many hectares of cotton (total area, not adjusted for row spacing) did your clients grow in the 2015-16 season?*

52 respondents

Clients grew of total of 193,601 hectares of which 150,485 were irrigated and 43,116 were dryland.

TOTAL SURVEY HECTARES

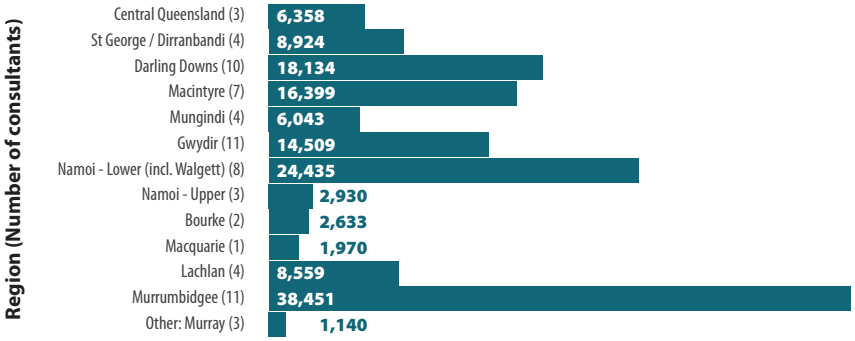


8

In which region/s are the irrigated cotton hectares of your clients situated?*

50 respondents

IRRIGATED COTTON HECTARES BY REGION

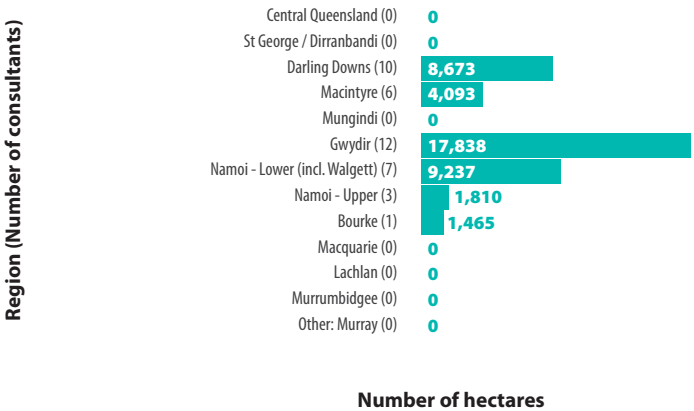


9

In which region/s are the dryland cotton hectares of your clients situated?*

39 respondents

DRYLAND COTTON HECTARES BY REGION



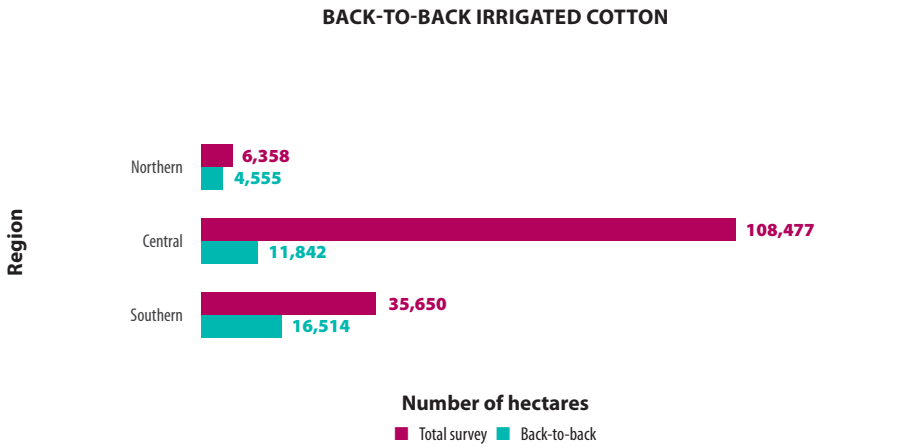
PLANTING

10

Of your irrigated cotton hectares in 2015-16, how many were back-to-back cotton, i.e. cotton grown in the same field in the 2014-15 and 2015-16 seasons?

51 respondents

A total of 32,911 irrigated hectares (22 percent of irrigated survey hectares) were back-to-back cotton.



11

Of your irrigated and dryland cotton hectares, how many were planted once, planted twice, or planted more than twice?*

49 respondents

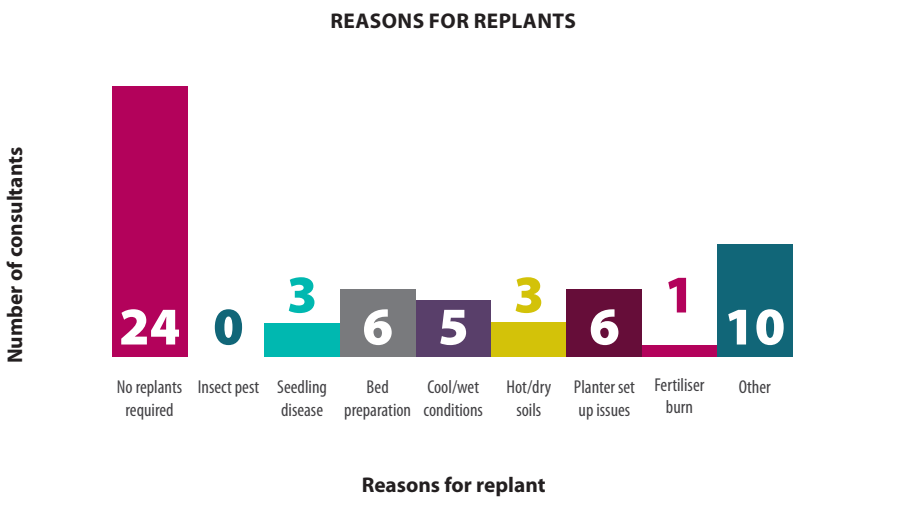
In total, 5,902 hectares were planted more than once.

12

If replants were required, please select the reasons.*

45 respondents

Note Other responses included: 2,4-D drift (1), hail (4), poor seed vigour (3), low vigour Bollgard III (1), poor germination (1), poor seed (1), old seed (1), seed depth (1).



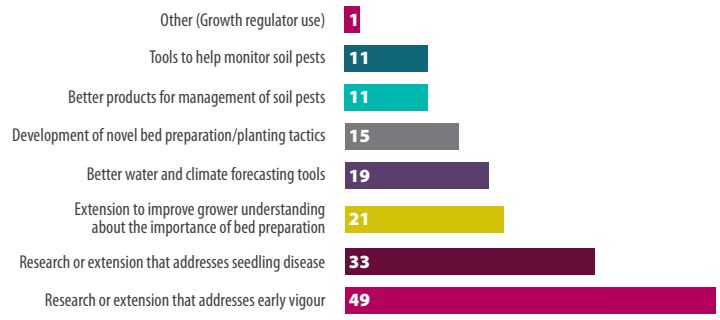
ON-FARM PRACTICES AND ATTITUDES

13

In terms of improving early establishment and crop growth, what would you like to see the industry focus on? Consultants selected up to 3.

63 respondents

INDUSTRY FOCUS FOR EARLY ESTABLISHMENT AND CROP GROWTH



Number of responses

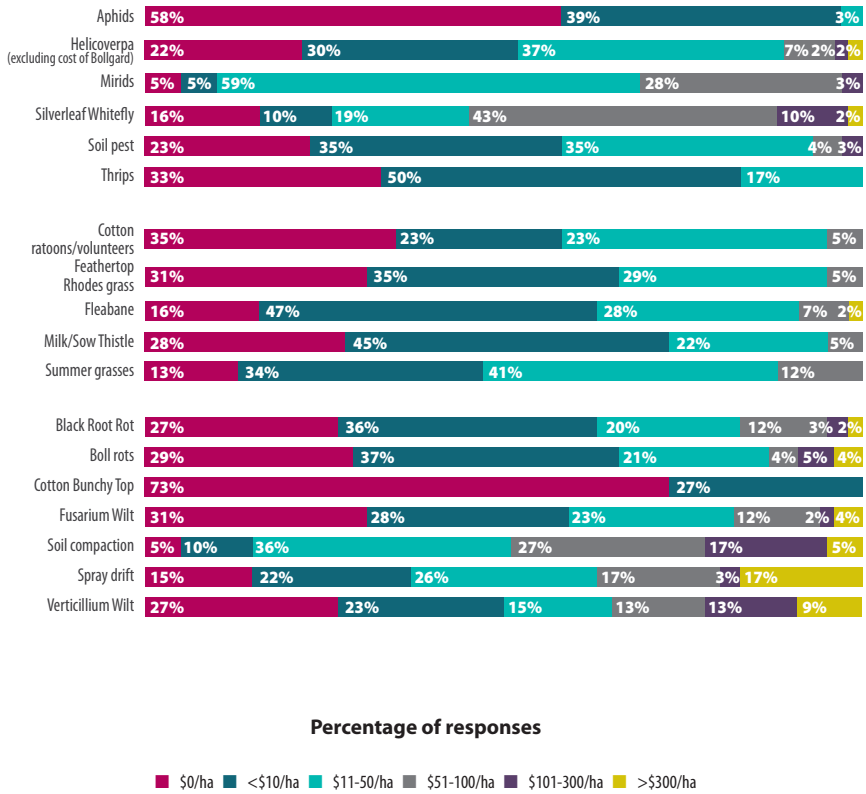
CROP PROTECTION

14

Rate the average impacts you think the following pests, weeds, diseases and disorders had on the profitability of your clients' cotton crops in 2015-16, either through budgeted or unbudgeted costs or through yield loss.*

62 respondents

ESTIMATED FINANCIAL IMPACT OF INSECTS, WEEDS, DISEASES/DISORDERS



Percentage of responses

$0/ha <$10/ha $11-50/ha $51-100/ha $101-300/ha >$300/ha

15

Are there any pests or situations where lack of product registration is limiting your ability to provide advice?

27 respondents

Alterneria and Sclerotinia.

Feathertop Rhodes grass and Fleabane lack of post emergent herbicides options.

Feathertop Rhodes Grass, Windmill Grass, soft options Green Vegetable Bug and Cotton Stainers.

Foliar fungicides - Alternaria in the west. Lint fungicides - sugar from whitefly as a substrate.

Green vegetable bug.

Insecticide on Wireworm. Alpha Scud, Regent?

Label restrictions for over the top applications of Metolachlor and Pendimethalin in cotton. Residual herbicide registrations for Diuron in fallow.

Lack of foliar fungicide registrations for Alternaria and boll rots. Symphyla also lack registered products.

Mealy bugs are an ongoing issue where we have no real registered solutions.

Miticide - Paramite is not registered by air. Abamectin still really the only choice.

Need more Helicoverpa products to cover conventional cotton.

Sclerotinia boll rot - but think a rego is being worked on for next year already?

Sclerotinia boll rot in some fields we lost 20bolls/m. Need a product permit if cool, wet conditions present themselves during flowering this coming season.

Sclerotinia boll rots fungicides.

Stocking of required products by resellers in southern valleys.

Symphyla.

The new product "Starkle" for Mirid and Whitefly control only had ground application registration which limited its usefulness. Aerial application will be available next season apparently.

There are only disruptive chemicals registered to control early season pests - Wireworm and Thrips, which are effective and cheap but nasty.

Verticillium Wilt.

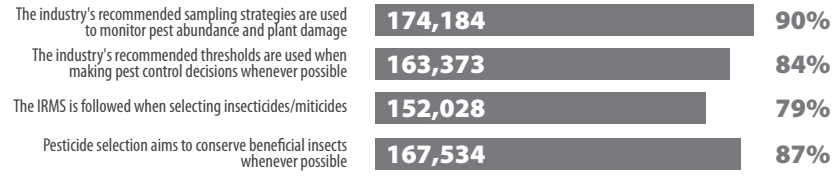
Verticillium Wilt - disease without product registration. Fleabane, Milk Thistle - use of residual herbicide very early in the fallow (12months prior to sowing). Sooty mould - nil fungicides for sooty mould control/prevention prior to harvest to protect colour of lint, prevent colour discounts during inclement weather.

16

With regards to insect pest management in 2015-16 cotton fields, how widely used (in terms of total irrigated and dryland hectares) were the practices listed.*

52 respondents

INSECT PEST MANAGEMENT PRACTICES



Number of hectares / Percentage of total survey hectares

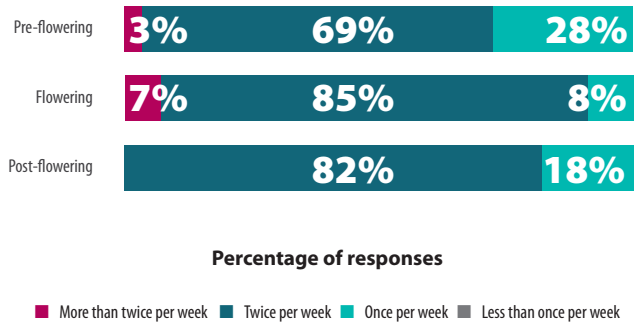
ON-FARM PRACTICES AND ATTITUDES

17

How frequently do you check Bollgard II cotton for making decisions about insect pests - pre-flowering, during flowering and post flowering?*

61 respondents

FREQUENCY OF CHECKING BOLLGARD II COTTON FOR SPRAYING

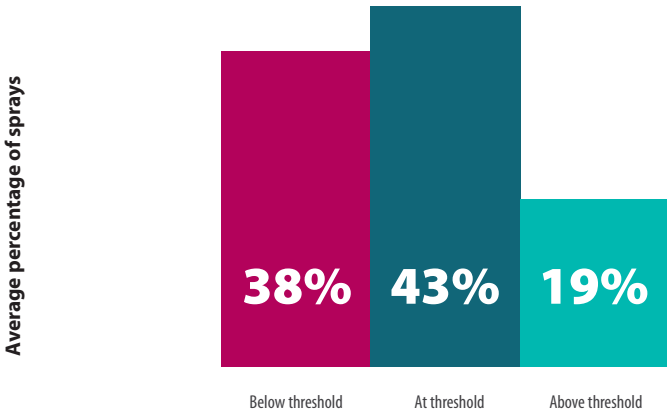


18

With regards to industry mirid thresholds, how often were the sprays you requested for mirids above, at or below the industry's general threshold?*

62 respondents

MIRID SPRAYS COMPARED TO INDUSTRY THRESHOLD

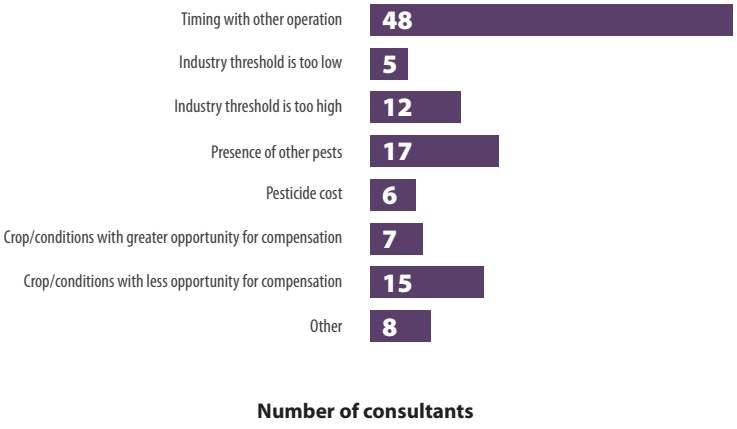


19

Where the decision to control mirids was not in line with industry thresholds, what were the reasons?*

56 respondents

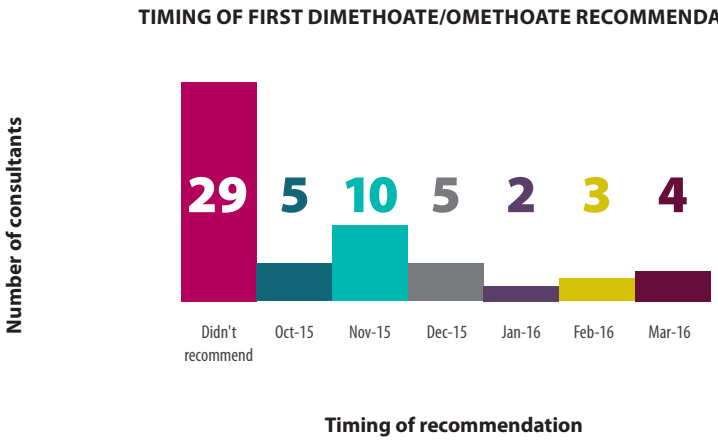
REASONS FOR MIRID CONTROL OUTSIDE INDUSTRY THRESHOLD



20

When during the 2015-16 cotton season did you make your FIRST recommendation to apply dimethoate/omethoate?*

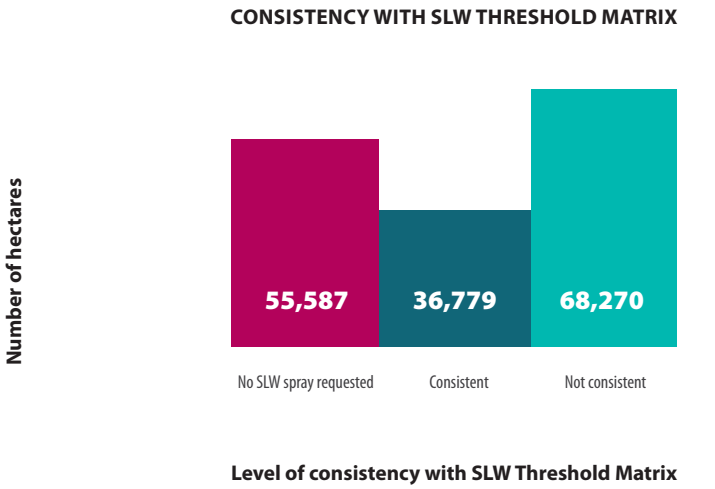
58 respondents



21

How often were the sprays you requested in 2015-16 for Silverleaf Whitefly consistent with the industry's Threshold Matrix?*

52 respondents

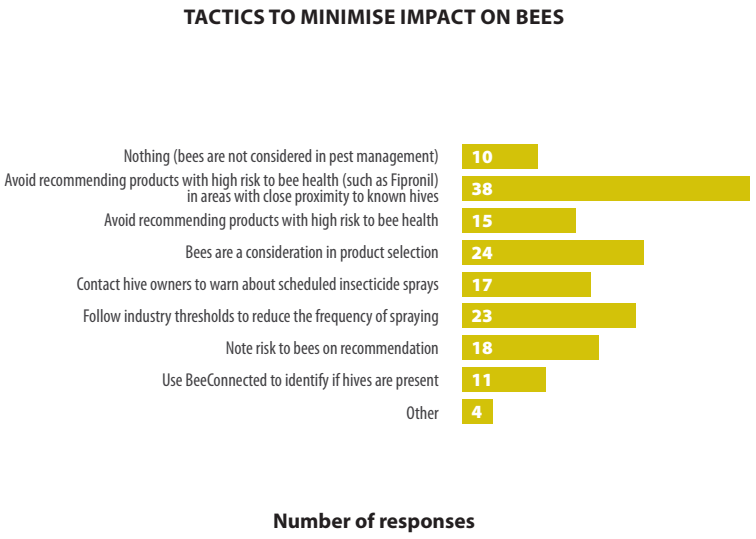


22

What do you do to minimise impact on bees? Consultants selected multiple options.

63 respondents

Note Other responses included: No bee hives in cotton area (3), no insecticides used (1).



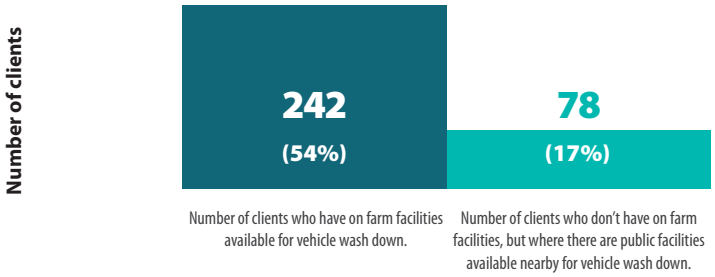
ON-FARM PRACTICES AND ATTITUDES

23

Of your cotton CLIENTS, how many provide wash down facilities for your vehicle?

52 respondents

CLIENT WASH DOWN FACILITIES



24

Of your cotton CLIENTS, how many do you think are successfully managing cotton volunteers all of the time?

52 respondents

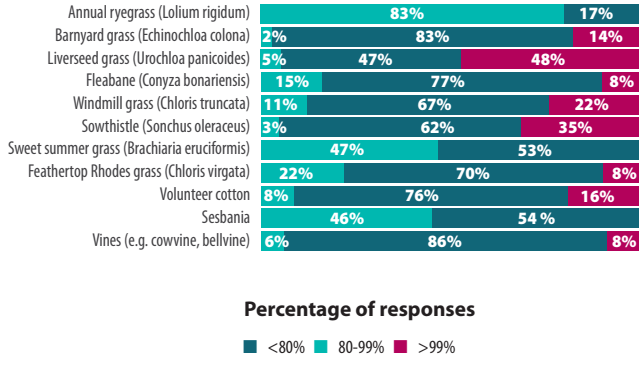
MANAGING COTTON VOLUNTEERS

25

Considering the herbicide used to target these key weeds, rate the proportion of infestation controlled.

58 respondents

PROPORTION OF INFESTATION CONTROLLED WITH HERBICIDE

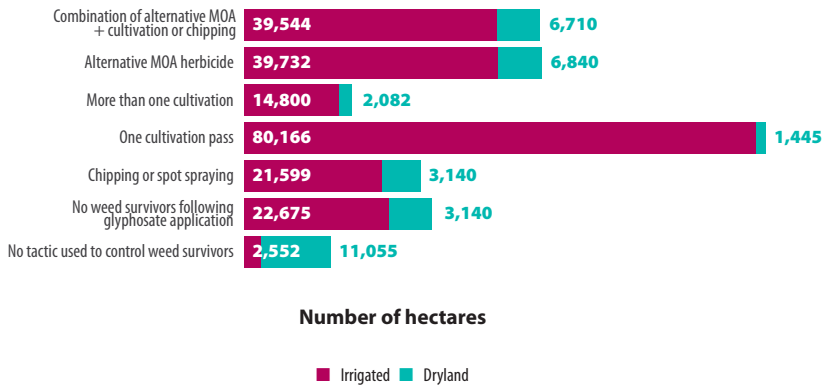


26

Thinking about weed management after the FIRST glyphosate application, of the dryland and irrigated cotton hectares over which you consulted in 2015-16, over what area did you apply the following control tactics for weed survivors?

51 respondents

CONTROL TACTICS FOR WEED SURVIVORS AFTER FIRST GLYPHOSATE APPLICATION

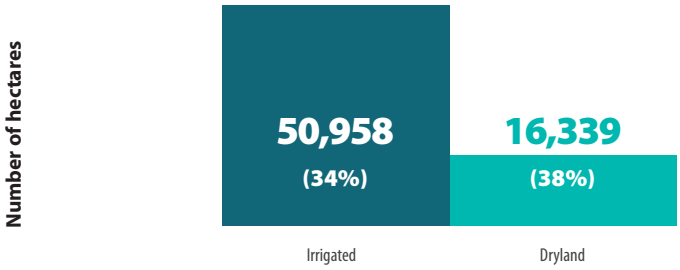


27

What is the total hectares affected by glyphosate resistant weeds?

48 respondents

AREA AFFECTED BY GLYPHOSATE RESISTANT WEEDS

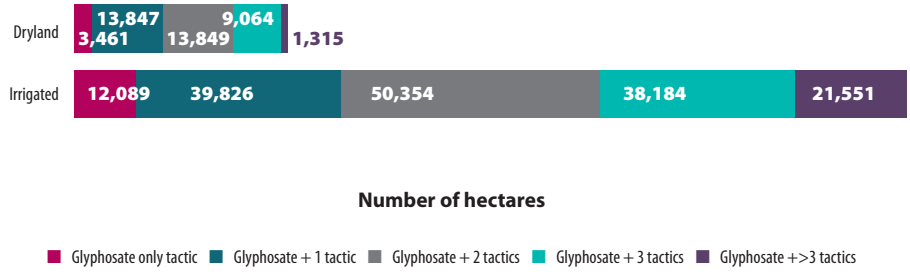


28

Of the irrigated and dryland cotton hectares over which you consulted in 2015-16, please estimate how many tactics were used for the cotton crop, including in preparation. For this question a tactic is considered a weed control operation such as cultivation, herbicide chipping.

52 respondents

WEED CONTROL TACTICS



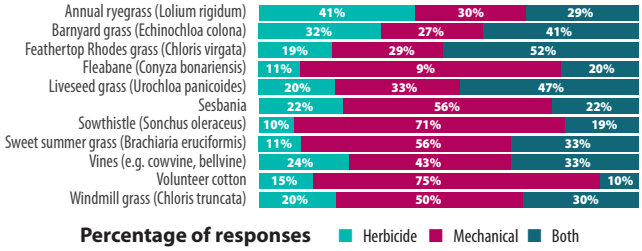
ON-FARM PRACTICES AND ATTITUDES

29

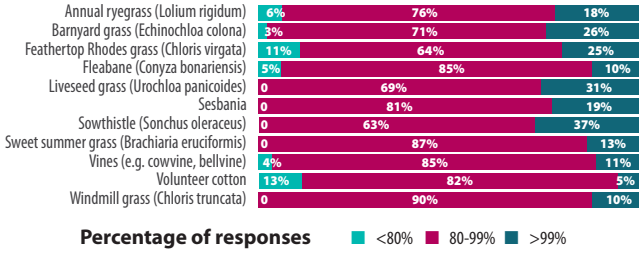
In your experience, what is the best strategy to control the following weed species that survive OTT glyphosate application?

61 respondents

STRATEGY FOR CONTROLLING WEEDS SURVIVING OTT GLYPHOSATE



PROPORTION OF CONTROL SUCCESS BY STRATEGIES

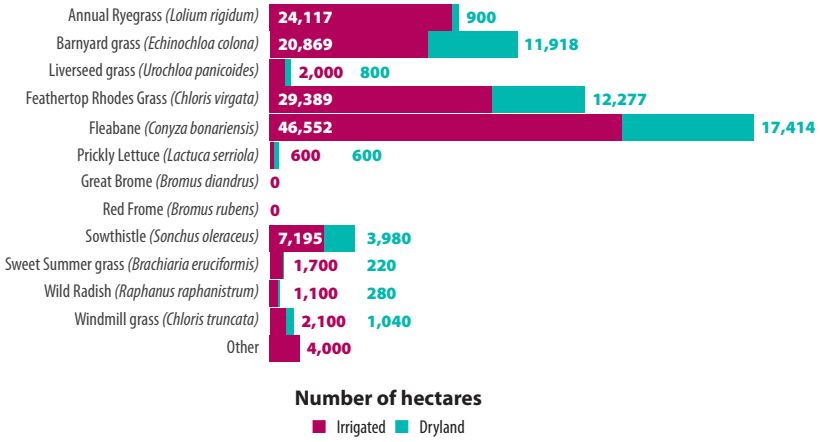


30

Of the irrigated hectares and dryland hectares over which you consulted in 2015-16, please estimate the total areas you believe to contain populations of herbicide resistant weeds. Include total area of fields even where the weeds only affect a small area.

45 respondents

AREA OF GLYPHOSATE RESISTANT WEEDS

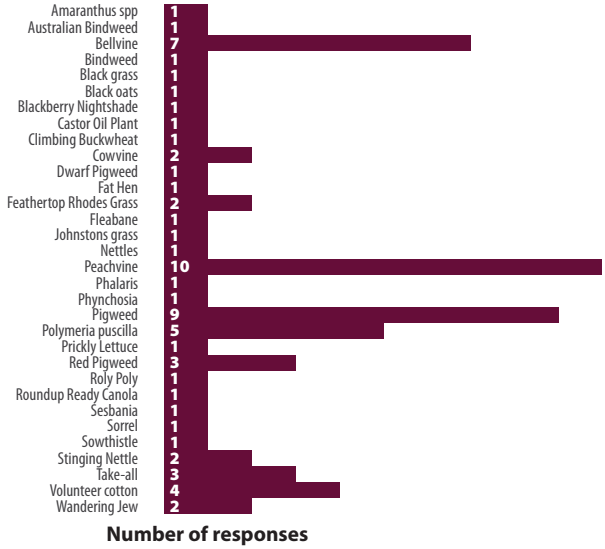


31

Aside from weed species known to have glyphosate resistance (listed in previous question), what other weed species are becoming more challenging to control in the irrigated farming system?

35 respondents

OTHER CHALLENGING WEEDS



32

In terms of weed management, what part of the farming system is weakest? For example, is there a particular farming activity, rotation crop/fallow or sequence of crops, or non-crop area that results in blow out of weeds?

56 respondents

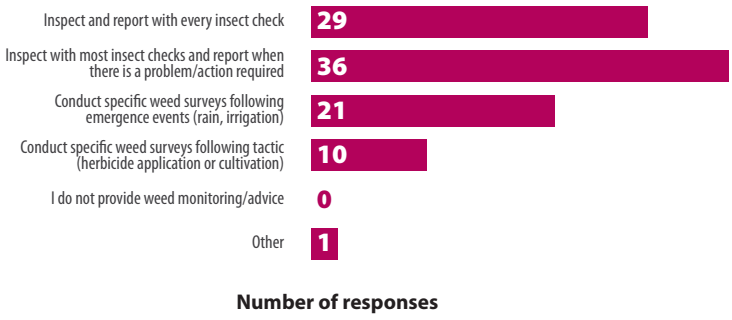
This was an open question. Please see the appendix for full individual responses.

33

How frequently do you actively monitor and report to your clients on weeds? Consultants selected multiple options.

63 respondents

WEED MONITORING AND REPORTING FREQUENCY

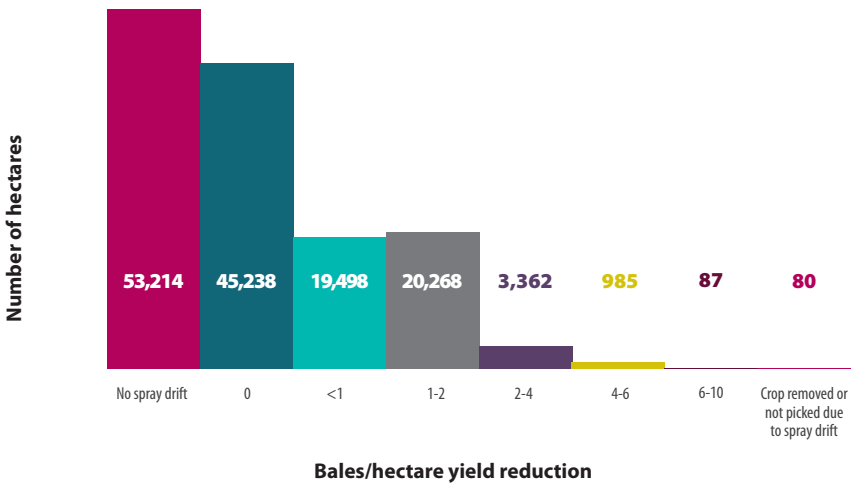


34

What impacts do you estimate SPRAY DRIFT had on your clients' cotton yields this season? Please indicate your best estimate.*

52 respondents

IMPACT FROM SPRAY DRIFT ON COTTON YIELD



ON-FARM PRACTICES AND ATTITUDES

35

What do you think could help to reduce the incidence of spray drift and herbicide damage during the cotton growing season?

60 respondents

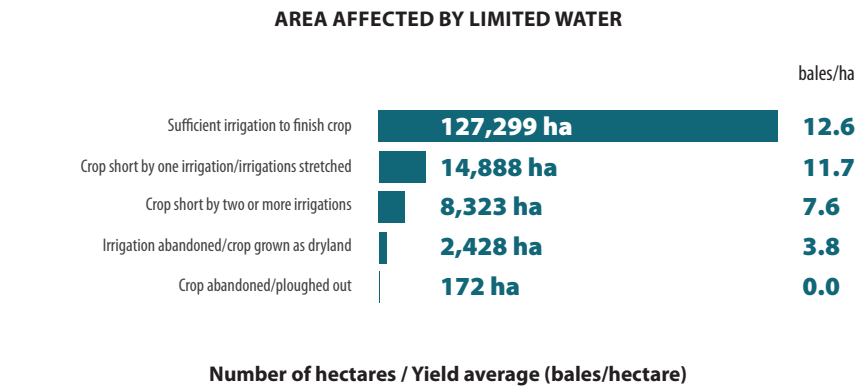
This was an open question. Please see the appendix for full individual responses.

WATER MANAGEMENT

36

For the irrigated cotton hectares over which you consulted, how much area in 2015-16 season was affected by limited water? Please also indicate your best estimates of yield in each situation.*

50 respondents

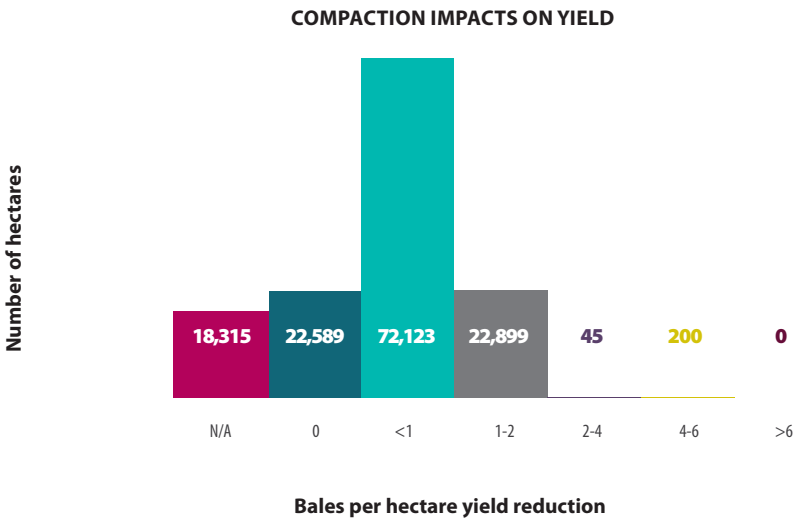


SOIL MANAGEMENT

37

What impacts do you estimate compaction had on your clients' cotton yields this season? * Please indicate your best estimate of total hectares for your irrigated cotton and dryland cotton.

52 respondents



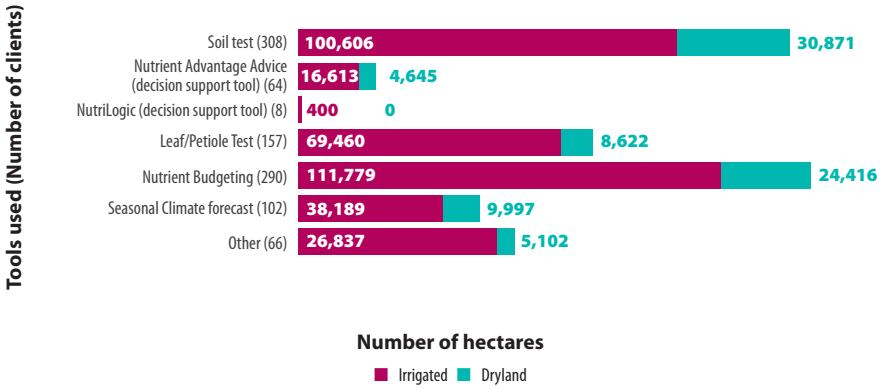
NUTRITION MANAGEMENT

38

Thinking about fertiliser decisions for cotton crops, which tools are used by you to assist with fertiliser recommendations for your cotton clients and their irrigated hectares and dryland hectares?*

52 respondents

TOOLS USED FOR FERTILISER RECOMMENDATIONS



39

Other fertiliser tools used specified.*

9 respondents

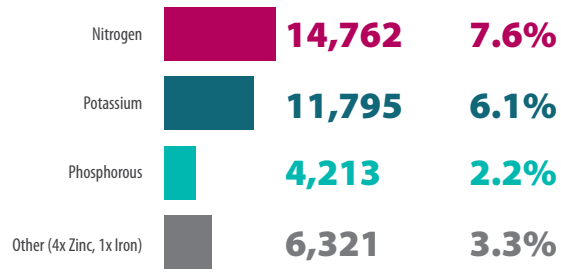
- Back Paddock Soil Mate software. Excellent and industry leader.
- Back Paddock Soil Mate, CotNPlan.
- Back Paddock Soil Mate.
- Expected yield or yield target.
- Experience.
- History.
- Ntester.
- Nutrient removal relative to target yield. Cropping history.
- Past crop experience with applied N rates and yields.

40

Across how many hectares did you see signs of nutrition deficiency during 2015-16?*

48 respondents

NUTRITION DEFICIENCY



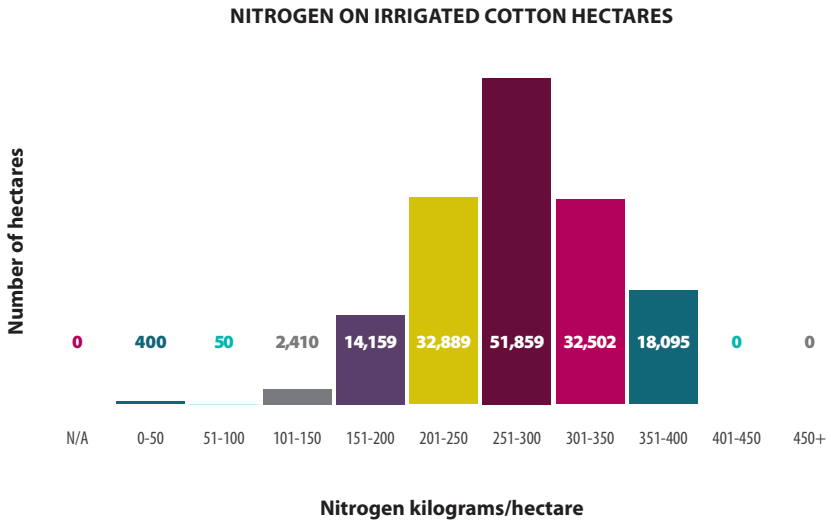
Hectares of nutrient deficiency / Percentage of total survey hectares

ON-FARM PRACTICES AND ATTITUDES

41

What is your best estimate on how much nitrogen was applied per hectare for your total irrigated cotton hectares in 2015-16?*

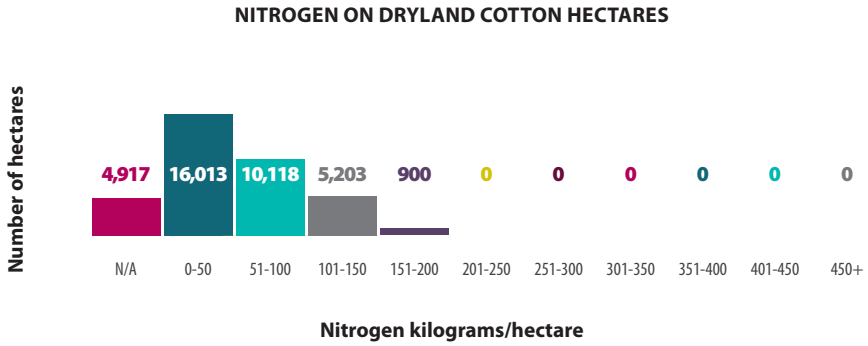
50 respondents



42

What is your best estimate on how much nitrogen was applied per hectare for your total dryland cotton hectares in 2015-16?*

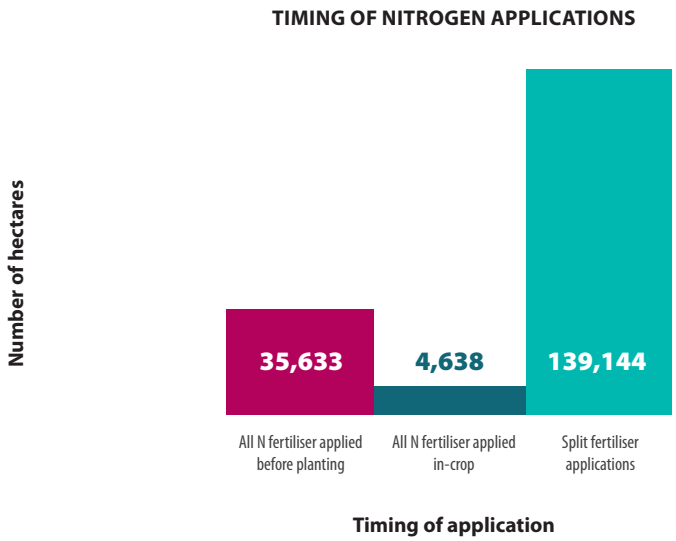
39 respondents



43

In 2015-16, when were the cotton crops' nitrogen fertiliser requirements applied?*

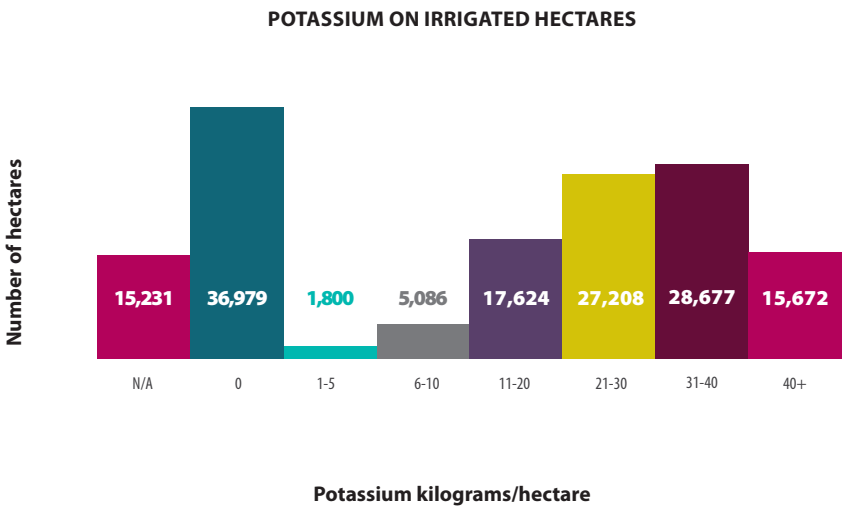
51 respondents



44

What is your best estimate of how much potassium was applied per hectare for your irrigated cotton hectares in 2015-16? (Kg K applied/ha, not fertiliser product)

49 respondents

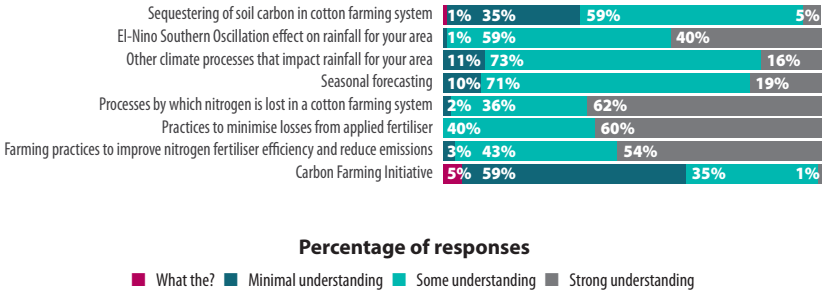


CLIMATE & EMISSIONS MANAGEMENT

45

Rate your understanding of the following.

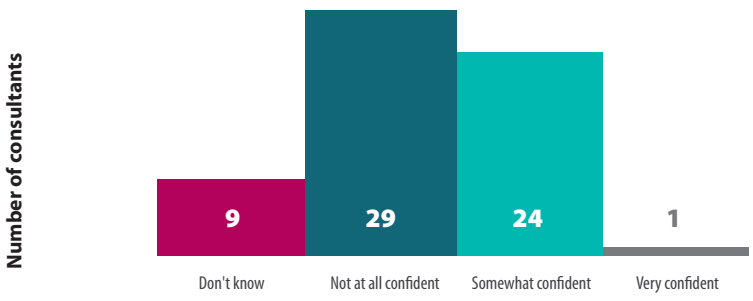
63 respondents



46

If you had a client that was considering participating in an Emissions Reduction Fund project, how confident are you that you could access information about the opportunities, benefits and trade-offs of participating in the ERF and/or implementing potential mitigation/sequestration options?

63 respondents



RESEARCH, DEVELOPMENT & EXTENSION

47

How many of your cotton clients have participated in, or are participating in, an Emissions Reduction Fund project?

63 respondents

Four consultants reported that a total of four clients have, or are, participating in an Emissions Reduction Fund project.

CRDC

48

Are you aware of the Cotton Research and Development Corporation (CRDC)?

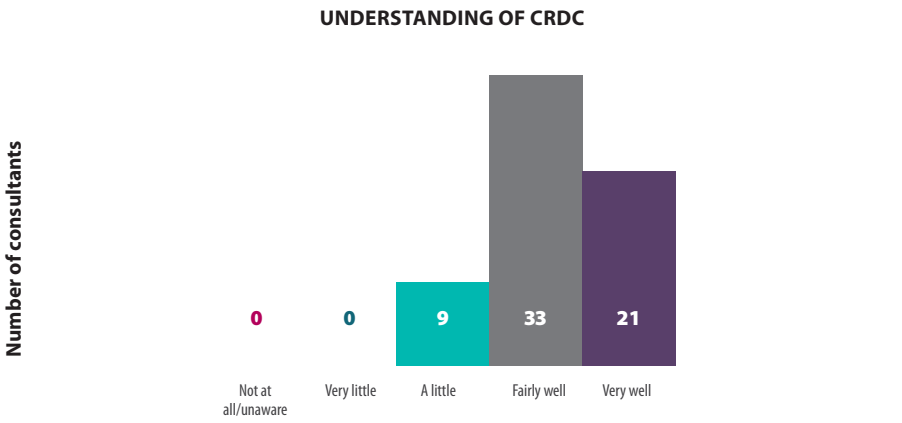
62 respondents

All consultants reported they were aware of the Cotton Research and Development Corporation.

49

How well would you say you understand what the Cotton Research and Development Corporation (CRDC) does?

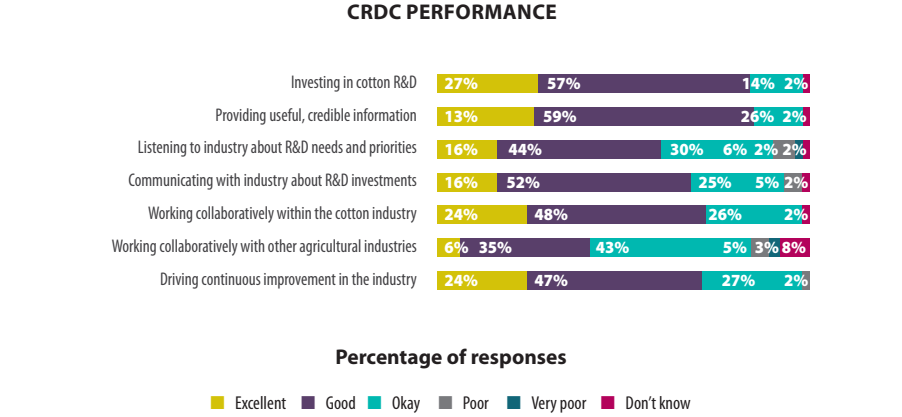
63 respondents



50

How would you rate the Cotton Research and Development Corporation's (CRDC) performance?

63 respondents



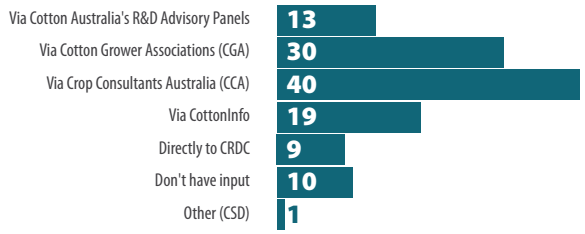
COTTON RESEARCH & DEVELOPMENT

51

In addition to this survey, how do you have input into the Cotton Research and Development Corporation (CRDC) about cotton research, if at all?

62 respondents

INPUT INTO CRDC ABOUT COTTON RESEARCH



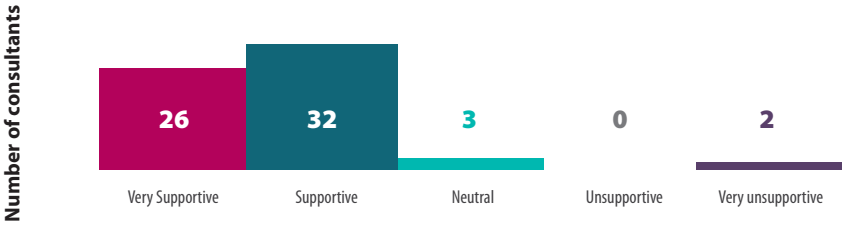
Number of consultants

52

Overall, how supportive are you of CRDC's research and investment activities?

63 respondents

SUPPORT FOR CRDC RESEARCH AND INVESTMENT ACTIVITIES

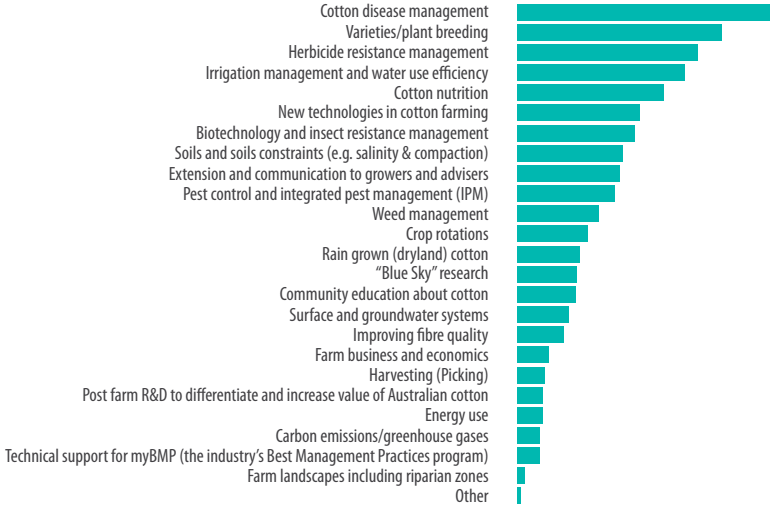


53

If you were to invest $25 million in cotton research and development, please indicate how you might distribute these funds to each of these areas of work?

63 respondents

RESEARCH AND DEVELOPMENT INVESTMENT PREFERENCES



Distribution of $25M in million dollars

RESEARCH, DEVELOPMENT & EXTENSION

54

Comments relating to previous question.

14 respondents

All are important however funding needs to go to specific projects that are able to achieve an outcome. Important to ensure no doubling up as may be able to use other industry's research for issues such as soils, weed resistance etc. Important to have local research.

Black root rot is challenging viability of cotton growing in southern NSW and Fusarium and Verticillium will soon follow.

Continual improvement in breeding is essential to counter the cost price squeeze of our businesses.

Encourage collaboration with other industries, particularly grains in topics where issues are the same such as nutrition, weeds, insects, compaction.

I have found collaborating with Jenny Foley from the DNRM under the CRDC funded project NRM1401 very useful.

More research is required for Dryland Cotton to help grow the industry.

Other category is for soil microbiology. Good vs bad. How microbes can gain us nutrition, soil health and plant health. And how truly the farm practices we do impact on the soil. I think there is so much we can gain from a much better understanding of the soil across so many areas of crop production.

Our production gains through breeding need to be protected by soil and nutritional management as well as continuing to produce a product that the market wants to buy in a way the is economically sustainable.

Pix management, defoliation, compaction, N trials, K foliar trials all need looking at as we are now dealing with 14 plus bale per hectare crops, so it is possibly a different animal then it was 20 years ago when some research was done in this area.

That's a hard question.

Varieties and plant breeding highest priority. It is one of the main reasons we can grow viable cotton in the south.

Verticillium.

Weeds and disease becoming the biggest constraints.

When funding is limited then the primary research should be in improving production based issues to maintain our profitability and sustainability.

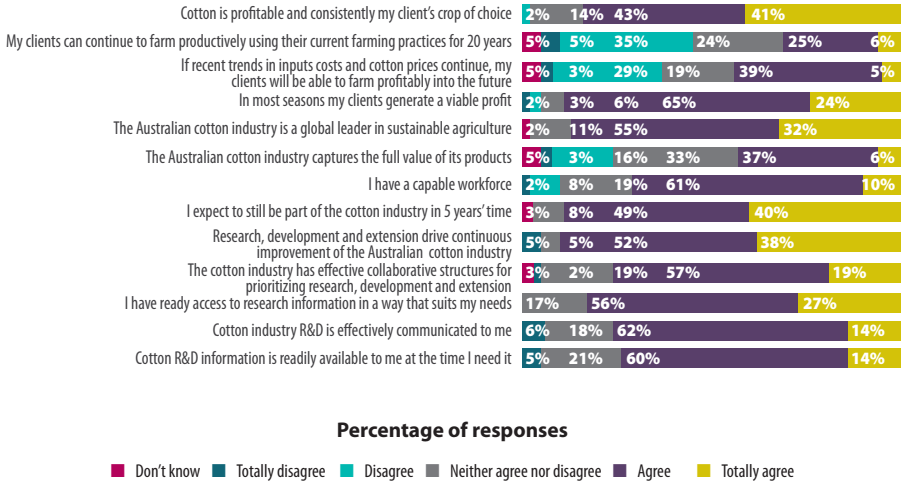
COTTON INDUSTRY

55

Please give your opinion on each of the following statements in relation to your cotton farming enterprise and the cotton industry.

63 respondents

CONSULTANT OPINIONS ON COTTON ENTERPRISES AND INDUSTRY



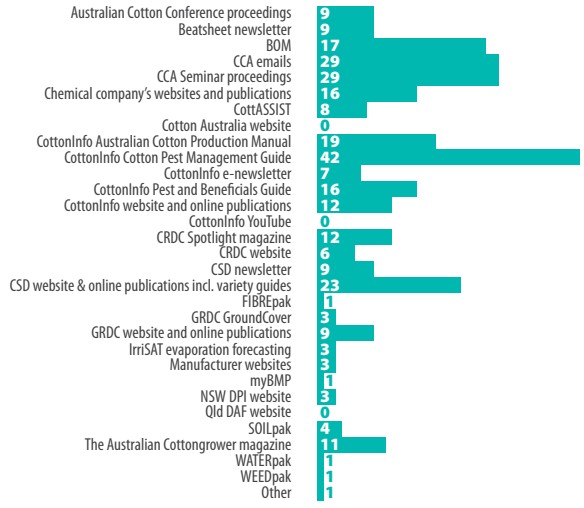
INFORMATION & RESOURCES

56

Please list up to 5 publications and/or websites that, in your opinion, are the most valuable sources of information for cotton consulting.
* Consultants selected up to 5 options.

62 respondents

VALUABLE SOURCES OF INFORMATION FOR COTTON CONSULTING



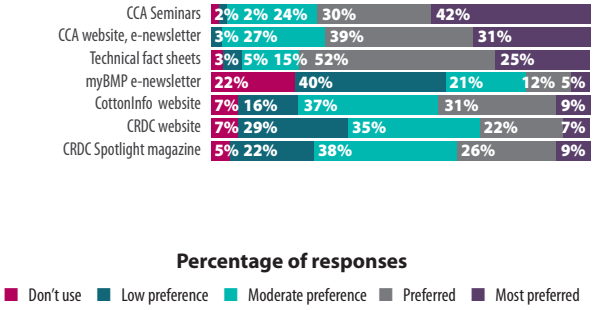
RESEARCH, DEVELOPMENT & EXTENSION

57

To receive information about cotton research and development, please indicate your preference for each of these mechanisms.*

63 respondents

PREFERENCE FOR RECEIVING RESEARCH AND DEVELOPMENT INFORMATION

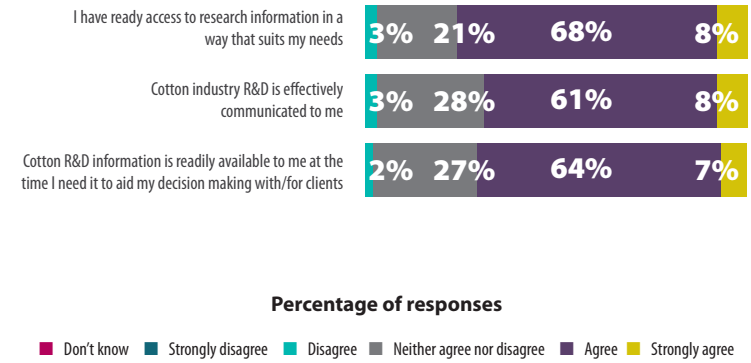


58

Please give your opinion on each of the following statements.*

63 respondents

COTTON R&D INFORMATION ACCESS

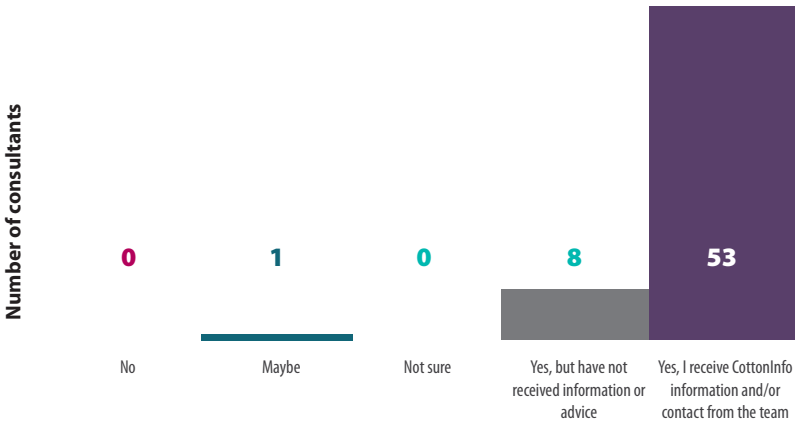


59

Are you aware of CottonInfo - the cotton industry's joint extension program (consisting of regional development officers, technical specialists and *my*BMP)?*

62 respondents

COTTONINFO EXTENSION PROGRAM AWARENESS

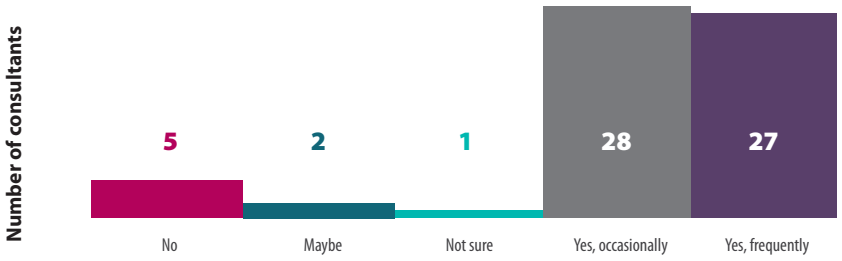


60

Do you source information from the CottonInfo team or information resources (e.g. Cotton Pest Management Guide, Cotton Production Manual, *my*BMP etc.)?*

63 respondents

COTTONINFO INFORMATION SOURCE

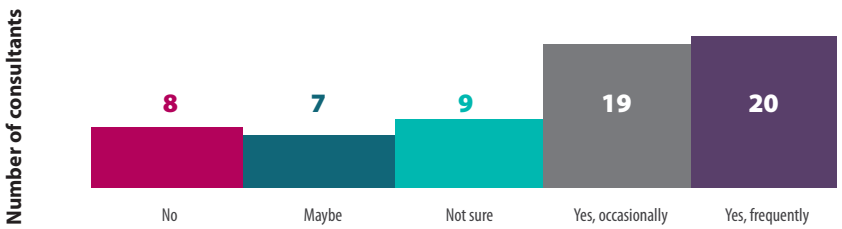


61

As an advisor, has the CottonInfo Moisture Manager (fortnightly newsletter) and IrriSat climate workshops resulted in an increased use and understanding of seasonal forecasting and better decisions?

63 respondents

SEASONAL FORECASTING UNDERSTANDING FROM WORKSHOPS



62

How do you use short, medium and long term seasonal forecasting information to make decisions to improve on farm agronomy and practices?

47 respondents

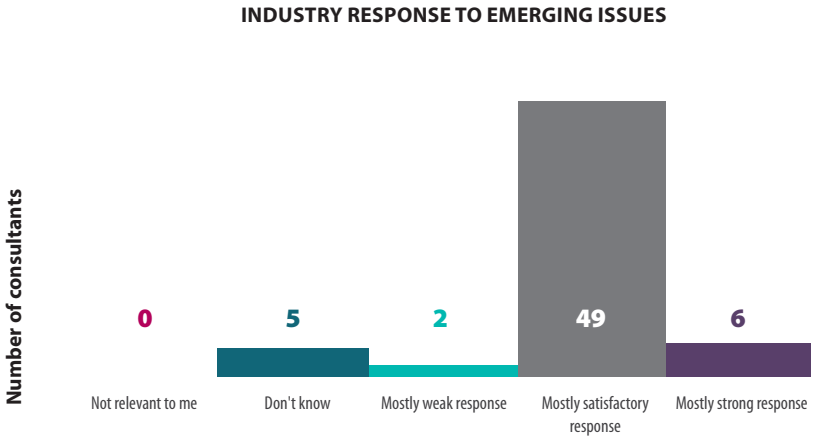
This was an open question. Please see the appendix for full individual responses.

RESEARCH, DEVELOPMENT & EXTENSION

63

How would you rate the response from industry (researchers, CottonInfo, extension, Cotton Australia) in terms of supporting people in the field to recognize and respond to emerging issues?

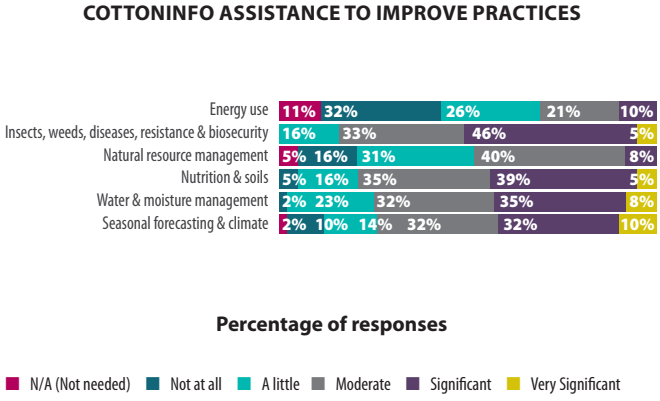
62 respondents



64

To what degree have the CottonInfo team, information resources and *my*BMP assisted you to improve practices on your client's farms?*

62 respondents



65

Please provide comment on industry capacity to respond to emerging issues.

42 respondents

This was an open question. Please see the appendix for full individual responses.

66

Thinking about industry extension services and your ability to access research, what do you value and what would you like to see the industry do differently?

44 respondents

This was an open question. Please see the appendix for full individual responses.

FARM TRIALS

67

How many of the cotton clients you work with did on-farm trials in the 2015-16 season?*

44 respondents

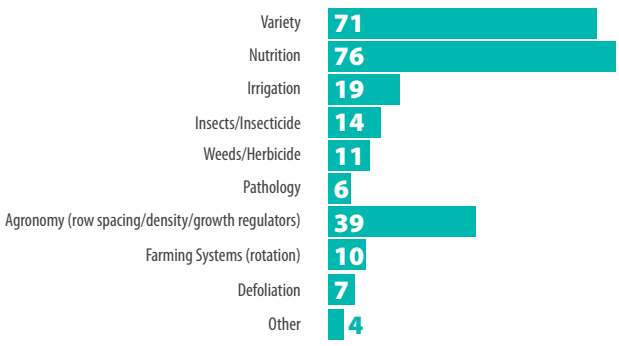
ON-FARM TRIALS

68

How many of the total number of on-farm trials had the following focus?

49 respondents

FOCUS OF ON-FARM TRIALS



APPENDIX

WHAT IS INCLUDED IN THE APPENDIX?

Following on from here, you will find individual responses to Questions 32, 35, 62, 65 and 66 as these responses expand on, or add to an understanding of, graphed information.

QUESTION 32

In terms of weed management, what part of the farming system is weakest? For example, is there a particular farming activity, rotation crop/fallow or sequence of crops, or non-crop area that results in blow out of weeds?

Back to back cotton - summer broadleaf weeds are exposed to glyphosate as only chemical control. Peach vine and Bladder Ketmia in particular. Cotton/bare fallow/cotton. Fleabane is difficult to control going into the cotton system particularly in light of restrictions on Diuron use.

Back to back crops seem to have the most problems in building up resistant weeds. Cotton then straight into a cereal long fallowed back to cotton works.

Back to back RR cotton. Wet season fallows in intensive mixed cropping areas (less product choice due to drift).

Certain crops where full weed control is not possible such as in Chickpea.

Channel and roadway spraying.

Channels and field edges.

Channels and river systems.

Channels, back to back cotton, any other summer crop.

Channels.

Contract spraying timing and water volume.

Cost of alternate herbicides. Laziness.

Cotton on cotton is the weakest system, it doesn't allow for herbicide rotation. Also limited to same areas of refuge to be planted in the same fields generally, which increases weed seed set.

Ditches supply channels water ways roads shed areas.

Dryland cotton is weakest, due to potentially repeated use of glyphosate and a reluctance to spend money on alternative weed control measures.

During drought large areas of fallow are the greatest risk.

Fallow control during winter when very wet and unable to get sprays on in a timely fashion.

Fallow control in dry seasons.

Fallow is probably the time to ensure good weed control.

Farm hygiene.

Field edges and no till systems.

Good timing of herbicides.

Group A resistant Black Oats are favoured by a sequence of winter crops if only group A's are used e.g. pulses, barley and non-Clearfield canola

Glyphosate resistant grasses are favoured by summer crops with poor residual control or a RR crop with poor knockdown and residual control followed by inadequate physical control.

Growing Pigeon Peas as a refuge blows out weeds.

Growing Sorghum causes a grass weed blowout.

Having no rotation will definitely blow out weed populations. Poor fallow hygiene.

High reliance on glyphosate is the biggest problem with growers not wanting to do a double hit unless things are really bad.

Irrigation supply delivery systems. Traffic areas. Monoculture systems of only cotton for rotation.

Leading in to planting, plant back issues.

Management of Feathertop Rhodes Grass in sorghum/non IT corn.

Mungbeans, chickpeas, faba beans, sorghum - grass weeds.

No till in wet conditions - 100% reliant on herbicides.

Non crop areas and roadsides need more attention re weed control of the problem weeds such as Fleabane and Feathertop Rhodes Grass which are adapted to spread easily. Too much reliance on herbicides in all situations.

Non crop areas, channels, drains roadways, tree lines etc.

Non-crop areas and channels and drains and rota buck areas are not seen as important by growers and are really breeding grounds for weeds.

Non-crop areas with Fleabane.

Non-crop areas.

Non-cropped areas for Fleabane. Channels and drains for Ryegrass and Fleabane. Back to back cotton for Sow thistle. Cereal/cotton for ryegrass numbers. Back to back for group A selection resistance.

OTT herbicide options.

Pidgeon Pea refuges, inaccessible tail water systems.

Pigeon pea areas - particularly in the south where Bathurst Burr is in high populations and residuals don't work. Back to back cotton rotations for volunteers. Ratoon control in cotton planted on the flat where root cutting is difficult.

Pigeon pea refuge.

Pigeon peas weed control is poor. volunteer cotton is an ongoing problem and ditches and main supply are source of a lot of weeds where we have few registered good options to cover all out weeds hence glyphosate is over used.

Poor crop rotation and fallow use of only glyphosate.

Pulse crops like mungbeans and faba beans are a weak link with limited herbicide options when following with cotton.

Refuge areas and non-crop areas.

Refuge fields.

Reliance on glyphosate.

Rotation crops - Feathertop Rhodes Grass and Fleabane populations tend to increase in rotational summer grain crops as the pre-emergent residual herbicides are the only method of weed control in crop.

Rotation wheat growing increases Ryegrass seed bank.

Sorghum --> Cotton. Late flush of FTR in sorghum crop that can produce a large seedbank for the following cotton crop.

Summer fallows are difficult due to surrounding cotton and therefore not being able to use 2,4-D products. Generally, need to rely on cultivation although Roundup/Valour has been working well.

The use of soil residual herbicides under poor (dry, windy) environmental conditions.

Timing and conditions is the weakest link.

Volunteer cotton plants in non-crop areas.

We were having problems with weeds getting a bit hairy in channels and supply's but we have changed our farming system to incorporate consistent control. We also now try and spray all our channels with a broadleaf and grass residual when we can. We have implemented the spraying of lontrel onto our fields going into wheat which allows us to control fleabane. Our intention with our cotton crop this year was to place a layby or residual herbicide down but we ran out of time. We will aim to do that in the coming season. However, in saying that we had no weed issues this year in irrigated or dryland cotton crops.

Zero till. Poor time management.

APPENDIX

QUESTION 35

What do you think could help to reduce the incidence of spray drift and herbicide damage during the cotton growing season?

A tighter weather station network with inversion monitoring capabilities and alerts. Better communication between neighbours. A better understanding of inversions and slower spraying speeds and lower boom heights.

Access to cheaper alternate chemistry (Valor etc. at cheaper price). Education. Litigation.

Accredited applicators.

Agronomist meetings during rain events in the spring and summer, which then needs to be relayed to growers and contractors. Subsidised spray workshops with Graham Betts and Bill Gordon.

Applicators prosecuted for off label applications would be a good start.

Awareness is quite good. Tighten up times of application.

Awareness of nozzle requirements for all spraying not just 2,4-D. Awareness of correct decontamination process of spray rigs.

Better communication between farmers within districts, greater understanding/education of the spray application process.

Better communication between growers to ensure that their neighbours are aware of their crops. Also so that cotton growers are aware of the other crops around also, as spray drift is more common from roundup ready from cotton fields, than any other herbicide injuring cotton.

Better communication between neighbours.

Better communication. More education.

Better education and understanding of all farmers relating to best practice.

Better education of farmers and their staff (especially farmers with high staff turnover).

Better education to growers and advisors on movement of herbicides, the different forms of herbicides - Starane, 2,4-D, ester, etc. and how they move and behave. Drift management tools and understanding weather. A LOT of spraying occurred in inversions early morning.

Better knowledge of inversion layers and poor spraying conditions. Better access to live weather conditions.

Better targeted spray application information by email and text rather than in the media. Regularly send this info to all spray operators, farmers, farm workers and agronomists during the summer. To do this Cotton Australia would need a complete data base of all these people. It is the major drift problem areas that need to be targeted for attention and accept that in intensively farmed areas that some small amounts of drift from ground spraying is inevitable, and it is best not to alienate farmers who grow other crops.

Breed Group I resistant cotton. Limit Gp I use window. Better communication of CottonMap between neighbours. Ban night sprays with Gp I, especially in summer.

Communication with neighbours.

Communication, education and an alternative herbicide to volatile hormones for weed control in summer.

Conducting more spray drift workshops in the community and target no cotton growers to attend.

Continued education and extension to spray rig contractors and agronomists.

Continued education, monitoring of inversion conditions. Restriction on sale of 24D during summer at least to the point that growers who purchase go on a register and have to prove that they have Chem Cert before purchase.

Develop better fallow residual chemicals for the cereal crop market. Especially for fleabane. Conduct stewardship training for phenoxys before they can be purchased, as was the case when endosulfan had issues.

Diligence to application practices and conditions. This goes for cotton growers too! Growers just think they need to get a spray on virtually no matter what the conditions are.

Dryland growers getting chased by insurance companies, spray drift insurance could be the game changer.

Education Education Education Education Education Education Education

Education on inversion events. Inversion forecasting. Awareness of where cotton fields are. Advertising the importance of correct spraying procedures. Compulsory training in inversion awareness for operators.

Education on the carryover of phenoxy herbicides in the soil and stopping people spraying in poor conditions.

Education on use of alternative chemistry. Education on appropriate 24D spraying conditions.

Education to all spray applicators about inversions.

Education. Spray workshop days like we use to have. Encourage use of fallow residual herbicides. Work with Weedit spot spray technology to fine tune its use. Development of system that alerts growers and spray rig operators of when inversions are occurring. Ken Young GRDC Act developing this.

Education. Banning of 2,4-D between November and April.

Fear of investigation.

Follow best practice i.e. conditions and water rates etc.

Good question...

Greater awareness, to help reduce ignorance.

I hate to say it but 24D resistance cotton would probably solve a lot of the problem. Could also make problem worse for non-cotton growers with broadleaf summer crops like mungbeans.

I think this year was particularly bad due to large areas of fallow and high cost of safer control options.

Inversion warning system, more education, more research into how much drift we get from spray rigs using the "Correct Setup" to minimise drift, spraying with the "correct" conditions. There is always cotton downwind, only the distance varies.

Keeping growers diligent and reminded about cleanliness. Some of the spray drift suffered by our clients was their own fault! Not cleaning rigs out properly.

Less spraying at night, better inversion forecasting with perhaps an app for mobiles or red shaded areas come up over cotton map when inversions are forecasted by the BOM.

Mandatory no-spray window of 2,4-D products from November to end January.

More attention paid to application conditions. Drift reducing adjuvants.

More awareness in the dry land spraying. Workshops and radio advertisement.

More education. Possibly making dryland growers more aware of the CottonMap facility.

New MOA. Education if you could get them into a room.

Non-cotton growers - more awareness that cotton is still grown in drought years. Cotton growers - awareness of alternative methods for weed control. All growers/consultants/agronomists - being proactive when it comes to weed control. Asses the risk (likelihood of weeds, methods of control, potential for off target drift) and employ methods to minimise the use of 24D. There was a lot of 24D used early in the season during very dry period (low humidity) chasing very low populations of fleabane in fallows. Maybe these farmers could have just waited until a better time for spraying, used cameras to reduce volumes, used different herbicide, sprayed in late winter/early spring before cotton was planted, residuals, neighbour notification.

Ongoing awareness campaign. Mandatory neighbour notification for phenoxy products.

Only thing that will work is more education.

Penalties to those who are constantly a drift concern to their neighbours. However, it is disheartening when you see them out at 2-4am on windy nights spraying 24D with no regard for your crop. Frustrating when you have wind records, sightings of their rigs and experienced people watching who can smell what they are spraying but they can still get away with it. We spent an extra $50-80/ha this year trying to get a good plant stand then our neighbour comes and absolutely stuffs the initial development of our crop because of their negligence. It should be criminal. Nothing has been done and nothing will be done to protect us.

Phenoxy detecting monitors installed around the district.

Prevent use of highly volatile chemicals during summer months.

Reminders of the risk through all media.

Remove the ability to spray 2,4-D during October/November/December.

Report drift incidences to industry bodies and neighbours.

Restrict use of hormone type herbicides.

Restricted use of 24D products from September-April. More awareness and education. 24D tolerant Cotton.

Spraying in conditions that are suitable to minimise drift. Education on this.

The use of more spray drift reduction products like FMC's Dead Sure. And applicators following the spraying guidelines.

Using resellers to disseminate information with phenoxy based products at point of sale.

QUESTION 62

How do you use short, medium and long term seasonal forecasting information to make decisions to improve on farm agronomy and practices?

A tool in irrigation and planting decisions.

All.

Assess risk in decision making.

Continually using as many different forecasts to predict water use and water requirements. Use this info for planting area decisions as well as irrigation scheduling.

Disease forecasting. Planting decisions. Irrigation timing. Crop water use forecasting - evapotranspiration. Spray timing. Crop stress management.

Don't use enough. Typically, area of cotton to be planted must have budgeted and allocated water. This is established during the planning phase, as all our hectares must be fully irrigated and have associated water for such.

Every day consideration.

Goes into every decision in crop and pre crop, being timing of fertiliser application, weed sprays, insect sprays, planting time etc.

I discuss forecasting with clients when making decisions on cotton areas to be planted and row configurations to be used.

I don't. If a farmer holds off watering on forecast rain they will usually get behind on their water management, to the detriment of the crop.

I use as a guide only.

I use it with trepidation! It is guide but that is all. Most of the time can't really make any hard decisions.

I use short, medium and long term seasonal forecasting in all aspects of agronomy and on farm practices.

Irrigation water scheduling and budgeting. Fallow management. Crop rotations sequencing. Operation timing.

Long Term - seasonal crop planning areas, variety, plant pop, and mix of crops. Medium - for irrigation budgeting during the growing season. Short Timing of operations planting watering and spraying.

Medium and long term forecasting is not reliable enough to influence many on farm decisions. Short term does influence day to day operations e.g. planting.

More info the better.

More so short term forecasting for irrigation scheduling.

Mostly disease management. Some row spacing decisions. Some crop choice decisions.

Only use short forecasting.

Regularly.

Short - planting rotation crops, applying fertiliser, spraying weeds, irrigation scheduling. Medium - All above, ground prep. Long - Ground prep, crop rotation, R&M expenditure on farm.

Short term - irrigation timings, spray timings. Medium term - organising sprays, growth management, fertiliser. Long term - water requirements vs fertiliser requirements vs paddock hectares to grow.

Short term (0-7 days) used every day to decide timings of all inputs (water/fertiliser/chemicals/defoliant) and timing of operations (planting/irrigation/harvest). Medium (7-16 days) same as above but is just getting ready so have everything lined up as the forecast moves into 7 days. Long term 1-3months - Don't make critical decisions like planting Ha (water budget) as still too risky. But use it when planning scenarios for the upcoming season.

Short term forecasting can influence decision making such as planting, irrigation scheduling and picking timing decisions. Making any decisions from medium to long term forecasting is rare except for amount of cotton hectares that are to be grown.

Short term most accurate and therefore useful. No enough confidence in the long term!

Short term only for watering, spray decisions. Long term too unreliable at present.

Short-term when deciding on when to start planting (soil temps). Short-term may influence water timings and spray timings. Long-term- taken with a pinch of salt and only used as a guide (they are still not accurate enough).

Take it into consideration when taking to growers about planting intentions.

Take it with a grain of salt. Forecasting has not improved in 10 years, no matter what anyone would suggest.

Temperature forecasts are generally good but rainfall forecasts are poor and totally unreliable.

The short term forecasting models are a very useful tool. Medium and Long term forecasts are a guide only in making decisions for clients.

The use of multiple weather sites and take an average.

They help when making decisions around whether to grow crops that rely heavily on in-crop rainfall, such as dryland cotton in the Macquarie Valley.

Timing of operations.

Use short forecasting info, try not to base any decisions on longer forecasting as it's notoriously inaccurate.

Use short term forecasting for irrigation decisions.

Use short term rainfall data to make decisions on irrigation. Planting. Applying treatments to fields for disease. insects and nutrition. Don't use medium or long term forecasting do not consider reliable.

Use this to work out number of hectares that should be planted and what level of risk some growers may be taking with a lower megs/ha starting balance. Mungindi growers tend to only plant ha's they have 11megs for whereas St George growers will work on 8-9megs/ha and allow or hope for rain or a river flow.

Used primarily for irrigation scheduling.

Used to ensure timeliness of operations.

Usually confuse us.

Vital. I am greatly influenced by the long term SOI forecasts as more often than not it is right. If a dry season is forecast, we plan for it. Better than having a total 50:50 guess either way. Short term is useful, the fact it is not always correct is still better than no assistance at all.

We have been using seasonal forecasting so as to better develop more suitable planting window to reduce weather risks at picking and increase yield.

We monitor the weather closely to help make timing decisions on fertiliser and other applications such as irrigation and defoliation.

We use short term forecasting all the time to help manage irrigation scheduling and farm operational timing. Do not rely on long term forecasts much, except to say that when your dams are empty and the forecast is poor you tend not to spend any money or make any big plans.

When calculating possible crop yield and therefore nutrient requirements. When timing the application of residual soil herbicides. When estimating possible yields for crop insurance and marketing purposes.

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QUESTION 65

Please provide comment on industry capacity to respond to emerging issues.

Adequate to good. Some of the disease concerns and thus the required research needs to be addressed. 1 pathologist per state is not enough with the emerging disease issues especially when their focus is dictated by CRDC on primarily one disease.

All good.

Fairly good - have researchers and industry people ready and happy to help when required.

Fairly good, everyone is well connected and accessible.

Fairly reactive. Disease identification and testing is severely hindered in the South at this stage.

Generally, insect response has been good even though we still have threshold concerns. Lewis Wilson in particular has always been excellent. I feel nutrition is always a hot topic and we still have a long way to go there. Industry working very hard against herbicide resistance. A big effort needs to go into Verticillium Wilt.

Generally Ok but it depends on which department is responding. Verticillium is a good example where the industry response has been Ok but it took 5 years of consultants suggesting there was a problem building before any action was taken.

Generally, very good. The industry is well supported by the staff at: CottonInfo, CGA's, Cotton CRC, Cotton Australia, CSD. Not so much by Monsanto and Bayer.

Good communication between growers, agronomists and researchers enables the whole chain to be "aware" of emerging issues simultaneously.

Good enough.

Hard to respond to local/seasonal issues need previous experience - need people on ground straight away with long history with cotton in local areas. Also able to predict issues and ensure info is available proactively not reactively.

I believe the industry has a very good structure and depth of expertise to manage emerging issues.

I have always found the response to an issue has been excellent, two recent issues being spray drift and Verticillium strain.

I have seen over the years that the cotton industry is far in front of other industries in which I have consulted (horticulture and grains) at responding to emerging issues.

I think it is generally satisfactory.

I think the cotton industry is very quick to respond to any issues that do emerge.

I think the industry has a good capacity to respond to emerging issues. There is always a willingness to provide assistance between the regions.

Industry capacity has diminished over time with less funding available to researchers. Verticillium, potential exotic diseases (blues disease), and weed resistance are all serious threats to production. Current personnel have been under pressure as they struggle to juggle resources to get on the ground for White fly and verticillium in particular. Human capacity has diminished as there are less attractive career prospects to attract people to join the ranks of the DPI or CSIRO. Much of this 'public good' research is suffering as it is not as attractive to industry until there is a crisis that needs research to solve an issue.

Insect problems are responded to well and quickly due to the strong research capacity and competency of the teams. Disease problems are responded to slowly, with a lack of interest and with a basic knowledge bank. If I have a problem I would only contact the Queensland disease team. Nutrition - can be difficult to find someone to talk to.

Issues seem to be acted on quickly with light extension delivered when need. Sometimes the extension is from people who don't have a full understanding of the topic rather from researchers who do have a greater understanding.

It seems to me that there are many platforms/organizations that are in a position to respond to emerging issues. However, if the resolution of such issues involves research (such as for example increase in

Verticillium Wilt etc.) a lot of time is needed which people in the field feel they don't have.

Mostly okay, but some of the team is getting older.

Need to make sure we have strong expertise in entomology, pathology and a succession plan to ensure this continues.

Not sure.

Poor for disease, good for other issues.

Pretty good, it's hard to keep everyone happy.

Quite good, I think the industry has the people and structures to respond as it has in the past.

Responses to emerging disease and there impacts on cotton farms in the south have been slow.

Seems to be solid, maybe sometimes is not as open as it should be, exotic pests/disease to a region etc.

Should be pretty good as long as there is experienced people in the field, identifying issues. Also a clear line of communication between them and industry support.

The cotton industry has the capacity to respond to emerging issues.

The industry has a history of responding well and quickly.

The industry response to mealy bug for our region has been very slow. Work has been done but not on what we and the growers need.

There is a lag in responding to issues in the field. We need more short term, NGA style research, aimed at answering specific research questions.

There is definitely capacity to respond however, it is not normally done in a timely manner.

They need to listen to those who are in the field, not to those who may provide funding for nothing or wasted $.

They seem well resourced, as long as the numbers don't drop off, I think the capacity is there with support from more industry and research.

Usually pretty good. Depends on the grower.

Very good.

Very good. Locally placed seed, and cotton info representatives make it easier to respond to local emerging issues.

Well supported and generally on top is things. Didn't like that the south was excluded on the Dithane permit this season.

With the great on ground staff we have, the response is very good indeed.

QUESTION 66

Thinking about industry extension services and your ability to access research, what do you value and what would you like to see the industry do differently?

Adequate to good. Some of the disease concerns and thus the required research needs to be addressed.

Addressing key issues in their respected areas.

Being able to contact an info team member is great, but sometimes their ability or maybe capacity to help is sometimes very limited.

Centralised meetings where most researchers can present their latest work as it keeps us up to date and allows feedback to research on direction from the field.

Communicate up to date results on research and findings throughout the season not at the end when information can't be used.

Currently happy the present extension services.

Employ keen people on career Ag issues.

Enhance the knowledge base and support in the southern valleys - particularly in disease and insects as its a ticking time bomb. Southern researchers are interested but do not seem to have the necessary cotton experience or knowledge to support the area on their own. Whitefly advice was a classic example

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this year - advice from local industry was weak and unless the advisor knew someone in the north (i.e. Lewis or another consultant) to refer to, there were some very ill educated decisions made.

Establish CCA or CGA meetings again at the local level.

Farmers need more reliability in return on investment from industry advice. Otherwise, most stick to what works for them. They often listen to other farmers/neighbours for advice which is frustrating.

Field days with relevant experts are valuable.

Getting information in a timely way when required is most valuable. Mostly we find that the industry is well supported. However, have had some issues this year (with Sclerotinia) where no information in cotton freely available as it is rarely an issue in northern grower areas. (Sclerotinia more prevalent in south with cooler temps).

I think it is a good idea for CottonInfo to do at least one field trial in each valley. It is always good to hear about local results and something outside the variety trial/Ambassador brief.

I think the cotton industry extension services are excellent and don't need changing.

I think the more access via the internet the better.

I value being able to access research results relatively easily either through web sites or by direct contact with researchers. I find it frustrating however, that often little new findings are available despite ongoing research efforts. This is particularly true for crop nutrition (especially related to Phosphorus) and Verticillium Wilt.

I value CottonInfo, MCGA, Cotton CRC, CSD. But I would like to see more support from Cotton Australia in relation to water security, by this is meant Cotton Australian should be fighting to ensure government buy-backs are proportionally equal across all valleys and help any valleys that have had miscalculations such as the Macquarie Valley where the MDBA used incorrect conversion factors.

I value highly skilled people working with enthusiasm. The people employed to extend research need to have a very good understanding of the research in the first place, they also need to have a good deal of empathy for their audience. So I would prefer more skilled people in the role of extension.

I value the plethora of information available and the conduits for its access i.e. CottonInfo, Pest Management Guide and MyBMP, but I have also been in the industry long enough to develop relationships with researchers so am happy to contact them directly. Keep funding the current and emerging scientists to give them confidence in their future researching issues of relevance to our industry.

I would like Cotton Australia to shut down and that money used for research and extension. At the very least move them back to the real world away from Sydney.

I would like to see compulsory Bale levy applied as GRDC does with Grain. Cotton industry as a whole has had a really good run with research and extension and we are only just starting to feel what other industries feel with reduced funding. I personally value greatly the efforts of the entomology and Pathology teams working on cotton. The key people are very responsive, care a lot about the customer and go above and beyond to help if they can. Lewis Wilson, Melina Miles, Linda Smith, Richard Sequera, Mike Bange all provide excellent service to industry. An issue is making sure there are career paths for young scientists to rise through the system to the same levels of experience as these guys near the later part of their careers.

There have been some demonstrations of a lack of redundancy – the canopy temperature sensor project was not well finished and possibly not followed closely enough by management to see the results properly extended to industry - Macquarie and Gwydir growers were left to their own devices when Rose and Coast left the industry. CRDC and CottonInfo have been very collaborative in the last few years and have engaged at multiple levels to organisations such as CCA to further the extension of research and to identify the research needs that should take priority. It can be frustrating retraining the CottonInfo field staff - however they have been keen and attentive to industry needs. One issue that I see is the funding model that sees the CottonInfo team working for CSD. This is somewhat of a conflict of interest as it makes any variety or seed related issue hard for these guys to take on as it could jeopardize their funding.

In the southern region I think we have good support from the industry.

Just need to keep good people as relationships and experience take time to build and these are the most valuable forms of extension.

Less Narrabri focus and more even spread.

Look to hire people with more 'technical' training.

Make regional CottonInfo people more accountable and productive and useful. What do some of these people do when they are at work?

More quality surveys on disease presence in the south. It's a bigger issue than what people are aware of.

Nothing I can think of.

Online tools to make easy searching and reading information.

Relevant extension work.

Southern NSW specific research. Particularly diseases such as BRR and Sclerotinia and shorter season varieties.

The ability to contact researchers directly has always been a huge advantage for the cotton industry. People like Lewis Wilson, Grant Herron, Sharon Downs, Mike Bange, Warwick Stiller, Mike Bell etc. have always been very giving of their time.

The extension is done very well on the whole, though it would be great to see a few of the major events coming south.

The most important component is having a local representative.

They need to listen more to the consultants!!! We are seeing so much in the field and quite often when we bring issues up they tend to be glossed over as if researchers etc. already have their own set agenda. Recent examples are new ideas on how to do nutrition research and the secondary effects wet weather might have to change thresholds for sucking bugs attacking bolls. Think how many collective hours' consultants spend observing field issues, do not ignore that. Do some one on one sit downs with multiple consultants and see what feedback you can get and what research they would like to see done. Face to face interviews would be much better than a survey.

Tours like the N tour where the researchers were delivering results was more beneficial than hearing extension from a 2nd party.

Value direct contact with the best researchers. Need to make sure these people are well resourced and not spending all their time doing admin.

Value someone who has experience in our region who can identify with the shortcomings of the climate and understand the farming practices that occur. Right now we have a couple of new people to the region who aren't 100% familiar with the region and its practices. It is not the case of dragging information from other valleys and saying, "yup this will work" because if that was the case, most people would have tried it by now.

Value that the industry has been able to retain key experiences staff. I think they need to concentrate on areas as they have climate forecasts and irrigation systems that are not adequately cover by others such as CSD or Ag Depts. They need to keep up their work on environmental issues, riparian vegetation and water runoff/contamination issues, making sure that cotton growing is a good fit in the regions for decades to come.

Value local research that is relative to each valley. I would like to see them concentrate resources on southern issues.

Value the information re pests/disease/weeds/quality. Would like to see this on more of a local level.

Weekly updates.

Would like to see more field days and in field trials with new technologies. Canopy sensor, stem psychrometers, nitrogen monitoring/in field sensors, robotics.

NOTES

Australian Government

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