CRDC
COTTON RESEARCH AND DEVELOPMENT CORPORATION

CROP CONSULTANTS AUSTRALIA

QUALITATIVE REPORT

on the 2022-23 cotton season:
A survey of consultants


ANNELISE RYAN

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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 60 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 393 cotton growers and covered 291,583 hectares: 43% of the Australia cotton production area for the 2022-23 season (not adjusted for row spacing). This is based on the 2022-23 production figure of 676,210 hectares (Cotton Australia).

METHODOLOGY

The survey consisted of 60 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 from May to August 2023, with questions referring to the 2022-23 cotton season. Questions that collected data on clients or areas were only made available to one participant from a consultancy to avoid duplication. The number of consultants who responded to each question is denoted beside the symbol.

DATA COLLATION

The online Cvent survey program (www.cvent.com) was used to compile the data. Interpretations are up to the user.

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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THE CONSULTANTS AND THEIR CLIENTS

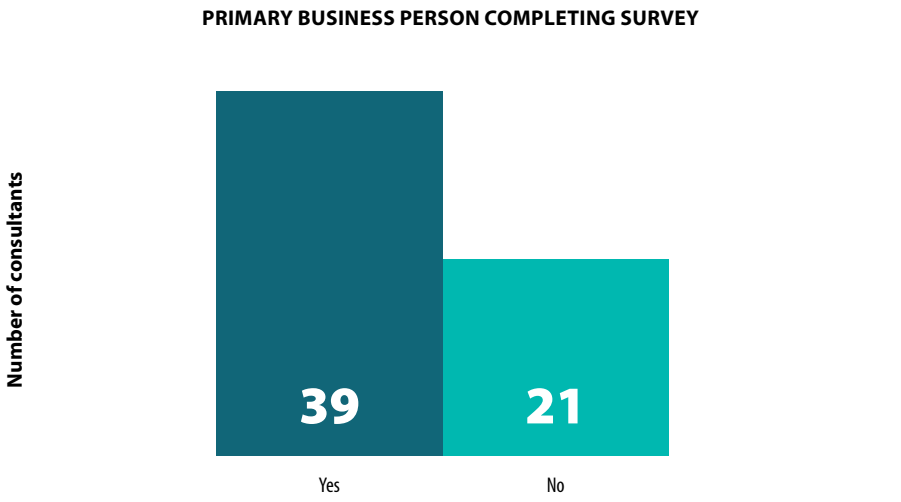
ABOUT THE CONSULTANTS

1

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

60 respondents

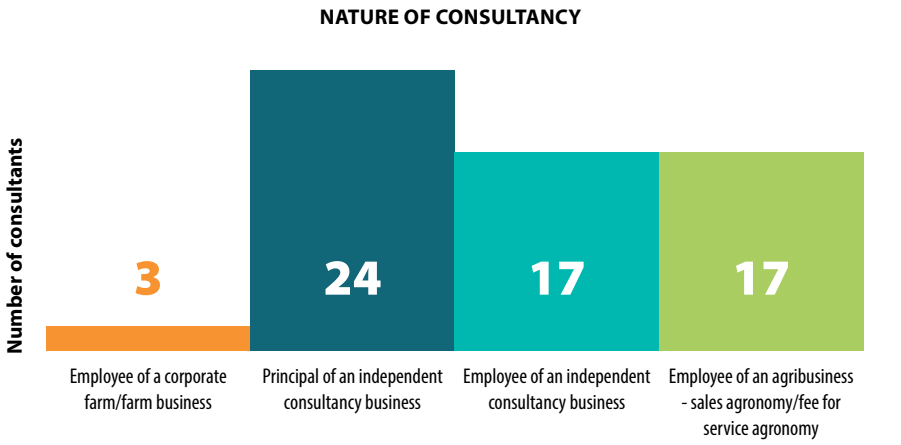
***Note:** 39 consultants completed the survey on behalf of their business or business unit, which involved completing the specific questions relating to staff, hectares and number of clients. 21 consultants completed the survey questions only relating to individual practices and attitudes.



2

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

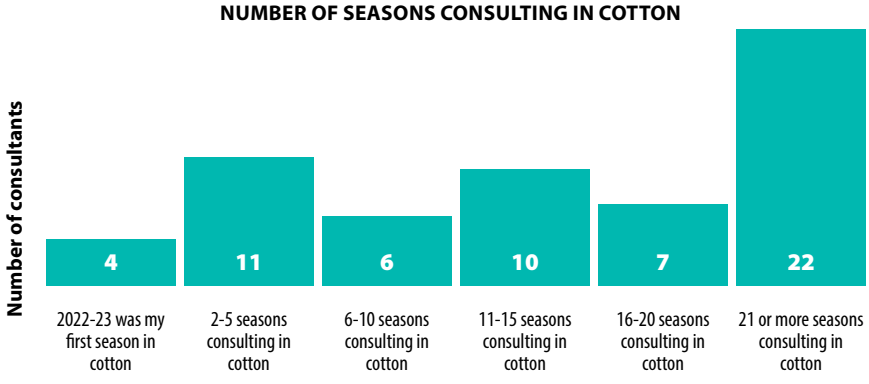
60 respondents



3

For how many seasons have you worked consulting in cotton?

60 respondents

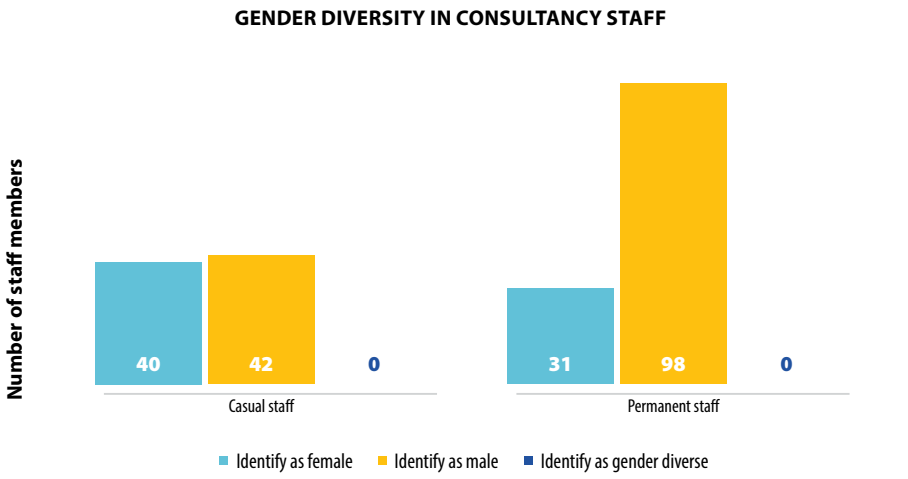


THE CONSULTANTS AND THEIR CLIENTS

4

What was the gender diversity of the permanent and casual staff employed in your business (including yourself) in January 2023?

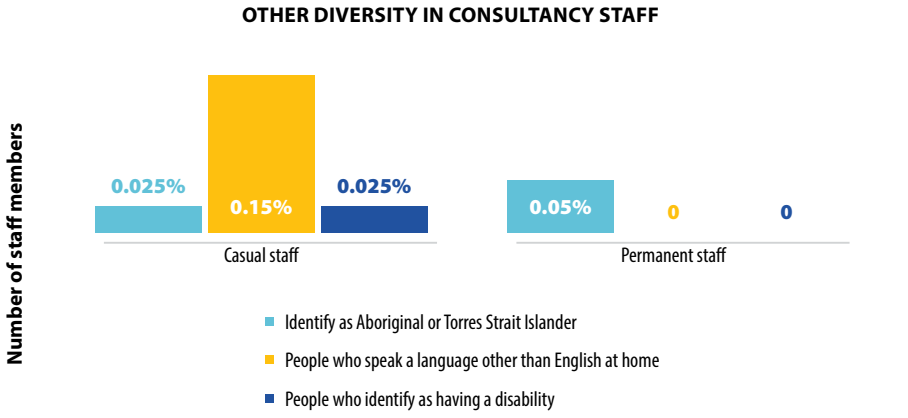
40 respondents



5

How many of the permanent and casual staff employed in your business (including yourself) in January 2023 identify as being in the following demographic groups?

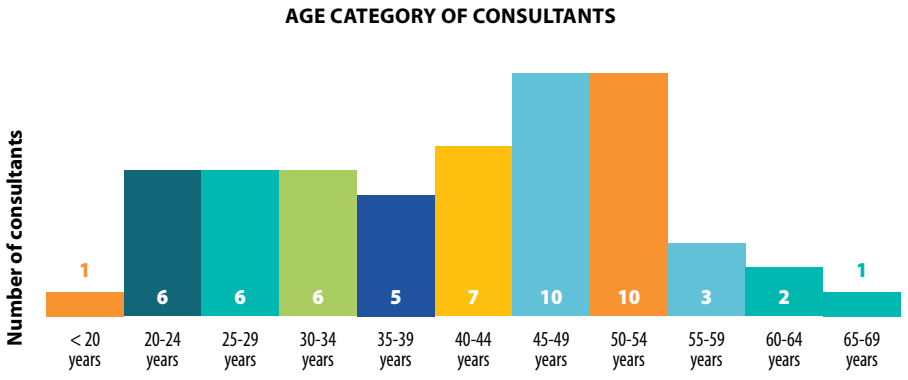
40 respondents



6

What age category do you belong to?

57 respondents



THE CONSULTANTS AND THEIR CLIENTS

7

Please list out any learnings or lessons that you have gained in the 2022-23 season.

57 respondents

Spread planting dates.

Good yields can be achieved in cool years.

Do not delay cut out.

Losses from water logging prior to planting occurred.

Quiet for mirids & Whitefly.

Green Vegetable Bug & Red banded shield bug kicked in early.

Aphids and bunchy top present for the last 90 days and required 2 sprays on some crops.

Haven't seen widespread bunchy top since 1999/2000.

Early plant was better. Nutrition very important. Low vigour after wet year.

Good ground preparation and even plant establishment are vital for good yields.

Cotton Bunchy Top hasn't gone away.

Every season is different.

Cotton is an amazing plant.

You never know which discipline of scientist that you will be needing in the upcoming season.

I have learnt a lot in the 22-23 season. Being a young agronomist is challenging at times without all of the knowledge to make decisions, however I feel like I have learnt a lot and am starting to grasp the chemical side of it a bit more.

Green Vegetable Bug Management and nitrogen management in wet years.

From a cold, wet start a cotton crop can recover well to achieve high yields of 16 - 17b/ha.

Despite a cold miserable start with high disease infection early we can still achieve amazing results if the weather goes with you at the end.

Aphids were prolific and kept coming back despite targeted softer spray options for beneficials. In a bad year it just is what is it is, be on the lookout.

Mites also prolific in known 'mitey' farms - products that targeted all stages of mites were the most effective.

High yielding season (best ever for some growers) even though preparation/planting was delayed as a result of the wet winter in 2022.

Formula for growing high yielding cotton has not really changed.

We were lucky to be able to pick late, due to the weather.

Rutherglen Bug inhabit cotton but not a lot of research done.

Try not to work 7 days a week. It's not healthy.

How to better time manage in a big season.

A perfect growing season can offset a multitude of sins, when it comes to poor ground preparation conditions, and very limited opportunity to ameliorate compaction from the previous season.

Very hard to keep staff for the whole season.

The impact of drought stress and the impacts of water logging.

The quality effects of uneven boll distribution across the plant.

The ability to still grow 10+ bales in a very challenging season - the crop truly can compensate.

Hold back first in-crop irrigation until soil profile is more depleted and minimise any potential waterlogging of cotton before 10 node stage.

Stink bug complex can be in high numbers after a very wet year - and are difficult to control low in the canopy.

Beneficials did a good job on aphids and whitefly in areas, with no sprays required on some fields - and could have maybe extended this to other fields.

Nitrogen rates needed to be high for best yields - slightly lower eg 750kg vs 850 kg/ha urea showed a fair yield decline.

THE CONSULTANTS AND THEIR CLIENTS

Only what I have known for a while... every year is different.

That cotton needs a certain amount of day degrees to achieve a respectable, pickable crop. A season to remember and to forget in the southern region. Again in a cool season - starving the crop of inputs and running a heavy pix program has proved vital.

Never trust a weather forecast.

Good ground preparation is 90% of growing successful crops.

I'm getting old.

Whole cotton production system, biggest lesson particularly for upper Namoi was importance of timing throughout season for planting date, to cutout and defoliation for getting most efficiency and production out of cotton crop with very cold wet start hot dry middle and overall very limited on total day degrees for the season.

Scouting small fields in southern NSW is almost unviable.

How vital and important sowing windows and crop establishment is to setting up a yield potential.

Although cotton is a widely studied crop with well-defined best practices, there are often curveballs in growing it successfully.

Staff are difficult to find.

Being organised, confident, thorough, as well as being timely and trusting your gut instincts are vital in this role.

Take photos and notes, you never know when you may need them.

It pays to do your own research.

Cotton day degree accumulation significantly impacted by cold weather. Finding it more difficult to find casual staff and accommodation. Defoliation tactics and chemical rates need to be reassessed.

Got some experience with the new B3XF varieties to help hone specific management going forward.

Good experience this year with short season / low heat unit year, good demonstration of how managing for earliness can pay dividends.

Cooler season. The challenges of late planted cotton and managing mites.

No season is ever the same.

High host crop coverage equals high insect pressure.

The speed at which OP resistant aphids can spread across regions/valleys.

The season had limited day degrees in most valleys so there was little time for any crop compensation. Some of the frost damage was the worst I have experienced.

No extreme heat is a good thing!

As is low insect pressure!!

Great yields this year.

I got to experience the challenges of a mild and cool season in the south. I saw the implications of late planting and the impact this as on in season development, yields and quality. The biggest learnings were mostly to do with lowering input requirements and adjusting inputs to match yield potentials.

Increase consultancy experience.

Greater depth of understanding of growing cotton in a challenging season.

60 percent of cotton in Southern NSW germinated 11th Nov because we were unable to traffic fields in October and hence poor yields expected. Yet to pick as of 7th June.

The importance of planting on time.

Ramifications of planting cotton in the Riverina either in the window (1st-10th Oct) but during red and amber light conditions or past the window but when conditions were green or amber.

Crops can achieve a lot if you have a favourable January and February.

THE CONSULTANTS AND THEIR CLIENTS

Another challenging but rewarding season. A cool, wet start followed by a very dry summer created a lot of challenges with high water use and staffing problems around ensuring irrigation schedules were maintained through the lack of rainfall. Fortunately, a cooler season helped where irrigation intervals were stretched slightly however highlighted how much of an issues staffing is for our growers in these large production years.

The extreme influence of plant population and soil water holding capacity having an intertwined relationship to yield in a drier year.

Make decisions on what is in front of you and what will happen, not what might.

You never stop learning. To have good staff is very rewarding.

Trust your instincts.

Xtendflex® looks like a great tool in dryland crops.

The impact of minor pests in a cool start growing season.

Influence of hormone on fruiting position development.

Most challenging cotton season for me yet - some trends but also some surprising results. 606 clearly the variety to grow in disease fields. 2,4-D damage bad but often not as bad as we think due to cotton's ability to compensate. Staff have different thresholds for work intensity and need to be conscious of this at all times. Floods and underlying nutrition had a big impact in final result.

Long season cotton in our region continues to cause issues I believe, for the long-term sustainability of the industry.

TOBY LOCKREY

THE CONSULTANTS AND THEIR CLIENTS

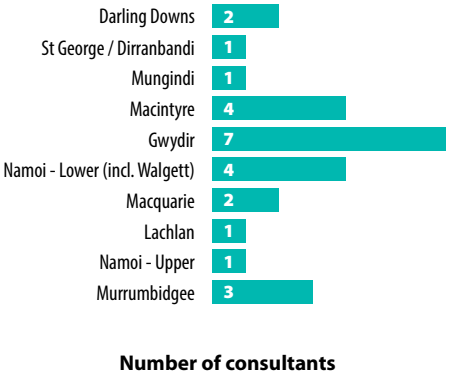
ABOUT THE CLIENTS

8

In which regions did you conduct the majority of your work in 2022/23? This question was only asked of those respondents that were ***not*** answering on behalf of their consultancy business?

21 respondents

REGIONS IN WHICH CONSULTANTS CONDUCT THE MAJORITY OF WORK

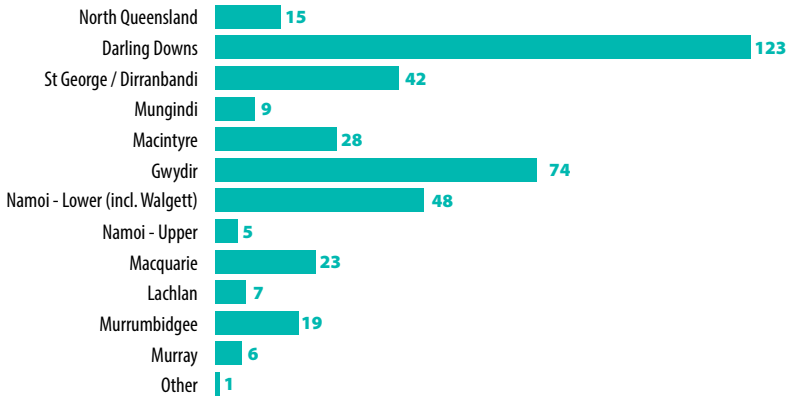


9

In which region/s are your cotton clients based? This question was only asked of those consultants responding on behalf of their consultancy business.

35 respondents

LOCATION OF CLIENTS

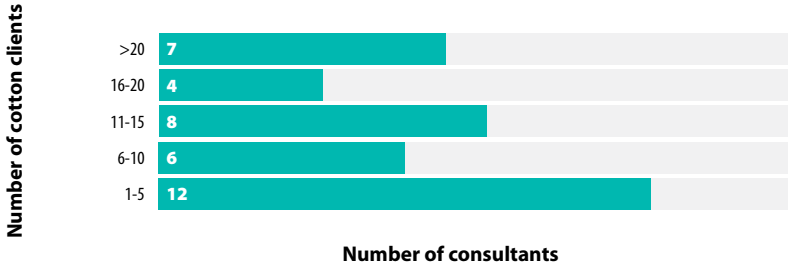


10

How many cotton clients did the business (or business unit) service in 2022-23? This question was only asked of those consultants responding on behalf of their consultancy business.

35 respondents

CLIENTS SERVICED PER BUSINESS

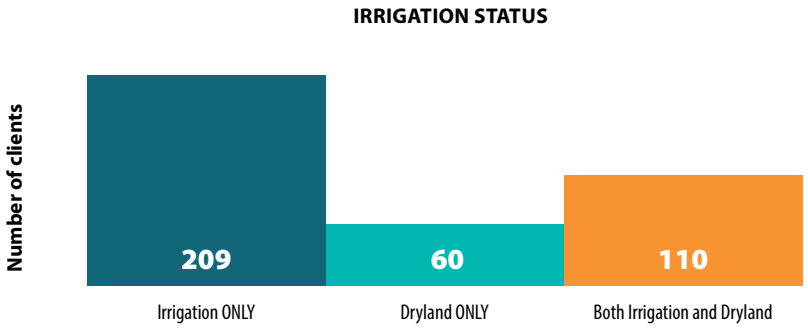


ON-FARM PRACTICES AND ATTITUDES

11

How many of your cotton clients have dryland, irrigation or both?

34 respondents

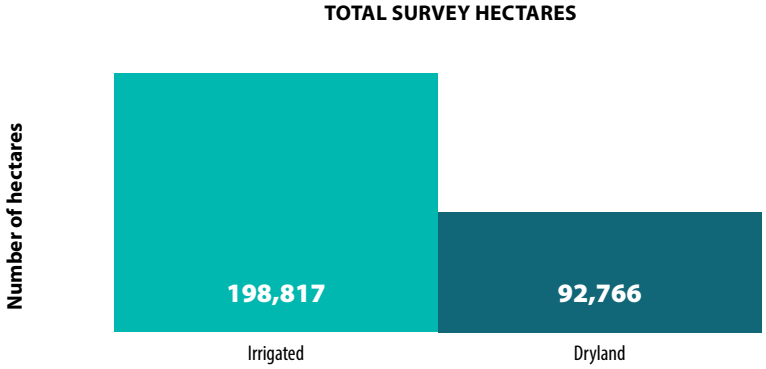


COVERAGE

12

How many hectares of cotton (total area, not adjusted for row spacings) did your clients grow in the 2022-23 season?

34 respondents

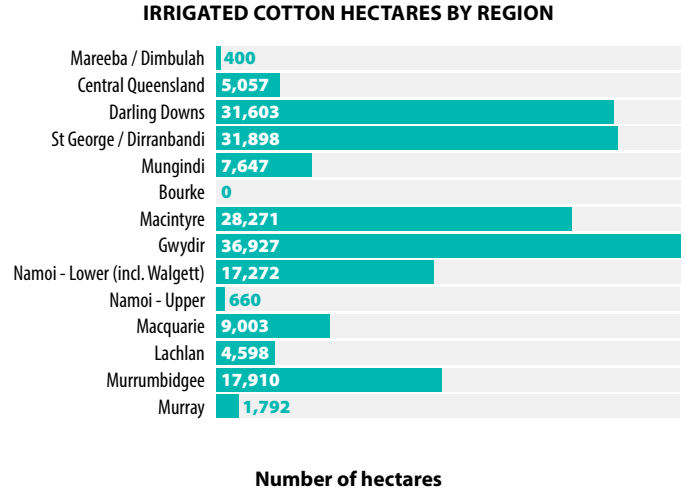


13

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

33 respondents

193,038ha



ON-FARM PRACTICES AND ATTITUDES

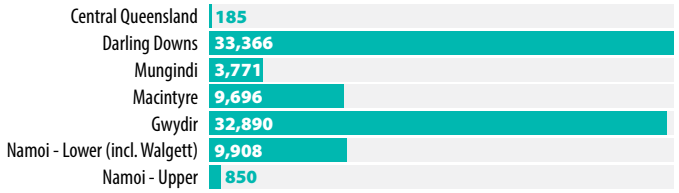
14

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

23 respondents

90,666ha

DRYLAND COTTON HECTARES BY REGION



Number of hectares

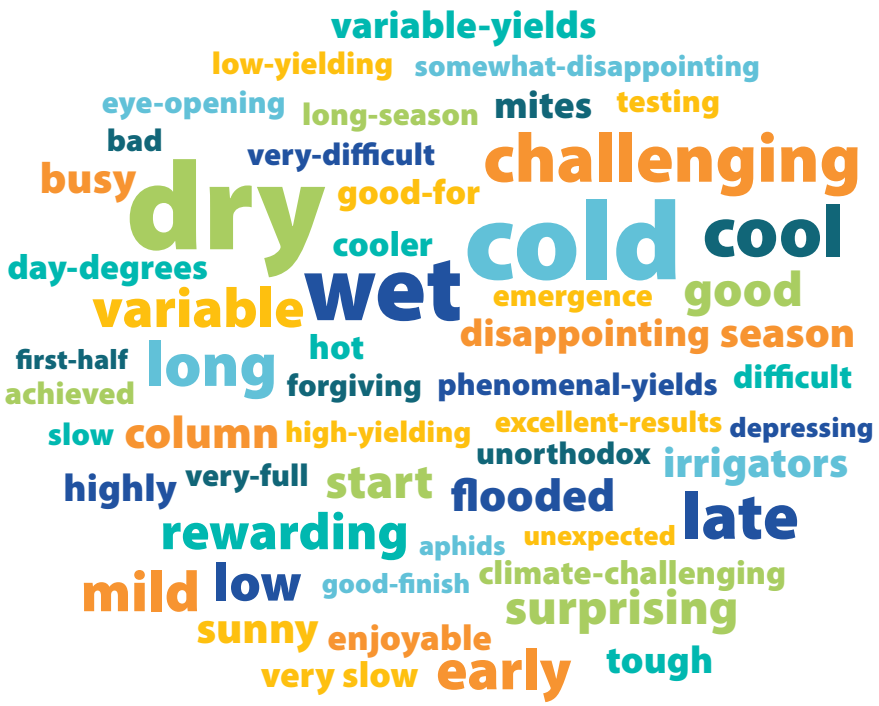
2022-23 SEASON

15

Describe the 2022-23 cotton season in THREE words or less.*

59 respondents

*Verbatim responses are detailed in Appendix 1.



ON-FARM PRACTICES AND ATTITUDES

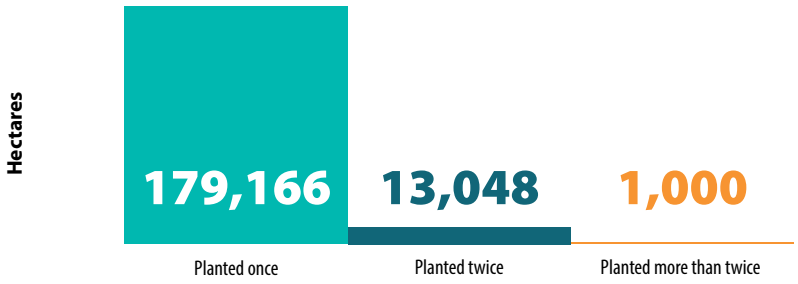
PLANTING

16

Of the irrigated cotton hectares, how many were planted once, planted twice or more than twice?

57 respondents

PLANTING OF IRRIGATED HECTARES

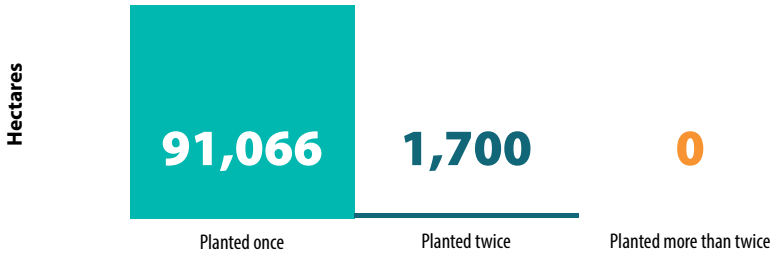


17

Of the dryland cotton hectares, how many were planted once, planted twice or more than twice?

55 respondents

PLANTING OF DRYLAND HECTARES



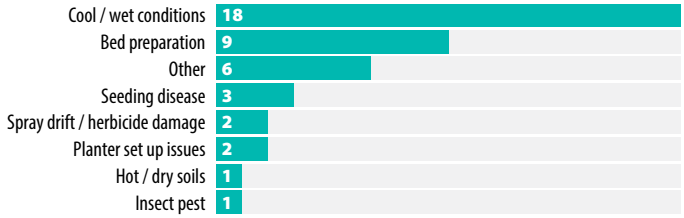
18

Select the reason/s why replants were required (select multiple as required)*:

33 respondents

*Other responses included: Flooded, crusting of soil, hail, and poor seed vigour.

REASONS FOR REPLANTS



Number of replants

ON-FARM PRACTICES AND ATTITUDES

FARMING SYSTEM

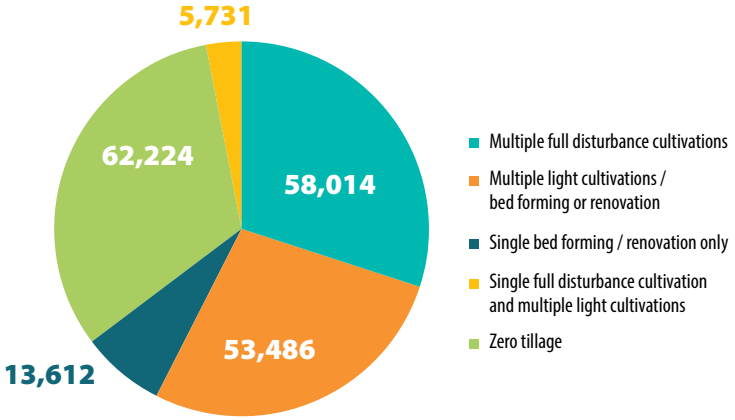
19

What reduced tillage practices were used in your 2022-23 irrigated cotton crops? Please allocate number of hectares to each practice.

33 respondents

193, 067ha

IRRIGATED AREA (HECTARES)



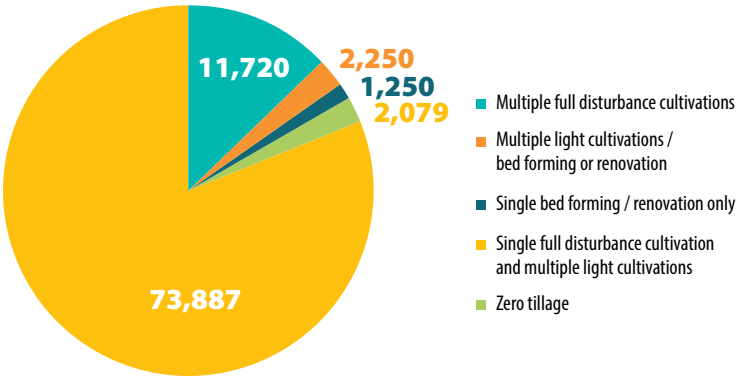
20

What reduced tillage practices were used in your 2022-23 dryland cotton crops? Please allocate number of hectares to each practice.

24 respondents

92,386ha

DRYLAND AREA (HECTARES)



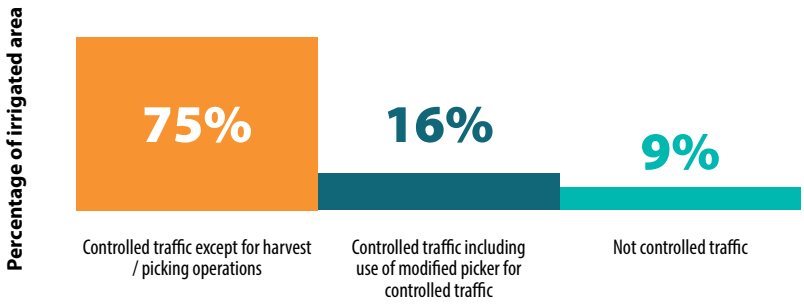
21

Of your irrigated cotton hectares, how widespread in 2022–23 was the use of controlled traffic by your cotton clients? Please allocate number of hectares (to best of your knowledge) to the options listed.

31 respondents

187,909ha

IRRIGATED AREA



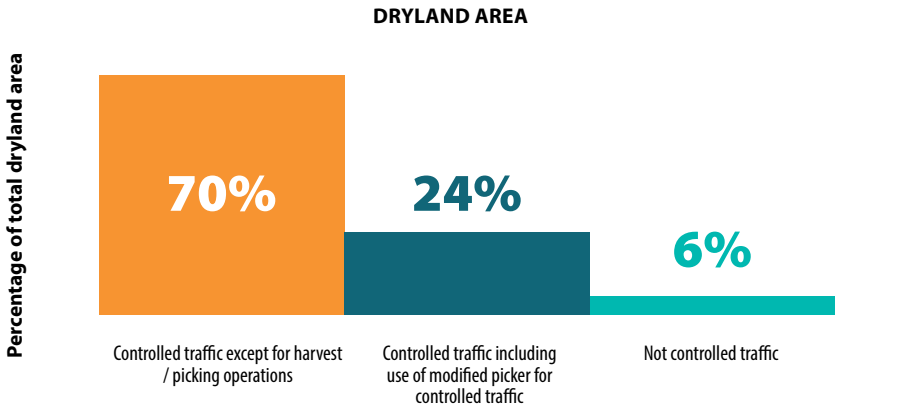
ON-FARM PRACTICES AND ATTITUDES

22

Of your dryland cotton hectares, how widespread in 2022–23 was the use of controlled traffic by your cotton clients? Please allocate number of hectares (to best of your knowledge) to the options listed.

24 respondents

92,766ha

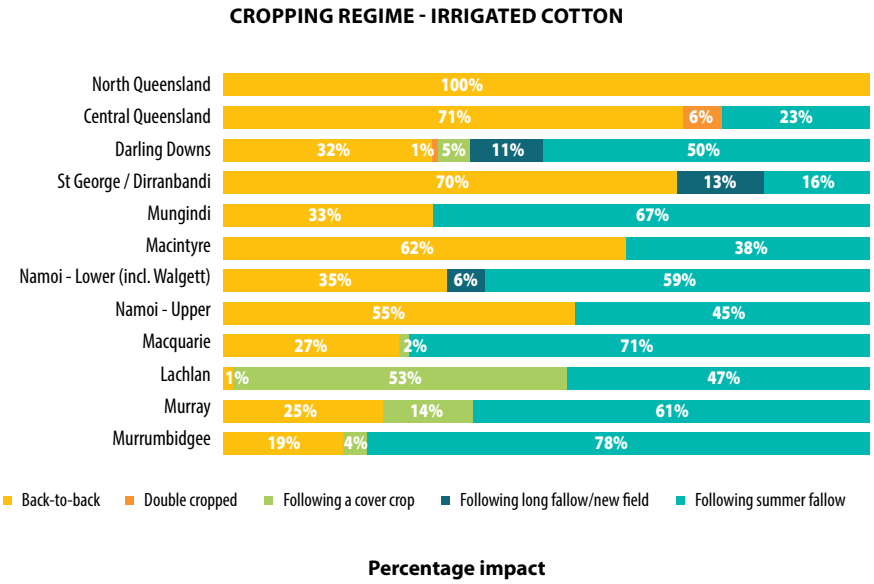


23

Of your irrigated cotton hectares in 2022-23, how many hectares apply to each fallow situation?

31 respondents

176,204ha

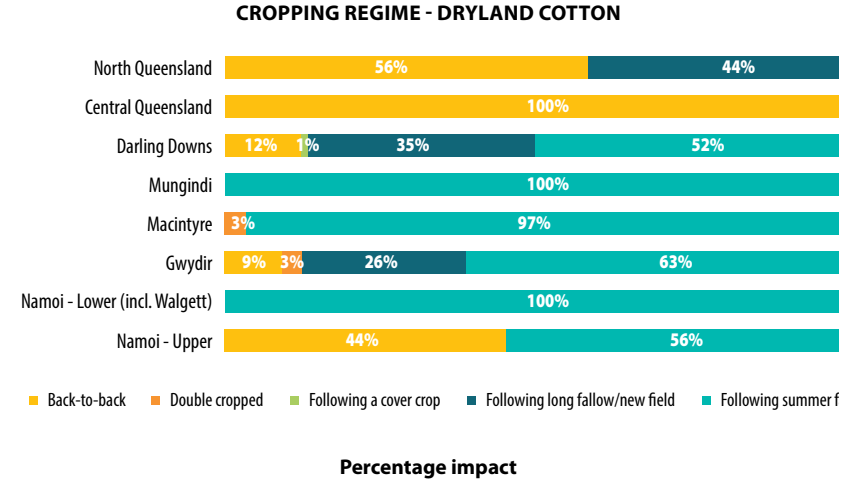


24

Of your dryland cotton hectares in 2022-23, how many hectares apply to each fallow situation?

21 respondents

73,302ha



ON-FARM PRACTICES AND ATTITUDES

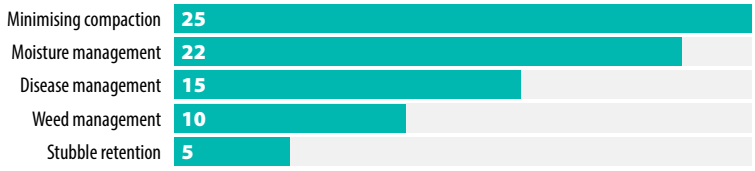
25

What are the main factors that impact on your decisions about tillage management, controlled traffic and crop rotation?*

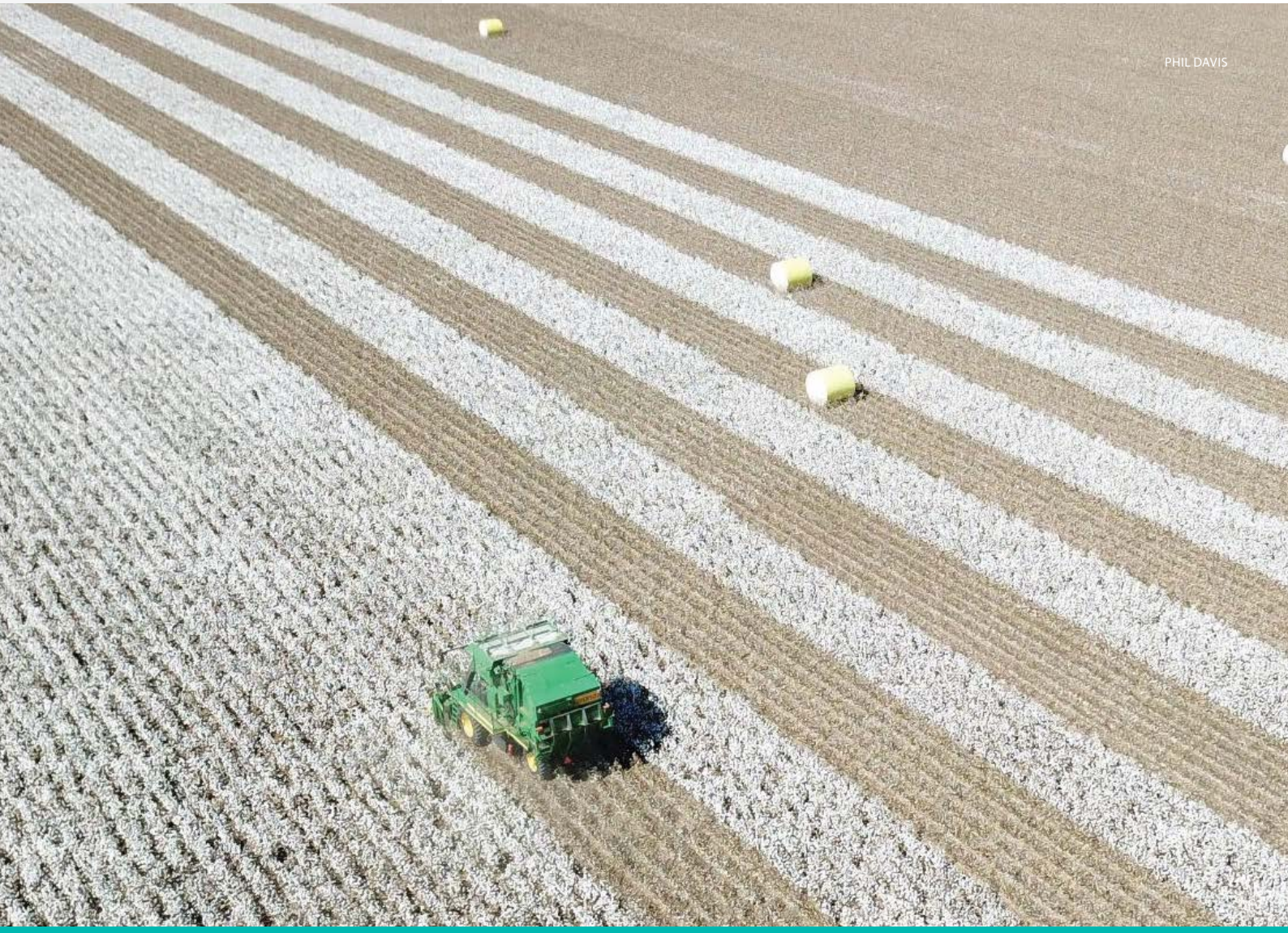
49 respondents

***Note:** Number of responses for the major factors are presented in this graph. Full verbatim answers are presented in Appendix 2.

FACTORS THAT IMPACT ON DECISIONS ABOUT TILLAGE, CONTROLLED TRAFFIC AND CROP ROTATION



Number of consultants



PHIL DAVIS

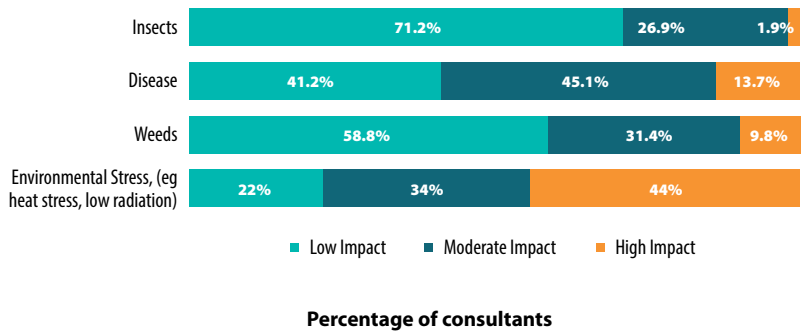
ON-FARM PRACTICES AND ATTITUDES

CROP PROTECTION

26

Rate the average impacts you think insects, disease, weeds and environmental stress had on your clients' 2022-23 crops.

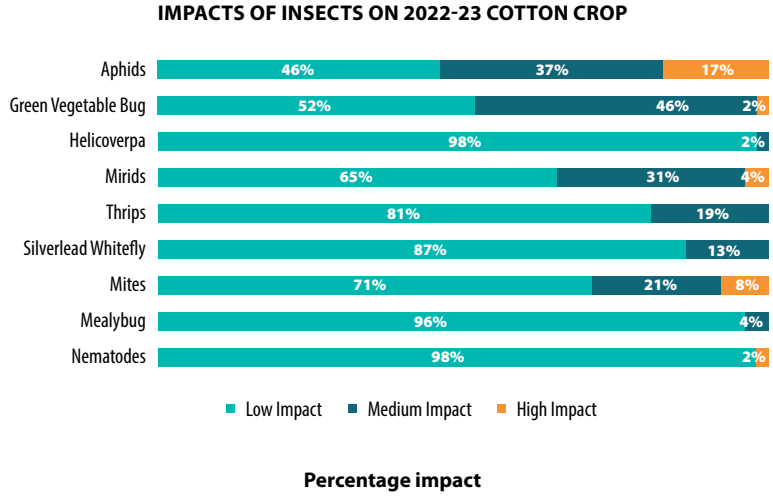
52 respondents



27

Rate the average impacts you think the following pests had on your clients' cotton crops in 2022-23.

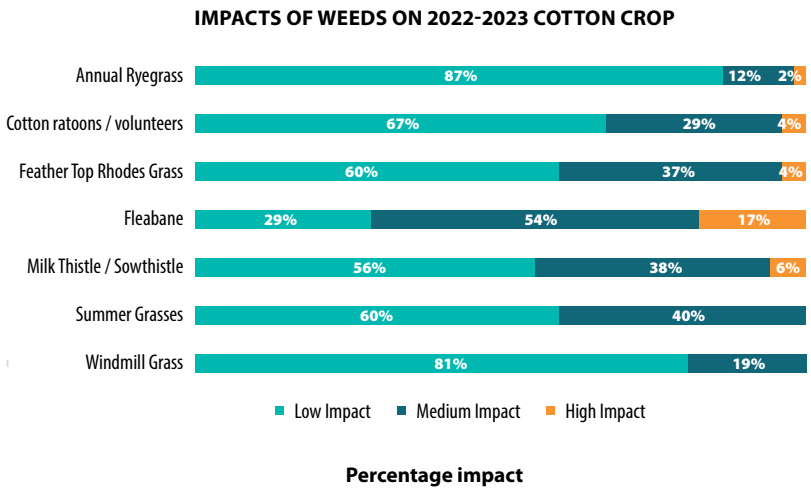
52 respondents



28

Rate the average impacts you think the following weeds had on your clients' cotton crops in 2022-23.

52 respondents



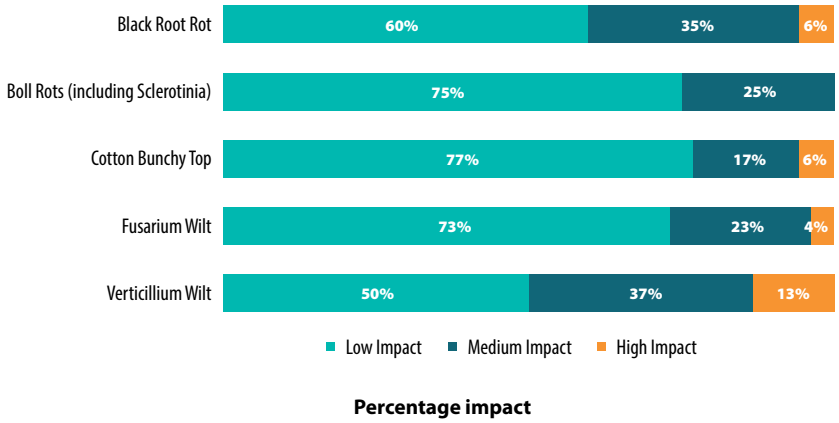
ON-FARM PRACTICES AND ATTITUDES

29

Rate the average impacts you think the following diseases had on your clients' cotton crops in 2022-23:

52 respondents

IMPACTS OF DISEASE ON 2022-23 COTTON CROP

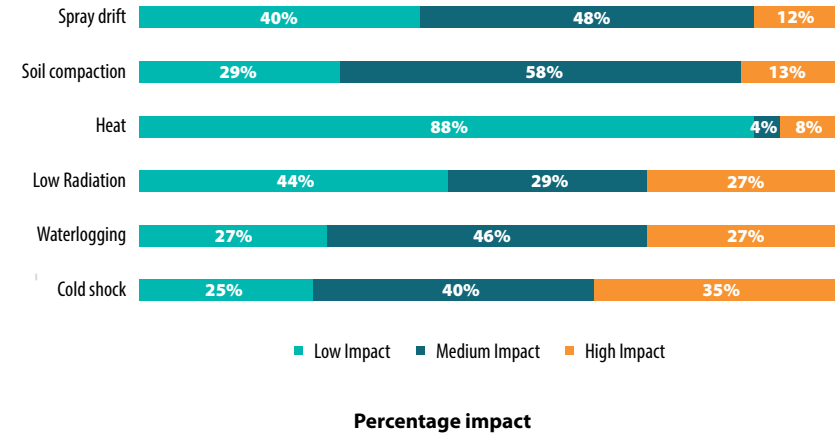


30

Rate the average impacts you think the following prevailing environmental conditions had on your clients' cotton crops in 2022-23.

52 respondents

IMPACTS OF ENVIRONMENT ON 2022-23 COTTON CROP

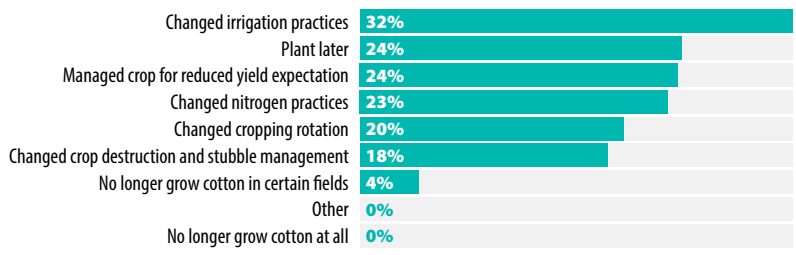


31

Thinking about your clients, please select the options applicable to changes in their practices in the past 5 years due to the impacts of disease?

29 respondents

CHANGES IN PRACTICES IN THE PAST 5 YEARS DUE TO THE IMPACTS OF DISEASE



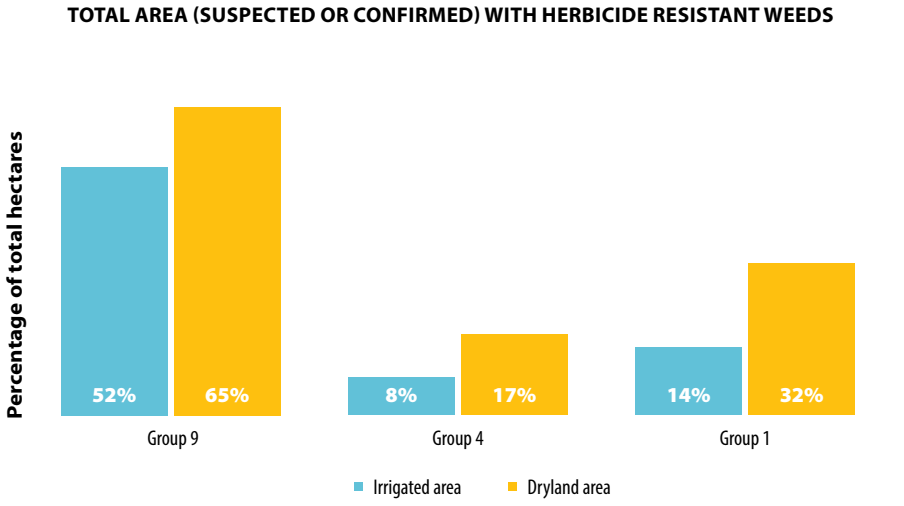
ON-FARM PRACTICES AND ATTITUDES

WEEDS

32

Of the irrigated and dryland cotton hectares over which you consulted in 2022-23, what is the total area (suspected or confirmed) with herbicide resistant weeds?

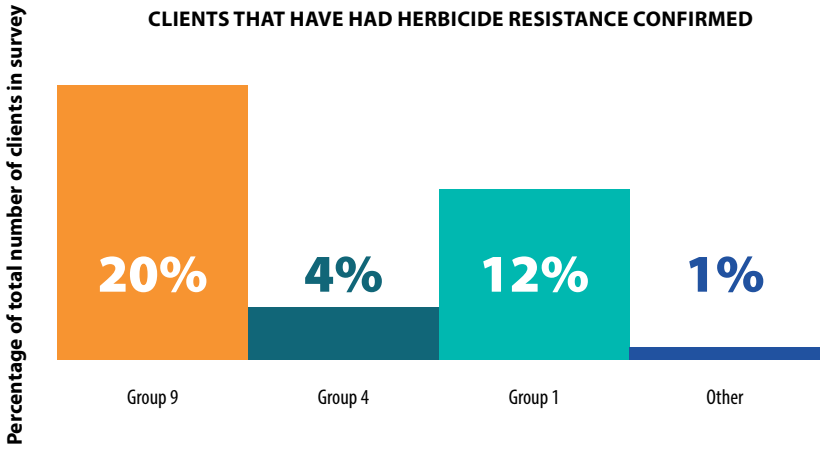
54 respondents



33

How many of your cotton clients have had herbicide resistance CONFIRMED?

20 respondents



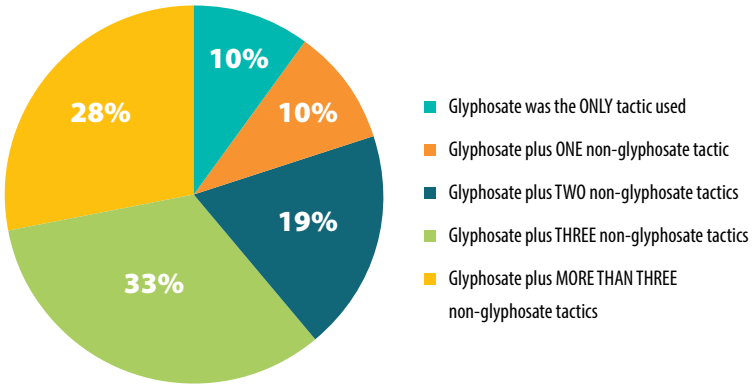
ON-FARM PRACTICES AND ATTITUDES

34

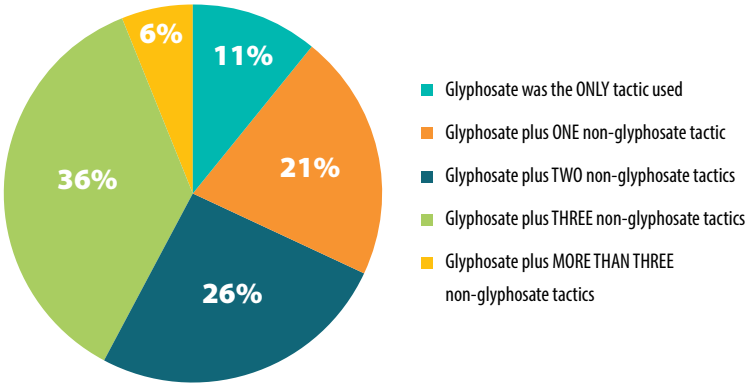
Of the irrigated and dryland cotton hectares over which you consulted in 2022-23, please estimate how many tactics were used for the cotton crop, including in preparation. For this question, a tactic is considered a weed control operation such as cultivation, herbicide or chipping.

32 respondents

NUMBER OF WEED CONTROL TACTICS - IRRIGATED



NUMBER OF WEED CONTROL TACTICS - DRYLAND



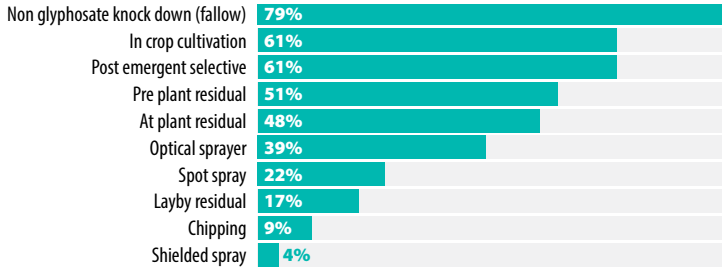
ON-FARM PRACTICES AND ATTITUDES

35

Thinking about your cotton clients and how they have managed weeds across their cotton farming system, what weed control tactics do they undertake?

32 respondents

USE OF NON GLYPHOSATE WEED CONTROL TACTICS



Number of total clients in the survey

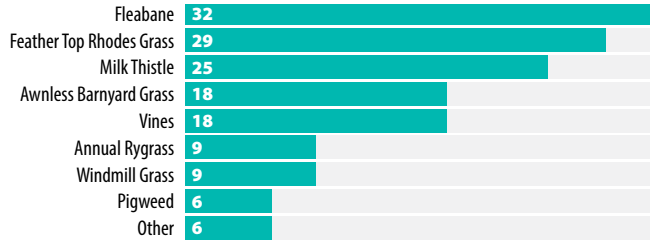
36

In your experience what weed species are CURRENTLY or EMERGING as the biggest challenge to control in the IRRIGATED system?*

48 respondents

***Note:** Other included liverseed grass, wild oats, and saltbush. Number of responses for the major weeds are presented in this graph. Full verbatim answers are presented in Appendix 3.

WEED SPECIES CHALLENGES FOR IRRIGATED COTTON



Number of consultants

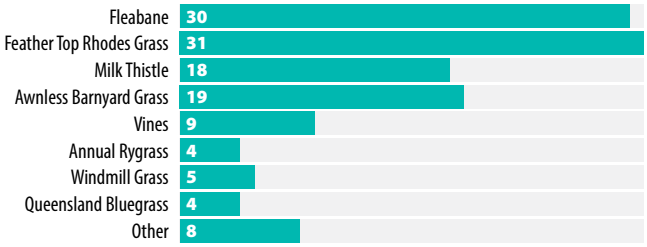
37

In your experience what weed species are CURRENTLY or EMERGING as the biggest challenge to control in the DRYLAND system?*

41 respondents

***Note:** 'Other' included liverseed grass, button grass, prickly lettuce, green amaranth, capeweed and wireweed. Number of responses for the major weeds are presented in this graph. Full verbatim answers are presented in Appendix 4.

WEED SPECIES CHALLENGES FOR DRYLAND COTTON



Number of consultants

ON-FARM PRACTICES AND ATTITUDES

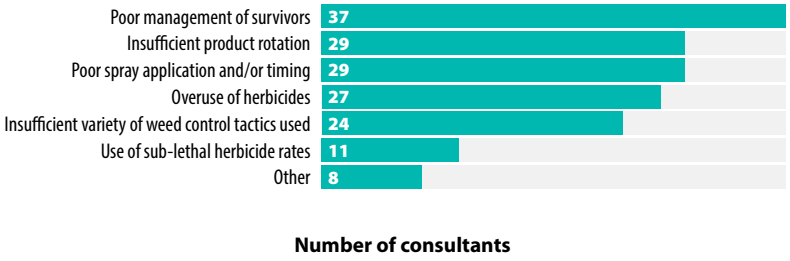
38

In your opinion, what do you believe are the major factors that lead to herbicide resistant population developing on your clients' farms?*

52 respondents

***Note:** Other comments are included as Appendix 5.

MAJOR FACTORS CONTRIBUTING TO HERBICIDE RESISTANCE



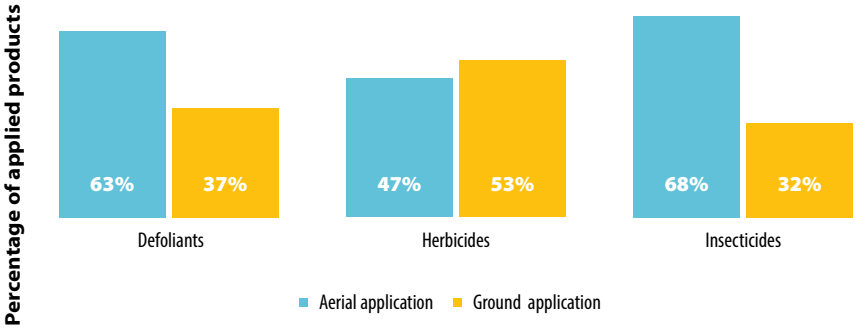
SPRAY APPLICATION

39

Thinking about application of crop protection products, on average what is the percentage applied by air or by ground application.

50 respondents

AVERAGE PERCENTAGE APPLIED BY AIR OR GROUND APPLICATION



THOMAS WHITE

ON-FARM PRACTICES AND ATTITUDES

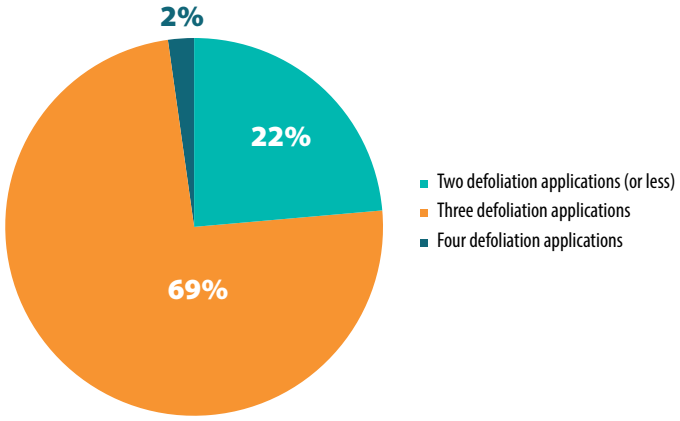
DEFOLIATION

40

Thinking about your irrigated cotton hectares, how many applications of defoliant products were required?

31 respondents

NUMBER OF DEFOLIATION APPLICATIONS - PERCENTAGE OF IRRIGATED HECTARES



NUTRITION MANAGEMENT

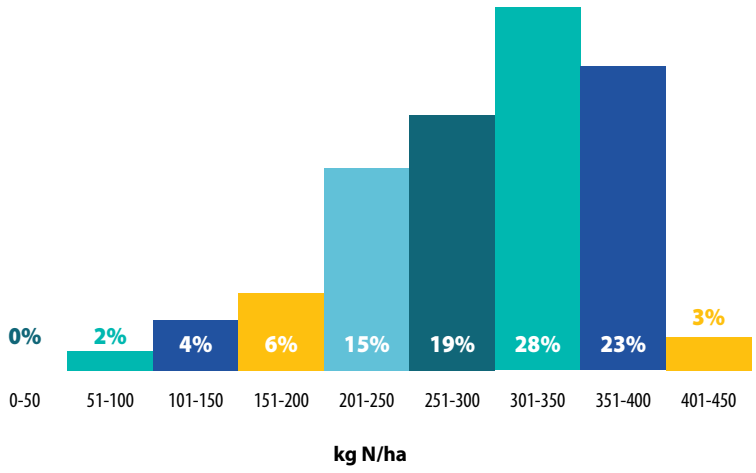
41

What is your best estimate of how much nitrogen was applied per hectare for your total irrigated cotton hectares in 2022-23? Include all applications made in the previous fallow period as well as in-crop applications.

32 respondents

188,758ha

AMOUNT OF NITROGEN APPLIED IN IRRIGATED COTTON



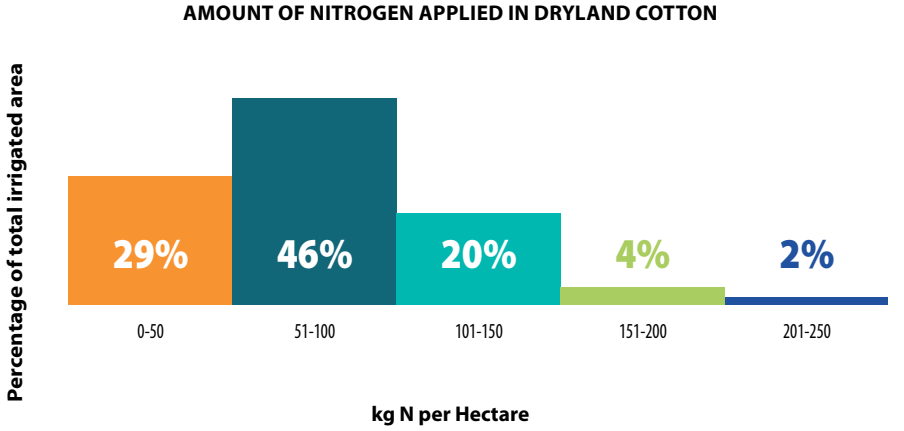
ON-FARM PRACTICES AND ATTITUDES

42

What is your best estimate of how much nitrogen was applied per hectare for your dryland cotton hectares in 2022-23? Include all applications made in the previous fallow period as well as in-crop applications.

32 respondents

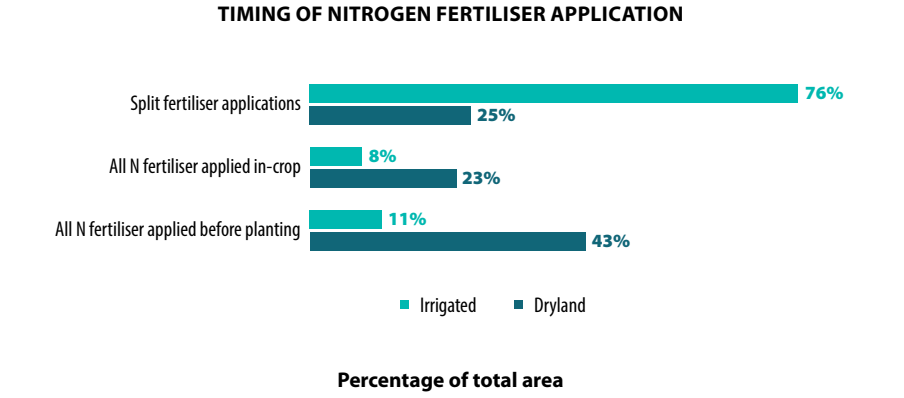
83,390ha



43

In 2022-23, when were the cotton crops' nitrogen fertiliser requirements applied?

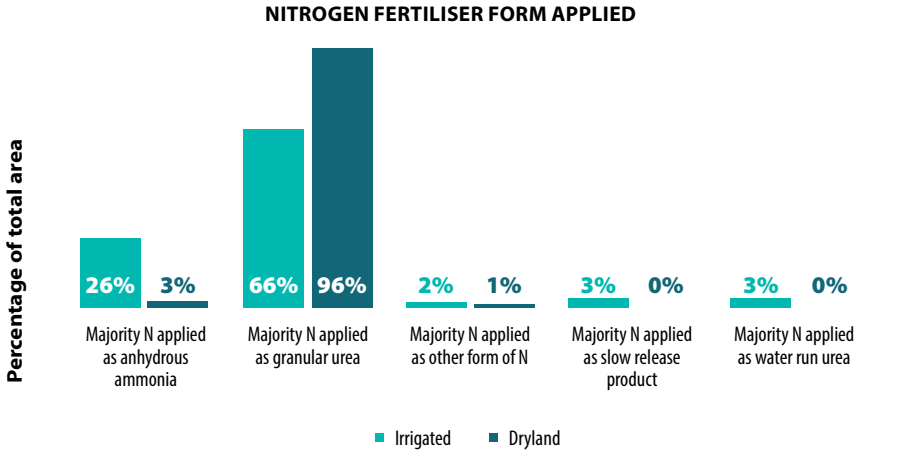
32 respondents



44

In 2022-23, how were the cotton crops' nitrogen fertilizer requirements applied?

32 respondents



ON-FARM PRACTICES AND ATTITUDES

NUTRITION

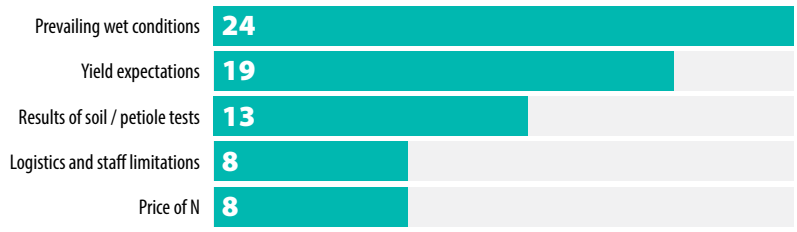
45

What factors influenced your decisions about nitrogen application (rates, timing, N budgets) in the 2022-23 season?*

51 respondents

***Note:** Responses have been summarized. Full verbatim responses are presented as Appendix 6.

FACTORS INFLUENCING DECISIONS ABOUT NITROGEN APPLICATION



Number of consultants

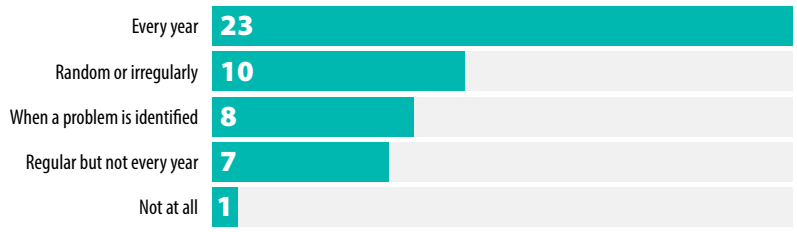
46

What factors determine your soil testing strategy, for example how often you test each field, what tests are conducted and the use of site-specific testing?*

50 respondents

***Note:** Responses are summarized in the following table. Full verbatim of responses are available in Appendix 7.

HOW OFTEN CONSULTANTS ARE SOIL TESTING



Number of consultants

ON-FARM PRACTICES AND ATTITUDES

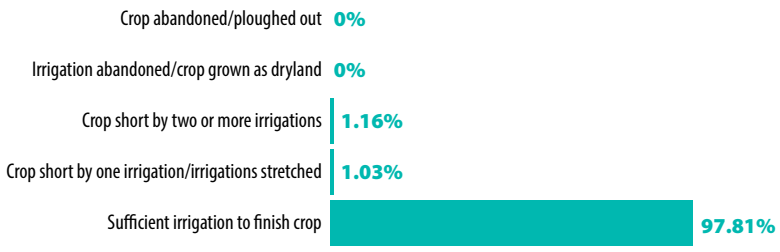
WATER MANAGEMENT

47

For the irrigated cotton hectares over which you consulted in 2022-23, how much area was affected by limited water and what was the average yield in each case?

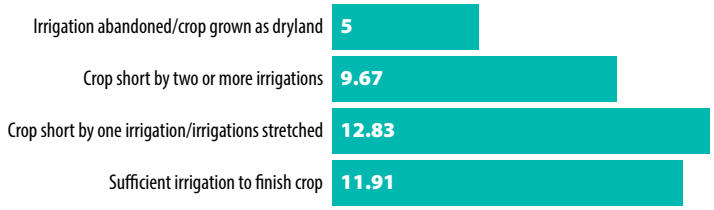
31 respondents

IRRIGATED AREA AFFECTED BY LIMITED WATER



Percentage of total irrigated area

IRRIGATED YIELD AFFECTED BY LIMITED WATER



Average yield in bales/ha of crop

BILL BACK

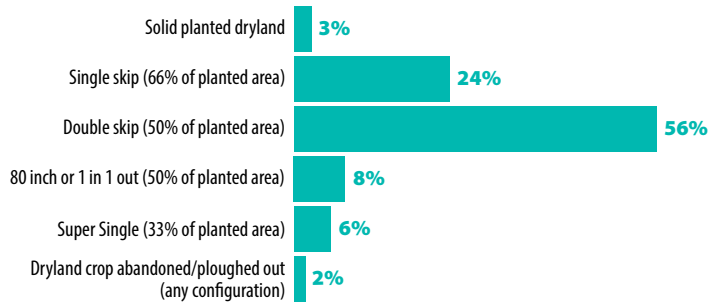
ON-FARM PRACTICES AND ATTITUDES

48

For the dryland cotton hectares over which you consulted, please indicate your best estimate of yield for each situation.

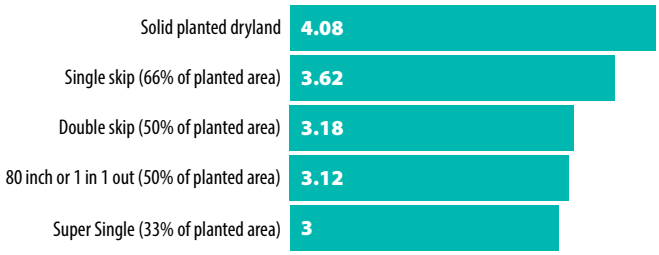
23 respondents

DRYLAND COTTON AREA BY ROW CONFIGURATION



Percentage of total dryland area

DRYLAND COTTON YIELD BY ROW CONFIGURATION



Yield (bales/ha)

WARWICK DATE

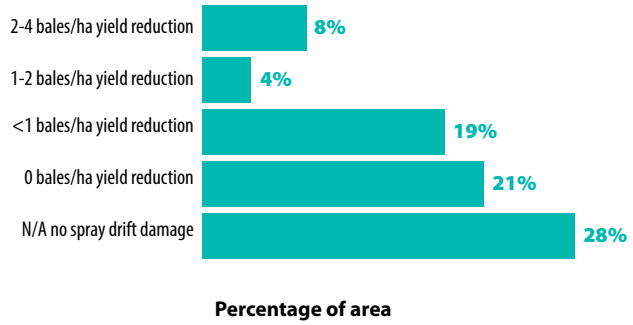
ON-FARM PRACTICES AND ATTITUDES

YIELD IMPACT

49

What yield impacts do you estimate spray drift had on your clients' crops this season?

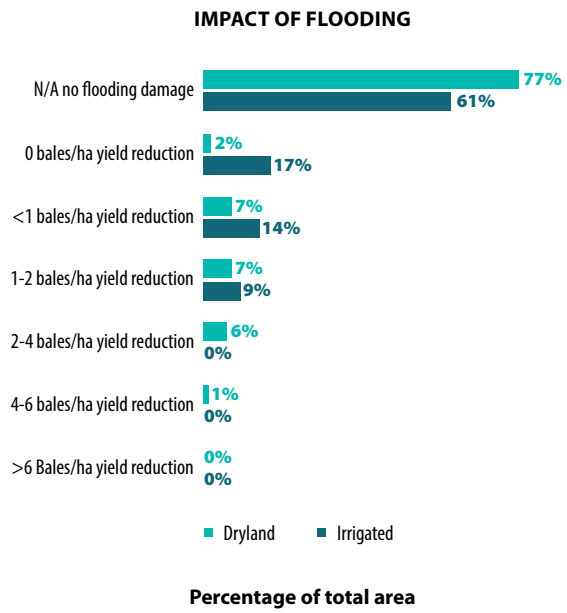
30 respondents



50

What yield impacts do you estimate flooding had on your clients' cotton crops in 2022-23?

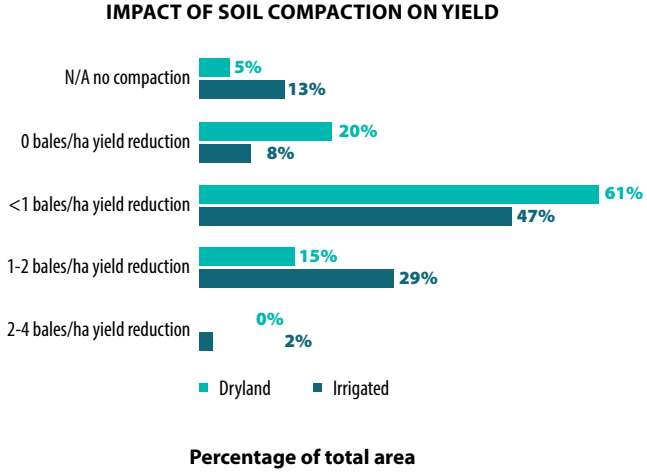
30 respondents



51

What impact do you estimate compaction had on your clients' cotton yields in 2022-23?

31 respondents



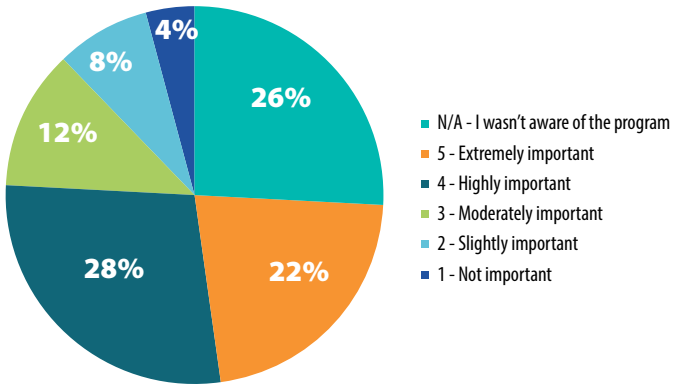
SUSTAINABILITY

52

How important is cotton's "PLANET. PEOPLE. PADDOCK." sustainability program to the industry?

50 respondents

IMPORTANCE OF THE "PLANET.PEOPLE.PADDOCK" SUSTAINABILITY PROGRAM TO THE INDUSTRY

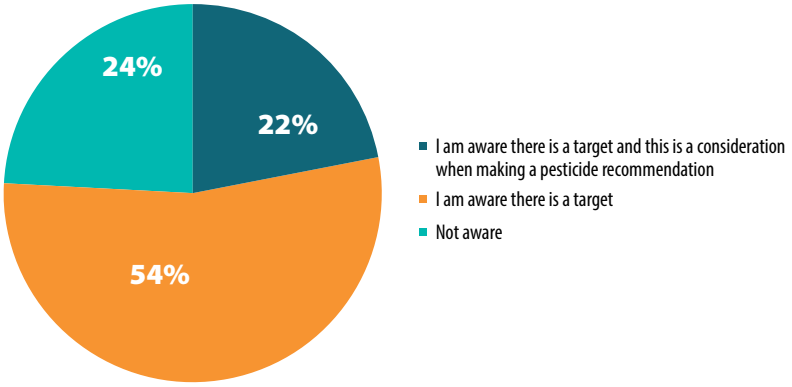


53

Are you aware of the cotton industry targets to reduce the environmental impact of pesticides (as measured by Environmental Toxic Load) by five per cent, every five years.

50 respondents

AWARENESS OF COTTON INDUSTRY TARGETS TO REDUCE ENVIRONMENTAL IMPACT OF PESTICIDES



SUSTAINABILITY

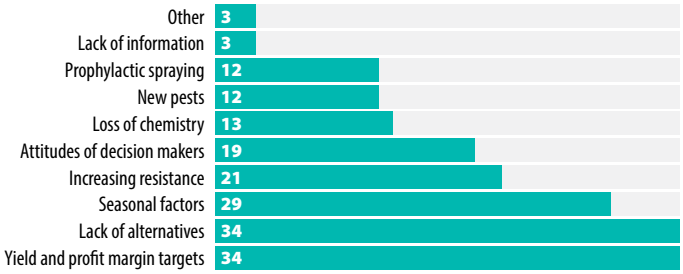
54

What do you see as the greatest challenge to reducing pesticide (insecticides, herbicides, fungicides, defoliants) usage and why?*

50 respondents

***Note:** Other comments are detailed in Appendix 8 .

GREATEST CHALLENGES TO REDUCING CHEMICAL USAGE



Number of consultants

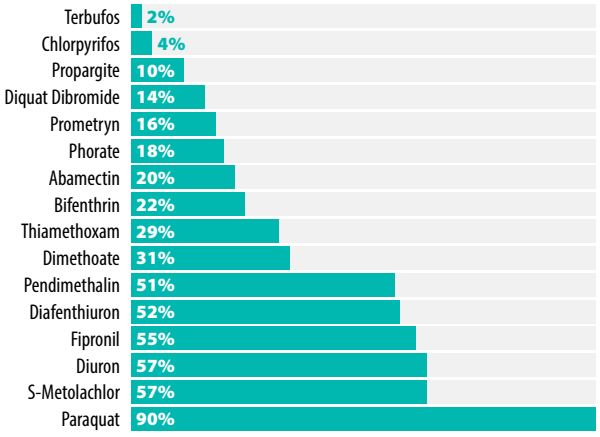
55

Of the following higher hazard pesticides, what do you estimated the impact would be if the use of these actives in cotton was no longer allowable?*

50 respondents

*Additional comments are attached as Appendix 9.

PERCENTAGE OF CONSULTANTS WHO ESTIMATE THE IMPACT OF LOSS OF ACTIVES TO BE HIGH OR VERY HIGH



APPENDICES

APPENDIX 1

QUESTION 14

Describe the 2022-23 cotton season in THREE words or less.

55 respondents

Low day-degrees early	Wet cold start
Very slow start	Climate challenging
wet, dry, difficult	challenging 1st half
Variable cool dry	Wet, dry, cold
Wet, Challenging, Surprising	cold and dry
Dry dry dry	cool, slow
cold dry good	Cool, Mites, Late
Wet mild good	variable
very full season	Challenging
Testing, unorthodox, difficult	cold mites aphids
Phenomenal yields Rewarding	Cool, Sunny, Dry
Cold, Long, Challenging	cool, sunny, dry
Challenging	Cold, Wet, Late.
Challenging	Eye-opening/challenging
Good for irrigators	Late, low yielding
Long. Somewhat disappointing	Cold, wet, disappointing.
Cool wet dry	bad
Excellent results achieved	good finish
Vert difficult start	Challenging Cooler Dry
Forgiving	Variable, Dry Surprising
Wet, cold, late	Emergence, Dry
Variable yields	Long Challenging Unexpected
high yielding	cold then mild
wet, cold, depressing	Cold, Busy, enjoyable
Cold and wet	Challenging highly variable
Tough long season	Long and disappointing
Hot and dry	flooded late cold

APPENDICES

APPENDIX 2

QUESTION 25

What are the main factors that impact on your decisions about tillage management, controlled traffic and crop rotation?

Stubble cover for as long as is practical, Maximising water infiltration and retention, rainfall, minimising soil compaction, crop selection based on profitability and rotation for agronomic reasons, tillage operations necessary for tram track renovation and irrigation.

Compaction & extent of compaction (number of tracks). Ability to get through the stubble. Extent of erosion & ability to bring the paddock back into shape. Following crop if going to cultivate to ensure good stubble cover. Crop rotation- disease break, weed situation (i.e. if winter grasses a problem then a summer crop or a broadleaf crop), crop rotation plan, profitability of crop.

Moisture. Pupae busting. Ground cover. Compaction.

Compaction. Minimal soil disturbance. Permanent beds (1.5m).

It's all about moisture profit & difficult weeds.

It is weeds, diseases and status of the soil moisture.

Too broad a question to really answer. Tillage management is about compaction and bed formation. Need the best bed with the least compaction. Controlled traffic is all about minimising compaction. Crop rotation can be about minimising compaction but also about profit in general. Crop rotations offer different options for nutrient cycling, weed and disease control as well as the potential benefits from alleviating soil compaction.

These decisions are dependent on the season - whether it was wet or dry, the amount of disease present if any, and the nutrition remaining in the soil after the crop.

Compaction, application efficiency.

Main factor is compaction and needing to ensure we had ripped deep enough after the wet cotton pick in 2022.

Tillage management on irrigation: Type of stubble from the following crop, for example sorghum stubble doesn't break down well if incorporated would prefer to just re-bed form and leave the stump of the sorghum to decompose in the centre of the hill. Cereals either working on an angle as opposed to straight up the row otherwise you get too much straw in a line in the hill or burning to get rid of the straw. Majority of growers perform controlled traffic on most operations, last year's weather dictated not enough time to perform multiple cultivations on most paddocks. Majority centre busted and then a couple light bed reforms and rolling or cultivating. Dryland all planted into stubble.

Need to pupae bust. Need to reform beds on irrigated farms. Volunteer/ratoon cotton removal. Incorporation of manure. Paddock levelling.

The number one factor in a dryland scenario is soil moisture. The most important factor with the irrigated crop is water usage and nutrient management.

Profit and environmental benefit.

Soil type, PAW, Profitability, Weed management.

Compaction. Weed management. Profitability. Moisture conservation.

Soil conditions. Water availability. Crop profitability. Disease.

Seasonal conditions mainly around harvest.

Reduce compaction, improve water infiltration.

This was virgin country (new development) and cotton was the first crop of choice based on available land for the 22/23 season and profitability. Generally cotton, followed by winter crop then summer fallow and winter fallow before cotton again. However, wet conditions sometimes don't allow winter crop following cotton.

Availability of equipment. Availability of land. Availability of water.

Moisture at time of planting, disease, crop prices.

APPENDIX 2
CONTINUED

Tillage - implement availability to grower and conditions during preparation Controlled traffic - grower machinery and implement width Crop rotation - profitability, grower attitude to risk, weed management, farm layout.
Ground conditions, roughness, and disease management.
Reducing compaction and developing hard pans, maintaining and improving soil structure, decreasing disease and weed pressure through effective crop rotation as well as maintaining/ improving soil health.
Farmers' methods.
Soil tilth. Soil type. Soil disease (including crop history). Soil compaction.
Grower farming system, soil type, soil moisture content and ability to do desired/appropriate tillage, previous crop residue & previous soil compaction. Controlled traffic in irrigated cotton is consistent from time paddocks hilled up, crop rotation depends on land available to match water available and relative Gross margins of individual crops and impacts of each crop on the subsequent crop - in terms of nutrition/disease/ground residue.
Factors impacting decisions about tillage management, controlled traffic and crop rotation are moisture preservation, disease potential, productivity, sustainability, soil structure preservation.
Available machinery, wheel spacing of machinery. soil type, compaction, soil moisture, wheel track renovations, application of fertilisers (manure).
Compaction management, moisture management.
Winter weather, turnaround time, back-to-back cotton, crop rotation, weed pressure.
Soil health and sustainability.
Vert presence and planter configuration.
Tillage management:1. Soil moisture content at time - compaction limitations. Best to do ground prep when dry to avoid smearing and promoting poor soil and hill structure.2. Stubble from previous crop - this will guide what implement will get best incorporation outcome. Control Traffic:1. Reasons listed above around moisture/compaction etc relevant here. Crop Rotation:1. Disease is a big driver of crop rotation decisions in the south2. Cost also other main driver - using Gross Margins and budgeting will also guide decisions.
Weed control, season outlook, location and the particular farming system.
Compaction from wet picking requires wheat crop to dry and crack profile and also requires some deep tillage.
Disease management. Profitability. Aim to conduct CTF as much as possible to reduce soil structure damage.
Wet conditions this year in particular delaying field prep, poor seedbeds, not straight, wet planting and now wet picking causing compaction but also struggling to get plants to sit up on hills, stay high and dry and picking without crop-lifters now root cutting will be an issue.
Retention of moisture.
Machinery capacity/restrictions. Moisture capture/ conservation. Minimising compaction. Disease & nutrition management.
Limiting compaction throughout paddocks, moisture and soil structure preservation, disease control minimisation.
Moisture, both in soil profile and forecasted. Disease also plays a large part in crop rotation decisions.
Quality of final planting zone. Water capture. Compaction. Weed control.
Compaction, soil health, logistics.
Compaction. Timings of irrigation/rainfall. Disease risks.
Tillage comes down to soil and trash conditions. Dry and trash than more operations. Some nice rain in there then less. Virtually all gets offset or speed tilled across the rows now.
We are 100% irrigating under lateral move sprinklers. Everything we do is to allow the water better to infiltrate the ground. We grow a cover crop and strip till the plant line to establish cotton. Our cotton is grown on the flat, and our land prep is minimal because of this.

APPENDICES

APPENDIX 3

QUESTION 36

In your experience what weed species are CURRENTLY or EMERGING as the biggest challenge to control in the IRRIGATED system?

Fleabane

Glyphosate resistant milk thistle. Glyphosate resistant barnyard grass. Feathertop rhodes grass.

Fleabane, sow thistle, windmill grass, barnyard grass, liverseed grass, FTR, ryegrass.

Tall Fleabane. Feathertop.

Glyphosate resistant barnyard grass, feathertop rhodes grass, peachvine and fleabane.

FTR. RR BYG. RR Milk T.

Summer grasses such as barnyard grass is currently the greatest weed and this is due to roundup resistance. Feathertop is emerging as the next major weed and this is due to roundup tolerance. However milk thistle resistant to roundup might be the next emerging weed if we are not careful.

Barnyard grass, due to resistance.

Cotton volunteers are the greatest problem especially in Dryland cotton in the NT whereby we have a mass germination of volunteers at the start of the wet season but are unable to get on the fields to spray. These then take moisture away from the soil profile at planting. To have the option to rotate between a Roundup Ready cotton then to a Liberty cotton would be perfect. Cotton volunteers are the major issue at St George & Mungindi. The residual herbicides at planting and in crop plus cultivation has reduced the problem resistant weeds were becoming.

Glyphosate tolerant (unconfirmed resistant) milk thistle.

Glyphosate resistant feathertop rhodes grass, barnyard grass, liverseed grass, flaxleaf fleabane and milkthistle.

Glyphosate resistant fleabane. Glyphosate and Haloxyfop resistant Feathertop

Gly R feather top. Gly R barnyard grass group. Grp 1 resistant wild oats. Fleabane. Gly tolerant Ipomea. Everything tolerant spurge.

Glyphosate resistant liverseed Grass. Peach vine, bell vine. Paraquat resistant Tall fleabane. Glyphosate resistant feather top rhodes grass. Glyphosate resistant windmill grass. Glyphosate resistant fleabane. Milk thistle. Red pigweed. Yellowvine.

Glyphosate resistant Barnyard grass, Feather Top, Fleabane.

Peachvine. Fleabane. All grass weeds.

Windmill grass and FTR increasing in prevalence. Fleabane an ongoing challenge.

Pigweed. Fleabane. Glyphosate resistant windmill grass. Glyphosate resistant ryegrass. Glyphosate resistant milk thistle.

Feathertop rhodes grass. Fleabane. Polymeria puscilla.

Glyphosate Resistant Windmill Grass and grass herbicide tolerant WG. Milk Thistle.

Gly resistant milk thistle, gly resistant fleabane, gly resistant ryegrass.

Glyphosate resistant Barnyard grass and milk thistle.

Where inter row cultivation is not an option fleabane and Glyphosate resistant variations of grasses such as windmill grass and feather top Rhodes.

Fleabane, annual ryegrass.

Fleabane. Windmill Grass. Both resistant to Gly.

Annual rye grass (gly/fop & grp B resistant). Fleabane. Windmill grass. Sow thistle. Feather top Rhodes grass.

Resistant feathertop, milkthistle,barnyard grass, button grass, prickly lettuce, fleabane, peach vine tolerance.

Gly resistant sowthistle, barnyard grass, feathertop, liveried grass.

Fleabane, FTR, red pigweed, bell vine, peach vine, milk thistle (might be resistant).

Glyphosate resistance in feathertop and summer grass. Group A resistance in the above weeds.

Milkthistle, Feathertop rhodes.

Gly resistant milkthistle, feathertop Rhodes grass.

Feather Top Rhodes, FLEABANE, Bellvine, Peachvine, Milkthistle (might be resistant) and Red Pigweed.

FTR, Fleabane, red pigweed, bell vine, peach vine, milk thistle (might be resistant).

APPENDICES

APPENDIX 3

Gly resistant Ryegrass and Fleabane - are current issues in the system. Emerging issues include stinging nettles and Feathertop - difficult to control with Gly.	Glyphosate resistant Barnyard Grass. Glyphosate resistant Feathertop Rhodes Grass. Glyphosate resistant Fleabane. Glyphosate resistant Saltbush.
Reoccurring germinations of Fleabane where residual herbicide (Diuron) wasn't able to be used due to late ground prep and concerns of effecting plant establishment in a challenging (wet/cold) start to the season. Sowthistle where poor plant establishment and has grown a smaller plant allowing greater light inception into the lower canopy that allows continued germination of sowthistle.	Gly resistant fleabane. Group A resistant barnyard grass. Group A resistant feathertop grass.
Gly+Paraquat+GpA resistant Ryegrass.	Glyphosate resistant BY Grass. Glyphosate resistant FTR Grass. Glyphosate resistant Fleabane. Glyphosate tolerant peach-vine. Glyphosate tolerant milk thistle.
Fleabane, all species. Becoming increasingly hard to kill, but it was a difficult season to double knock due to wet weather. Glyphosate resistant milk thistle.	Peach vine. Sow thistle. Windmill grass.
Fleabane, resistant FTRG, sowthistle and resistant ryegrass.	Gly resistant Barnyard grass. Gly resistant fleabane.
Glyphosate Resistant Barnyard Grass. Glyphosate Resistant Feathertop Rhodes Grass. Bellvine. Peachvine. Red Pigweed.	Glyphosate resistant windmill grass, Feathertop Rhodes when can't double knock and gly resistant sow thistle, fleabane in wet periods. When residuals fail to work at their best ability and we have multiple emergence opportunities/wet summers, challenges are created with timeliness of everything. Residuals at planting followed by a flood and multiple big rain events meant many escapes.
	Glyphosate resistant FTR. Pigweed, Green amaranth, peach vine, awnless barnyard grass.
	Fleabane and resistant annual ryegrass.

TOBY LOCKREY

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APPENDIX 4

QUESTION 37

In your experience what weed species are CURRENTLY or EMERGING as the biggest challenge to control in the DRYLAND system?

Fleabane
Gly resistant milk thistle. Gly resistant barnyard grass. Feathertop rhodes grass.
Fleabane, sow thistle, windmill grass, barnyard grass, liverseed grass, FTR, wireweed, ryegrass, capeweed.
Feathertop.
Glyphosate resistant barnyard grass, feathertop Rhodes grass, peachvine and fleabane.
FTR. RR FTR. RR BYG. RR Milk T. Ryegrass.
Currently it's barnyard grass and fleabane. But feather top and milk thistle are emerging as challenging weeds in the dryland system. These are all to do with either resistance to glyphosate (BYG) or tolerance to glyphosate (FTR and FB).
Fleabane and feathertop is the biggest challenge for control. I think resistance is becoming an issue that we need to be aware of.
Barnyard grass remains a battle. Glyphosate tolerant (unconfirmed resistant) milk thistle.
Glyphosate resistant feathertop Rhodes grass, barnyard grass, liverseed grass, fleabane and milkthistle.
Glyphosate resistant red pigweed.
Feathertop and fleabane.
Gly resistant feather top. Gly R barnyard grass group. Grp 1 resistant wild oats. Fleabane. Gly tolerant Ipomea. Everything tolerant spurge.
Flaxleaf fleabane. Feathertop Rhodes grass. barnyard grass. paraquat resistant Tall fleabane. Queensland bluegrass.
Glyphosate resistant Barnyard grass, Feather Top, Fleabane.
As per the irrig answer.
Fleabane.
Glyphosate Resistant Windmill Grass and grass herbicide tolerant WG. Milk Thistle.
Fleabane, glyphosate resistant ftr and windmill grass.
Fleabane, Feather-top Rhodes Grass.
Resistant Queensland blue grass feathertop, milkthistle, barnyard grass, button grass, prickly lettuce, fleabane, tall fleabane, tarvine, peach vine tolerance.
Barnyard Grass, FTR, Fleabane, Peachvine, rye grass, milk thistle (might be resistant).
Feathertop rhodes, fleabane, milk thistle.
Gly resistant windmill grass, gly resistant milkthistle.
Barnyard grass, Feather Top Rhodes, FLEABANE, Peachvine, Milkthistle (might be resistant).
Barnyard grass, FTR, fleabane peach vine, rye grass, milk thistle (might be resistant).
Bellvine is a big concern - Gly won't do much to it. Will need to begin incorporating and inter-row residual/shielded spraying option.
Big 4 - Fleabane, Sowthisle (when missed as a rosette and move to elongation, near impossible to kill), Windmill Grass, FTRG (becoming more of a problem due to becoming more widespread among farming systems).
Don't grow dryland cotton but Feathertop Rhodes Grass is increasingly an issue in dryland winter cereal fields.
Fleabane.
Glyphosate Resistant Barnyard Grass. Glyphosate Resistant Feathertop Rhodes Grass. Fleabane. Milk Thistle.
Glyphosate resistant Barnyard Grass. Glyphosate resistant Feathertop Rhodes Grass. Glyphosate resistant Fleabane.
Glyphosate resistant milk thistle, fleabane, FTR, ABG. Group A resistant FTR and ABG.
Gly resistant fleabane. Group A resistant barnyard grass. Group A resistant feathertop grass.
Glyphosate resistant BY Grass. Glyphosate resistant FTR Grass. Glyphosate resistant Fleabane. Glyphosate tolerant peach-vine. Glyphosate tolerant milk thistle.
Sow thistle. Feathertop Rhodes. Fleabane.
Gly resistant fleabane.
Glyphosate resistant windmill grass, feathertop rhodes when can't double knock and gly resistant sowthistle, fleabane in wet periods. Tall fleabane making an appearance around Boomi now.
Glyphosate resistant FTR. Pigweed, Green amaranth, peach vine, awnless barnyard grass.

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APPENDIX 5

QUESTION 38

In your opinion, what do you believe are the major factors that lead to herbicide resistant population developing on your clients' farms?

Other responses:

I think all these are factors contributing to resistance. Poor management of survivors is the key factor.

Controlling weeds in a fallow whilst considering sensitive crops subject to spray drift.

Lack of safe pre-em options.

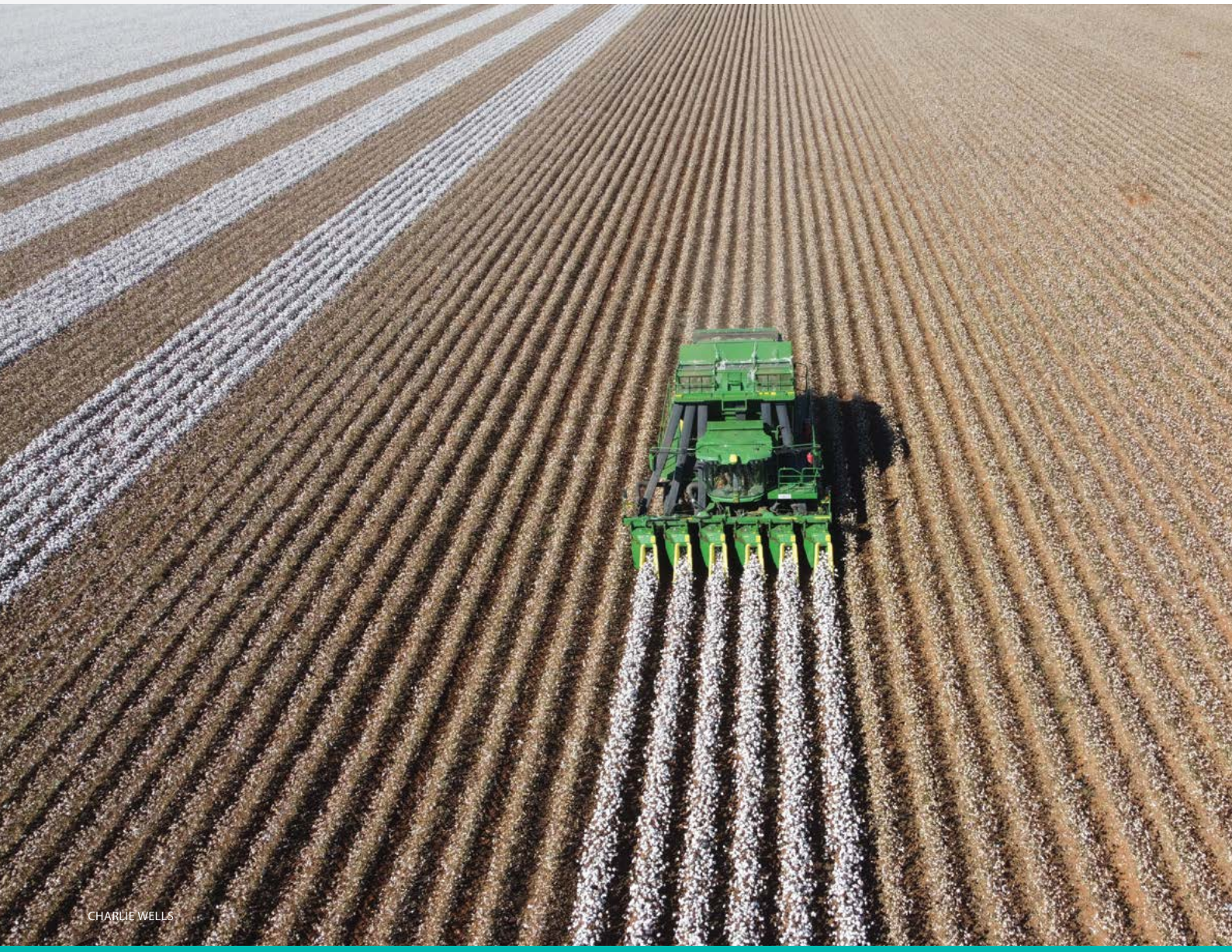
Limited chemistry available for cotton.

Capacity and timing applications to when conditions are good.

Generally, I suggest that the current glyphosate weed species present on my client's farms have been selected for resistance outside of the farm, e.g. in zero till dryland systems, or along roadways etc, but they have excellent dispersal mechanisms and are very invasive. The biggest factor, once they get to the farm is generally the poor management of survivors.

Off farm contamination eg wind.

Failure to double knock in fallow.



CHARLIE WELLS

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QUESTION 45

What factors influenced your decisions about nitrogen application (rates, timing, N budgets) in the 2022-23 season?

When it was possible to apply.

A very wet winter restricted our ability to pre-plant apply fert.

Yield potential, ability to traffic the crop, loss of N due to de-nitrification. try to apply 70-80% of N upfront.

Yield. Previous wet season. Timing.

Generally apply 60% over winter and 40% in crop which is water run.

Weather conditions, product prices, capacity.

Yield. NUE, waterlogging, availability of N, availability of machinery and staff. Getting the job done.

Price of N and also timing of application.

Potential Yields considering we had full water, not the price of N.

Rainfall/flooding. Getting product. Anhydrous cheaper than urea but majority of irrigators not set up for it.

Previous cotton yield. Target yield. Residual soil nitrogen level. Crop assessments.

Crop requirement. Nitrogen usage efficiency. Timing.

Full profile, low starting N, get it on when possible.

Soil N. Yield expectations. Losses from water-logging.

Low N profiles would require early application. Wet weather and could have led to big losses if went too early.

Target yield. Product price. Field history & soil test results, if available. Soil condition. Water availability. Cotton price. Product availability.

Crop requirement from yield expectations.

Price, availability and logistics.

The flood / very wet season. Aerial applied urea was our only option.

Ability to apply N in-crop. Number of N-buggies. Target yield. Nitrogen losses from waterlogging.

High yielding crops the season before wet conditions for previous 12 months on fallow.

Limited gas availability.

Cool season and low day degree accumulation. Soil test results driving Nitrogen rates which were all very minimal.

High yields in previous crop, wet season.

Petiole tests and industry standards.

Soil tests. Crop growth stage and development. Yield potential.

Rates - crop history/yield potential/soil tests (where done)/field, farm & historical district knowledge/ grower attitude. Timing - ability to apply pre sowing was limited - so timing post plant was from 1st irrigation onwards or spread prior to rain events - aiming to have all N applied by mid January.

Weather changes, price of fertiliser - affordability, crop rotation - pulses prior?

Very wet winter and expensive urea. Delayed fertiliser application and increased in crop application.

Soil test, target yield.

Weather - the wet winter forced us to rely on more in crop applications of N.

Loss of N due to waterlogging this year made us apply more in crop. Also fast turnaround off cotton paddocks from late pick last year.

The weather.

Crop demand, aimed fairly high with full irrigation allocation in irrigated and full profile in dryland crops.

Weather - the wet winter forced us to relay on more in crop application than usual.

Weather - the wet winter forced us to rely on more in crop applications of N.

Realistic yield benchmarks were set early on and the low yield potential of crops was identified very early in the season. This acknowledgement meant that crop fert in inputs in-season were lowered to match yield potential of crops. Similarly, for subsequent crop management, reduced inputs of upfront P was considered given the lowered yielding cotton crops - ie 200kg of upfront MAP for the cotton should support 11b/ha yield potential, if this was not achieved, reduced upfront MAP volumes for the following wheat/cereal crop have been reduced accordingly to match this.

Crop potential and therefore the overall crop demand .

Timing of application aligning with in crop irrigation timing with significant amounts water run or spread prior to cultivation and then watered.

Season day degree and therefore yield potential dictates N budget. Also soil N and petiole N.

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Starting N in the soil - majority of fields had soil tests completed before planting. Petiole testing in season used to fine tune N application. Yield estimates - ensuring only fertilising to yield potential, not more. Wet weather - ensuring N applications not going out in waterlogged conditions. Budget got wound back and back as the season progressed due to poor weather conditions.
N budget for reduced expected yields was defiantly the biggest.
A lot came down to logistics. Availability of anhydrous since Big N has ceased. Wet conditions resulting in late and compromised preparation.
Cropping History/Frequency. Back to back or Long fallow. Target Yield. Soil Type. Underlying Compaction/Subsoil Constraints. Ability/ Willingness to apply multiple split applications of N.
Rainfall patterns, soil water level, plant density.
Rainfall, nitrogen prices.
Poor soil structure. Wet weather. Evidence to show the benefits of split applications.
Soil tests. Logistics.
Budget. Yield prospects. Water availability.
Starting N, timing of pre plant N application, cropping rotation, yield potential, disease risk.
90% is growers' choice.
All nitrogen was spread under lateral move irrigators and watered in. Because of this ability to easily water in nitrogen, all product was applied in crop.

TOBY LOCKREY

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QUESTION 46

What factors determine your soil testing strategy, for example how often you test each field, what tests are conducted and the use of site-specific testing?

All fields are soil tested prior to a crop.

Test fields in management units before every crop. Mostly N (northern cropping test on nutrient advantage). Either doing 0-45 & 45-90 or straight for N. Full tests are broken into 0-30 30-60 60-90. Not site specific, marking on Agworld & heading back to that location.

Previous issues. How often done previously. Soil Types.

Annual soil testing of historical points in fields across all paddocks planted to cotton that year.

Comprehensive 5-10 years. Nitrogen selection of paddocks per MU timing dependent on rotation.

Nitrogen - based on nutrient budgeting and future crop potential. Other nutrients based on soil testing and replacement strategy.

Soil test locations are determined from yield maps, soil types and also NDVI images. Tests are conducted before and after the season to see what nutrients are there before planting, and what remains after the crop.

Generally all farms have soil tests done during the winter months so as to see what is happening though this is alternated across fields each year.

Lots of soil test conducted pre and post flooding to work out de-nitrification loss last season. Depends on the grower - like to use previous yield maps as well to determine average areas. Two fields in the same rotation normally get done to help determine N status.

Soil tests are mainly conducted after a period of forced fallow (drought) to assess nutrient status and to develop a nutrition program for the coming cotton crop.

All irrigated fields tested (comprehensive test) every 5-6 years. All irrigated fields tested (N) every 3 years.

1 per year and budgets after.

Most fields tested for N except where. No site specific.

Test before each crop, particularly after wet period. Mainly nitrogen, but comprehensives every 4-5 years. Grid and zonal sampling used.

Generally, some fields are tested each season. Some clients test every season, and others may only test once every few years and others do little testing at all. Some fields are tested for N alone at 3 depths, i.e. 0 to 30cm; 30 to 60cm 7 60 to 90cm. Others have a complete soil test conducted in the 0 to 30cm zone and N only in the deeper zones. Generally, sub sampling and bulking is still the predominant form of testing rather than site-specific testing.

Most fields get tested if going to cotton.

Every year.

On an as need basis, when making decisions or have reason to be uncertain of the likely N (or other nutrient) loads.

Long term removal. Recent rotations. Nitrogen losses. Ability to get timely soil testing done. Previous crop performance. Fertiliser price. Budget. Time since last testing.

Poor yielding areas are site specific tested. Generally do a couple of tests on fallow and back-to-back to get an indication of what may be left.

Very little used... only in problem areas.

Every client has different attitudes towards soil testing. More grid sampling testing is happening now for P,K,sodicity, acidity. Nitrogen testing isn't happening on every single field each year but signature fields where groups of fields are farmed together.

Unsure about field history.

Reliability in variable soil types.

Soil type. Crop history.

Soil testing is ad hoc & depends on growers' willingness to test - generally do percentage of fields in an area each year to give basic background which is then extrapolated across farms/fields of similar crop & yield history, soil type and historical N application. Majority soil testing is site specific and re visited each time, on average each field would be tested every 5-10 yrs.

Whether growers want their paddocks tested, areas of poor growth, addition of fertilisers, deficiency symptoms, performance of crops in previous years, changes in yield expectations.

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GPS and zonal testing undertaken, dependent upon available info. 60% paddocks (per season) going to cotton are soil tested. All paddocks tested within 3-year rotation. Targeting N and surface P and K.

Crop rotation.

We test all farm units yearly to help with N budgets and to monitor P & K levels. So on average at least half of the paddocks would have a soil test.

Test every 3 to 4 years on back to back country. Fallow tested every time

Only some grid soil sampling been done across some clients.

A site per field and multiples sites in dryland fields with large soil variation.

We are testing all farm management units yearly to help nitrogen budgets and to monitor P and K levels. So, on average at 50 % of fields would have a soil test.

We test all farm units yearly to help with N budgets and to monitor P and K levels. So on average at least half of the paddocks would have a soil test.

If there is known variability, more frequent tests will be taken. This season we have done a significant amount of grid soil sampling to identify more strategic management zones. Huge savings have also been associated with this.

Limited soil testing completed. If done is all site-specific testing according to the majority soil type of an individual field or management area. All new (recently development fresh country) will be soil tested prior to its 1st crop.

Deep N testing pre-plant most fields each year. Shallow comprehensive soil testing on representative fields every 3-4 years.

Each field tested every 2 or so years, rotation dependent. Moving more towards zonal testing to allow for VR applications of inputs such as chicken litter. Testing for N, P, K, micronutrients, sodium, organic carbon, bulk density.

Using grid testing for variable P testing while MAP price isn't moving wherever we can use the savings made in fert as an indication as to how much ha we can do. Testing one field in each management zone for 0-30 and 30-60 based on prior history or performance in fallow fields, testing post cotton crops, and testing in EM areas for VR gypsum maps post laser. Also grid testing all fields with known history of BRR being done.

Generally each field or each management Unit - depending on the situation.

A mixture across our client base. Some soil test a mix of 'representative' fields prior to each crop. Some don't soil test frequently and just run a nitrogen budget using applied N v removal based on crop requirement and previous yield. Little use of site specific testing as not yet utilising variable rate applications. Soil tests conducted are typically 'complete' analysis of the top 30cm of soil for all nutrients and 'salts'. Below 30cm, generally on Nitrogen and Salts are monitored.

Soil tests conducted most years leading into the cotton crop however each field is tested every 5 years to see levels and crop removal monitored and N requirement calculated along the way.

All fields going to cotton are tested prior to planting to correct any inconsistencies within paddocks. Paddocks that have been identified as either low or high yielding, as well as paddocks that have not been tested in a while.

Only done after long fallows, use a nutrient bank more.

Before every crop. Complete.

Annual soil testing, tissue sample program 3x in season.

Depends on historical variability and if i think there is something other than N at play limiting performance that we don't understand. Will overlay yield with elevation/drainage if nothing obvious in poor performing patches.

Soil testing doesn't happen anymore.

GPS marked soil test locations. Test 40% of fields each year based on location, soil type, and cropping history. Cluster sample to keep it simple and not mix soil types.

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QUESTION 54

What do you see as the greatest challenge to reducing pesticide (insecticides, herbicides, fungicides, defoliants) usage and why?

I don't see the reason for why 'kg active ingredient is the main concern. Why isn't it the active ingredient's effect or potential effect on the environment that's measured.

Agronomists having the tough conversations with their growers about using softer slightly more expensive control options. Agronomists in our area who used Regent ended up with 4-6 insecticides costing growers $130-$240/ha for no extra yield benefit because prophylactic spraying with Regent is easy which then lead to Skope, Shield etc.

Price points from growers.

PHIL DAVIS

APPENDIX 9

QUESTION 55

Of the following higher hazard pesticides, what do you estimated the impact would be if the use of these actives in cotton was no longer allowable?

Need more alternatives not less.

Once Transform comes off patent i would expect to see a large increase in usage which will be great for the industry as hopefully much less use of regent.

Biggest losses would be residual herbicides and specialised insecticides for example diafenthiuron and propargite of which there are very few effective alternatives. Bifenthrin although not used often would be a loss as there are no affective alternatives for controlling green vegetable bug when this becomes an issue.

The reason for loss will be improper application and social license. We need to do a case study of what's happing in France and make everyone aware.

No.

There is no reliable alternative to low rates of fipronil or dimethoate - these are by far the softest products in the system and reliably work. This is a significant constraint.

Bring back aldicarb.

The loss of 1 individual product in isolation would have low impact as most have viable alternatives, however the loss of a range of complimentary or alternative products (e.g. loss diuron/ pendimethalin/s-metolachlor) could have a severe impact on managing resistance, particularly in weeds. In addition the loss of older chemistry will add cost to production where newer chemicals may be more expensive and at times less effective.

Loss of any product can lead to overuse and resistance of remaining chemistry.

With resistance we need as many options as possible.

Residual herbicides used extensively on channels to control difficult weeds such as fleabane and milk thistle. Paraquat very important in our double knock strategy for Glyphosate resistant ryegrass in post harvest cotton.

Use well and safely so the majority can still be used.

n/a

Resistance on a few of these are rising so need alternatives more readily. Phorate still used in some regions more than others where available but there are other options for liquid in furrow.

Loss of cheap products would be seen as a financial impact but would hopefully stop prophylactic spraying.

All actives are tools used collectively to control pests, rotate chemistry, manage crops based on expected financial reward, and deal with resistance. Looking at actives in isolation ignores the benefit of an active used selectively in a farming system. It's a very simplistic view of a complex farming system. Many actives that are considered high impact, are not first-choice options in a spray program. However, they each have specific fits in a farming system for the before mentioned reasons. Perhaps the use of an IRMS type program is better to regulate their use rather than simply looking at removing a product from the market. The introduction of better commercial options can see these products be replaced or reduced in their usage.

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