



2018 GROWER SURVEY

SEPTEMBER 2018



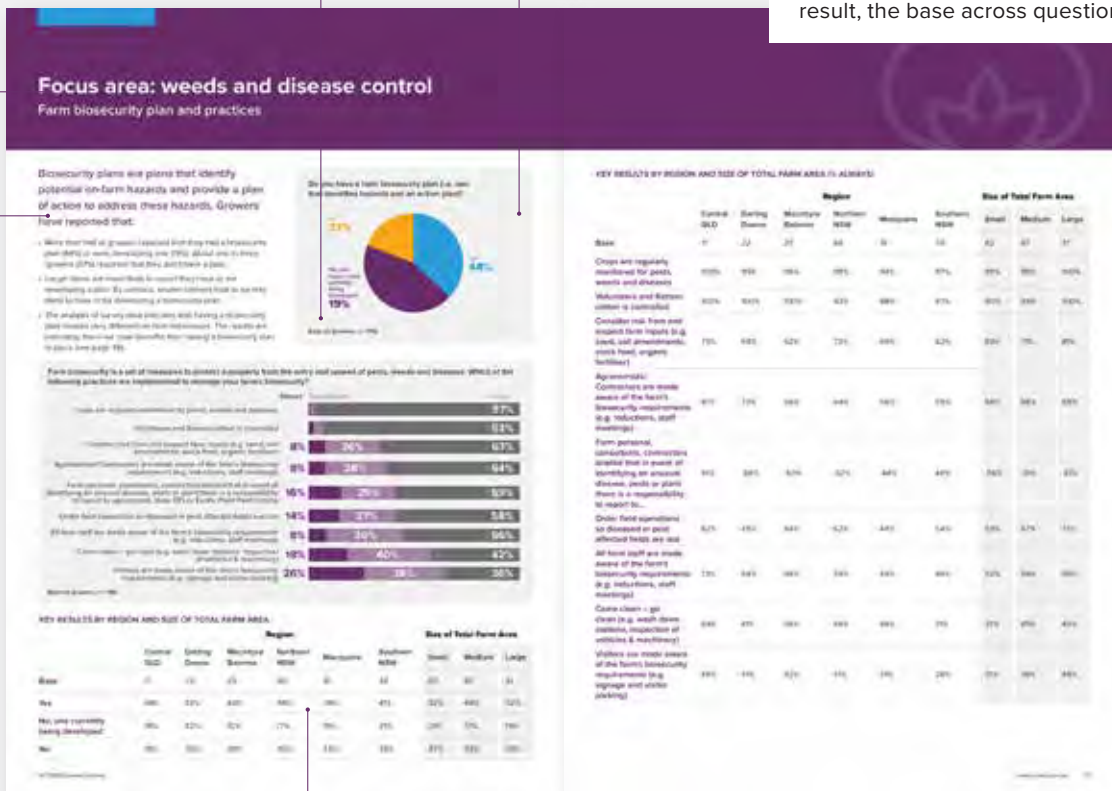
How to navigate the report

The banner above each page denotes the section and sub-section currently navigated to in the report. For example, this page is within the “Weeds and Disease Control” section (denoted by the heading) and covers questions regarding “Farm biosecurity plan and practices”.

The commentary to the left provide high-level insights into the results at an overall level, and (where applicable) results across two main segments – Region and Size of Total Farm Area

The results below are results of survey measurements reported at an overall level – covering all regions and farm sizes.

The base represents the cohort of respondents to the question (e.g. all growers), and the number that provided an answer to the question (180). Growers did not necessarily answer each question – as a result, the base across questions may vary.



Segments were categorised as follows:

Region (based off location, Q1)

- Central QLD
- Darling Downs
- Macintyre – Balonne
 - Border Rivers
 - St George / Dirranbandi
- Northern NSW
 - Gwydir
 - Lower / Upper Namoi
 - Bourke
- Macquarie
- Southern NSW
 - Lachlan
 - Murrumbidgee
 - Murray

Size of Total Farm Area (based on cropping area in Q2)

- Small (< 1,000 ha)
- Medium (1,000 – 5,000 ha)
- Large (> 5,000 ha)

The results below are results of survey measurements reported at two key segment levels:

Region (six categories) and Size of Total Farm Area (three categories). For instance, in Darling Downs 22 respondents answered the question, of which 32% stated “Yes” when asked if they have a farm biosecurity plan.



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It is important to note that the responses contained within the CRDC Grower Survey provide a snapshot in time of grower data, but do not tell the full story. The Grower Survey is one of many research projects commissioned by CRDC to gather industry information. The results are not intended to be used in isolation, but rather in consideration of these other projects, such as the CRDC and Cotton Australia Australian Grown Cotton Sustainability Report, and the industry's best practice program, *myBMP*, and extension program, CottonInfo, and the significant program of R&D that is managed by CRDC. In conjunction with these programs, the Grower Survey helps the industry measure practices and inform continuous improvement. The results are as provided by growers, and have not been independently verified. For any queries regarding the Grower Survey, please contact CRDC.

2018 Grower Survey

Background to the 2018 Grower Survey

The Cotton Research and Development Corporation (CRDC) undertakes an annual survey of cotton growers to gather information about farming practices and growers' views on research, development and extension. This information helps to inform CRDC about the benefits of the research it invests in. Change in industry practice can be quantified by comparing information across the surveys conducted over the past 20 years.

Previous surveys have included a number of core annual questions and then a number of focus areas to investigate specific aspects of the farming system.

In 2017, CRDC undertook a review of the aims, purpose and design for the survey. The 2017 Grower Survey was developed by a working group including CRDC, Cotton Australia, researchers and others. The 2018 Grower Survey has then been refined by the working group with reference to the 2017 survey, CRDC's Monitoring and Evaluation Framework and supplemented by research questions relevant to the seasonal conditions. This survey gathered mid-term assessment of growers' views of CRDC's performance against the Strategic RD&E Plan 2018-23.

The 2018 Grower Survey included:

- Baseline information about growers and their farm business including respondents' demographics (region, farm area) and season and farm information (yields, quality, area of cotton).
- A number of other focus areas were included in the survey including:
 - awareness and understanding of CRDC
 - awareness and understanding of CottonInfo
 - weeds and disease control
 - irrigation
 - automation
 - workforce
 - industry sentiment

The results from the 2018 Grower Survey now follows. Ahead of this, we provide an explanation to assist readers in understanding and interpreting the results in this report.

How and when the survey was conducted

When the survey was conducted The 2018 Grower Survey was conducted using a mixed mode data collection methodology.

This included:

- Growers where email contact details were available were invited to complete the survey online
- Growers were also contacted by phone to firstly encourage them to complete the survey online and, where possible, complete the survey over the phone

Surveys have usually been conducted in winter, focusing specifically on the preceding crop. The 2016 survey was however conducted in February 2016.

CRDC agreed that to ensure consistency over time the Grower Survey should be conducted at the same time each year.

The 2018 Grower Survey opened on 6th June 2018 and ran until 26th July 2018.





2017-18 SEASON WRAP-UP

A look at the 2017-18 season

The 2017–18 cotton season saw 500,000 hectares of irrigated and dryland cotton planted, capitalising on stored irrigation water and above average forward cotton prices. This was just shy of the 2016–17 crop, the largest planting in five years.

Cotton production for the 2017–18 year reached 4.6 million bales, up from 4.2 million bales in 2016-17, due to favourable seasonal conditions for irrigated summer crops. A lack of rainfall during the season meant it was too dry for many dryland crops.

The industry yield for 2017-18 (including irrigated, semi-irrigated and dryland cotton) is expected to average near 10 bales per hectare; a tremendous recovery from the challenging season of 2016-17 when yields averaged 7 bales per hectare.

The Australian cotton industry in 2017-18:

- **500,000 hectares** – planted into irrigated and dryland cotton, just shy of the 2016-17 crop, which was the largest crop in five years.
- **4.6 million bales** – produced by the Australian cotton industry
- **\$2.92 billion** – gross value of cotton production

Source: ABARES Ag Commodities Report, June 2018

CRDC'S INVESTMENT IN 2017-18

\$25.1 million

CRDC's investment in cotton RD&E on behalf of cotton growers and the Australian Government

318 RD&E projects

118 research partners

5 key program areas

farmers, industry, customers, people and performance

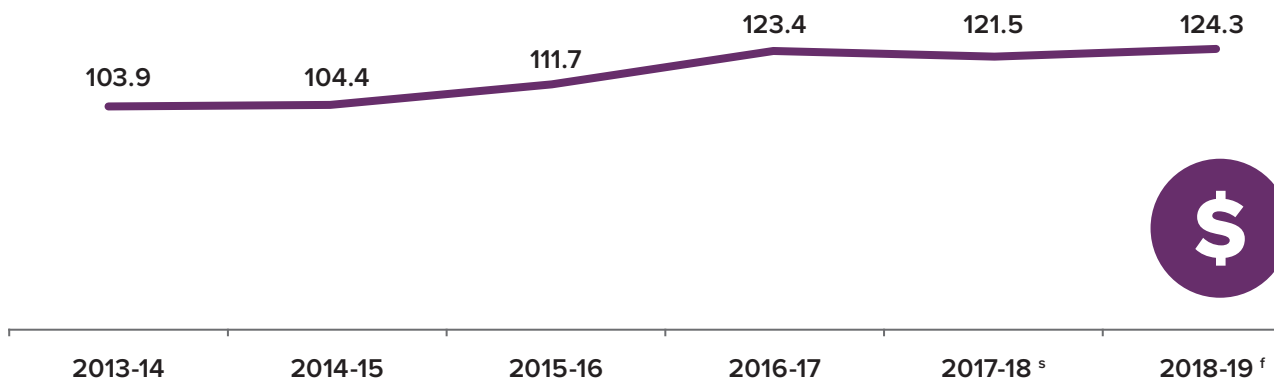
Commodity performance indicators



Australian Government
Department of Agriculture and Water Resources
ABARES

Source: Agricultural Commodities:
 June quarter 2018 - Statistics

Indexes of cotton prices received by farmers (Australia)

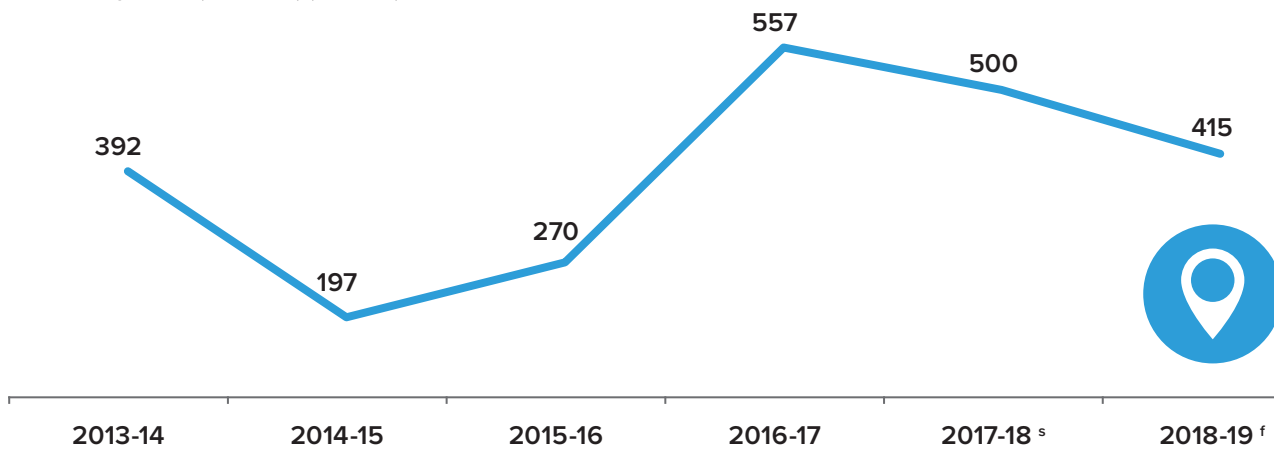


^f ABARES forecast. ^s ABARES estimate.

Note: The indexes for commodity groups are calculated on a chain-weighted basis using Fisher's ideal index with a reference year of 1997–98 = 100. Indexes for most individual commodities are based on annual gross unit value of production. Prices used in these calculations exclude GST. Series break in 2015–16. Prior to 2015–16 figures are based on establishments with an estimated value of agricultural operations (EVAO) of \$5,000. From 2015–16 (inclusive) figures are based on establishments with an EVAO of \$40,000.

Source: ABARES; Australian Bureau of Statistics

Cotton crop areas (Australia) ('000 ha)



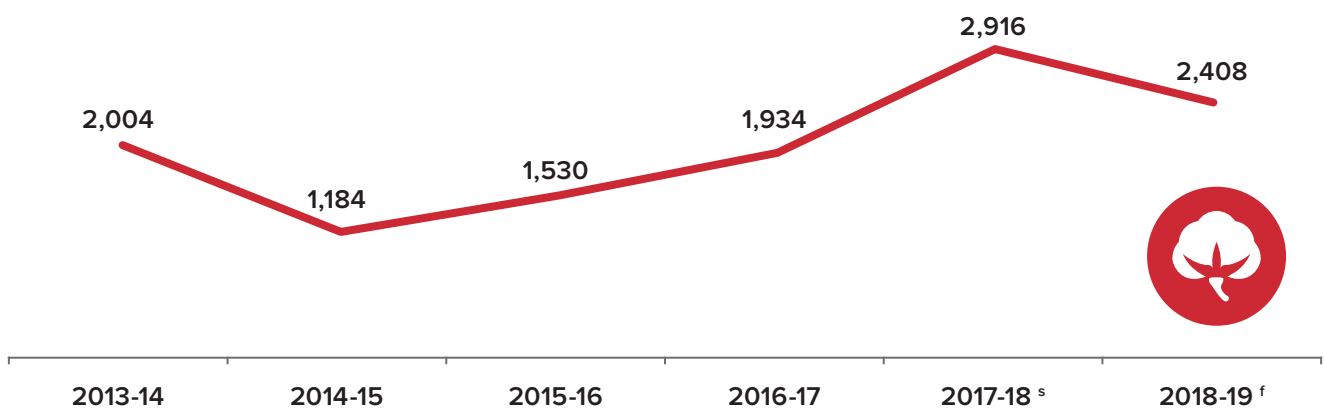
^f ABARES forecast. ^s ABARES estimate.

Note: Series break in 2015–16. Prior to 2015–16 figures are based on establishments with an estimated value of agricultural operations (EVAO) of \$5,000. From 2015–16 (inclusive) figures are based on establishments with an EVAO of \$40,000.

Sources: ABARES; Australian Bureau of Statistics; Cotton Australia, Australian cotton industry statistics - Cotton Annual, Sydney

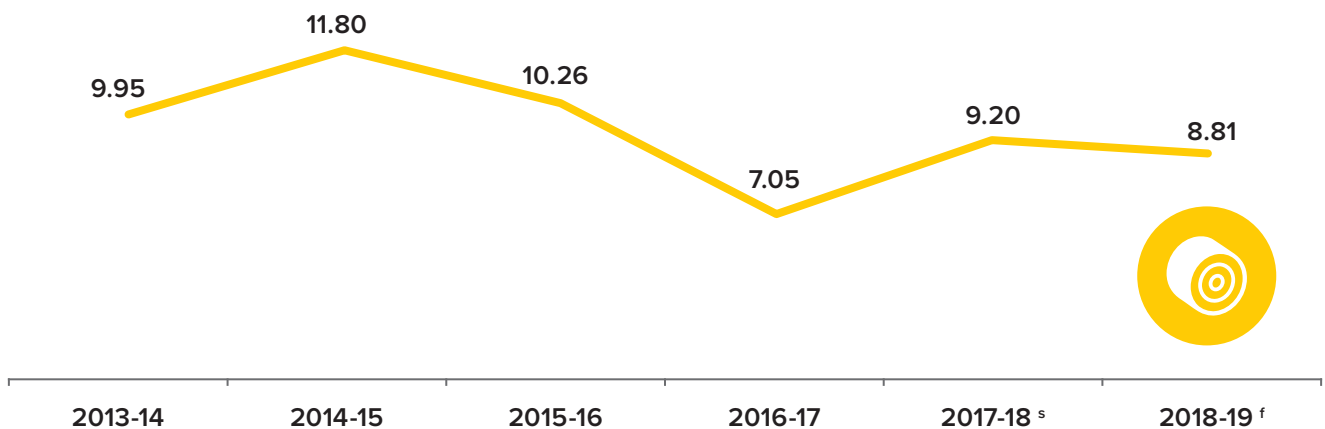


Gross value of cotton lint and cotton seed production* (Australia) (\$m)



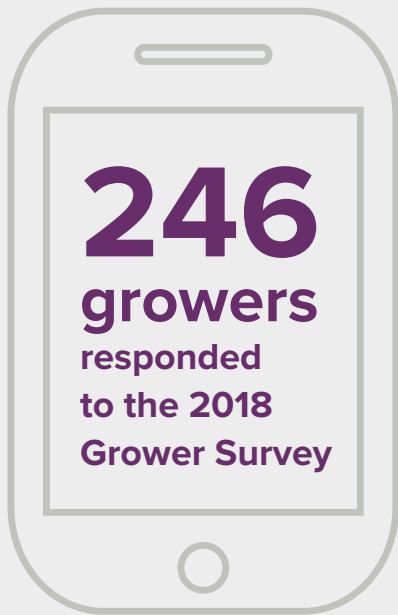
^f ABARES forecast. ^s ABARES estimate. ^{*} Value delivered to gin. Note: The gross value of production is the value placed on recorded production at the wholesale prices realised in the marketplace. The point of measurement can vary between commodities. Generally the marketplace is the metropolitan market in each state and territory. However, where commodities are consumed locally or where they become raw material for a secondary industry, these points are presumed to be the marketplace. Prices used in these calculations exclude GST. Series break in 2015–16. Prior to 2015–16 figures are based on establishments with an estimated value of agricultural operations (EVAO) of \$5,000. From 2015–16 (inclusive) figures are based on establishments with an EVAO of \$40,000. Sources: ABARES; Australian Bureau of Statistics

Average cotton yields (Australia) (bales/ha)



^f ABARES forecast. ^s ABARES estimate. Results based on ABARES reported t/ha divided by 0.227 (standard weight of a bale). Note: Series break in 2015–16. Prior to 2015–16 figures are based on establishments with an estimated value of agricultural operations (EVAO) of \$5,000. From 2015–16 (inclusive) figures are based on establishments with an EVAO of \$40,000. Sources: ABARES; Australian Bureau of Statistics

Key findings



95% of growers are very positive about the future of the industry



12% of total farm area was under cotton production in 2017-18



Growers reported an average of **576** hectares under cotton



YIELDS
AVERAGE YIELDS
(BALES/HA)

11.22 (fully irrigated)

2.43 (partially irrigated)

1.16 (raingrown | dryland)



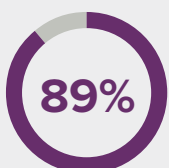
WATER USE
AVERAGE WATER
APPLIED (ML/HA)

7.72 ML / ha (fully irrigated)

1.10 ML / ha (partially irrigated)



17% of growers generated and used solar energy on their farm in 2017-18



of growers reported they are supportive of CRDC and their research investments and activities



4.3

(small farms)



7.9

(medium farms)



26.6

(large farms)

Average total number of staff varies by farm size, with **31%** of growers looking to recruit more staff in the next 12 months.



44%

of growers currently have a farm biosecurity plan (identifying hazards and an action plan) with a further **19%** currently developing a plan



49% of growers have confirmed weeds that are resistant to herbicides, with a further **26%** suspecting this, but not yet confirmed



31% of growers with full or part irrigation farmland monitor the quality of groundwater throughout their farm



94% of growers agree that CottonInfo is a trusted information source



35% of growers currently use automation on their farm, and **40%** do not currently use, but are considering options for the future

Focus area: industry sentiment

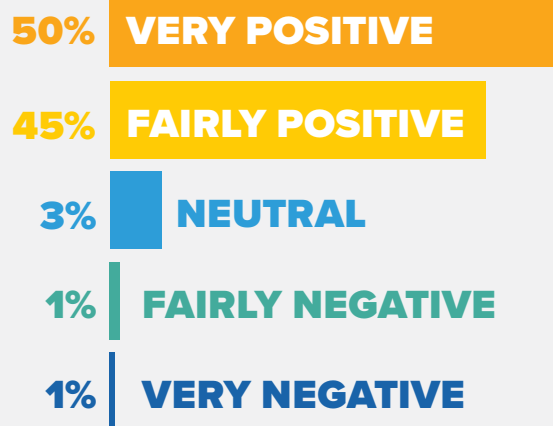
Feelings about the future of the cotton industry

The feedback from the 2018 CRDC Grower Survey indicates a high level of confidence and optimism about the future of the industry among cotton growers.

- The overwhelming majority of growers are positive about the future (95%) with just 2% holding a negative view. This was an increase (up 3 points) on the 2017 result. Of note is that there was an uplift in the proportion of farmers reporting they were very positive (up 9 points from the 2017 result).
- This strong level of optimism is consistent across all geographies and all farm sizes. While the results vary slightly across regions, the results still indicate a high level of optimism.

The results present a different perspective than the information provided in the June Rabobank survey, where farmers across all sectors are more negative than positive about the future of the agricultural sectors.

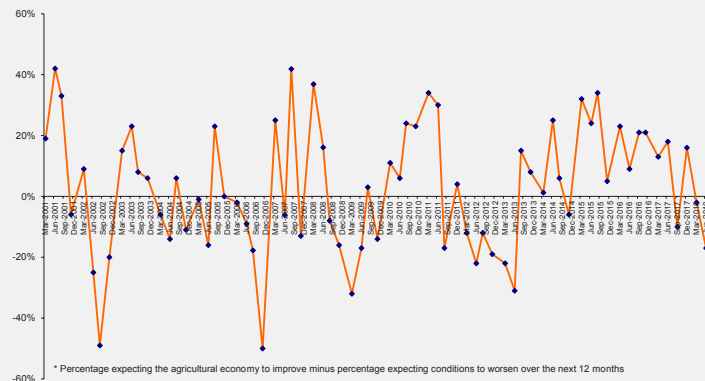
How they feel about the future of the cotton industry



95%
REPORTED
A POSITIVE
OUTLOOK
(UP 3% ON 2017)

NETT
SENTIMENT
(POSITIVE –
NEGATIVE):
93%
(UP 3% ON 2017)

Base all growers; n = 171



Source: Rabobank Rural Confidence Survey - Quarterly, June 2018

(<https://www.rabobank.com.au/-/media/rabobank-au/files/pdf/rural-confidence-survey/2018/june-national.pdf>)

KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	11	22	21	63	15	38	61	82	28
Positive outlook	100%	91%	100%	95%	87%	95%	98%	93%	93%
Negative outlook	0%	5%	0%	0%	13%	0%	0%	2%	4%
Nett sentiment	100%	86%	100%	95%	73%	95%	98%	90%	89%

Focus area: industry sentiment

Sentiment about their farming business and the cotton industry

Growers were asked specifically about the role of R&D and the profitability of cotton. The results from the 2018 survey are more emphatic (compared to the results reported in 2015-16) with:

- One in two growers strongly agreeing that RD&E drives improvement in the industry (this result was up 25 points from the previous measure); and
- One in two (51%) strongly agree that cotton is profitable and consistently their crop of choice. What was interesting is that smaller farms were more likely (93%) than larger farms (75%) to agree with this statement.

Overall there was strong endorsement of both these positions with very few farmers disagreeing with these statements (5% disagree). Further analysis has indicated that where farmers were very positive about the future of cotton, there was clearly a stronger agreement with these statements.

Would you agree or disagree with the following statements about your farming business and the cotton industry: (% Agree)

Research, development & extension drive continuous improvement of the Australian cotton industry

46%

(down 20% on 2015-16)

50%

(up 25% on 2015-16)

2%

disagree

Cotton is profitable and consistently my crop of choice

34%

(down 9% on 2015-16)

51%

(up 14% on 2015-16)

5%

disagree

Base all growers; n = 171

■ % Agree ■ % Strongly Agree

KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA (% AGREE)

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	11	22	21	63	15	38	61	82	28
RD&E drive continuous improvement of the Aus cotton industry	100%	95%	100%	95%	87%	100%	98%	95%	96%
Cotton is profitable and consistently my crop of choice	100%	91%	90%	81%	80%	82%	93%	82%	75%

Focus area: industry sentiment

Factors that limit the bottom line of their cotton business

What one or two factors are most limiting the bottom line for your cotton business?

When asked about what things may be limiting their bottom line, growers were direct and single minded, reporting that:

- More than eight in ten mentioned water and weather as the primary challenges to improving or even sustaining the farm profitability. This was articulated from a number of different perspectives including:
 - Access to water
 - Water policy
 - Rainfall
 - Weather forecasts (no rain)

Other factors mentioned by fewer growers included the cotton price, labour shortages and increases in input costs.

82%

of growers mentioned either **water or weather / climate**



Growers mentioned terms such as...

Water availability	21%	Rain (no further specification)	4%
Water (no further specification)	21%	Lack of rain	4%
Rainfall (no further specification)	10%	Water security	2%
Weather (no further specification)	10%	Climate (no further specification)	2%
Lack of water	9%	Reliability of water	2%
Related to Government policy	7%	Irrigation management	1%
Price of water	6%	Drought	1%

Other items growers mentioned...

Cotton price / price (unspecified)	9%	Price of energy / diesel	4%
Lack of staff / skilled staff / availability of contractors	8%	Disease control / research	2%
Costs (e.g. input costs, production costs)	7%	Yield	1%
Soil (soil variability, sodium, soil quality)	4%	Spray drift	1%
Cotton variety (e.g. lack of)	4%	Marketing	1%

Base all growers; n = 170

Note: only verbatims mentioned by at least 1% (n = 2 or more) of growers are listed above.

Focus area: CRDC

Awareness of CRDC

The 2018 study collected feedback from growers about their engagement and experience with CRDC. The results from the 2018 Grower Survey shows that:

- The overwhelming majority of growers are aware of CRDC. Only a handful of growers indicated they were not aware. These results are largely consistent with the 2015-16 survey results.
- Growers are reporting an increased level of familiarity (up 4 points) with CRDC (almost three in four reporting they know what CRDC does very/fairly well). Perhaps not surprisingly, larger growers reported being more familiar than the smaller growers.
- The large majority of growers (89%) are supportive of CRDC's research and investment (up 1 point).

Growers also reported a strong assessment of CRDC in regards to:

- Providing useful, credible information (up 0.1 to 4.1 out of a maximum rating of 5); and
- Communicating with growers (up 0.5 to 3.9).

Pleasingly, these reports are largely consistent across all regions and across farms of different sizes.

That said, growers in southern NSW have reported somewhat lower results across a number of measures. Some further investment into engagement with growers in this area may be warranted.

Before completing this survey today, were you aware of the Cotton Research and Development Corporation (CRDC)?



176 of 181 growers were aware of CRDC. This compares to 225 of 226 growers in 2015-16.

Base all growers; n = 181

KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

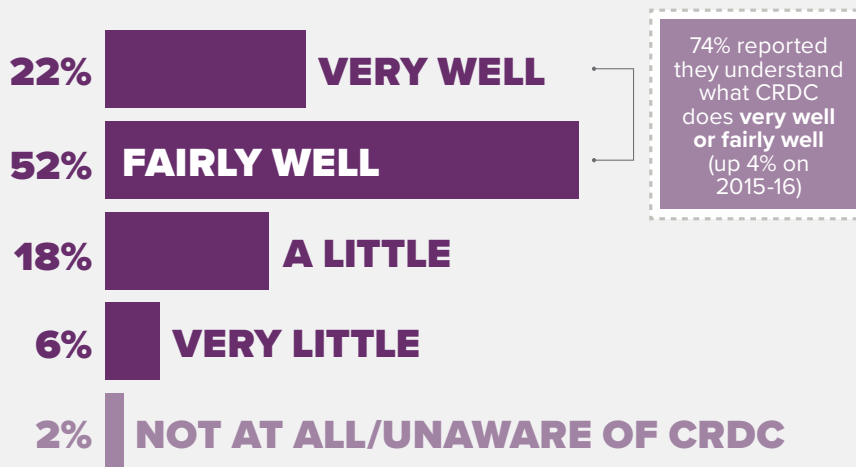
	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	11	22	25	67	16	39	62	88	31
% aware of CRDC	100%	100%	100%	97%	100%	92%	100%	94%	100%



Focus area: CRDC

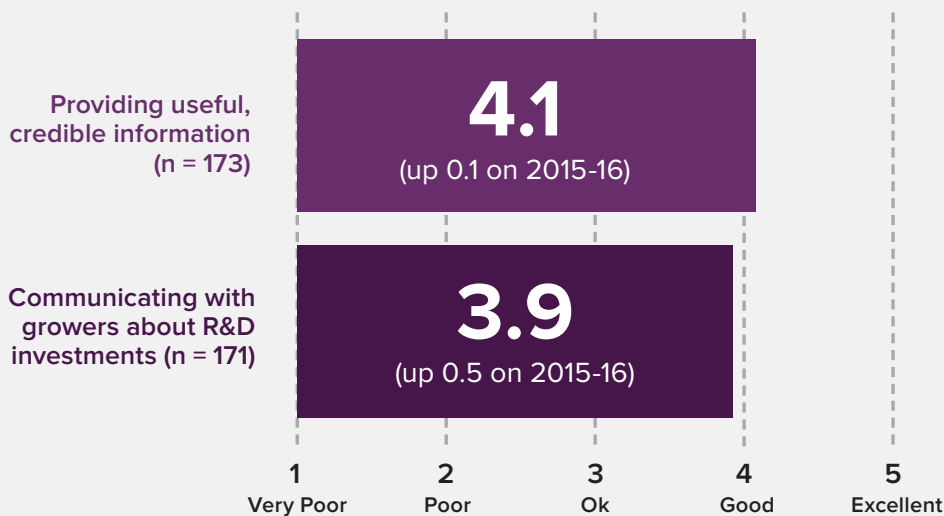
Understanding and performance of CRDC

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



Base all growers; n = 181

How would you rate CRDC's performance in:



Base all growers (excluding "Don't know" answers); n varies



KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

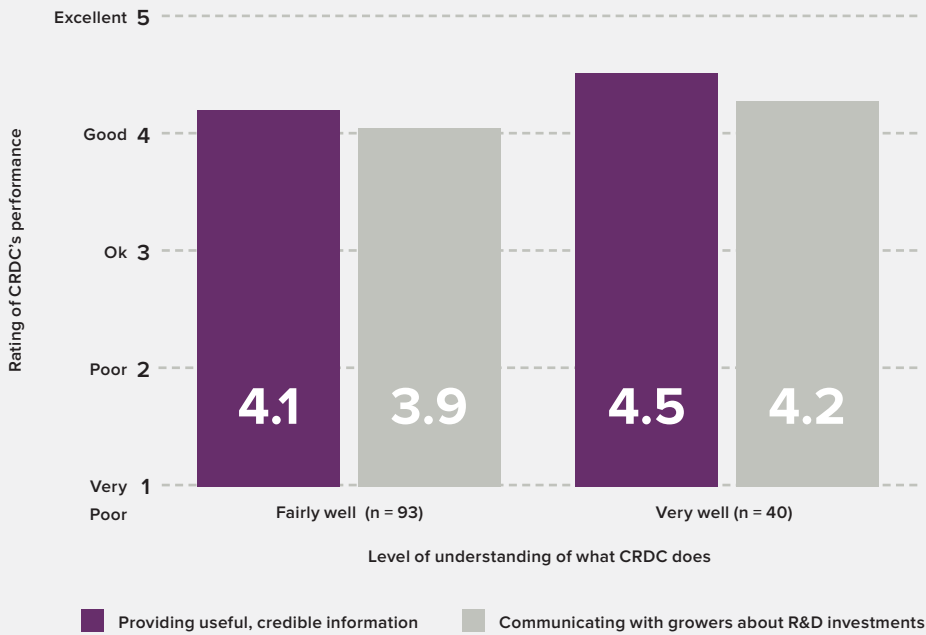
	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	11	22	25	67	16	39	62	88	31
% Very well	36%	23%	16%	30%	38%	3%	27%	20%	16%
% Fairly well	64%	59%	56%	55%	38%	41%	34%	58%	71%
% Very + fairly well	100%	82%	72%	85%	76%	44%	61%	78%	87%

KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

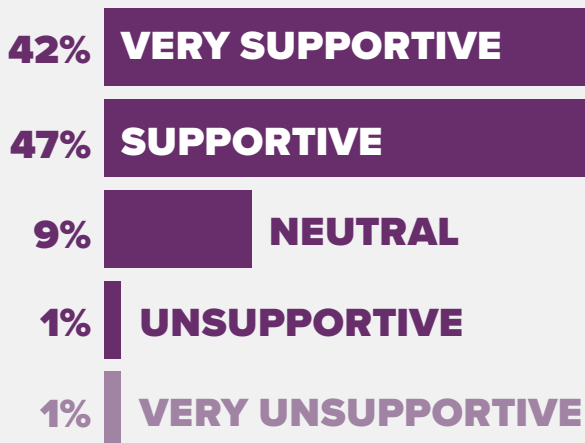
	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	11	22	25	65	16	34	59	84	30
Providing useful, credible info	4.5	4.0	4.2	4.2	4.1	4.0	4.2	4.1	4.0
Base	11	22	25	64	16	32	58	83	30
Communicating R&D with growers	4.1	3.8	3.9	3.9	4.0	3.6	3.9	3.9	3.7

Focus area: CRDC

Support of CRDC's research investments and activities

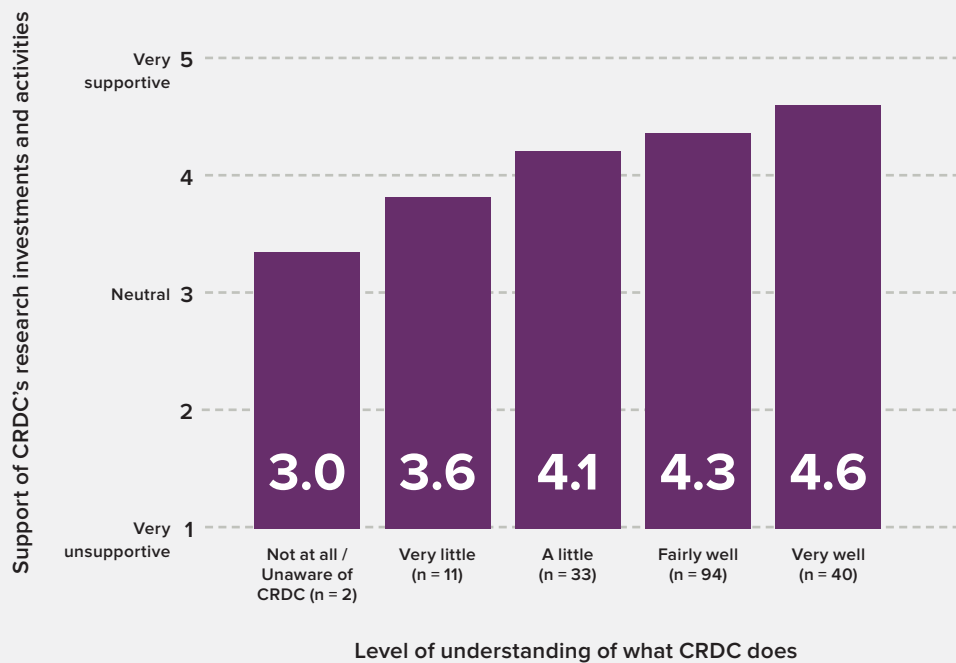


Overall, how supportive are you of CRDC's research investments and activities?



89% reported they are supportive of CRDC's research investments and activities (up 1% on 2015-16)

Base: all growers; n = 180



KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	11	22	25	66	16	39	62	87	31
% Very supportive	64%	27%	52%	56%	31%	15%	45%	39%	42%
% Supportive	36%	59%	48%	32%	69%	62%	42%	49%	52%
% Very supportive + Supportive	100%	86%	100%	88%	100%	77%	87%	88%	94%
% Neutral	0%	9%	0%	9%	0%	21%	11%	8%	6%

Focus area: CottonInfo

Awareness of CottonInfo

The 2018 study also collected feedback from growers about their engagement and experience with CottonInfo. The results from the 2018 Grower Survey shows that:

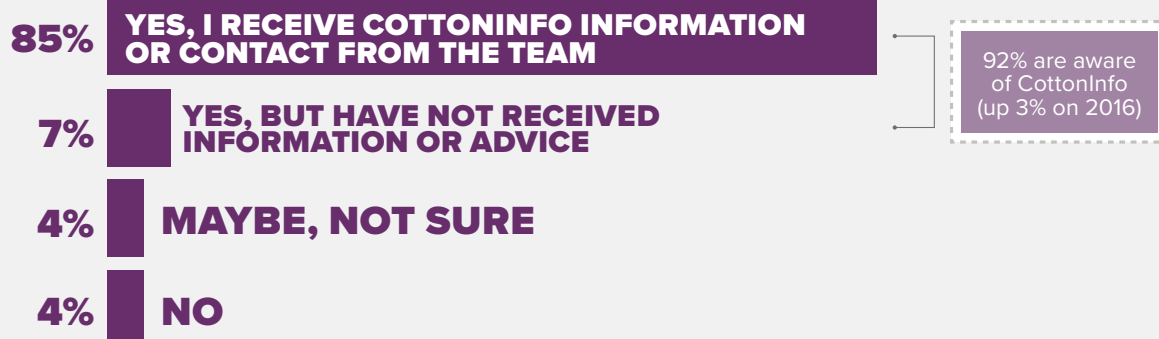
- The overwhelming majority of growers are aware of CottonInfo. With the majority of growers aware, the improvement on the 2016 result (up 3 points) was small but now provides a reach to more than nine in ten growers.
- Awareness of CottonInfo is consistent across all regions and farm sizes.
- More than three in four (78%) reported sourcing information from CottonInfo, a result down on that reported in 2016. Growers in southern NSW were less likely to source information from CottonInfo.

Within these results, the feedback has indicated that the information and resources provided by CottonInfo are delivering support to deliver improved practices. Results are up from 2016 across all focus areas (weeds, water management, NRM, energy, nutrition).

There was further positive feedback with growers strongly supporting the proposition that CottonInfo:

- Is a trusted information source; and
- Provides useful, credible information.

Are you aware of CottonInfo - the cotton industry's joint extension program (consisting of regional extension officers, technical leads and myBMP)?



Base all growers; n = 180

KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

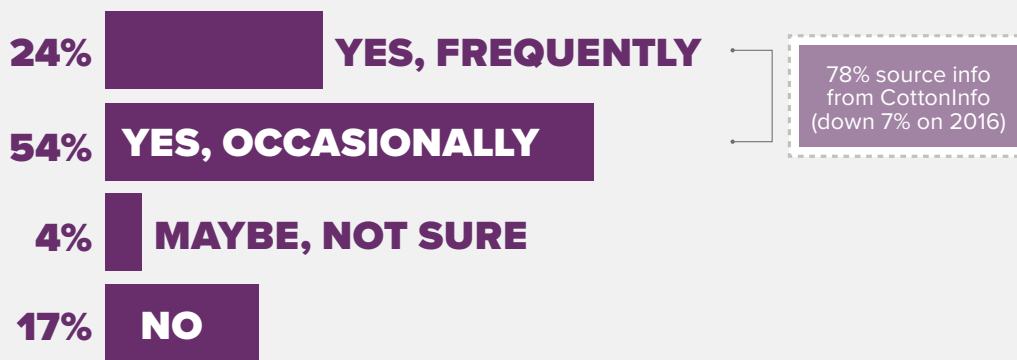
	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	11	22	25	66	16	39	62	87	31
% Yes, I receive CottonInfo contact	91%	82%	92%	86%	100%	72%	84%	85%	87%
% Yes, but not received info	9%	14%	4%	6%	0%	8%	6%	7%	6%
% aware of CottonInfo	100%	96%	96%	92%	100%	80%	90%	92%	93%



Focus area: CottonInfo

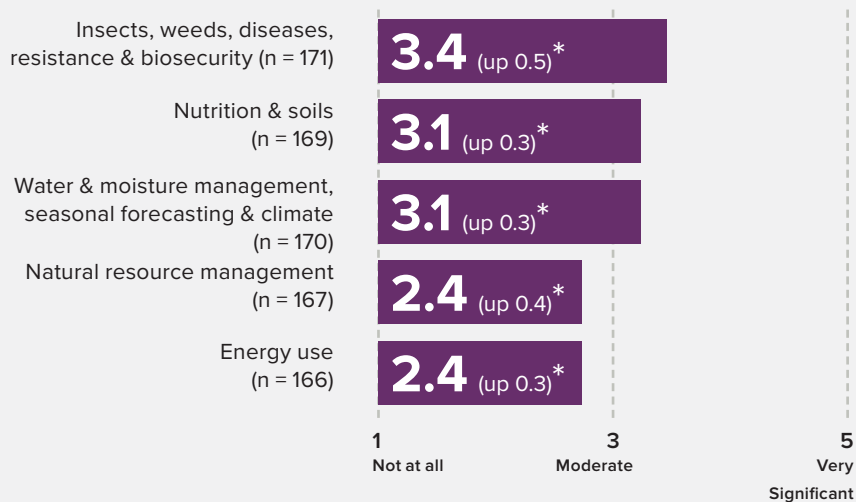
Sourcing from CottonInfo and usefulness of the CottonInfo team and resources

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



Base all growers; n = 180

To what degree have the CottonInfo team, information resources and *myBMP* assisted you to improve practices on your farm in relation to...



Base all growers (excluding "N/A, not needed" answers); n varies

*Trend data based on 2016 results.



KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	11	22	25	66	16	39	62	87	31
% Yes, frequently	27%	32%	12%	24%	44%	18%	18%	25%	35%
% Yes, occasionally	55%	59%	76%	58%	50%	36%	58%	52%	55%
% Yes	82%	91%	88%	82%	94%	54%	76%	77%	90%

KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	11	22	25	62	15	36	60	81	30
Insects, weeds, diseases, etc.	3.3	3.5	3.4	3.5	3.8	2.9	3.0	3.5	3.7
Base	11	22	25	61	15	35	60	79	30
Nutrition & soils	3.3	3.0	3.0	3.2	3.6	2.7	2.8	3.3	3.2
Base	11	22	25	61	15	36	60	80	30
Water & moisture management, etc.	2.9	3.3	3.1	3.0	3.7	2.8	2.9	3.1	3.4
Base	11	19	25	60	15	36	58	78	30
Natural resource management	2.6	2.5	2.2	2.5	2.8	1.9	2.2	2.4	2.5
Base	11	21	25	61	13	36	58	79	30
Energy use	2.8	2.6	2.5	2.4	2.6	2.1	2.3	2.4	2.7

Focus area: CottonInfo

Sentiment about CottonInfo

Thinking about CottonInfo, do you agree or disagree that... (% Agree)

CottonInfo is a trusted information source (n = 170)

94%

1% disagree

CottonInfo provides useful, credible info (n = 170)

90%

2% disagree

Base all growers (excluding "N/A" answers); n varies

KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

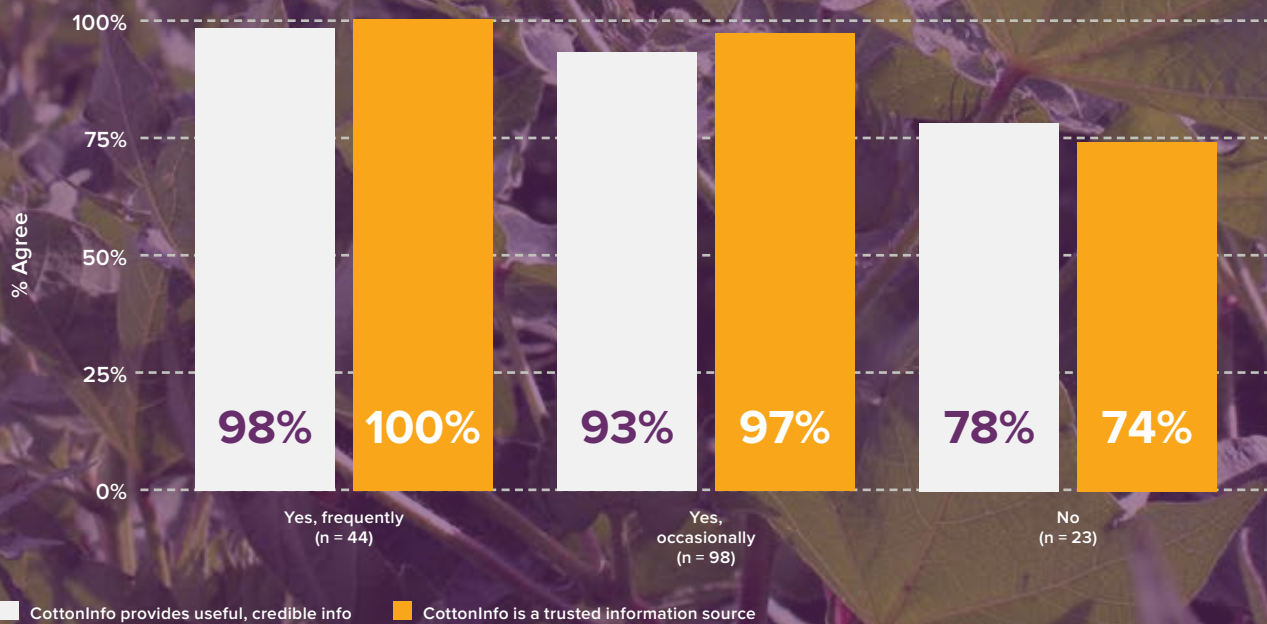
	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	11	22	25	60	16	35	60	81	29
Trusted information source	100%	100%	96%	95%	100%	83%	90%	95%	100%
Base	11	22	25	60	16	35	60	81	29
Provides useful, credible info	82%	91%	92%	92%	94%	86%	85%	91%	97%



Ruth Redfern



Do you source information from the CottonInfo team or information resources?



Focus area: farm profiles

Area and distribution of farm land

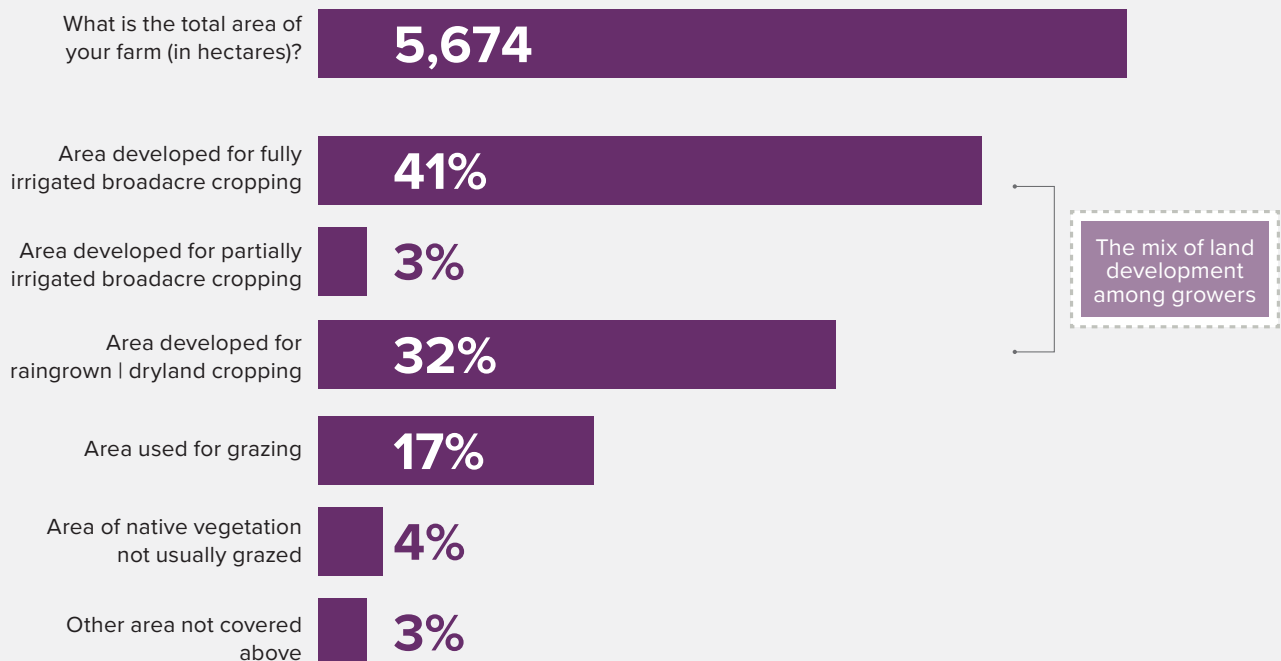
The initial enquiries of growers related to building an understanding of their farm use. The feedback from the 2018 CRDC Grower Survey indicates:

- Growers reported (on average) a farm size of some 5,674 ha;
- 76% of the available land area was developed and available for cropping or other uses including cotton; with
- Growers typically reporting the majority of the developed area being either fully irrigated or developed for dryland farming; and with
- Some 24% of their total farm area remains in use for grazing, native vegetation or other.

The nature of cotton farming obviously varies across the different growing regions and farm sizes as illustrated in the results shown below.



Average distribution of land on their farm

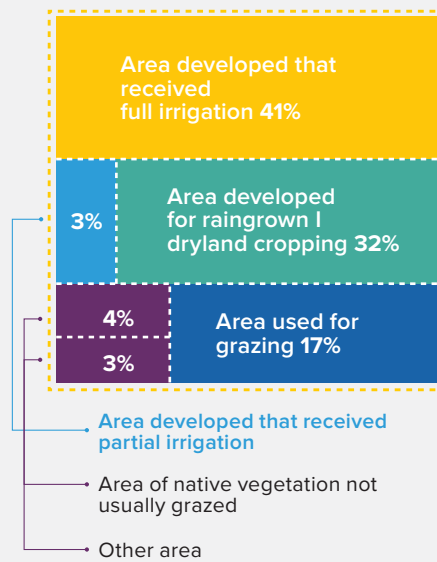


Base all growers; n = 219*

*Note: One grower was removed from the calculation of total farm size (ha) due to having a substantially different farm size when compared to all other growers.



Average distribution of land on their farm



KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	14	25	30	79	20	50	67	115	37
Total area	2,790	1,617	11,906	6,570	4,204	4,038	964	4,058	19,226
Full irrigation	35%	30%	37%	33%	33%	67%	57%	37%	25%
Partial irrigation	0%	7%	1%	3%	3%	2%	2%	4%	1%
Raingrown Dryland	18%	51%	24%	44%	40%	11%	19%	33%	52%
Other	46%	12%	39%	20%	24%	21%	22%	26%	22%

Focus area: farm profiles

Average riparian length and width

The feedback from the 2018 CRDC Grower Survey indicates:

- Growers report their average riparian area is 6.31km in length; and with a
- Average width of 169m.

The analysis indicates the size of these riparian areas varies considerable across the different growing regions. Not surprisingly also there is considerable variation across the different farm sizes.

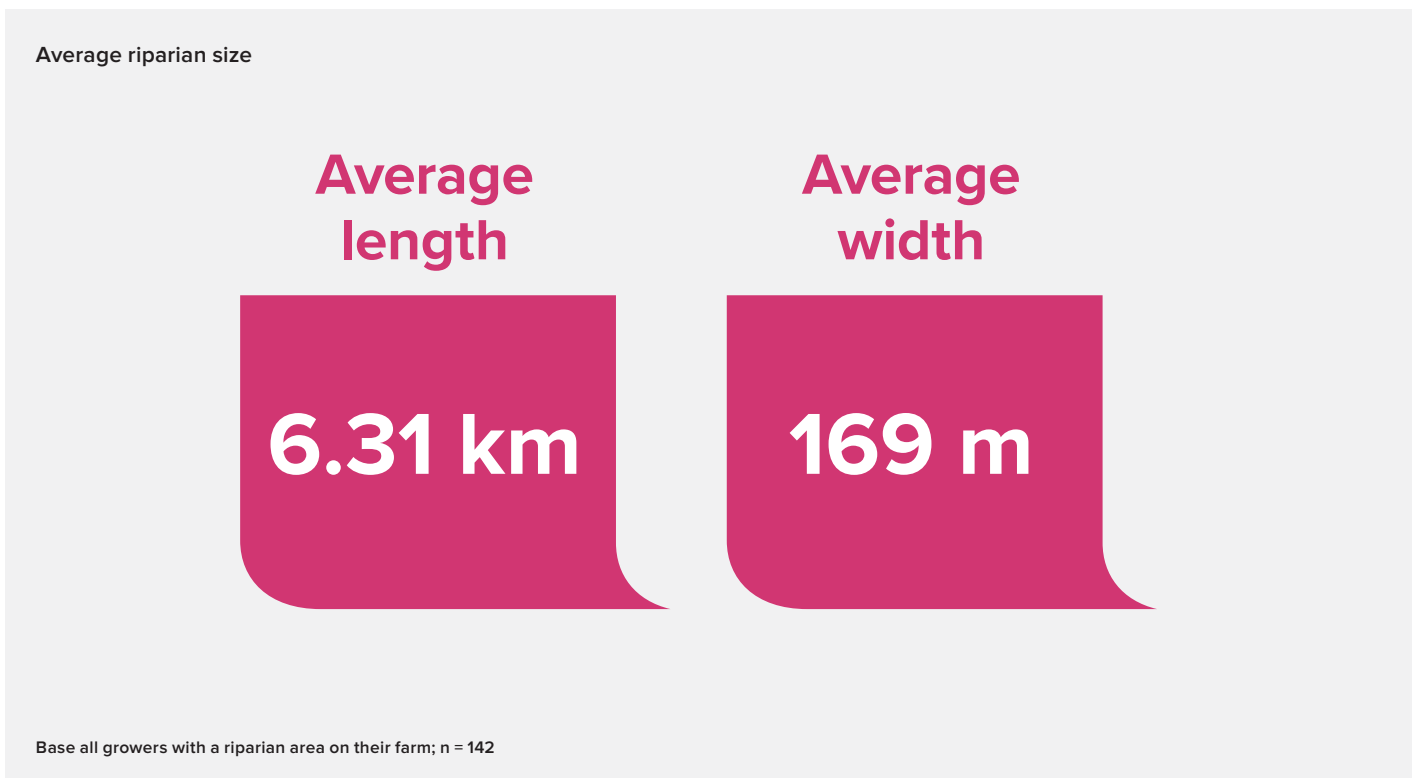
This compares to a reported average area of 7.65km reported in 2017, 7.5km in the 2014 survey and 9km reported in the 2011 survey.

.....

“A riparian zone is land alongside creeks, streams, gullies, rivers and wetlands.”

Source: <http://www.waternsw.com.au/water-quality/catchment/living/managing-land/riparian>

.....



KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	14	17	18	52	13	28	45	70	27
Average length	6.21 km	3.97 km	7.80 km	7.99 km	4.74 km	4.40 km	3.00 km	7.00 km	10.01 km
Average width	211 m	250 m	119 m	181 m	66 m	156 m	161 m	191 m	125 m



Focus area: 2017-18 cotton crop

Distribution of area planted for cotton

Key information about the growers' area planted for the 1718 season was collected during the survey. The feedback from the 2018 CRDC Grower Survey indicates:

- Growers reported a field area planting of 45% of the developed fully irrigated areas (down just 3 points on the 2017 result);
- Just 24% of the partially irrigated developed area was allocated and used for their cotton crop; and
- Just 12% of the dryland area was allocated to cotton. This compares to 11% last year and 16% reported in the 1516 survey.
- Based on the feedback provided in the 2018 Grower Survey, cotton was grown on an estimated 12% of total farm land. This compares to the previous estimate of 14% of the total farm area reported by Cotton Australia.
- On average, growers reported an area of 576 ha allocated to cotton. This compares to the 2017 Grower Survey estimate of 624 ha, and the 2018 estimate of 305 ha as reported by Cotton Australia.
- Based on the estimates provided by growers, it is estimated that the total cotton crop area for the 1718 season was 501,811 ha. This compares to the ABARES forecast of 500,000 ha and the Cotton Australia forecast of 452,000 ha.

Source (ABARES): Agricultural Commodities: June quarter 2018 - Statistics

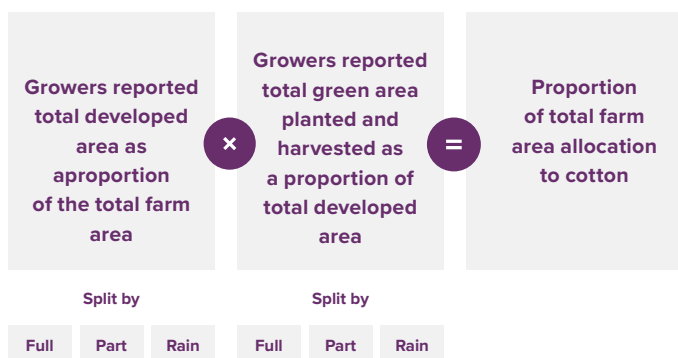
Source (Cotton Australia): http://cottonaustralia.com.au/uploads/publications/03-051801_COTTON_ANNUAL_2018_DR4.pdf

AREA PLANTED FOR COTTON WITHIN EACH DEVELOPED AREA FOR THE 2017-18 COTTON GROWING SEASON

	Fully Irrigated (proportion)	Partially Irrigated (proportion)	Raingrown Dryland (proportion)
Field area planted	45%	24%	12%
Green area planted	33%	8%	8%
Area planted but not harvested	3%	3%	1%

Base all growers who grew cotton during 2017-18 season; n varies (Fully Irrigated, n = 167, Partially Irrigated, n = 31, Raingrown | Dryland, n = 130).

ESTIMATION METHOD TO CALCULATE PROPORTION OF TOTAL LAND AREA UNDER COTTON



AREA UNDER COTTON CROP WITHIN THE 2017-18 SEASON

Average area growers reported as area allocated to cotton crop (ha / grower)	576
Total number of growers growing cotton in 2017-18*	871
Total area under cotton crop within 2017-18 (ha)	501,811

* Total sample size: n = 1,144. When contacted by phone, 15.4% of contacts stated they were not in the farming business anymore.

A further 10% when surveyed identified they were not farming cotton in 2017-18. Taking these into account, the effective number of cotton growers is n = 871.

Focus area: 2017-18 cotton crop

Yields for the 2017-18 cotton growing season

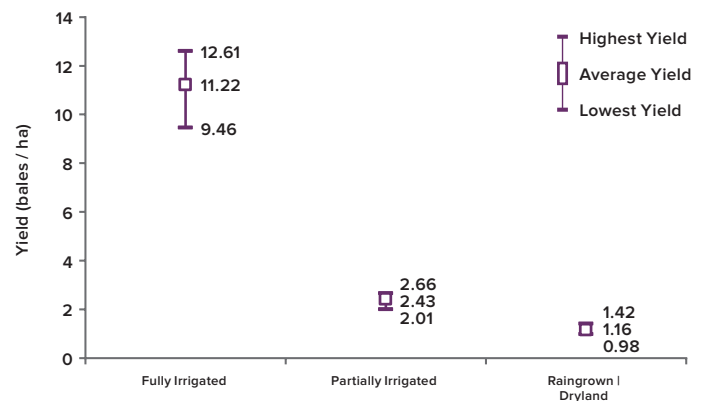
Growers reported three key indicators for the yields they achieved for the 1718 growing season.

These were average yield across their entire crop, the highest and then lowest yield from one field for the same crop. This provides a sense of the breadth of performance across their farms.

The results provided by growers indicate the variation across fully, partially and rain grown areas.

A quick overview of the different yields achieved across these different areas is shown opposite.

For fully irrigated areas, the 1718 survey reported an average yield of 11.22 bales/ha. This reported result is up on 2017 (9.99) but slightly down on the 1516 survey result (12.4).



YIELDS FOR THE 2017-18 COTTON GROWING SEASON (BALES PER HECTARE)

	Fully Irrigated (bales per ha)	Partially Irrigated (bales per ha)	Raingrown Dryland (bales per ha)
Average yield	11.22	2.43	1.16
Yield achieved by your highest-yielding field (average of grower-reported yield)	12.61	2.66	1.42
Yield achieved by your lowest-yielding field (average of grower-reported yield)	9.46	2.01	0.98

Base all growers who grew cotton during 2017-18 season; n varies (Fully Irrigated, n = 158, Partially Irrigated, n = 31, Raingrown | Dryland, n = 123).

KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	13	14	25	48	18	41	48	82	28
Fully irrigated – Average yield	9.62	9.04	11.00	11.07	14.48	11.32	11.07	11.00	12.09
Fully irrigated – Highest yield from one field	11.73	10.84	11.97	12.31	15.94	12.79	12.34	12.56	13.22
Fully irrigated – Lowest yield from one field	7.71	7.68	9.02	9.24	13.12	9.54	9.43	9.42	9.63
Range of variation from average yield	4.03	3.16	2.95	3.07	2.82	3.25	2.91	3.14	3.59

Focus area: 2017-18 cotton crop

Moisture profile, in-crop rainfall and water applied

Could you please provide estimates on what the moisture profile was at planting (or prior to pre-watering if performed) across the following areas (for the 2017-18 cotton growing season):

	Fully Irrigated	Partially Irrigated	Raingrown Dryland
Moisture profile at planting or prior to pre-watering (mm)	171.3	110.0	118.2

Base: all growers who grew cotton during 2017-18 season; n varies
(Fully Irrigated, n = 126, Partially Irrigated, n = 25, Raingrown | Dryland, n = 112).

How much in-crop rainfall (in mm) did you receive in the 2017-18 cotton growing season between planting and harvesting?

In-crop
rainfall

139.7
mm



Base all growers who grew cotton during 2017-18 season; n = 168

How much irrigation water (in mega litres) on average (per ha) was applied during the 2017-18 Cotton growing season?

	Fully Irrigated	Partially Irrigated
Average mega litres used per ha	7.72 ML / ha	1.10 ML / ha

Base all growers who grew cotton during 2017-18 season; n varies
(Fully Irrigated, n = 149, Partially Irrigated, n = 27).





KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	8	11	19	41	17	30	30	71	25
Fully irrigated – Moisture profile (mm)	175.0	241.4	234.3	163.8	184.7	107.3	168.3	150.7	233.2

KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	13	16	23	62	18	36	52	85	31
In-crop rainfall (mm)	289.0	179.2	114.4	129.5	116.5	113.8	148.5	136.6	133.5

KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	12	11	23	45	18	40	47	75	27
Fully irrigated – Mega litres used per ha (ML / ha)	6.04	3.88	8.26	6.92	9.11	9.24	7.57	7.66	8.16
Base	0	7	1	11	3	5	6	15	6
Partially irrigated – Mega litres used per ha (ML / ha)	-	1.96	0.00	1.46	0.00	0.00	0.92	1.29	0.83

Focus area: 2017-18 cotton crop

Total energy use and use of solar energy

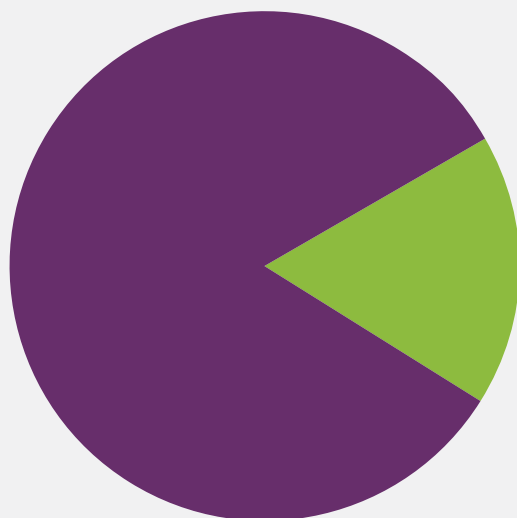
Please provide an estimate on what your total energy use was for the 2017-18 cotton growing season across the following operations – grower average per hectares of area planted for cotton:

	Diesel (L)	Bio-diesel (L) / Electricity (kWh)
Energy used for in-field operations (grower average / ha planted for cotton)	133 L / ha	0 L / ha <i>166 of 168 growers did not use Bio-diesel</i>
Energy used for pumping water (grower average / ha planted for cotton)	111 L / ha	70 kWh / ha

Base all growers who grew cotton during 2017-18 season AND answered the question; n = 154

How much solar energy did you make use of for the 2017-18 cotton growing season for your farming operations?

Don't generate solar energy
83%



Generated and used solar energy
17%



Base all growers who grew cotton during 2017-18 season; n = 168

Note: growers were asked to estimate how much energy (in kWh) they generate and use, but most growers were unsure of this. Hence, this result is not reported.

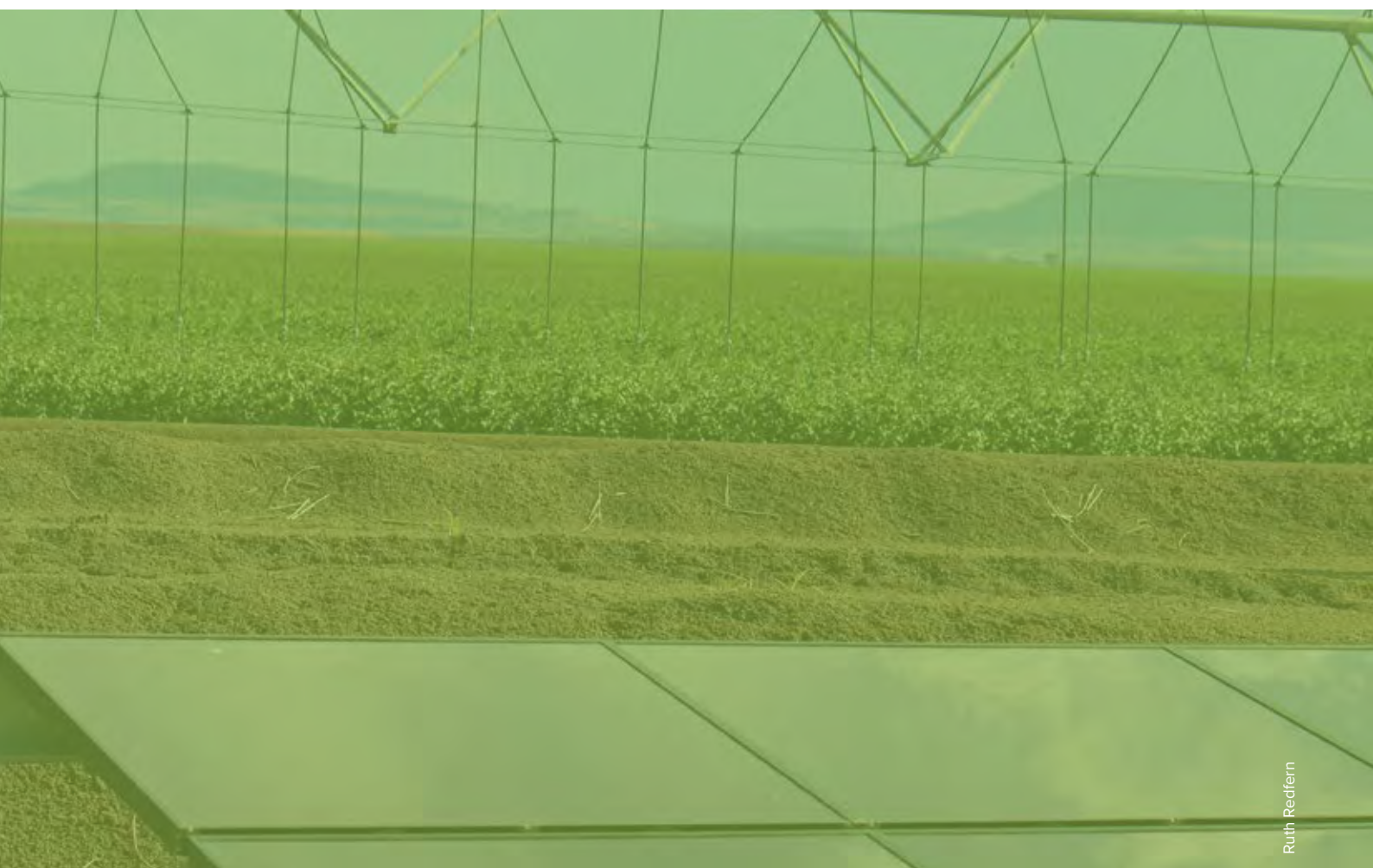
KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	11	20	24	58	16	38	58	78	31
% who generate and use solar energy	18%	15%	13%	14%	38%	18%	22%	18%	6%



KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	10	17	23	53	15	36	56	71	27
Diesel (L / ha) – Energy used for infield operations	99	107	161	109	111	179	122	147	117
Bio-diesel (L / ha) – Energy used for infield operations	0	<1	0	<1	0	0	<1	0	0
Diesel (L / ha) – Energy used for pumping water	23	58	96	129	187	98	97	124	106
Electricity (kWh / ha) – Energy used for pumping water	2	14	46	129	0	70	114	61	3



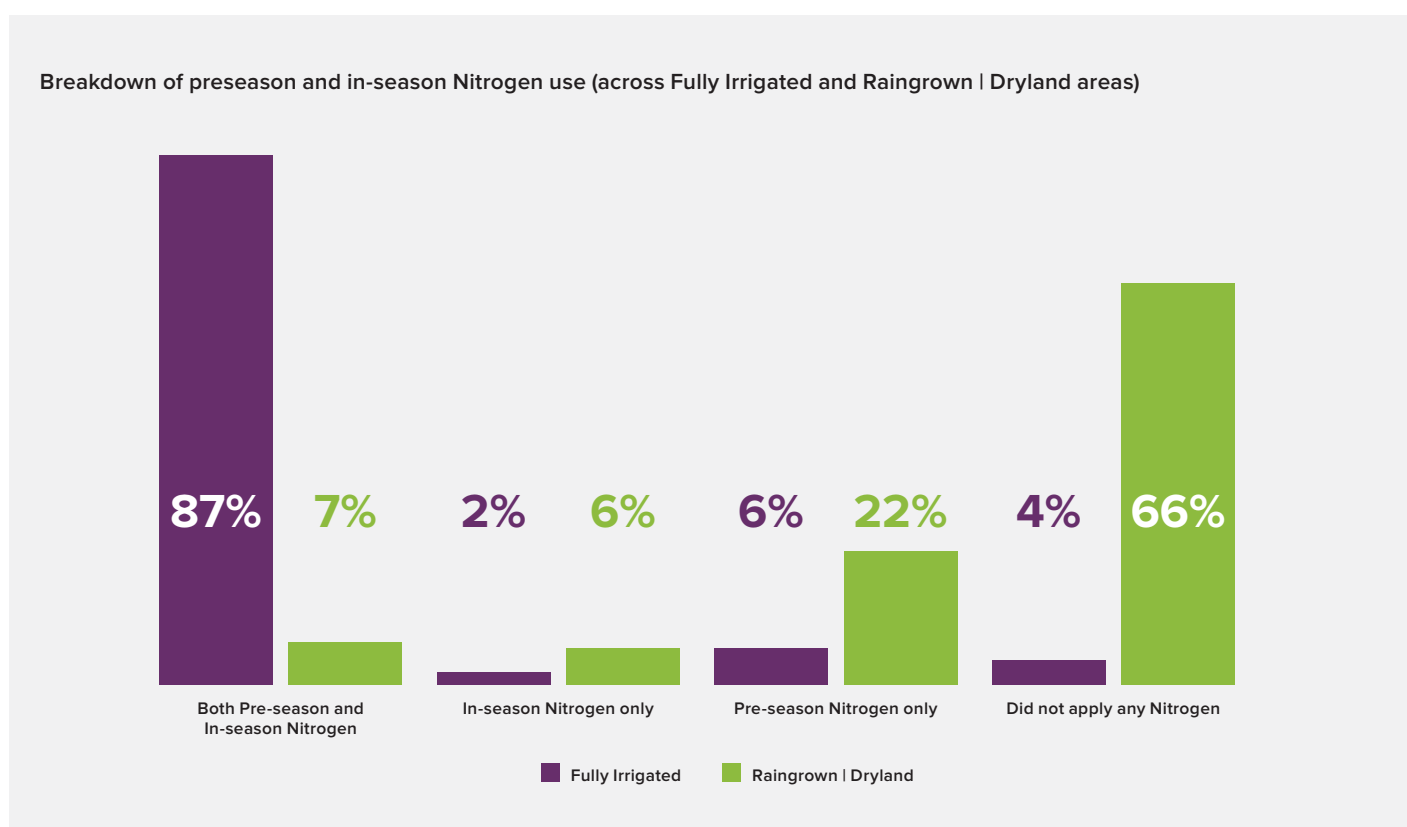
Focus area: 2017-18 cotton crop

Rate of applied nutrients in 2017-18

Please list the rate of applied nutrients for your most typical irrigated, partially irrigated and/or dryland cotton field/s in 2017-18:

	Fully Irrigated	Partially Irrigated	Raingrown Dryland
Preseason Nitrogen (kg N/ha)	197.5	59.7	26.8
In-season Nitrogen (kg N/ha)	138.4	9.0	7.2
Total Nitrogen (kg N/ha)	335.9	68.7	33.9
Total Phosphorus (kg P/ha)	65.2	13.0	3.3
Total Potassium (kg K/ha)	32.3	5.4	2.8
Total Zinc	7.7	1.6	2.6
Total Sulphur	46.1	4.0	11.5

Base all growers who grew cotton during 2017-18 season; n varies
(Fully Irrigated, n = 139, Partially Irrigated, n = 25, Raingrown | Dryland, n = 106).





KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	10	13	22	44	14	36	48	65	26
Fully irrigated – Preseason N (kg N/ha)	200.2	154.9	212.3	184.2	205.1	216.4	190.1	200.6	203.2
Fully irrigated – In-season N (kg N/ha)	96.7	80.1	153.9	98.5	215.7	180.3	133.7	141.4	139.6
Fully irrigated – Phosphorus (kg P/ha)	44.6	33.3	55.3	34.7	62.5	124.2	56.8	79.3	48.6
Fully irrigated – Potassium (kg K/ha)	47.9	26.6	44.5	14.8	8.3	53.0	23.8	42.3	24.4
Fully irrigated – Total Zinc	3.6	12.3	9.5	10.7	1.5	3.8	11.7	4.8	7.3
Fully irrigated – Total Sulphur	7.7	13.2	205.5	2.9	1.0	26.1	8.2	17.8	166.1



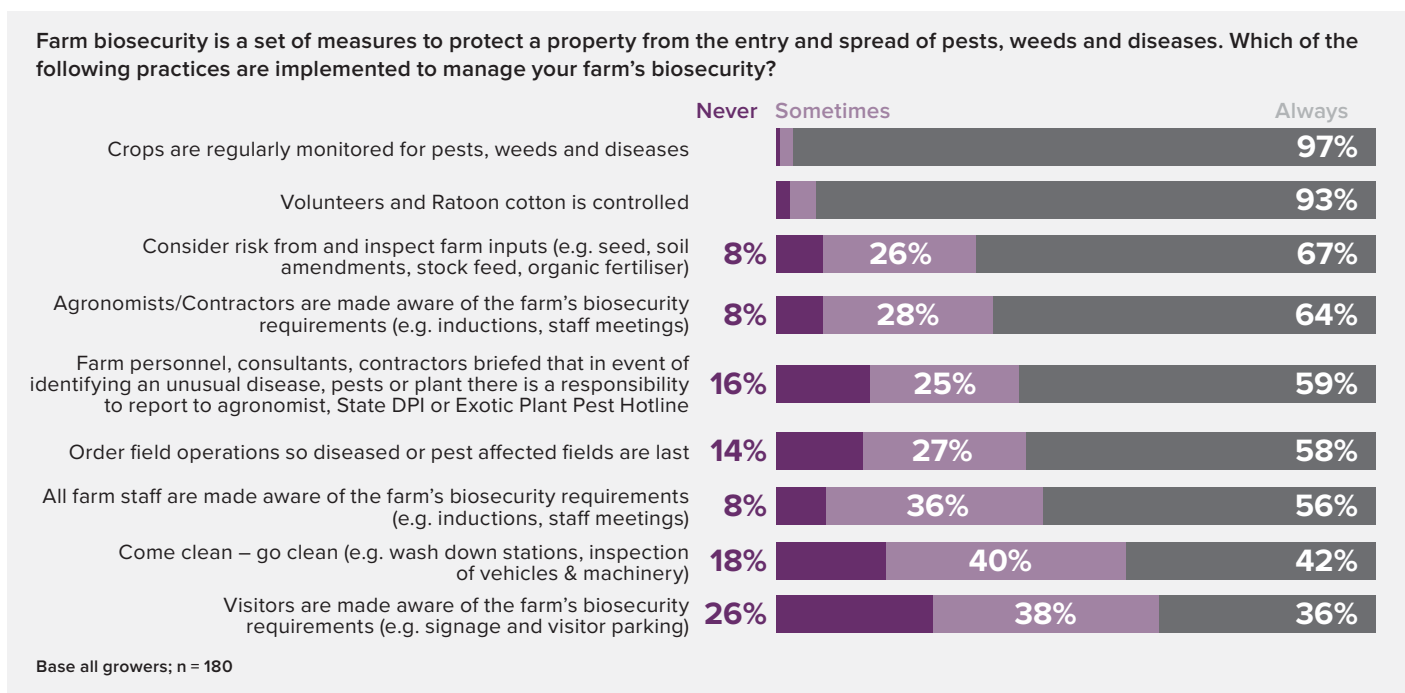
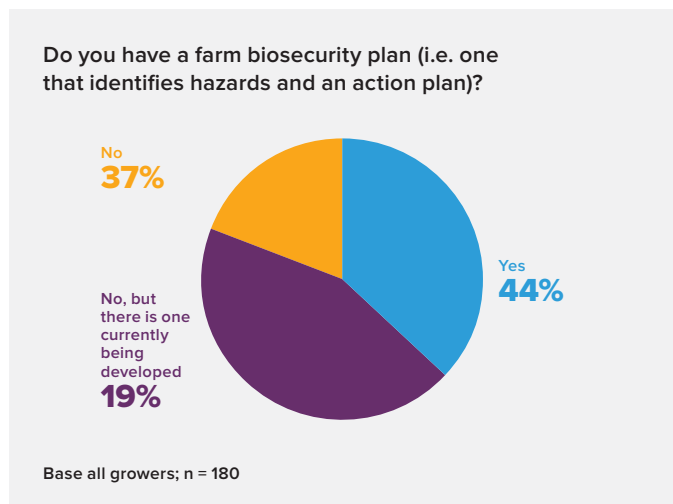
Ruth Redfern

Focus area: weeds and disease control

Farm biosecurity plan and practices

Biosecurity plans are plans that identify potential on-farm hazards and provide a plan of action to address these hazards. Growers have reported that:

- More than half of growers reported that they had a biosecurity plan (44%) or were developing one (19%). About one in three growers (37%) reported that they don't have a plan.
- Larger farms are more likely to report they have or are developing a plan. By contrast, smaller farmers look to be less likely to have or be developing a biosecurity plan.
- The analysis of survey data indicates that having a biosecurity plan creates very different on-farm behaviours. The results are indicating there are clear benefits from having a biosecurity plan in place (see page 38).



KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	11	22	25	66	16	39	62	87	31
Yes	64%	32%	40%	48%	38%	41%	32%	49%	52%
No, one currently being developed	18%	32%	12%	17%	19%	21%	21%	17%	19%
No	18%	36%	48%	35%	44%	38%	47%	33%	29%



KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA (% ALWAYS)

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	11	22	25	66	16	39	62	87	31
Crops are regularly monitored for pests, weeds and diseases	100%	95%	96%	98%	94%	97%	95%	98%	100%
Volunteers and Ratoon cotton is controlled	100%	100%	100%	92%	88%	87%	90%	93%	100%
Consider risk from and inspect farm inputs (e.g. seed, soil amendments, stock feed, organic fertiliser)	73%	68%	52%	73%	69%	62%	53%	71%	81%
Agronomists/ Contractors are made aware of the farm's biosecurity requirements (e.g. inductions, staff meetings)	91%	73%	56%	64%	56%	59%	56%	68%	68%
Farm personnel, consultants, contractors briefed that in event of identifying an unusual disease, pests or plant there is a responsibility to report to...	91%	68%	60%	62%	44%	49%	56%	61%	61%
Order field operations so diseased or pest affected fields are last	82%	45%	64%	62%	44%	54%	53%	57%	71%
All farm staff are made aware of the farm's biosecurity requirements (e.g. inductions, staff meetings)	73%	64%	48%	59%	44%	49%	52%	59%	55%
Come clean – go clean (e.g. wash down stations, inspection of vehicles & machinery)	64%	41%	36%	45%	44%	31%	37%	45%	42%
Visitors are made aware of the farm's biosecurity requirements (e.g. signage and visitor parking)	45%	41%	32%	41%	31%	26%	31%	36%	48%

Focus area: weeds and disease control

Farm biosecurity plan and practices

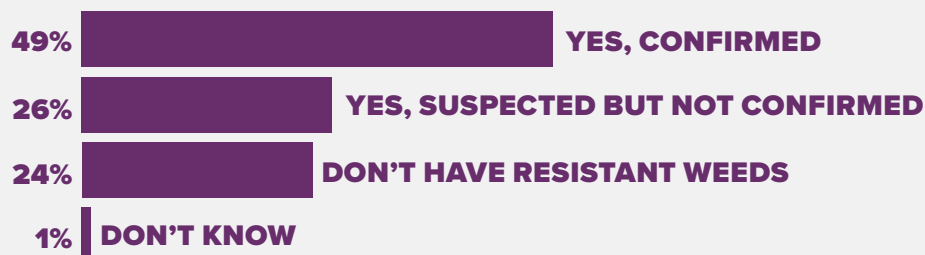
Farm biosecurity measures implemented by whether growers have a farm biosecurity plan (%Agree)



Focus area: weeds and disease control

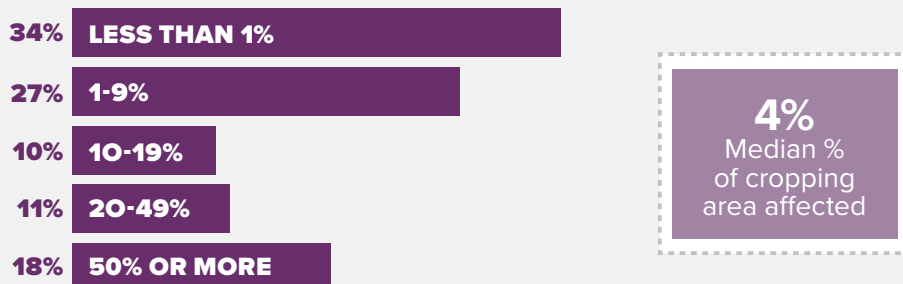
Herbicide resistant weeds

Do you suspect and have you confirmed that you have weeds that are resistant to herbicides?



Base: all growers; n = 180

Approximately what area of your cropping area is affected?



Base: all growers who suspect or confirm that they have weeds that are resistant to herbicides; n = 135

KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	11	22	25	66	16	39	62	87	31
Yes, confirmed	36%	41%	48%	52%	38%	56%	42%	52%	55%
Yes, suspected	27%	27%	36%	27%	38%	13%	27%	24%	29%
Don't have resistant weeds	36%	27%	16%	21%	19%	31%	29%	23%	16%
Don't know	0%	5%	0%	0%	6%	0%	2%	1%	0%

KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	6	15	19	51	12	26	40	64	26
Median % of cropping area affected	1%	10%	5%	2%	2%	10%	2%	5%	4%

Focus area: weeds and disease control

Herbicide resistant weeds

The 2018 Grower Survey results have indicated that:

- The majority of growers either have (49%) herbicide resistant weeds or suspect they have them (26%) on farm.
- This pattern is consistent across regions and farm sizes.
- On average, these herbicide resistant weeds are impacting a small area of the farm (median of just 4% of the total area affected).
- Among affected growers, there are more than one in two growers (54%) reporting they have been affected by more than one type of resistant weed.



What resistant weed/s do you have/suspect you have on farm, and how widespread are they?

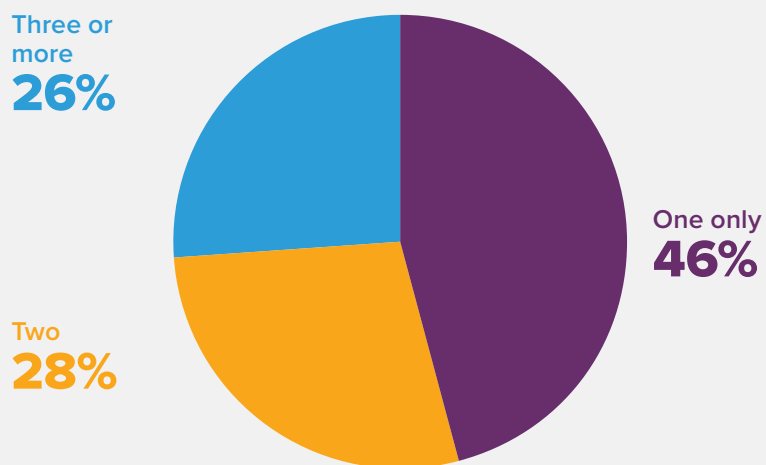
		Rare	Patches	Widespread
Annual Ryegrass	40%	7%	22%	11%
Flaxleaf Fleabane	36%	6%	17%	13%
Feathertop Rhodes Grass	29%	6%	19%	4%
Awnless Barnyard Grass	27%	8%	17%	2%
Sowthistle	13%	5%	6%	2%
Windmill Grass	9%	3%	4%	2%
Wild / Black Oats	8%	2%	5%	1%
Liverseed Grass	2%	0%	2%	0%
Silverleaf Nightshade	2%	0%	2%	0%
Other	15%	5%	8%	2%

Base all growers who suspect or confirm that they have weeds that are resistant to herbicides; n = 135

^Multiple responses accepted. Results may not add to 100%



Number of different types of resistant weeds on farm



Base all growers who suspect or confirm that they have weeds that are resistant to herbicides; n = 135

KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	7	13	20	51	12	27	40	65	26
Annual Ryegrass	0%	0%	5%	41%	67%	89%	40%	48%	27%
Flaxleaf Fleabane	29%	46%	35%	37%	50%	30%	33%	35%	46%
Feathertop Rhodes	100%	77%	50%	24%	0%	0%	38%	28%	23%
Awnless Barnyard	0%	23%	50%	35%	17%	7%	15%	26%	50%
Sowthistle	0%	0%	0%	27%	25%	0%	10%	8%	31%
Windmill Grass	0%	0%	0%	16%	33%	0%	8%	11%	8%
Wild / Black Oats	0%	8%	5%	16%	8%	0%	8%	3%	23%
Liverseed Grass	0%	0%	5%	4%	0%	0%	3%	3%	0%
Silverleaf Nightshade	0%	0%	0%	0%	0%	11%	0%	5%	0%
Other	14%	15%	15%	16%	17%	15%	15%	17%	12%

Focus area: weeds and disease control

Satisfaction with *WeedSmart*

Australia's agricultural sector has united to establish *WeedSmart*, an industry-led initiative to enhance on-farm practices and promote the long term sustainability of herbicide use. Research partners, commercial organisations, Government, advisors and growers have joined forces to ensure weed management is at the forefront of global farming practice.

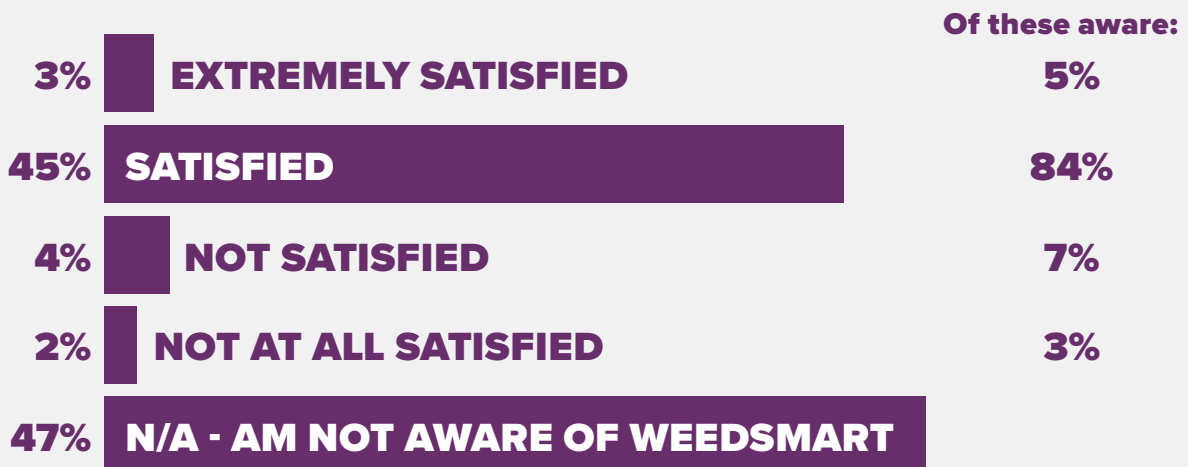
The *WeedSmart* Advisory Committee draws on industry support to bring growers tools and info.

The 2018 Grower Survey results indicate that:

- Just over one in two growers (53%) being aware of *WeedSmart*; with
- A large proportion (47%) of growers reporting that they are unaware of *WeedSmart*

The feedback from growers aware of *WeedSmart* suggests they are satisfied with the ability to deliver messages and advice that supports on-farm decisions.

How do you rate *WeedSmart* on their ability to deliver integrated weed management messages, and herbicide stewardship advice that assists with on-farm decision making?



Base all growers; n = 180



KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	11	22	25	66	16	39	62	87	31
Extremely satisfied	0%	0%	4%	3%	6%	3%	5%	1%	3%
Satisfied	45%	68%	44%	44%	25%	44%	35%	53%	42%
Not satisfied	0%	0%	4%	6%	6%	3%	0%	7%	3%
Not at all satisfied	0%	0%	4%	2%	0%	3%	3%	0%	3%
N/A – not aware	55%	32%	44%	45%	63%	49%	56%	39%	48%



Ruth Redfern

Focus area: weeds and disease control

Impact of spray drift on cotton crop

Grower feedback in the 2018 Grower Survey results have suggested that:

- Just under one in three (29%) of growers are being impacted by spray drift.
- Of the affected growers, reports from the survey are suggesting that on average 42% of the cotton crop has been impacted.
- There has been a yield impact among these affected growers (yield cost of 0.9 bales/ha) and a financial cost (\$47K).
- Not surprisingly, the larger area impacted, the more severe the yield and direct cost.



For the 2017-18 cotton growing season, what area of your cotton crop was impacted by spray drift, and what do you estimate to be the yield cost and financial cost of this damage?

% of cotton growers affected **29%**
(up 16% on 2013)

OF THE 29% OF COTTON GROWERS AFFECTED. . .

Average % of cotton crop area impacted **42%**

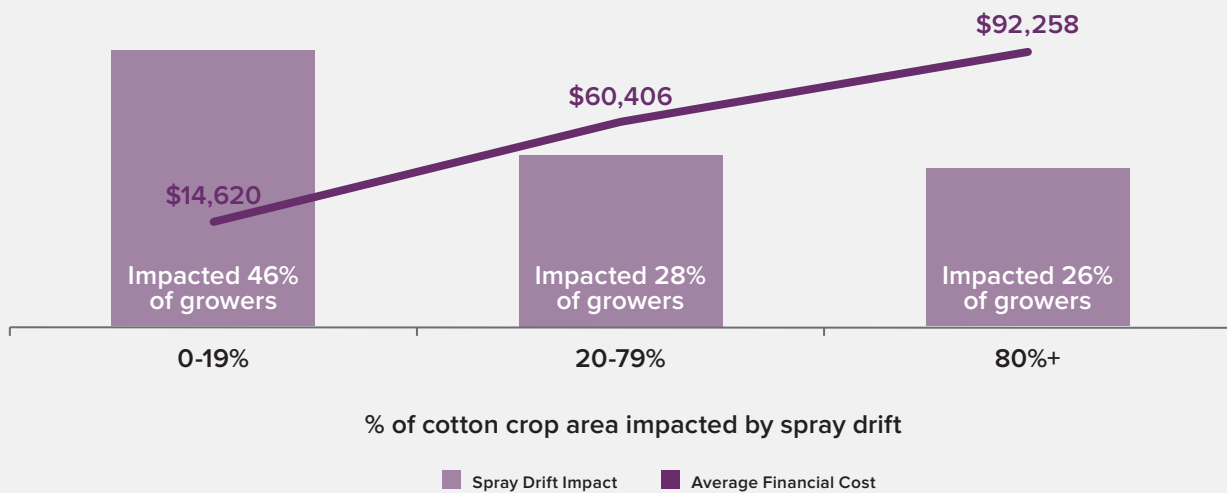
Average yield cost (in bales / ha) **0.9**
(up 0.2 on 2013)

Average financial cost (in \$) **\$47,009**

Base all growers who grew cotton during 2017-18 season; n = 162. 29% of cotton growers affected; n = 47.



Distribution of cotton crop area impacted and average financial cost



Base: all growers who have been affected by spray drift in the 2017-28 cotton growing season; n = 46

KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	11	22	23	55	15	37	58	74	29
% of cotton growers affected	18%	22%	30%	35%	47%	22%	21%	32%	38%
Average % of cotton crop area impacted	50%	5%	46%	46%	31%	54%	43%	41%	42%
Average yield cost (in bales / ha)	2.0	0.9	1.6	1.0	0.2	0.7	1.5	0.8	0.8
Average financial cost (in \$)	\$1,000	\$11,255	\$93,943	\$53,278	\$15,571	\$47,938	\$30,375	\$35,563	\$90,127

Focus area: irrigation

Irrigation system used on farm

One of the key areas of focus during the 2018 Grower Survey was on irrigation. In this section of the report results from growers with full or partial irrigation on farm were reported across a number of topics including:

- The number and type of irrigation systems used on farm;
- Use of furrow systems and the practices used in the last 5 years to optimise the system;
- Methods used to schedule irrigation across the season;
- Whether growers monitor the quality of groundwater, how often they do and the methods used to assess the quality of groundwater; and
- What, if any, automation is used for irrigation.

The results of the feedback from growers now follows.



Type of irrigation system used

Furrow

82%
(down 9%)

Pressurised irrigation system (centre pivot | lateral move)

25%
(up 3%)

Bankless

22%
(up 8%)

Drip

1%
(down 1%)

Other

1%

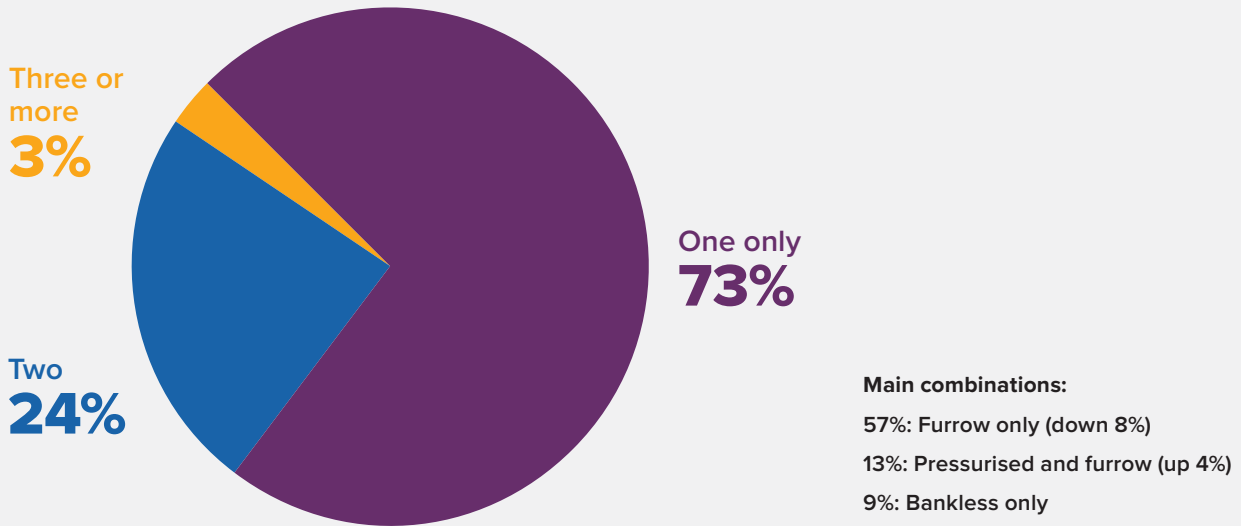
Base all growers with full or part irrigated crop area; n = 153

^Multiple responses accepted. Results may not add to 100%

*Trend data based on 2017 results.



Number of different types of irrigation systems used



Base all growers with full or part irrigated crop area; n = 153

*Trend data based on 2017 results.

KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

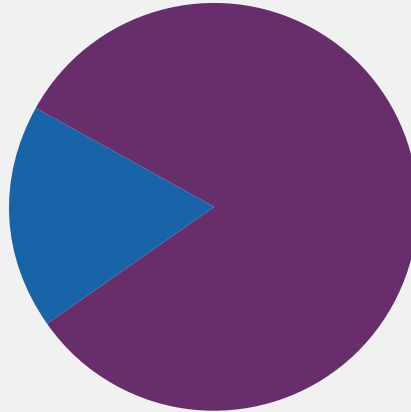
	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	10	18	22	49	14	39	56	73	24
Furrow	90%	89%	86%	90%	93%	59%	77%	84%	88%
Pressurised irrigation system	20%	67%	27%	24%	14%	13%	23%	22%	42%
Bankless	0%	0%	18%	8%	14%	62%	18%	23%	29%
Drip	0%	0%	0%	2%	0%	0%	0%	0%	4%
Other	0%	0%	5%	0%	0%	0%	0%	1%	0%

Focus area: irrigation

Irrigation system used on farm

Usage of furrow irrigation system

Do not use furrow
18%

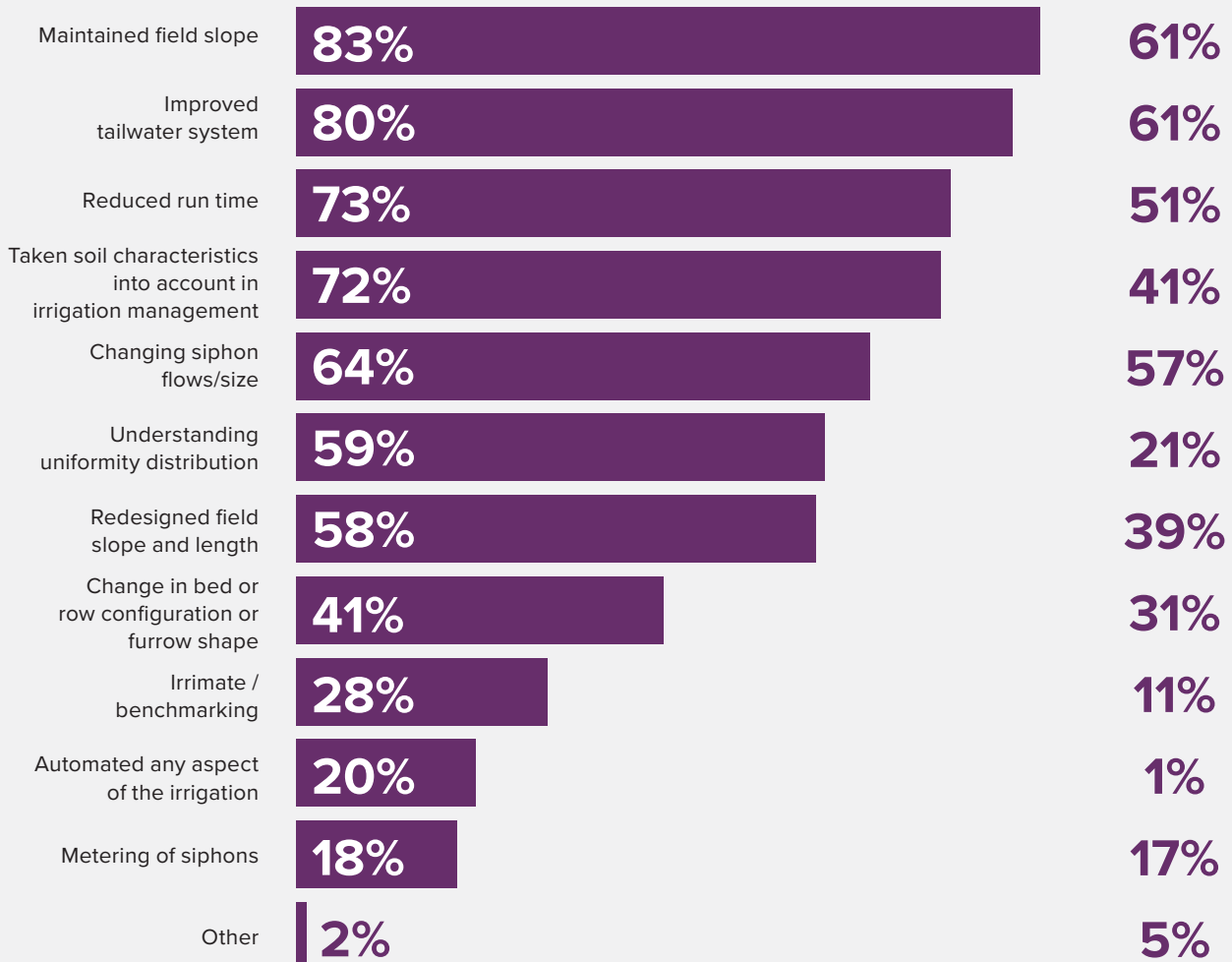


Use furrow
82%

Base all growers with full or part irrigated crop area; n = 153

Please select any of the following that you have done in the last 5 years to optimise furrow irrigation:

2014



Base all growers with a furrow irrigation system and answered the question; n = 116

^Multiple responses accepted. Results may not add to 100%



KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	8	15	17	39	13	23	40	56	20
Maintained field slope	88%	73%	82%	87%	62%	91%	78%	84%	90%
Improved tailwater system	75%	60%	71%	85%	85%	91%	68%	82%	100%
Reduced run time	75%	87%	59%	67%	62%	91%	65%	77%	80%
Taken soil characteristics into account	100%	47%	59%	72%	77%	87%	63%	77%	80%
Changing siphon flows / size	100%	80%	59%	62%	46%	57%	63%	61%	75%
Understanding uniformity distribution	88%	40%	41%	56%	46%	83%	55%	63%	55%
Redesigned field slope and length	63%	40%	41%	54%	38%	96%	45%	63%	70%
Change in bed or row configuration or furrow shape	25%	53%	29%	41%	31%	52%	38%	45%	35%
Irrigate / benchmarking	13%	13%	29%	31%	23%	39%	20%	30%	40%
Automated any aspect of the irrigation	25%	13%	18%	13%	15%	39%	13%	27%	15%
Metering of siphons	13%	7%	18%	18%	8%	30%	18%	14%	30%
Other	0%	0%	0%	5%	0%	0%	3%	0%	5%

Focus area: irrigation

Irrigation system used on farm

TOP FIVE COMBINATIONS OF SCHEDULING METHODS USED BY GROWERS DURING THE 2017-18 SEASON:



19%
(n = 27)

- Visual crop monitoring
- Weather forecasts
- Capacitance probe



12%
(n = 17)

- Visual crop monitoring
- Weather forecasts



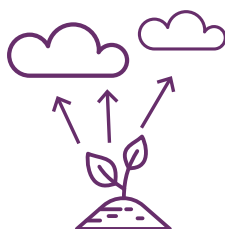
7%
(n = 10)

- Visual crop monitoring
- Weather forecasts
- Neutron probe



4%
(n = 4)

- Visual crop monitoring
- Weather forecasts
- Capacitance probe
- Remote sensing

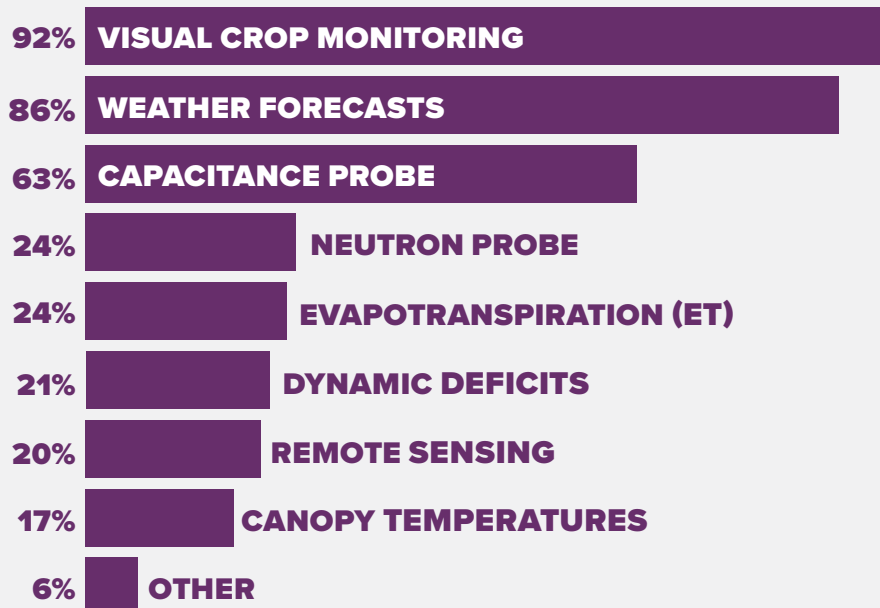


4%
(n = 4)

- Visual crop monitoring
- Weather forecasts
- Capacitance probe
- Evapotranspiration (ET)



Which of the following methods, if any, did you use for scheduling cotton irrigations during the 2017-18 cotton growing season?



Base all growers who grew cotton during 2017-18 season AND with full or part irrigated crop area; n = 145 ^Multiple responses accepted. Results may not add to 100%

KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	10	17	21	45	14	38	53	68	24
Visual crop monitoring	80%	94%	90%	93%	93%	95%	92%	94%	88%
Weather forecasts	80%	88%	76%	89%	79%	89%	87%	87%	79%
Capacitance probe	70%	47%	81%	71%	57%	53%	49%	68%	83%
Neutron probe	20%	12%	29%	20%	64%	18%	26%	21%	29%
Evapotranspiration (ET)	10%	18%	19%	22%	7%	39%	19%	25%	29%
Dynamic deficits	30%	12%	19%	27%	36%	11%	11%	21%	42%
Remote sensing	20%	18%	19%	18%	7%	29%	13%	24%	25%
Canopy temperatures	10%	0%	29%	18%	21%	18%	19%	15%	21%
Other	0%	12%	5%	7%	0%	8%	4%	7%	8%

Focus area: irrigation

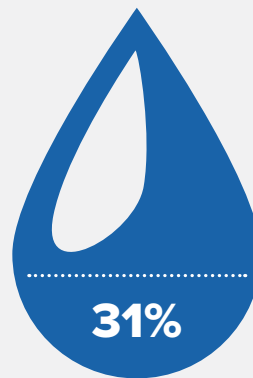
Monitoring the quality of groundwater

The measuring of the quality of groundwater was explored in the 2018 Grower Survey.

Among growers with full or partial irrigation, the survey results indicate that:

- Just under one in three (31%) of growers report that they monitor the quality of their groundwater. Once again, the larger farms are more likely to have adopted this practice.
- Among growers monitoring their groundwater, the frequency of this monitoring varies with some 15% indicating they do this several times a year and a further 32% once a year. More than one in two of these growers reported they did it less often (once every few years).
- The most frequent method used to assess groundwater quality was to send water samples to a lab for analysis.

Do you monitor the quality of groundwater throughout your farm?



31% of growers with full or part irrigated crop area monitor the quality of groundwater throughout their farm

Base all growers with full or part irrigated crop area; n = 153

KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	10	18	22	49	14	39	56	73	24
Yes	0%	22%	14%	45%	29%	33%	25%	27%	54%

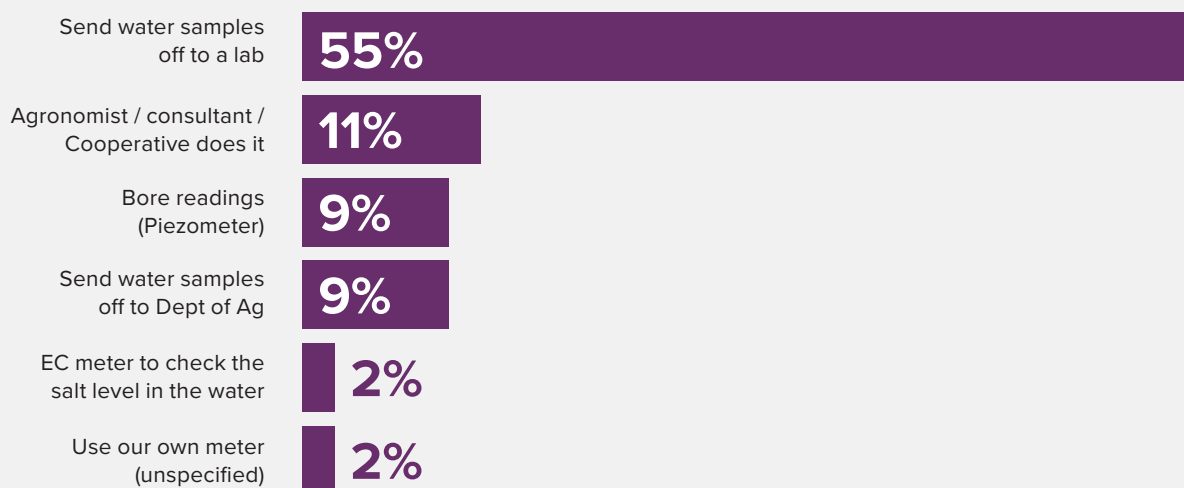
How often do you monitor the quality of groundwater?



Base all growers with full or part irrigated crop area AND monitor the quality of groundwater throughout their farm; n = 47



Please detail the methods you use to assess the quality of groundwater:



Base all growers with full or part irrigated crop area AND monitor the quality of groundwater throughout their farm; n = 47

^Multiple responses accepted. Results may not add to 100%

KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA (% ALWAYS)

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	0	4	3	22	4	13	14	20	13
Several times a year	-	25%	0%	18%	0%	8%	29%	10%	8%
Annually	-	0%	100%	23%	0%	54%	36%	15%	54%
Every few years	-	75%	0%	59%	100%	31%	36%	70%	38%
Once	-	0%	0%	0%	0%	8%	0%	5%	0%

What the growers said...

“Send samples to the water testing lab. We were also a part of trial 3 or 4 years ago, they were checking the quality of the bore water and changes through the seasons.”

“Send it off for testing in the lab. Recognition of changes in the soil in reference of the water quality that was applied.”

“Ord Irrigation Cooperative do this as part of our licence with EPA requirements. Permanent bores they test water quality.”

“We take water samples and have them tested for salts, pH and hardness and suitability for irrigation and stock.”

“Every 5 years we send water samples to Tamworth EPA laboratory for testing.”

“Samples taken to get analysed by a lab through an agronomist.”

“Put in a bottle and send it way to the lab to be tested.”

“Send a sample of to the laboratory to be analysed.”

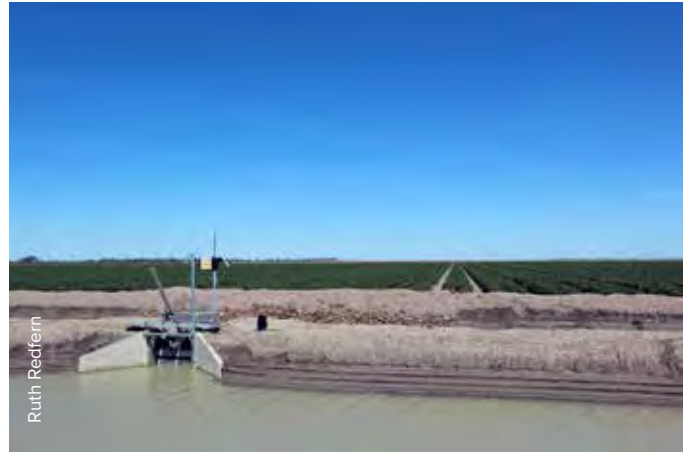
“Have only done it once so far, Dept of Ag sampling.”

Focus area: irrigation

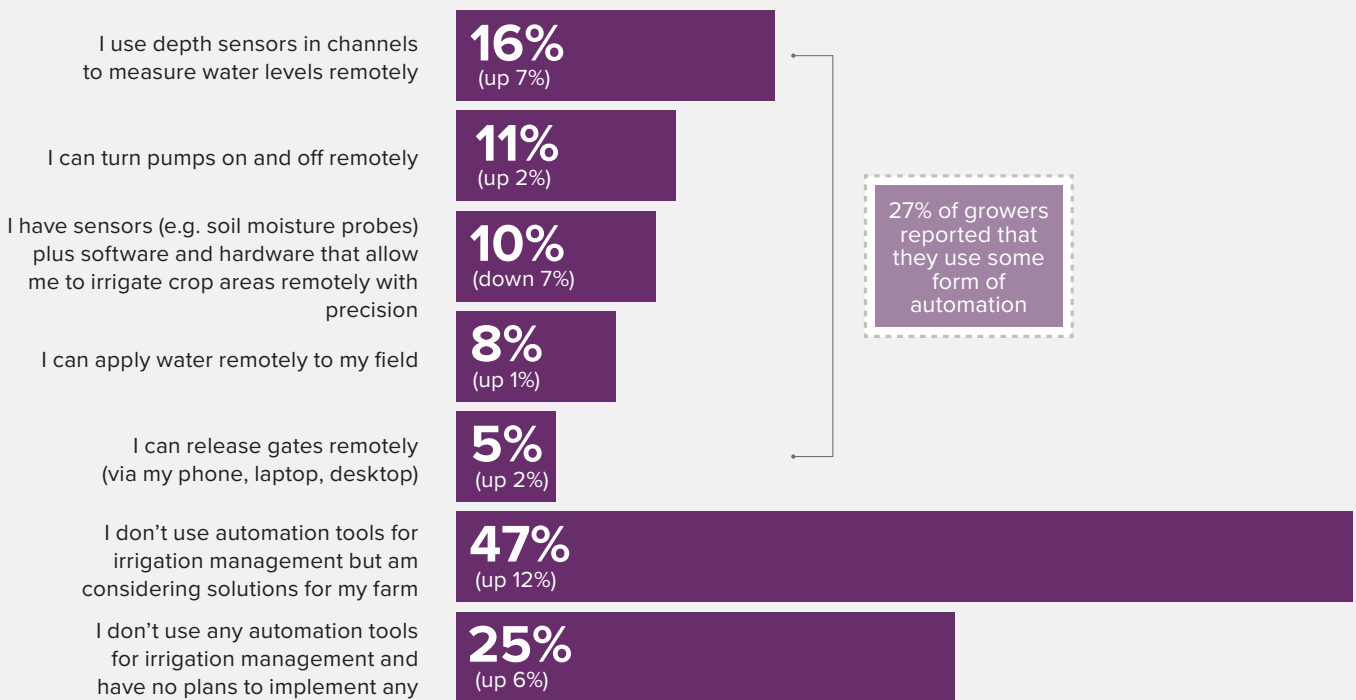
Level of automation for irrigation management

Growers with full or partial irrigation were asked to describe the level of automation for irrigation management used on farm. The results show that:

- Just under one in three (27%) of growers reported that they now use some form of automation. This is a largely consistent result across regions but more prominent among the larger farms.
- A further one in two (47%) have reported that while they don't currently use automation for irrigation management, they are considering solutions.
- There was a smaller cohort of some one in four growers (25%) who have no plans for any automation of irrigation management.



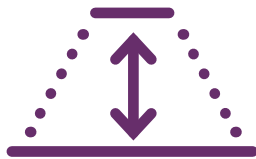
Which of the following statements best describes the level of automation for irrigation management that you have implemented on farm?



Base all growers with full or part irrigated crop area; n = 153
^Multiple responses accepted. Results may not add to 100%



TOP THREE COMBINATIONS OF IRRIGATION MANAGEMENT IMPLEMENT ON FARM BY GROWERS



7%
(n = 11)

- Depth sensors in channels



3%
(n = 4)

- Depth sensors in channels
- Sensors plus software and hardware that allow me to irrigate crop areas remotely with precision



3%
(n = 4)

- Turn pumps on and off remotely

KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

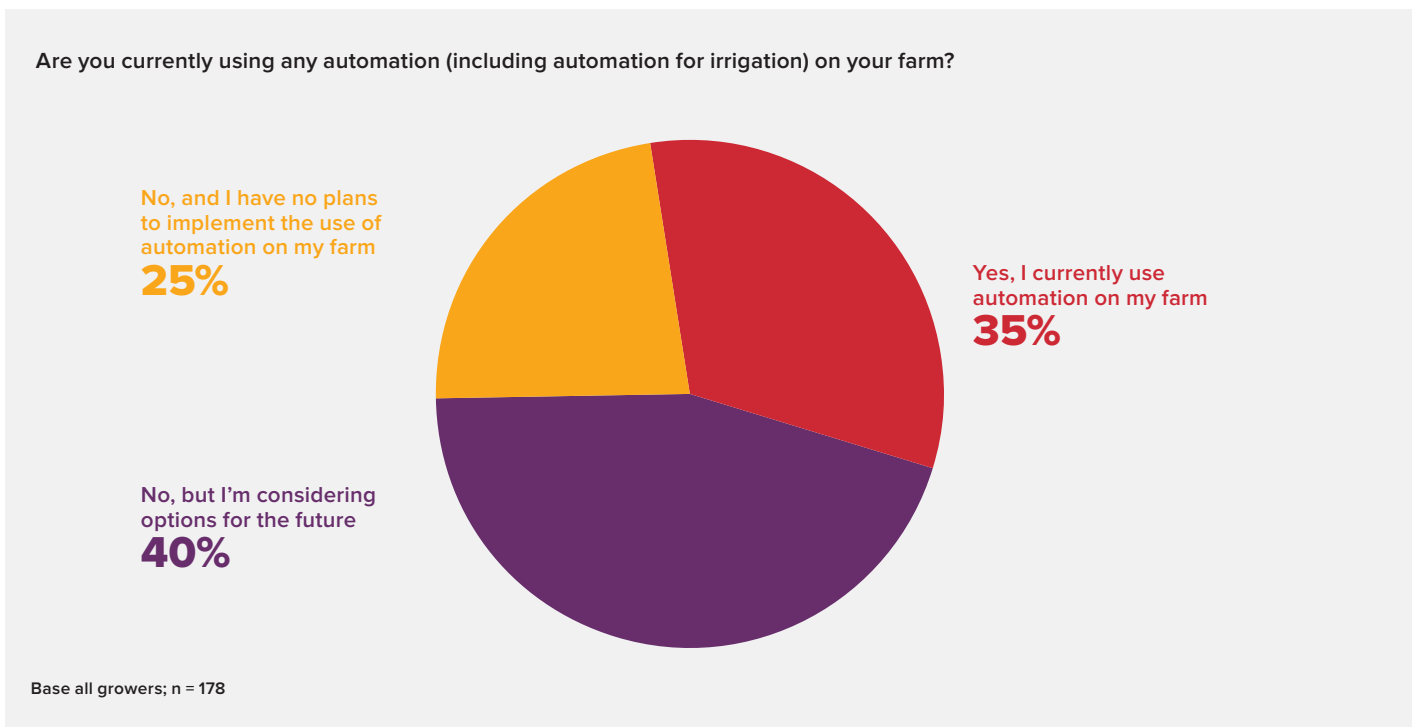
	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	10	18	22	49	14	39	56	73	24
Use some form of automation	30%	28%	23%	35%	21%	23%	18%	30%	42%
Don't use, but am considering	30%	50%	55%	37%	64%	51%	43%	51%	46%
Don't use and don't plan to	40%	22%	23%	29%	14%	26%	39%	19%	13%

Focus area: automation

Implementation of automation on farm

Automation on farm was another key focus area of investigation during the 2018 Grower Survey. The results show that:

- Just over one in three (35%) of growers currently use automation on farm. A further 40% have reported they are considering options, while the remaining 25% have no plans for any on-farm automation.
- These three segments provide some very different responses to automation:
 - Current users and those considering automation have a clearly more positive disposition towards automation. Interestingly, there was little difference in attitudes between the current users and the 'considerers'.
 - Those growers not considering have a far less positive view of the potential benefits of automation. The results indicate clearly different attitudes and perspectives towards automation.



KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

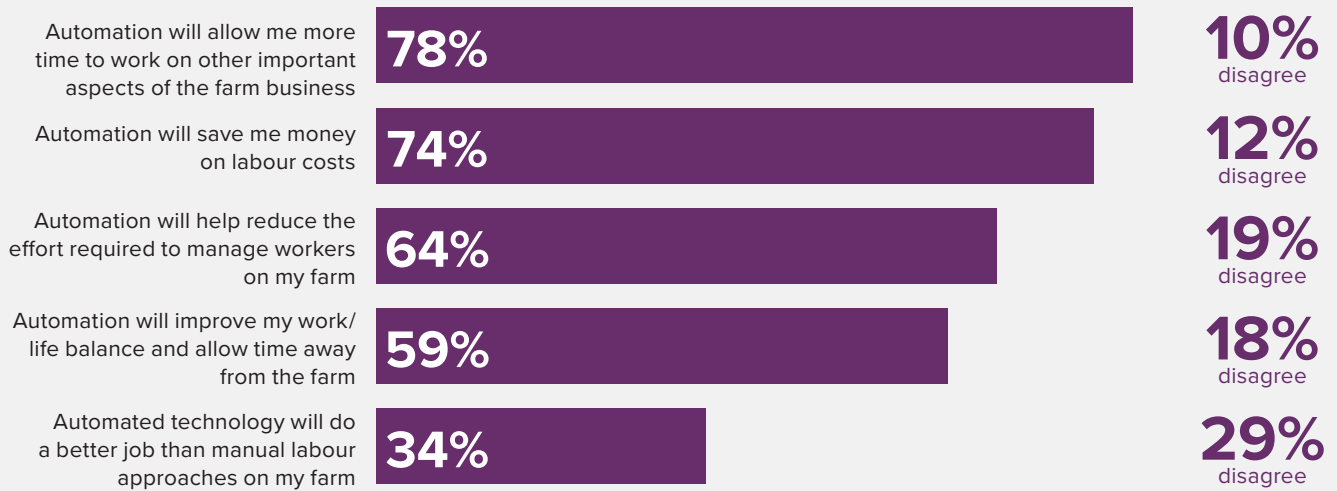
	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	11	22	24	65	16	39	62	86	30
Yes, currently use	55%	32%	17%	40%	25%	36%	29%	35%	47%
No, but considering	27%	45%	50%	29%	44%	51%	35%	42%	43%
No and have no plans to implement	18%	23%	33%	31%	31%	13%	35%	23%	10%



Focus area: automation

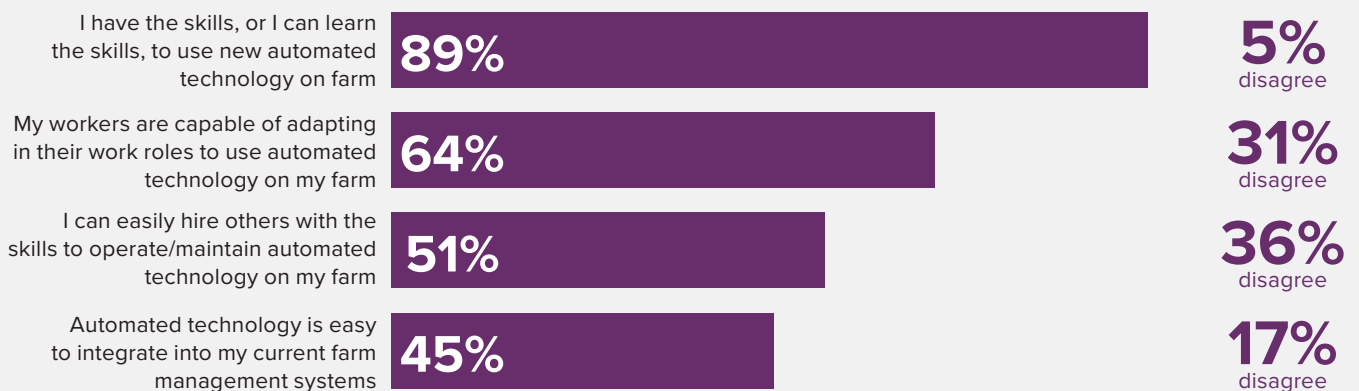
Usefulness and ease of using automation on farm

Regardless of whether or not you currently use automation on your farm, please indicate your agreement or disagreement with the following statements in relation to the usefulness of automation on cotton farms: (% Agree)



Base all growers; n = 177

Regardless of whether or not you currently use automation on your farm, please indicate your agreement or disagreement with the following statements in relation to how easy it is/will be to use automation on your farm: (% Agree)



Base all growers; n = 177



KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA (% AGREE)

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	11	22	24	64	16	39	62	86	29
Allow me more time to work on other aspects	73%	73%	83%	75%	63%	90%	79%	78%	76%
Save me money on labour costs	64%	64%	83%	78%	44%	82%	71%	73%	83%
Help reduce effort required	64%	59%	71%	58%	50%	79%	65%	63%	69%
Improve my work/life balance	55%	59%	67%	52%	44%	74%	65%	58%	52%
Will do a better job than manual labour	18%	45%	46%	22%	19%	49%	31%	37%	31%

KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA (% AGREE)

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	11	22	24	64	16	39	62	86	29
Have the skills / can learn the skills	73%	77%	88%	95%	81%	92%	79%	93%	97%
My workers are capable of adapting	64%	68%	63%	56%	31%	87%	65%	62%	69%
Can easily hire others with skills	64%	59%	46%	48%	19%	64%	50%	51%	55%
Tech is easy to integrate into my current farm mgmt systems	36%	50%	38%	41%	38%	62%	42%	42%	62%

Focus area: automation

Usefulness and ease of using automation on-farm

Agreement of statements on automation by their current use of automation on farm (% Agree)



Base all growers; n = 177

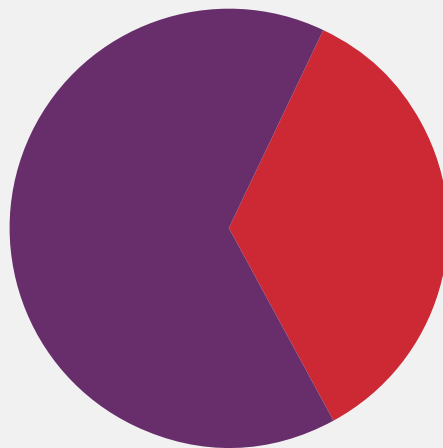


Focus area: automation

Reasons for using automation on farm

Usage of automation on farm

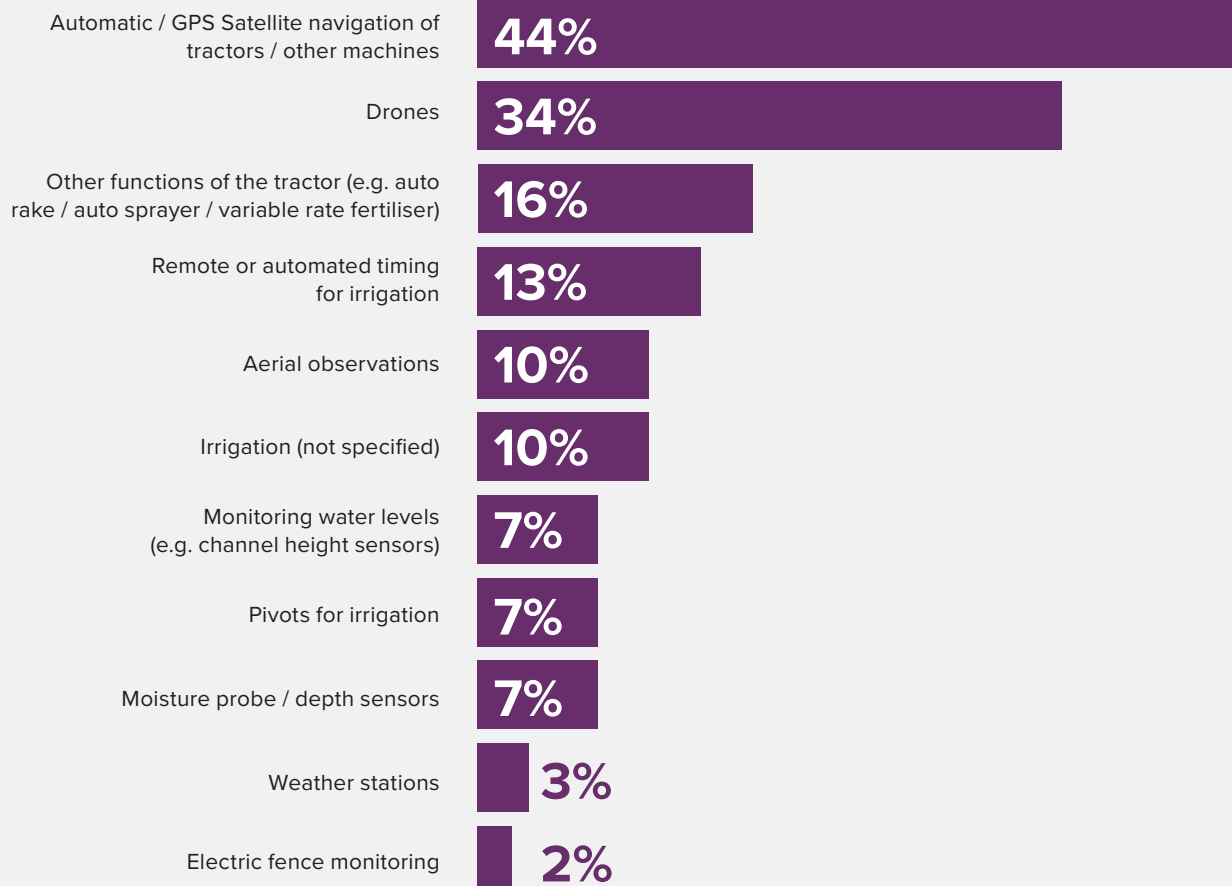
Do not
currently use
automation
65%



Currently use
automation
on my farm
35%

Base all growers; n = 178

What are you using automation for on your farm?



Base all growers who currently use automation on their farm; n = 61

^Multiple responses accepted. Results may not add to 100%



Melanie Jenison

What the growers said...

“I use a timer to open gates to irrigate, if it fails it will send a message to my phone. Auto navigation for the tractor. Drones used for mapping of crops.”

“We use drones to check areas of the farm during the season to check things such as crop establishments and water progress. Also use Satamap.”

“GPS auto steer on tractors, auto spray control, auto over spray boom shut off, satellite field data.”

“For the soil moisture management. Irrigation. Our tractors are partly automated. Module tracking.”

“Tractor - auto steering and fertiliser application. Drones for crop monitoring and irrigation.”

“Automated channel levels for high and low levels, rain gauges, drone, GPS in our tractors.”

“Controlling the centre pivots and pumps and partially automated tractors.”

“Moisture levels and weather reporting. Driver less tractors. Drones.”

“Auto navigation on the tractor. Self propelled boom spray.”

“Machine control on tractors and implements. Pumping water.”

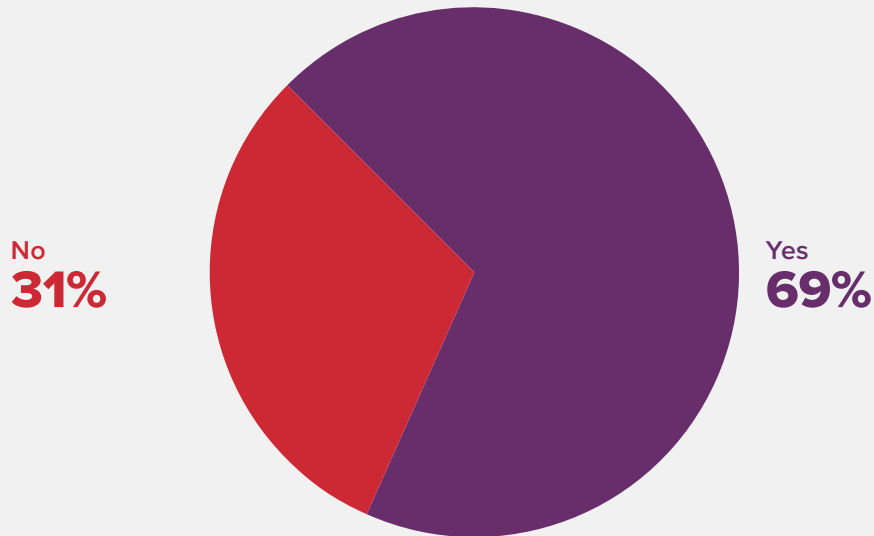
“Drone, auto rake for seeding, spraying and fertilising.”

“Drones - checking for gaps and checking on the crop.”

Focus area: automation

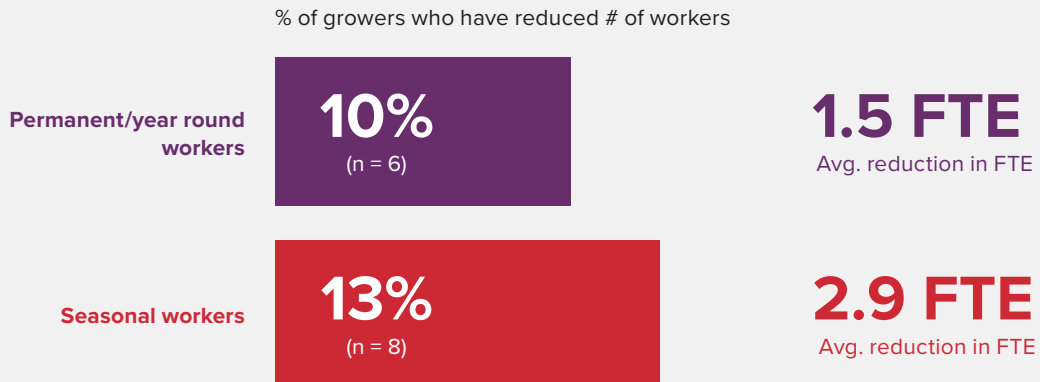
Automation and the impact on the workforce

Has this automation required workers to learn new skills to perform their job?



Base all growers who currently use automation on their farm; n = 61

Has this automation reduced the number of workers you employ on farm? If so, please estimate the reduction in workers (in terms of full time equivalent or FTE) employed on farm due to this automation:



Base all growers who currently use automation on their farm; n = 61

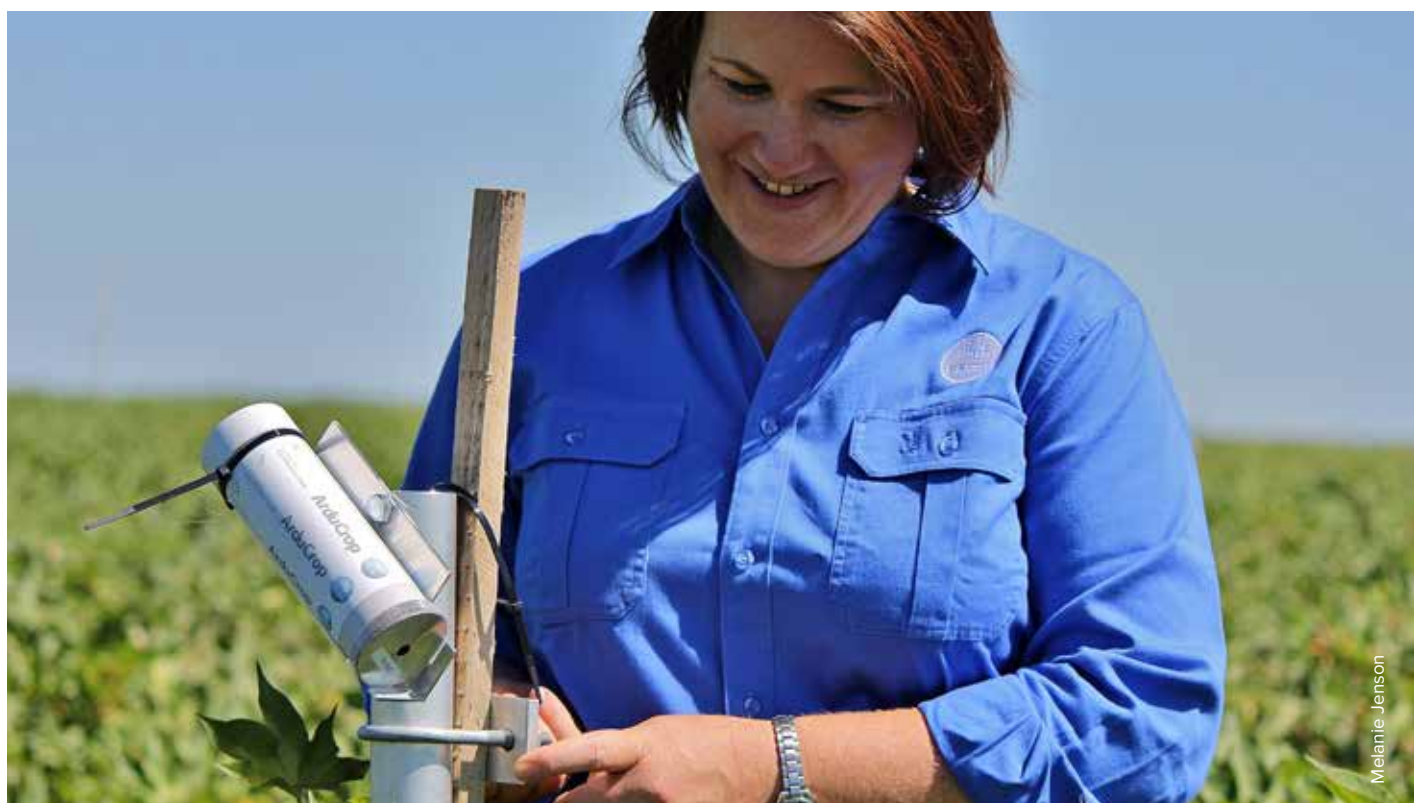


KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	6	7	3	26	4	14	18	30	13
Yes	67%	43%	100%	77%	75%	57%	56%	70%	85%

KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	6	7	3	26	4	14	18	30	13
% growers with reduction in permanent/year round workers	0%	14%	0%	12%	25%	7%	11%	10%	8%
% growers with reduction in seasonal workers	0%	14%	0%	19%	0%	14%	11%	10%	23%



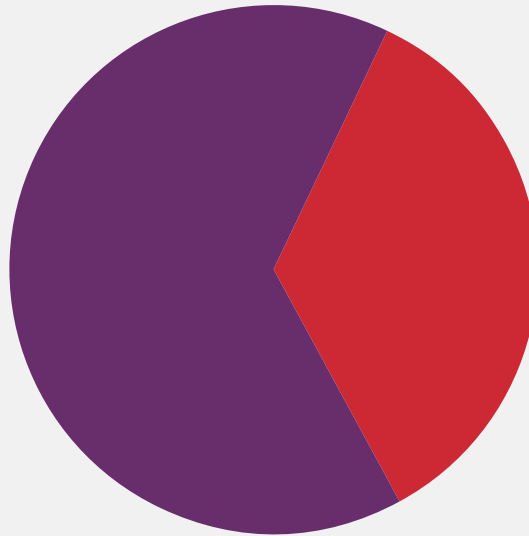
Melanie Jensen

Focus area: automation

Reasons for considering or not considering using automation

Usage of automation on-farm

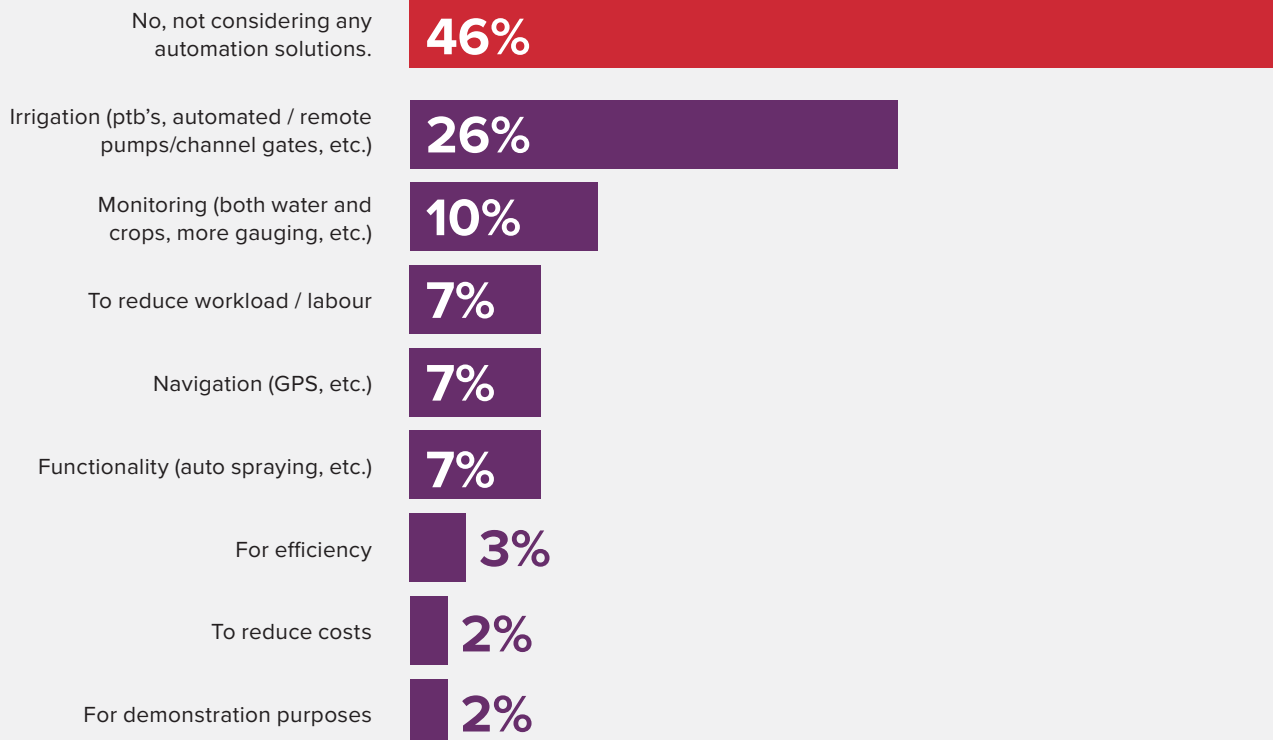
Do not currently use automation
65%



Currently use automation on my farm
35%

Base all growers; n = 178

Are you considering automation solutions for your farming business, and if so, please describe for what purpose:



Base all growers who currently use automation on their farm; n = 61

^Multiple responses accepted. Results may not add to 100%



Melanie Jensen

What the growers said...

“Possible automation of new Pontoon/manifold irrigation system (similar to bankless) we are currently building, allowing automatic application of irrigation water.”

“Yes, the primary one would be for irrigation so less manpower. Secondary is autonomous tractor in field, again less manpower.”

“Yes, looking at the river heights and water flows, padman stocks to redirect water, open up let water out different way.”

“Accuracy and ease of management - so everyone knows what’s happening at any one time.”

“I would like to get driver less tractors and automatic spray as well in the future.”

“The only thing I would be looking at is automation on the irrigation systems.”

“Possible irrigation auto controllers on underground pressurised system.”

“Yes, already half way through process. In order to reduce cost.”

“Water levels, doing more with the tractors, over head irrigation.”

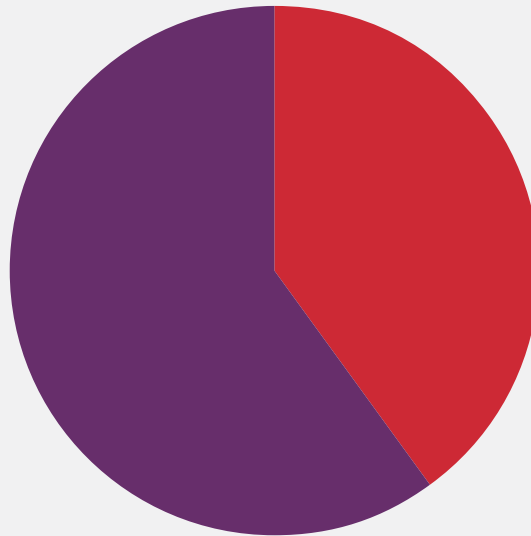
“Centre pivot for irrigation, solar generator and automated pumps.”

Focus area: automation

Reasons for considering or not considering using automation

Usage of automation on farm

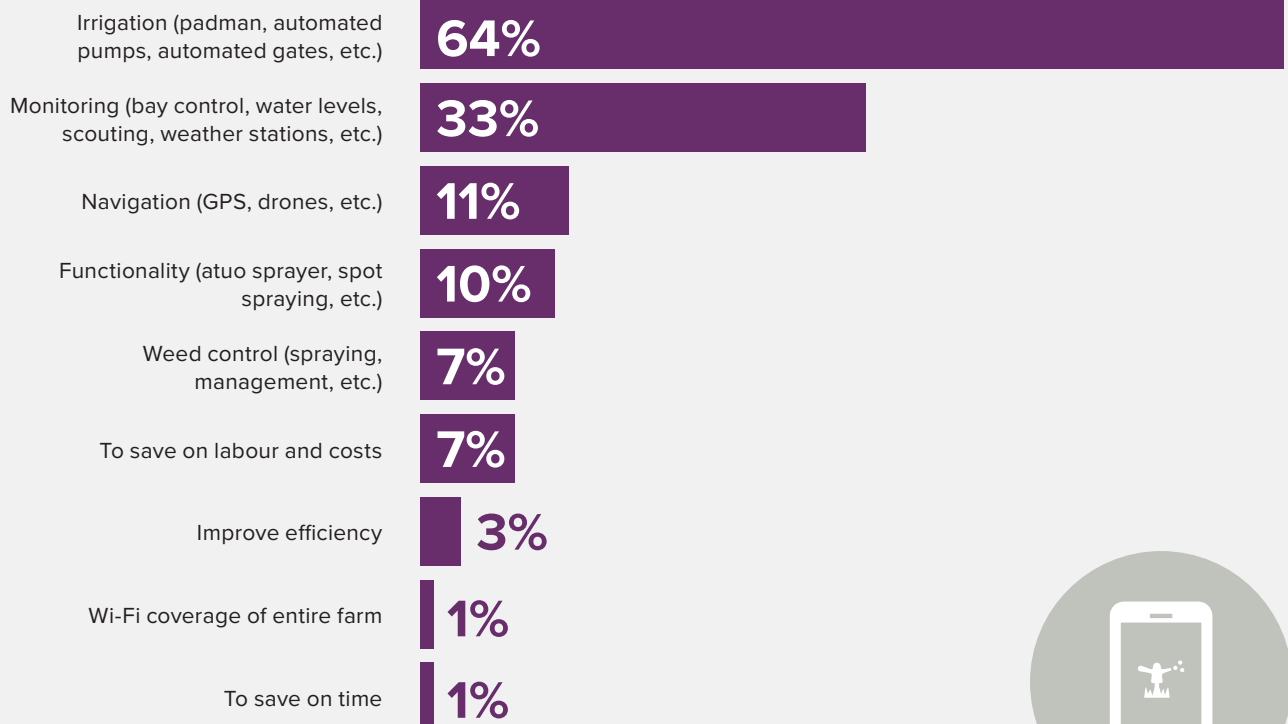
Use automation, or do not use and won't consider
60%



Do not use automation, but considering options for the future
40%

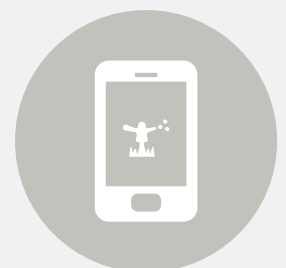
Base all growers; n = 178

What automation solutions are you considering for your farming business, and please describe for what purpose:



Base all growers who are not currently use automation on their farm, but is considering options for the future; n = 70

^Multiple responses accepted. Results may not add to 100%





Ruth Redfern

What the growers said...

“Weather stations for seeing rainfall and weather conditions for spraying. Fuel bowser monitoring - to keep track and order fuel and make sure it’s not being stolen.”

“Integrated GPS data from tractors to crop management application - improve connection of in-field variable data to crop management and yield outcomes.”

“I’d like to have automated sprays, chemical application, maybe automated seeding planting. Automated monitoring on crop and livestock.”

“Irrigation control to control flow of water. To give staff more time to complete other tasks. To increase efficiency of irrigation.”

“Bankless/ Bay irrigation methods for the whole farming system. Using automated gate opening and remote pump starts.”

“Variable rate and yield monitoring in progress. Water gate automation - too expensive at current prices.”

“Furrow sensors, channel height sensors, and canopy temp sensors for monitoring rather than automation.”

“Coordinating soil probes with centre pivots + pumps to automatically recognise watering requirements.”

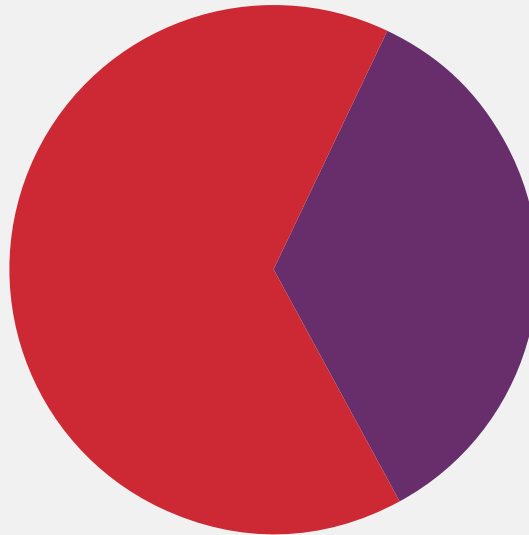
“Automation of gates with channel sensors for height control with perm siphons through the bank.”

Focus area: automation

Reasons for considering or not considering using automation

Usage of automation on farm

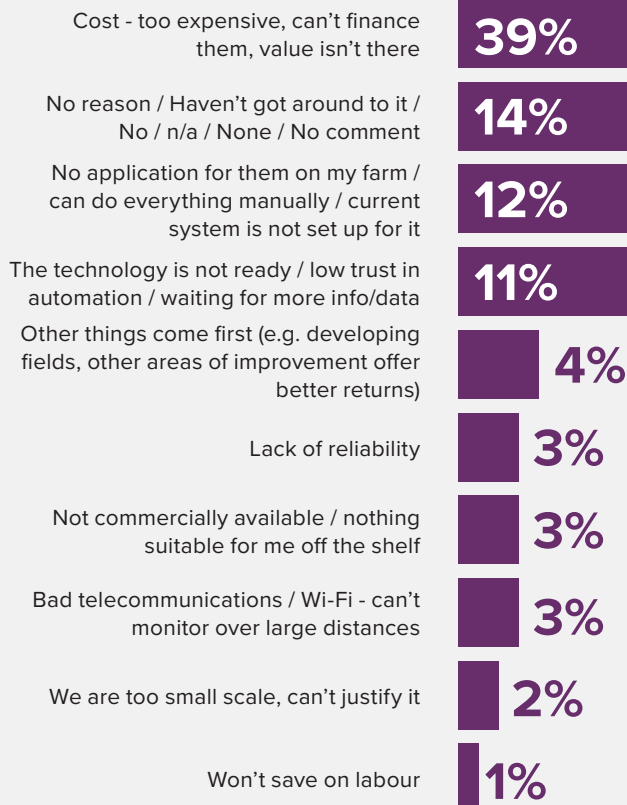
Do not currently use automation
65%



Currently use automation on my farm
35%

Base all growers; n = 178

Why do you currently not use any automation tools on your farm?



Base all growers who are not currently use automation on their farm; n = 115

^Multiple responses accepted. Results may not add to 100%



Warwick Waters

What the growers said...

“We only have a small amount of water and we manually distribute the water as efficiently as possible, even though that maybe more labour intensive.”

“There is nothing yet that can do a better or more economical job than my current workforce and machinery, warm fuzzy ideas do not pay the bills!”

“Because we don’t grow cotton frequently to justify the conversion expense and my staff keep changing so we haven’t bothered to train them.”

“Need to invest in infrastructure first. Automation on the farm would need to have a proven system for us to take on the investment.”

“Still need a human to go and look at the area. More trust in a human to look at field and make a decision.”

“We haven’t seen a need as yet. We have been land forming. We were waiting for the right time.”

“I think the cost to set up is high as far as automation goes, so it is a long way off yet.”

“We do use some, but it’s because of capital cost that we haven’t implemented it as yet.”

“Not convinced that they would do the job intended at the moment for the cost.”

“Reliability and long term support from automation providers are not guaranteed.”

Focus area: workforce

Summary of the workforce focus area

The 2018 Grower Survey explored a range of workforce related topic areas. Some of the key results of the feedback provided were that:

- Growers reported an average workforce of: 4.3 staff (small-sized farms), 7.9 staff (medium-sized farms) and 26.6 staff (large-sized farms).
- The majority are employed FT permanent, with staff spread evenly across entry level, experienced and managerial levels.
- Almost one in three (31%) have reported a likelihood to recruit staff in the next 12 months.
- Growers have overwhelmingly agreed it is important that staff feel as a valued part of the business and that getting the right staff is critical to on-farm success.
- 25% reported that during the 2017-2018 season, a lack of adequately skilled staff cost the farm.
- 84% of growers are satisfied with the staff they have on farm.



4.3

(small farms)



7.9

(medium farms)



26.6

(large farms)

Average total number of staff on farm



6.7 Average total number of staff per 1,000 hectares



6.0 Average number of full time permanent staff on farm



95% agree that it is important workers feel like a valued part of the business



31% likely to recruit staff in the next 12 months



25% said a lack of adequately skilled staff cost the farm



92% agree that getting the right employees on farm is critical to success



84% of growers satisfied with the staff they have on farm



KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base (Overall)	11	22	22	64	15	39	62	84	28
Average total # of staff	4.8	5.2	19.4	9.7	8.3	7.7	4.3	7.9	26.6
	Average # of staff per 1,000 hectares:						12.7	4.0	2.0
# of staff who are FT permanent	4.5	4.1	9.1	6.2	5.9	5.6	2.7	5.6	14.6
% likely to recruit staff in next 12 months	18%	23%	33%	40%	20%	28%	13%	43%	39%
% agree that it is important workers feel like a valued part of the business	91%	91%	100%	95%	87%	97%	85%	100%	100%
% agree that getting the right employees on farm is critical to success	91%	86%	95%	90%	93%	97%	85%	98%	93%
% who said a lack of adequately skilled staff cost the farm	9%	27%	29%	35%	7%	16%	15%	27%	43%
% of growers satisfied with the staff they have on farm	91%	86%	76%	84%	87%	82%	80%	90%	71%

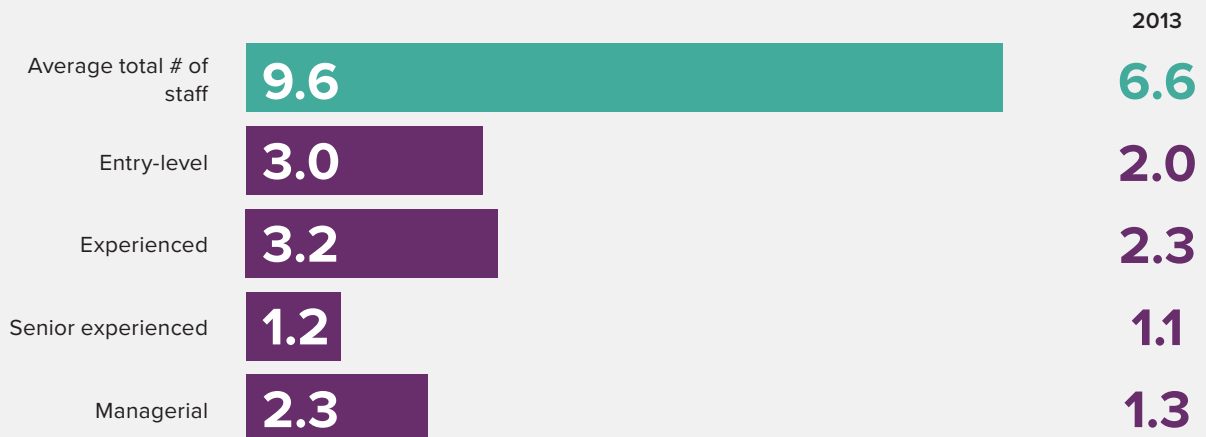


Warwick Waters

Focus area: workforce

Number of people in workforce

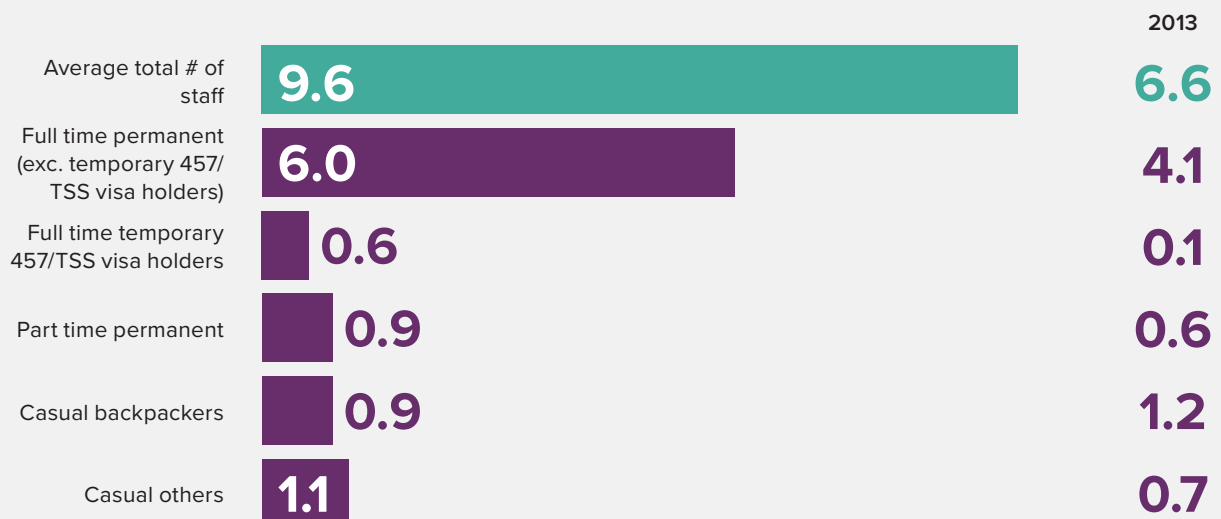
In JANUARY 2018, how many people were employed in each of the following positions on your farm? Include yourself and family but exclude gin staff.



Base all growers; n = 174

Definitions of each category as described in the survey are found below

In JANUARY 2018, how many people were employed in each of the following positions on your farm? Include yourself and family but exclude gin staff.



Base all growers; n = 174

Definitions: Entry-level e.g. assistant farm hand or driver who requires supervision or is inexperienced

Experienced e.g. experienced farm hand or machinery operator

Senior experienced e.g. a supervisor

Managerial e.g. farm manager, on-farm agronomist



KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base (Overall)	11	22	22	64	15	39	62	84	28
Total # of staff	4.8	5.2	19.4	9.7	8.3	7.7	4.3	7.9	26.6
Entry-level	1.1	1.5	6.5	2.9	2.7	1.9	1.1	2.0	9.9
Experienced	0.9	1.4	6.3	3.4	2.5	2.9	1.3	2.6	9.3
Senior experienced	0.3	0.7	2.2	1.4	1.4	0.7	0.4	1.1	3.3
Managerial	2.5	1.6	4.4	1.9	1.7	2.2	1.5	2.2	4.2

KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base (Overall)	11	22	22	64	15	39	62	84	28
Total # of staff	4.8	5.2	19.4	9.7	8.3	7.7	4.3	7.9	26.6
Full time permanent	4.5	4.1	9.1	6.2	5.9	5.6	2.7	5.6	14.6
Full time temporary	0.1	0.3	2.1	0.5	0.1	0.5	0.2	0.3	2.4
Part time permanent	0.0	0.3	3.4	0.8	1.3	0.3	0.5	0.4	3.6
Casual backpackers	0.1	0.1	2.7	0.6	0.5	0.6	0.2	0.8	3.0
Casual others	0.2	0.4	2.1	1.4	0.5	0.8	0.7	0.7	3.0

Focus area: workforce

Number of people in workforce

When considering your farm workforce in January 2018, can you please answer the following for each type of position:



Base all growers; n = 172

Definitions of each category as described in the survey are found on page 74





KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base (Overall)	11	22	21	63	15	39	62	82	28
Total # of staff new to farm in 2017	0.6	0.7	2.1	1.6	2.1	1.4	0.8	1.5	3.9
Entry-level	0.5	0.3	0.8	1.0	0.9	0.6	0.4	1.0	2.1
Experienced	0.0	0.2	1.0	0.4	0.9	0.5	0.3	0.4	1.4
Senior experienced	0.0	< 0.1	0.1	0.1	0.3	< 0.1	< 0.1	0.1	0.2
Managerial	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.2
Total # of staff new to farm and cotton in 2017	0.5	0.3	0.9	1.0	0.8	0.9	0.4	1.0	2.4
Entry-level	0.5	0.3	0.7	0.8	0.8	0.6	0.2	0.8	2.0
Experienced	0.0	< 0.1	0.2	0.2	0.0	0.2	0.1	0.2	0.4
Senior experienced	0.0	0.0	0.0	< 0.1	0.0	< 0.1	< 0.1	< 0.1	0.0
Managerial	0.0	0.0	0.0	< 0.1	0.0	0.1	< 0.1	0.0	0.0
Total # of vacancies	0.5	0.1	0.6	0.6	0.3	0.2	0.2	0.3	1.2
Entry-level	0.5	< 0.1	0.4	0.3	0.2	0.1	0.1	0.1	0.8
Experienced	0.0	< 0.1	0.1	0.2	0.0	0.1	< 0.1	0.1	0.3
Senior experienced	0.0	0.0	< 0.1	0.1	0.1	< 0.1	< 0.1	< 0.1	0.1
Managerial	0.0	0.0	0.0	< 0.1	0.0	< 0.1	0.0	< 0.1	< 0.1

Focus area: workforce

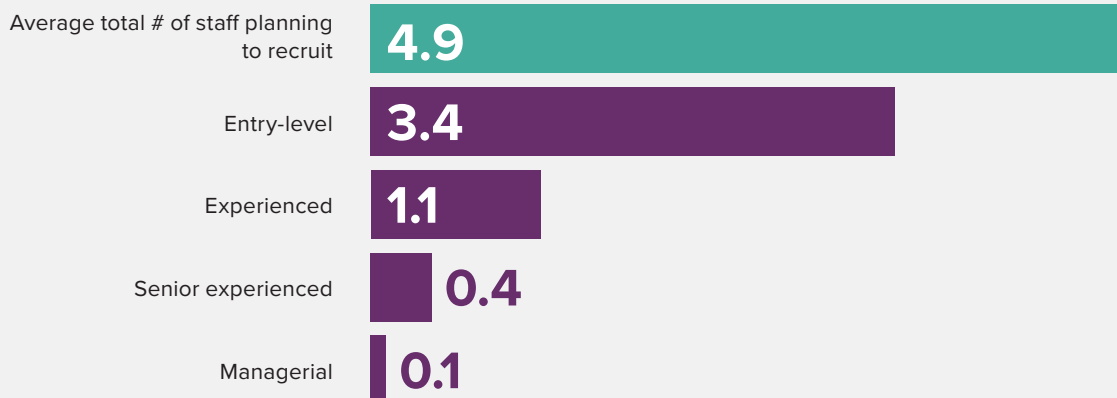
Recruitment of staff in the next 12 months

Do you plan on recruiting any staff in the next 12 months?



Base all growers; n = 172

How many staff do you plan to recruit in the next 12 months, in the following positions (including any current vacancies you will try to recruit for)?



Base all growers who plan on recruiting staff in the next 12 months; n = 54
Definitions of each category as described in the survey are found on page 74



KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	11	22	21	63	15	39	62	82	28
Yes	18%	23%	33%	40%	20%	28%	13%	43%	39%

KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

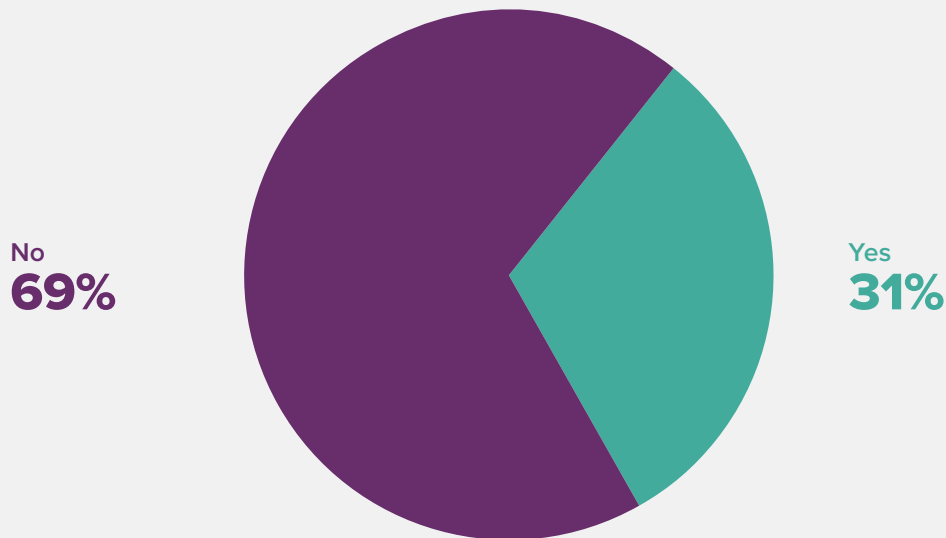
	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	2	5	6	25	3	11	8	35	10
Total # of staff	1.0	1.8	4.7	4.8	1.3	3.3	3.9	4.5	7.3
Entry-level	0.0	0.8	2.8	3.0	1.0	1.9	2.8	3.4	4.0
Experienced	1.0	0.4	1.7	1.2	0.3	0.7	0.8	0.8	2.5
Senior experienced	0.0	0.6	0.2	0.4	0.0	0.5	0.4	0.3	0.7
Managerial	0.0	0.0	0.0	0.1	0.0	0.2	0.0	0.1	0.1

Note: In the calculation of the average number of staff to be recruited, we have removed one result identified as an outlier.

Focus area: workforce

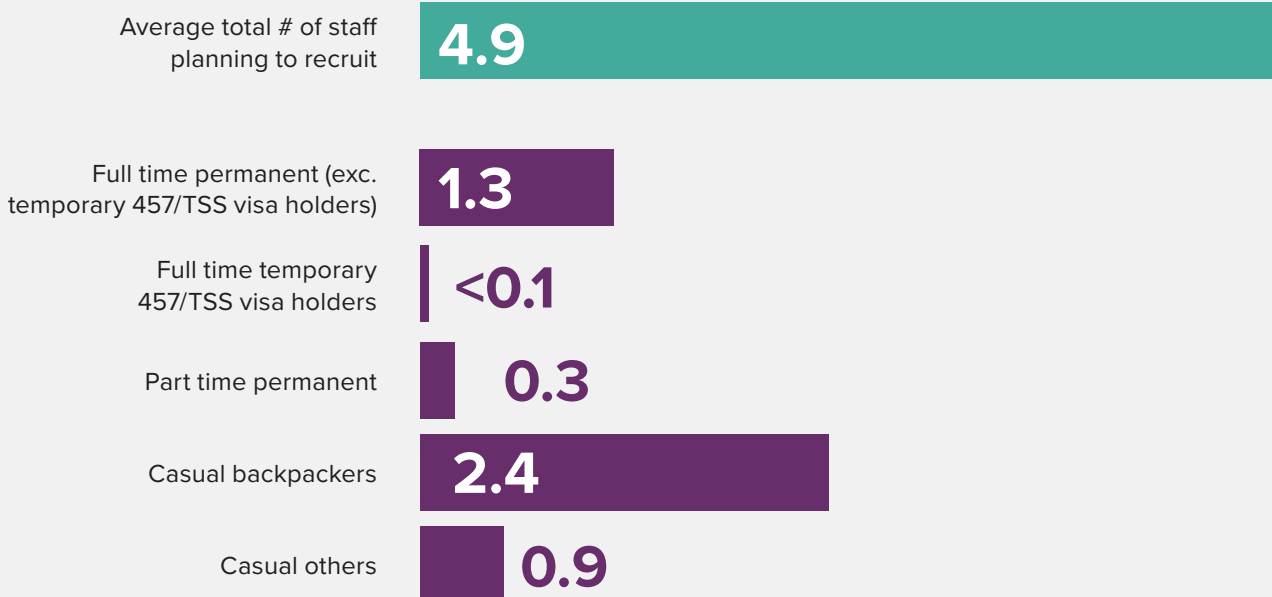
Staff details: value, interaction, skills, business needs

Do you plan on recruiting any staff in the next 12 months?



Base all growers; n = 172

How many staff do you plan to recruit in the next 12 months, in the following positions (including any current vacancies you will try to recruit for)?



Base all growers who plan on recruiting staff in the next 12 months; n = 54

Note: In the calculation of the average number of staff to be recruited, we have removed one result identified as an outlier.



KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	11	22	21	63	15	39	62	82	28
Yes	18%	23%	33%	40%	20%	28%	13%	43%	39%

KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	2	5	6	25	3	11	8	35	10
Total # of staff	1.0	1.8	4.7	4.8	1.3	3.3	3.9	4.5	7.3
Full time permanent	1.0	1.0	2.3	1.5	0.7	0.8	0.5	1.0	3.1
Full time temporary	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.1	0.0
Part time permanent	0.0	0.2	0.0	0.5	0.0	0.2	0.1	0.1	0.9
Casual backpackers	0.0	0.6	1.0	1.7	0.7	0.7	2.1	2.7	1.2
Casual others	0.0	0.0	1.2	1.1	0.0	1.5	1.1	0.6	2.1

Note: In the calculation of the average number of staff to be recruited, we have removed one result identified as an outlier.

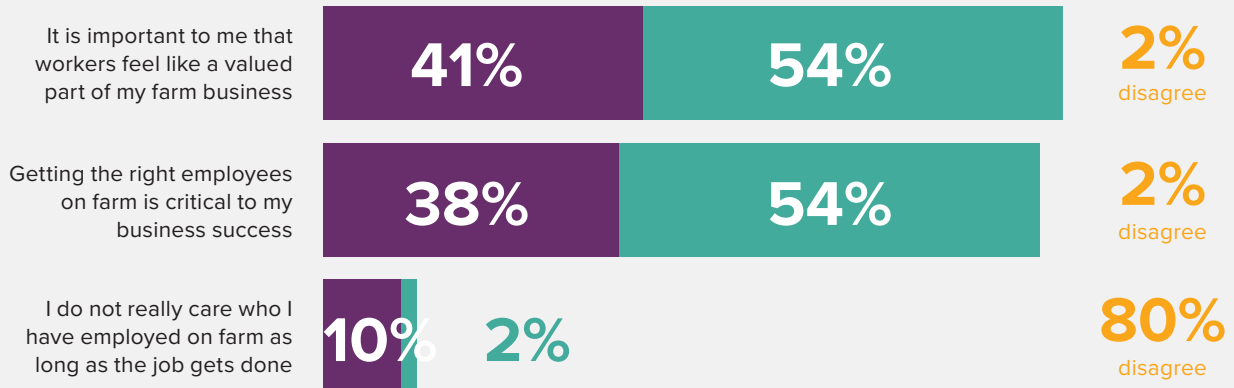


Melanie Jenson

Focus area: workforce

Staff details: value, interaction, skills, business needs

Please rate the following statements about the value of workers in your business: (% Agree)



Base all growers; n = 171

■ % Agree ■ % Strongly Agree

Please rate the following statements about your interactions with workers and management of your employees over the 2017-2018 season: (% Agree)



Base all growers; n = 171

■ % Agree ■ % Strongly Agree



KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA (% AGREE)

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	11	22	21	63	15	38	61	82	28
Important that workers feel valued	91%	91%	100%	95%	87%	97%	85%	100%	100%
Getting the right employees on farm is critical	91%	86%	95%	90%	93%	97%	85%	98%	93%
Do not really care who I have employed on farm	9%	9%	14%	16%	7%	8%	8%	15%	14%

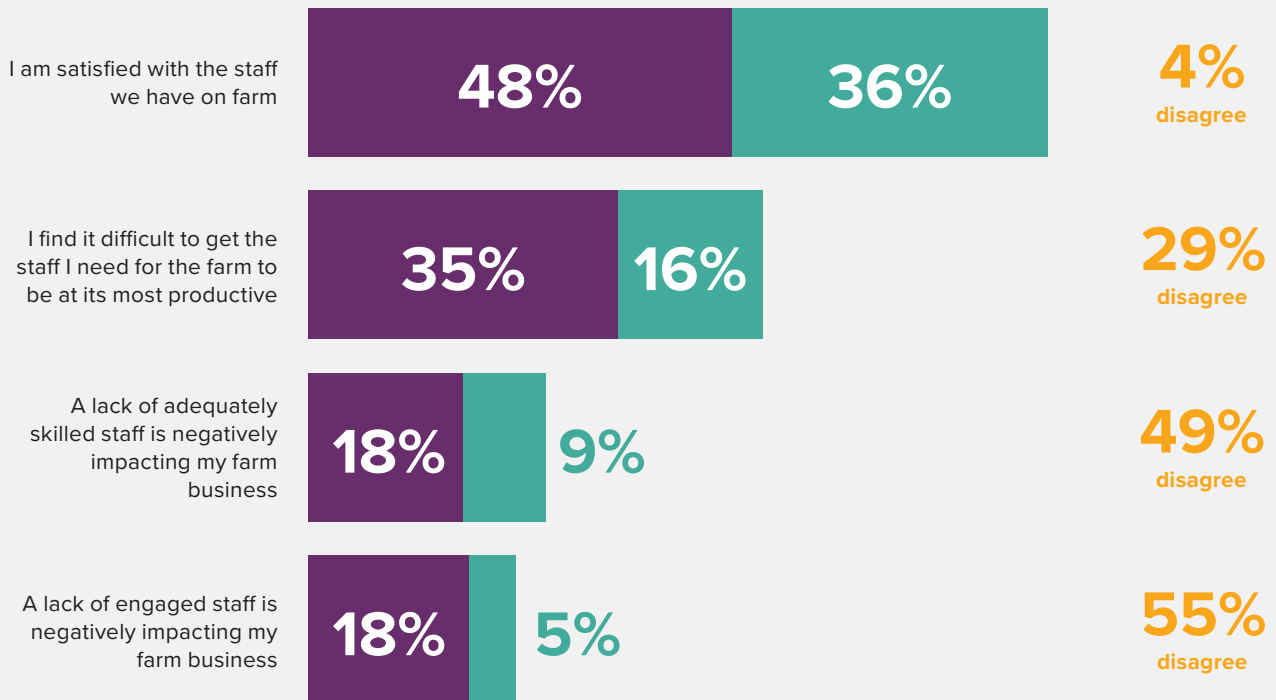
KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA (% AGREE)

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	11	22	21	63	15	38	61	82	28
Encouraged workers to give me their suggestions	91%	91%	95%	86%	87%	92%	80%	94%	96%
Had open discussions about skills development	91%	82%	86%	87%	60%	76%	72%	88%	86%
Able to trust workers on my farm	82%	86%	81%	75%	80%	79%	75%	78%	89%
Regularly provided feedback to my staff	82%	77%	67%	79%	60%	87%	69%	83%	82%
Feedback from exit interviews with workers leaving	45%	45%	29%	51%	13%	47%	34%	51%	39%

Focus area: workforce

Staff details: value, interaction, skills, business needs

Please provide feedback on whether your current staffing arrangements are meeting your business needs: (% Agree)



Base all growers; n = 171

■ % Agree ■ % Strongly Agree

KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA (% AGREE)

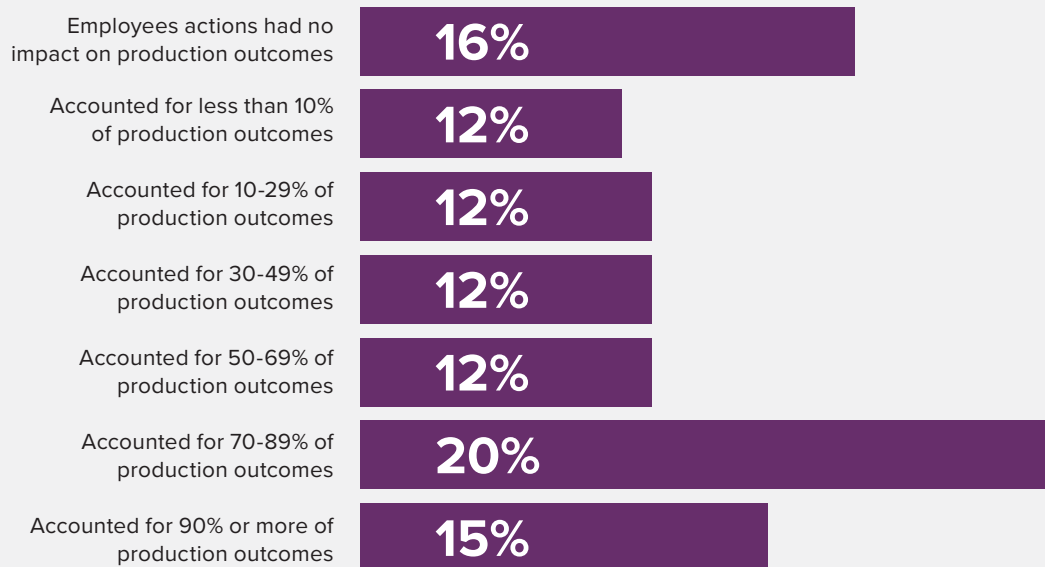
	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	11	22	21	63	15	38	61	82	28
I am satisfied with the staff we have on farm	91%	86%	76%	84%	87%	82%	80%	90%	71%
Find it difficult to get the staff I need	9%	41%	62%	60%	47%	50%	43%	55%	61%
Lack of adequately skilled staff is impacting business	9%	18%	24%	37%	13%	26%	21%	30%	29%
Lack of engaged staff is negatively impacting business	9%	14%	29%	29%	20%	21%	20%	23%	32%



Focus area: workforce

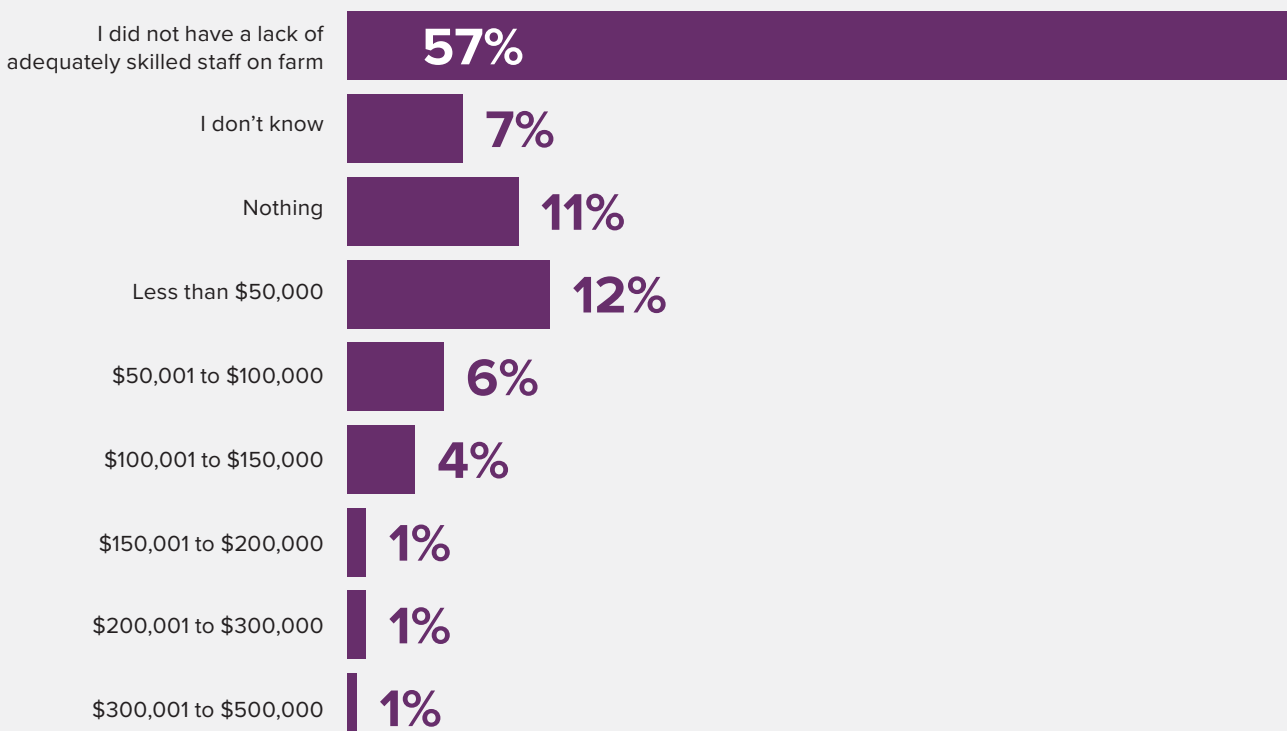
Staff details: value, interaction, skills, business needs

Please provide feedback on the impacts that skilled workers have on your farm business outcomes: How significant were employees' actions on the yield and quality of the crop produced for 2017-2018?



Base all growers; n = 171

In the 2017-2018 season, what shortfall did a lack of adequately skilled staff cost the farm in terms of direct loss, lost income and profit (include costs of mistakes made by inadequately skilled staff and cost to potential profit from production outcomes)?



Base all growers; n = 171



KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	11	22	21	63	15	38	61	82	28
No impact	36%	18%	0%	13%	20%	24%	26%	13%	4%
< 10%	18%	5%	10%	13%	13%	13%	11%	11%	14%
10-29%	0%	14%	19%	16%	0%	11%	8%	16%	11%
30-49%	9%	9%	5%	17%	13%	11%	13%	11%	14%
50-69%	18%	9%	14%	11%	27%	8%	11%	9%	25%
70-89%	18%	27%	24%	17%	27%	18%	10%	27%	25%
90%+	0%	18%	29%	13%	0%	16%	20%	13%	7%

KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	11	22	21	63	15	38	61	82	28
No lack of adequate skilled staff	73%	59%	48%	46%	73%	71%	59%	61%	43%
I don't know	9%	0%	14%	8%	0%	8%	7%	6%	11%
Nothing	9%	14%	10%	11%	20%	5%	20%	6%	4%
< \$50k	9%	23%	14%	16%	0%	5%	10%	12%	18%
> \$50k - \$100k	0%	0%	5%	10%	7%	5%	3%	7%	7%
> \$100k - \$150k	0%	0%	10%	3%	0%	5%	0%	4%	14%
> \$150k - \$200k	0%	0%	0%	3%	0%	0%	0%	1%	4%
> \$200k - \$300k	0%	0%	0%	3%	0%	0%	0%	2%	0%
> \$300k - \$500k	0%	5%	0%	0%	0%	0%	2%	0%	0%

Focus area: workforce

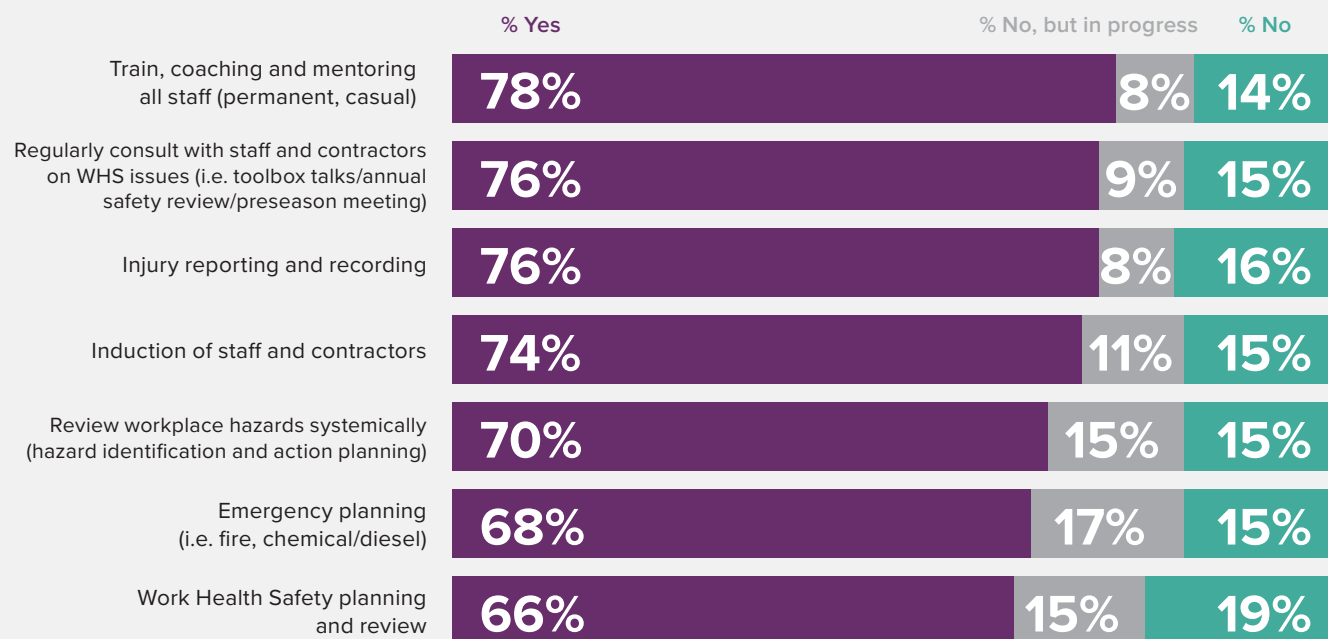
Safe systems, risks, and contractors

A measure of the safe systems of work was collected during the 2018 Grower Survey. The results show that:

- There is generally a widespread, if not complete, adoption of the safe systems of work.
- The strongest adoption of these systems resolved around induction, coaching and engagement with staff along with injury reporting and recording. Somewhat lower adoption was reported for emergency planning and work health safety planning.
- The analysis shows that there was a cohort of growers (44%) who reported adoption of all these systems, and another small cohort (6%) who reported no adoption of any of these safe systems of work. Growers are, on average, adopting 5.1 of these safe systems of work.



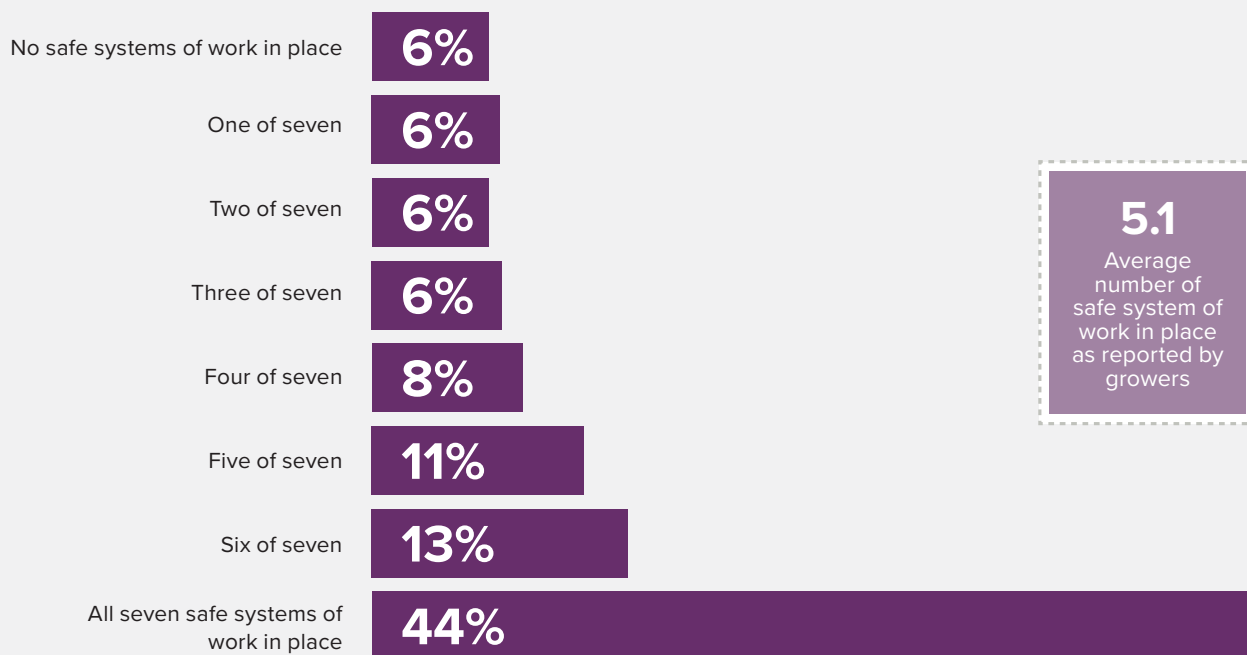
Do you have the following safe systems of work in place?



Base all growers; n = 171



Number of safe systems of work in place (of the seven safe systems of work measured in the survey)



Base all growers; n = 171

KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA (% YES)

	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	11	22	21	63	15	38	61	82	28
Train, coaching and mentoring all staff	91%	73%	76%	84%	67%	74%	66%	82%	96%
Regularly consult w/ staff/contractors on WHS issues	91%	77%	71%	87%	60%	61%	64%	80%	89%
Injury reporting and recording	64%	73%	81%	90%	67%	58%	66%	79%	89%
Induction of staff and contractors	73%	64%	81%	86%	73%	58%	61%	77%	96%
Review hazards systemically	100%	73%	71%	78%	40%	58%	64%	72%	79%
Emergency planning	82%	64%	71%	73%	60%	58%	56%	72%	82%
Work Health Safety planning/review	73%	73%	62%	75%	47%	55%	57%	68%	79%

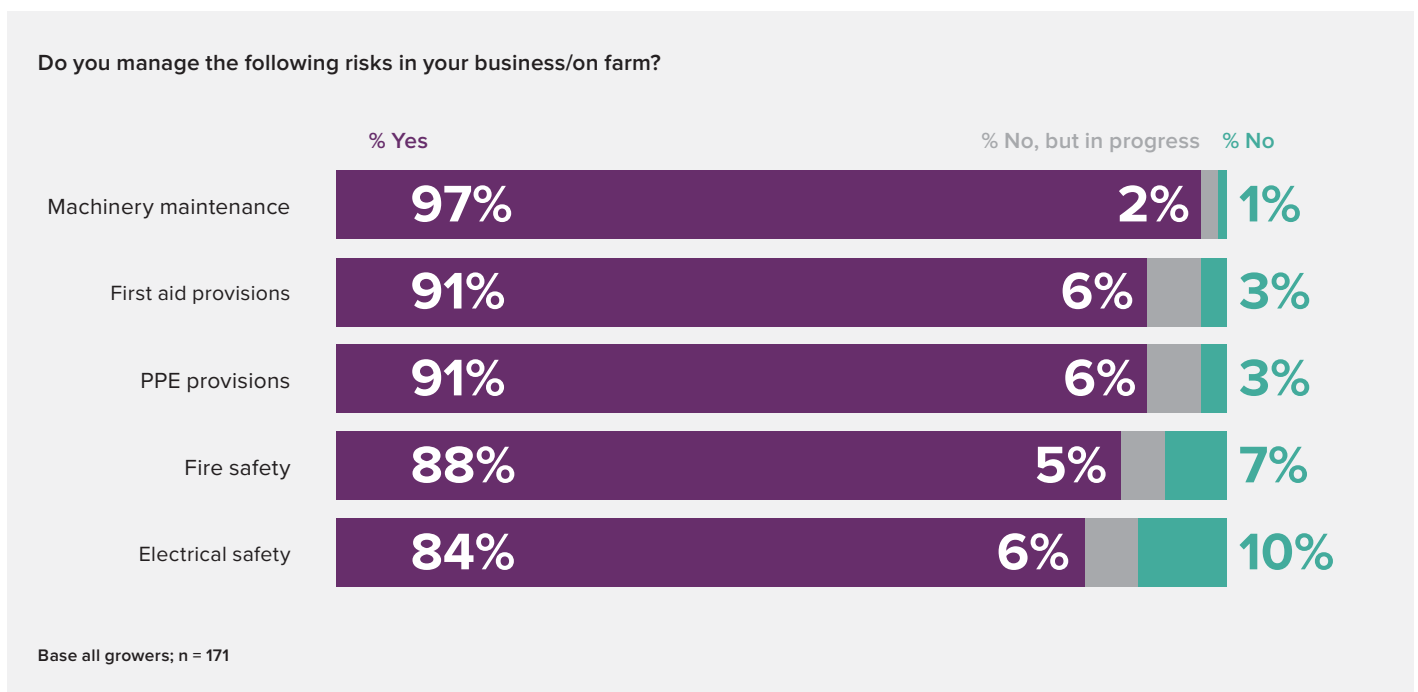
Focus area: workforce

Safe systems, risks, and contractors

The 2018 Grower Survey also sought to provide a measure of the management of risks. As shown in the chart below, the overwhelming majority of growers are reporting they manage most of the risks measured in the survey.

While almost all growers reported managing risks around machinery maintenance, first aid provisions and PPE provisions, a slightly lower number of growers reported managing fire safety and electrical safety risks on farm.

The results indicate that while growers appear to have adopted risk management across most of these areas, there remains a challenge to go the 'final step' to ensure all growers are managing for all on-farm risks.



KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA (% YES)

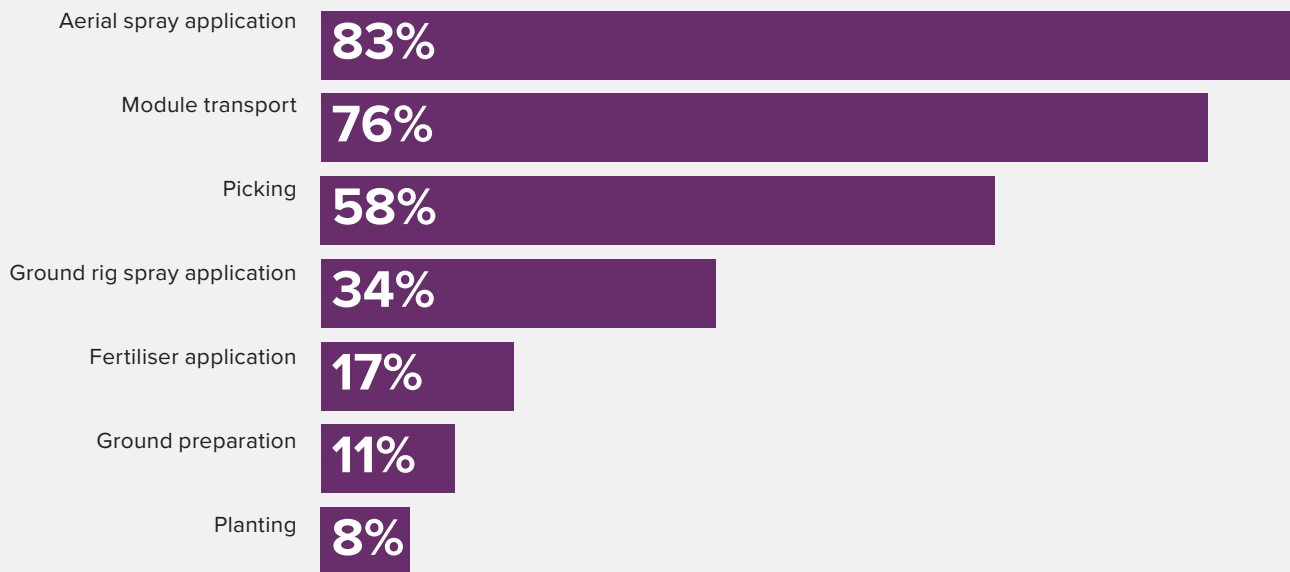
	Region						Size of Total Farm Area		
	Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
Base	11	22	21	63	15	38	61	82	28
Machinery maintenance	91%	86%	100%	100%	93%	97%	92%	99%	100%
First aid provisions	82%	82%	86%	97%	73%	97%	82%	95%	96%
PPE provisions	91%	86%	95%	95%	80%	87%	87%	90%	100%
Fire safety	91%	77%	76%	98%	80%	84%	82%	89%	96%
Electrical safety	91%	77%	90%	89%	73%	76%	80%	84%	89%



Focus area: workforce

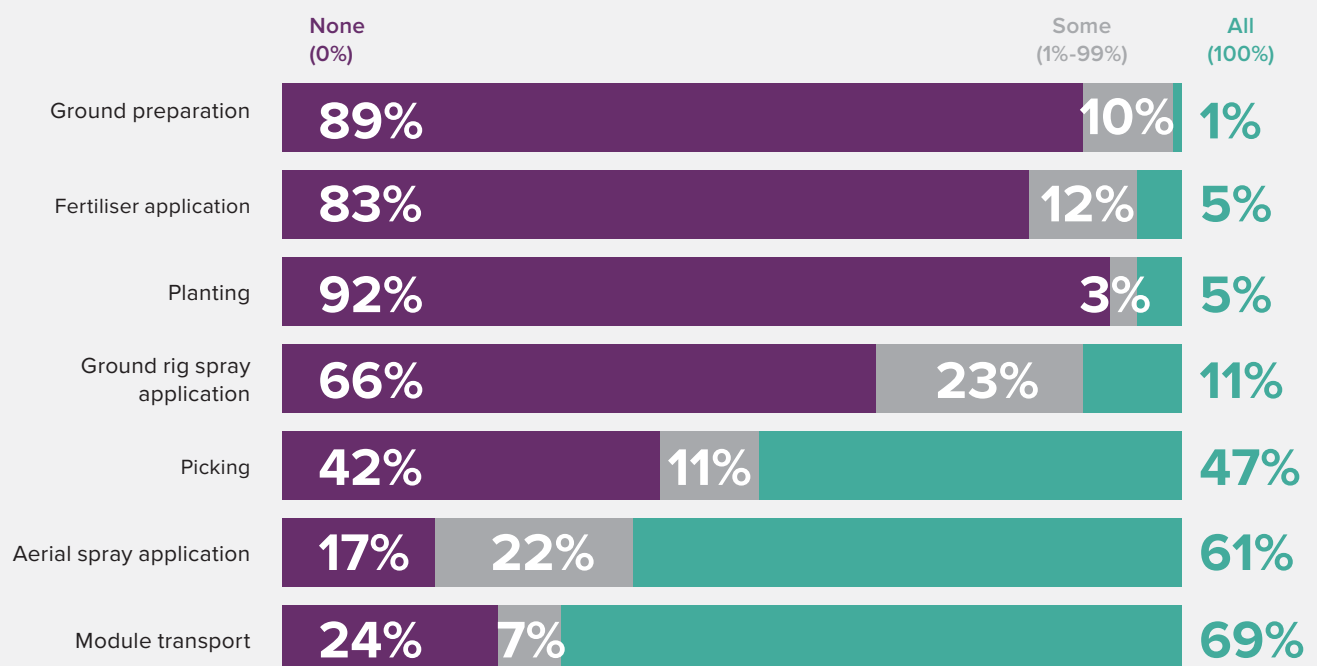
Safe systems, risks, and contractors

Did you use contractors for any of these operations for your 2017-18 cotton crop? (% used contractors to some degree)



Base all growers who grew cotton during 2017-18 season; n = 157

To what degree did you use contractors for any of these operations for your 2017-18 cotton crop?



Base all growers who grew cotton during 2017-18 season; n = 157



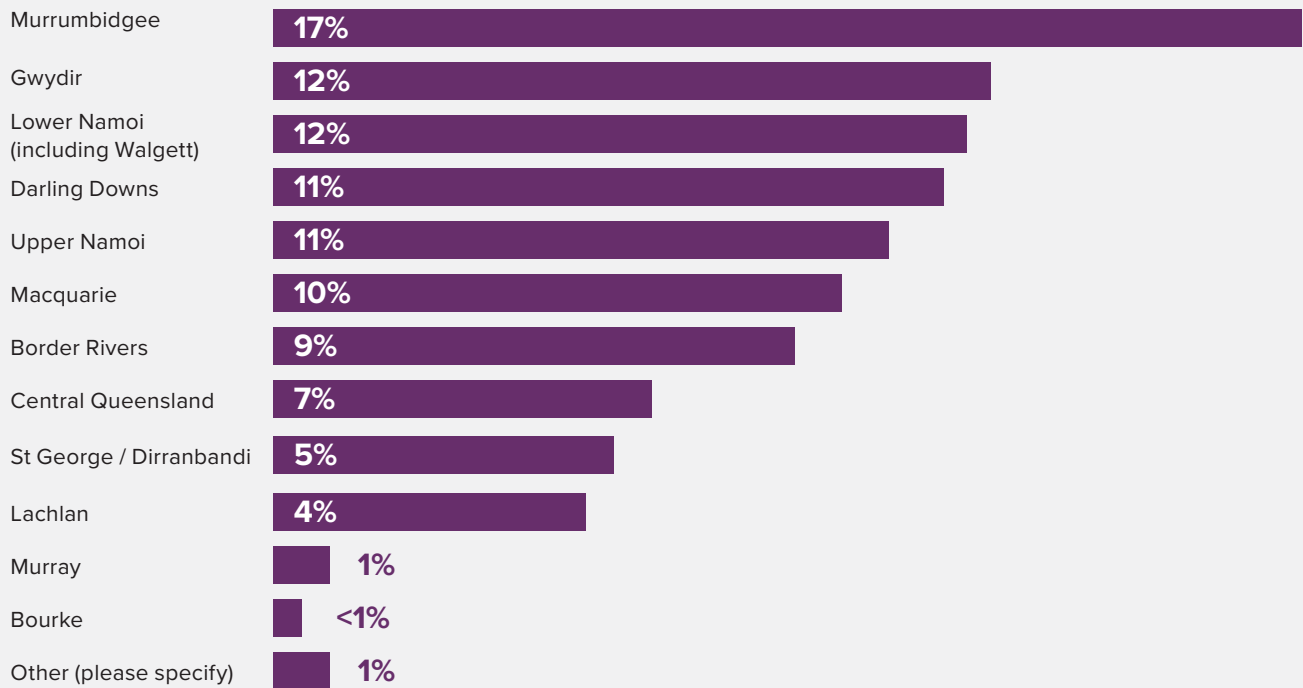
KEY RESULTS BY REGION AND SIZE OF TOTAL FARM AREA

		Region						Size of Total Farm Area		
		Central QLD	Darling Downs	Macintyre Balonne	Northern NSW	Macquarie	Southern NSW	Small	Medium	Large
	Base	11	20	20	54	14	38	58	73	26
Ground Prep	None	100%	95%	85%	94%	71%	82%	86%	89%	92%
	Some	0%	5%	10%	6%	29%	16%	14%	10%	4%
	All	0%	0%	5%	0%	0%	3%	0%	1%	4%
Fertiliser	None	82%	95%	75%	89%	79%	76%	81%	89%	73%
	Some	0%	5%	20%	9%	14%	18%	12%	10%	19%
	All	18%	0%	5%	2%	7%	5%	7%	1%	8%
Planting	None	100%	95%	95%	93%	93%	87%	93%	93%	88%
	Some	0%	5%	0%	6%	0%	0%	2%	1%	8%
	All	0%	0%	5%	2%	7%	13%	5%	5%	4%
Ground Rig	None	64%	80%	70%	70%	50%	55%	69%	68%	50%
	Some	9%	20%	15%	20%	36%	32%	26%	21%	23%
	All	27%	0%	15%	9%	14%	13%	5%	11%	27%
Picking	None	45%	45%	35%	52%	36%	32%	34%	47%	46%
	Some	0%	5%	30%	15%	7%	3%	9%	8%	23%
	All	55%	50%	35%	33%	57%	66%	57%	45%	31%
Aerial Spray	None	27%	30%	5%	17%	0%	18%	19%	19%	4%
	Some	0%	30%	15%	22%	7%	34%	33%	18%	12%
	All	73%	40%	80%	61%	93%	47%	48%	63%	85%
Module	None	45%	35%	25%	17%	7%	27%	16%	31%	23%
	Some	0%	10%	15%	4%	29%	0%	7%	4%	15%
	All	55%	55%	60%	80%	64%	73%	78%	65%	62%

Appendices

Farm region and grower age

In which region are you located?



Base all growers; n = 246



Which age category do you belong to?



Base all growers; growing cotton in 2017/18: n = 191, NOT growing cotton in 2017-18: n = 21

Appendices

Technical notes

Reliability of the Estimates

The estimates in this report are based on information obtained from a sample survey. Any data collection may encounter factors, known as non-sampling error, which can impact on the reliability of the resulting statistics. In addition, the reliability of estimates based on sample surveys are also subject to sampling variability. That is, the estimates may differ from those that would have been produced had all persons in the population been included in the survey.

Non-sampling error

Non-sampling error may occur in any collection, whether it is based on a sample or a full count such as a census. Sources of non-sampling error include non-response, errors in reporting by respondents or recording of answers by interviewers and errors in coding and processing data. Every effort is made to reduce non-sampling error by careful design of survey questionnaires and quality control procedures at all stages of data processing.

Sampling error

One measure of the likely difference is given by the standard error (SE), which indicates the extent to which an estimate might have varied by chance because only a sample of persons was included. There are about two chances in three (67%) that a sample estimate will differ by less than one SE from the number that would have been obtained if all persons had been surveyed, and about 19 chances in 20 (95%) that the difference will be less than two SEs.

Calculation of Confidence Interval

If 50% of all the people in a population of 20,000 people drink coffee in the morning, and if you were repeat the survey of 377 people ("Did you drink coffee this morning?") many times, then 95% of the time, your survey would find that between 45% and 55% of the people in your sample answered "Yes".

The remaining 5% of the time, or for 1 in 20 survey questions, you would expect the survey response to more than the margin of error away from the true answer.

When you survey a sample of the population, you don't know that you've found the correct answer, but you do know that there's a 95% chance that you're within the margin of error of the correct answer.

In terms of the numbers selected above, the margin of error MoE is given by:

$$MoE = z * \sqrt{\frac{\hat{p}(1 - \hat{p})}{n}}$$

where n is the sample size, \hat{p} is the fraction of responses that you are interested in, and z is the critical value for the 95% confidence level (in this case, 1.96).

This calculation is based on the Normal distribution, and assumes you have more than about 30 samples.

Margin of Error for a given sample size and survey estimate.

Sample Size

	30	50	75	100	150	171 (# surveys completed)	200	246 (# surveys started)	300	500	1,000	1,500	2,000
10%	n/a	n/a	n/a	± 5.88%	± 4.80%	± 4.50%	± 4.16%	± 3.75%	± 3.39%	± 2.63%	± 1.86%	± 1.52%	± 1.31%
20%	n/a	± 11.09%	± 9.05%	± 7.84%	± 6.40%	± 6.00%	± 5.54%	± 5.00%	± 4.53%	± 3.51%	± 2.48%	± 2.02%	± 1.75%
30%	n/a	± 12.70%	± 10.37%	± 8.98%	± 7.33%	± 6.87%	± 6.35%	± 5.73%	± 5.19%	± 4.02%	± 2.84%	± 2.32%	± 2.01%
40%	± 17.53%	± 13.58%	± 11.09%	± 9.60%	± 7.84%	± 7.34%	± 6.79%	± 6.12%	± 5.54%	± 4.29%	± 3.04%	± 2.48%	± 2.15%
50%	± 17.89%	± 13.86%	± 11.32%	± 9.80%	± 8.00%	± 7.49%	± 6.93%	± 6.25%	± 5.66%	± 4.38%	± 3.10%	± 2.53%	± 2.19%
60%	± 17.53%	± 13.58%	± 11.09%	± 9.60%	± 7.84%	± 7.34%	± 6.79%	± 6.12%	± 5.54%	± 4.29%	± 3.04%	± 2.48%	± 2.15%
70%	n/a	± 12.70%	± 10.37%	± 8.98%	± 7.33%	± 6.87%	± 6.35%	± 5.73%	± 5.19%	± 4.02%	± 2.84%	± 2.32%	± 2.01%
80%	n/a	± 11.09%	± 9.05%	± 7.84%	± 6.40%	± 6.00%	± 5.54%	± 5.00%	± 4.53%	± 3.51%	± 2.48%	± 2.02%	± 1.75%
90%	n/a	n/a	n/a	± 5.88%	± 4.80%	± 4.50%	± 4.16%	± 3.75%	± 3.39%	± 2.63%	± 1.86%	± 1.52%	± 1.31%

Note. Margin of Errors are provided at the 95% confidence level on the assumption of a large population size (non-finite) and normally distributed. Results labelled "n/a" are due to the assumption of the normal distribution not being upheld ($np < 10$ or $n(1-p) < 10$).

Appendices

Research design

Objective

The purpose of the CRDC Cotton Grower Survey is to capture valuable information about cotton farming practices to give a greater understanding of the industry's current practices and performance – so that trends can be monitored over time, practice change can be accurately measured, and areas for improvement and further RD&E investment identified. The annual Survey also aims to capture important information about growers' understanding and perception of cotton RD&E, led by CRDC.

Methodology

The survey was initially conducted via an online survey using contact lists provided by CRDC. Midway through the research period, the methodology shifted to a phone call encouraging growers to complete the survey online, or were given the option to complete the survey over the phone at a time that suited them.

Sample

In total, a sample of n = 1,144 growers was provided by CRDC, with n = 246 starting the survey and n = 171 surveys completed (completion rate of 14.9%). A breakdown of the number of surveys completed by Region is located below.

Of note is that through the phone call process, 15.4% of those contacted stated they were not in the farming business. This then provides an effective sample size of those still within business of n = 968, and an effective completion rate (of those still within business) of 17.7%.

Questionnaire

Growers were asked to complete a 20 minute survey which covered a range of topics related to their cotton growing experience both on and off-farm.

Key areas of interest included:

- Industry Sentiment
- CRDC
- CottonInfo
- Farm Profiles
- 2017-18 Cotton Crop
- Weeds and Disease Control
- Irrigation
- Automation
- Workforce

Timing

The online survey was launched on the 6th June 2018 and remained open until the 26th July 2018.

Region	Number of Started Surveys	Number of Completed Surveys
Overall	246	171
Central Queensland	16	11
Darling Downs	28	22
Macintyre – Balonne	34	21
Northern NSW	87	63
Macquarie	24	15
Southern NSW	56	38
Other	1	1

2018 Grower Survey

Survey Questions

Thank you for agreeing to complete the 2018 Grower Survey.

This survey is being conducted by Intuitive Solutions on behalf of the Cotton Research and Development Corporation (CRDC). Questions denoted with a red asterisk * are required questions and will need to be answered before moving forward in the survey.

Please continue to the next page to begin the survey.

Module 1

Farm Profiles

[SECTION ASKED TO ALL GROWERS]

First, we have a few questions about you and your farm. Please be assured that this information is only being used to compare your answers to other growers at an aggregate level. This information is NOT being collected to identify you in any way.

Q1. In which region are you located?

Central Queensland	1
Darling Downs	2
Border Rivers	3
St George / Dirranbandi	4
Gwydir	5
Lower Namoi (including Walgett)	6
Upper Namoi	7
Macquarie	8
Bourke	9
Lachlan	10
Murrumbidgee	11
Murray	12
Other (please specify which region)	90

Q2. On your farm, what was the total area for the following?

Number of ha

Total farm size

Area developed for fully irrigated broadacre cropping	
Area developed for partially irrigated broadacre cropping	
Area developed for raingrown / dryland cropping	
Area used for grazing	
Area of native vegetation not usually grazed	
Other area not covered above	

Q3. Approximately how long and wide is the riparian area on your property?

kms

Riparian length (best estimate)	
Average width (best estimate)	

Q4. Which age category do you belong to?

Under 20	1
20-34	2
35-39	3
40-44	4
45-49	5
50-54	6
55-59	7
60-64	8
65+	9



Q5. During the 2017-18 cotton growing season, what was the total area planted for cotton?

Area (in hectares)

None, I didn't grow cotton during the 2017-18 season 99

Module 2 Your 2017-18 Cotton Crop

[SECTION ASKED ONLY TO THOSE WHO GREW COTTON DURING 2017-18 SEASON]

The next questions relate to your 2017-18 cotton crop.

Q6. What area was planted for cotton for the 2017-18 cotton growing season?

[DISPLAY AREAS DEPENDENT UPON RESPONSES TO AREA QUESTION]

	Fully irrigated (ha)	Partially irrigated (ha)	Raingrown Dryland (ha)
Field area planted			
Green area planted			
Area planted but not harvested			

Q7. What were your yields for the 2017-18 cotton growing season?

[DISPLAY AREAS DEPENDENT UPON RESPONSES TO AREA QUESTION]

	Fully irrigated (bales/ha)	Partially irrigated (bales/ha)	Raingrown Dryland (bales/ha)
Average yield			
The yield achieved by your highest-yielding field			
The yield achieved by your lowest-yielding field			

Q8. Could you please provide estimates on what the moisture profile was at planting (or prior to pre-watering if performed) across the following areas (for the 2017-18 cotton growing season):

[DISPLAY AREAS DEPENDENT UPON RESPONSES TO AREA QUESTION]

	Fully irrigated	Partially irrigated	Raingrown Dryland
Moisture profile at planting or prior to pre-watering (mm)			

Q9. How much in-crop rainfall (in mm) did you receive in the 2017-18 cotton growing season between planting and harvesting?

In-crop rainfall (mm)

Q10. How much irrigation water (in mega litres) on average (per ha) was applied during the 2017-18 cotton growing season?

[DISPLAY AREAS DEPENDENT UPON RESPONSES TO AREA QUESTION]

	Fully irrigated	Partially irrigated
Average mega litres used per ha		

Q11. Please provide an estimate on what your total energy use was for the 2017-18 cotton growing season across the following operations:

Energy used for in-field operations (ground preparation, in season operations, harvesting and post-harvest operations excluding transport to gin).

Please provide your best estimate:

Diesel (L)

Bio-diesel (L)

Energy used for pumping water.

Please provide your best estimate:

Diesel (L)

Electricity use (kWh)

2018 Grower Survey

Survey Questions

Q12. How much solar energy did you make use of for the 2017-18 cotton growing season for your farming operations? Please indicate an estimate of how many kilowatt hours (kWh) were generated and used across the cotton growing season.

kWh generated and used across
2017-18 cotton growing season

No, we don't generate solar energy 2

Q13. Please list the rate of applied nutrients for your most typical irrigated, partially irrigated and/or dryland cotton field/s in 2017-18:

[DISPLAY AREAS DEPENDENT UPON RESPONSES TO AREA QUESTION]

	Fully irrigated	Partially irrigated	Raingrown / Dryland
Preseason Nitrogen (kg N/ha)			
In-season Nitrogen (kg N/ha)			
Total Phosphorus (kg P/ha)			
Total Potassium (kg K/ha)			
Total Zinc			
Total Sulphur			

Module 3 CRDC

[SECTION ASKED TO ALL GROWERS]

The next set of questions asks you about the Cotton Research and Development Corporation (CRDC).

Q14. Before completing this survey today, were you aware of the Cotton Research and Development Corporation (CRDC)?

Yes	1
No	2
Unsure	99

Q15. How well would you say you understand what the Cotton Research and Development Corporation (CRDC) does?

Very well	1
Fairly well	2
A little	3
Very little	4
Not at all/Unaware of CRDC	5

Q16. How would you rate CRDC's performance in:

Providing useful, credible information

Very poor	1
Poor	2
Ok	3
Good	4
Excellent	5
Don't know	99

Communicating with growers about R&D investments

Very poor	1
Poor	2
Ok	3
Good	4
Excellent	5
Don't know	99

Q17. Overall, how supportive are you of CRDC's research investments and activities?

Very unsupportive	1
Unsupportive	2
Neutral	3
Supportive	4
Very supportive	5



Module 4 CottonInfo

[SECTION ASKED TO ALL GROWERS]

The next set of questions asks you about CottonInfo.

Q18. Are you aware of CottonInfo - the cotton industry's joint extension program (consisting of regional extension officers, technical leads and myBMP)?

Yes, I receive CottonInfo information or contact from the team	1
Yes, but have not received information or advice	2
Maybe, not sure	3
No	4

Q19. Do you source information from the CottonInfo team or information resources (e.g. Cotton Pest Management Guide, Cotton Production Manual, myBMP, etc.)?

Yes, frequently	1
Yes, occasionally	2
Maybe, not sure	3
No	4

Q20. To what degree have the CottonInfo team, information resources and myBMP assisted you to improve practices on your farm in relation to...

Insects, weeds, diseases, resistance & biosecurity

Not at all	1
A little	2
Moderate	3
Significant	4
Very significant	5
N/A, not needed	99

Nutrition & soils

Not at all	1
A little	2
Moderate	3
Significant	4
Very significant	5
N/A, not needed	99

Water & moisture management, seasonal forecasting & climate

Not at all	1
A little	2
Moderate	3
Significant	4
Very significant	5
N/A, not needed	99

Energy use

Not at all	1
A little	2
Moderate	3
Significant	4
Very significant	5
N/A, not needed	99

Natural resource management

Not at all	1
A little	2
Moderate	3
Significant	4
Very significant	5
N/A, not needed	99

Q21. Thinking about CottonInfo, do you agree or disagree that...

CottonInfo provides useful, credible info

Strongly disagree	1
Disagree	2
Neither	3
Agree	4
Strongly agree	5
N/A	99

CottonInfo is a trusted information source

Strongly disagree	1
Disagree	2
Neither	3
Agree	4
Strongly agree	5
N/A	99

2018 Grower Survey

Survey Questions

Module 5

Weeds and Disease Control

[SECTION ASKED TO ALL GROWERS]

The next questions relate to weed and disease management across your farm.

Q22. Farm biosecurity is a set of measures to protect a property from the entry and spread of pests, weeds and diseases. Which of the following practices are implemented to manage your farm's biosecurity?

All farm staff are made aware of the farm's biosecurity requirements (e.g. inductions, staff meetings)	
Never	1
Sometimes	2
Always	3

Agronomists/Contractors are made aware of the farm's biosecurity requirements (e.g. inductions, staff meetings)	
Never	1
Sometimes	2
Always	3

Visitors are made aware of the farm's biosecurity requirements (e.g. signage and visitor parking)	
Never	1
Sometimes	2
Always	3

Farm personnel, consultants, contractors briefed that in event of identifying an unusual disease, pests or plant there is a responsibility to report to agronomist, State DPI or Exotic Plant Pest Hotline	
Never	1
Sometimes	2
Always	3

Come clean – go clean (e.g. wash down stations, inspection of vehicles & machinery)	
Never	1
Sometimes	2
Always	3

Crops are regularly monitored for pests, weeds and diseases	
Never	1
Sometimes	2
Always	3

Volunteers and Ratoon cotton is controlled	
Never	1
Sometimes	2
Always	3

Consider risk from and inspect farm inputs (e.g. seed, soil amendments, stock feed, organic fertiliser)	
Never	1
Sometimes	2
Always	3

Order field operations so diseased or pest affected fields are last	
Never	1
Sometimes	2
Always	3

Q23. Do you have a farm biosecurity plan (i.e one that identifies hazards and an action plan)?	
Yes	1
No, but there is one currently being developed	2
No	3

Q24. How do you rate <i>WeedSmart</i> on their ability to deliver integrated weed management messages, and herbicide stewardship advice that assists with on-farm decision making?	
N/A - am not aware of <i>WeedSmart</i>	0
Not at all satisfied	1
Not satisfied	2
Satisfied	3
Extremely satisfied	4

Q25. Do you suspect and have you confirmed that you have weeds that are resistant to herbicides? (excluding Roundup Ready volunteers)	
Yes, confirmed	1
Yes, suspected but not confirmed	2
Don't have resistant weeds	3
Don't know	99

[IF CONFIRMED OR SUSPECTED OF RESISTANT WEEDS, ASK THE NEXT TWO QUESTIONS]

Q26. Approximately what area of your cropping area is affected (in hectares)?	
Total area with herbicide resistant weed populations	

Q27. What resistant weed/s do you have or suspect you have on your farm, and how widespread are they?

	Name of species	Frequency (Rare, patches, widespread)
Weed species #1	*specified answer*	[DROP DOWN BOX]
Weed species #2	*specified answer*	[DROP DOWN BOX]
Weed species #3	*specified answer*	[DROP DOWN BOX]
Weed species #4	*specified answer*	[DROP DOWN BOX]
Weed species #5	*specified answer*	[DROP DOWN BOX]



[ASKED ONLY TO THOSE WHO GREW COTTON DURING 2017-18 SEASON]

Q28. For the 2017-18 cotton growing season, what area of your cotton crop was impacted by spray drift, and what do you estimate to be the yield cost and financial cost of this damage?

Area of cotton crop impacted by spray drift (in ha)	
Estimate of yield cost of spray drift (in bales / ha)	
Estimate of financial cost of spray drift (in \$)	

Module 6 Irrigation

[SECTION ASKED ONLY IF THERE IS IRRIGATED AREA ANSWERED IN Q2. FOR THOSE WHO ANSWERED "0" FOR BOTH FULL AND PARTIAL IRRIGATION AREA, GO TO THE NEXT MODULE]

The next questions relate to your irrigation systems and use of technologies for irrigation.

Q29. What type of irrigation system do you use?

Please select all that apply.

Pressurised irrigation system (centre pivot lateral move)	1
Bankless	2
Furrow	3
Drip	4
Other (please specify)	99

[ASK ONLY IF GROWER HAS A FURROW SYSTEM AS PER QUESTION ABOVE]

Q30. Please select any of the following that you have done in the last 5 years to optimise furrow irrigation:

Please select all that apply.

Improved tailwater system	1
Maintained field slope	2
Changing siphon flows/size	3
Reduced run time	4
Taken soil characteristics into account in irrigation management	5
Redesigned field slope and length	6
Change in bed or row configuration or furrow shape	7
Understanding uniformity distribution	8
Metering of siphons	9
Irrimate / benchmarking	10
Automated any aspect of the irrigation	11
Other (please specify)	90

[ASKED ONLY TO THOSE WHO GREW COTTON DURING 2017-18 SEASON]

Q31. Which of the following methods, if any, did you use for scheduling cotton irrigations during the 2017-18 cotton growing season? Please select all that apply.

Visual crop monitoring	1
Weather forecasts	2
Capacitance probe	3
Neutron probe	4
Evapotranspiration (ET)	5
Dynamic deficits	6
Canopy temperatures	7
Remote sensing	8
Other (please specify)	90

Q32. Do you monitor the quality of groundwater throughout your farm?

Yes	1
No	2

[IF YES TO ABOVE QUESTION, ASK THE FOLLOWING TWO QUESTIONS]

Q33. How often do you monitor the quality of groundwater?

Several times a year	1
Annually	2
Every few years	3
Once	4

Q34. Please detail the methods you use to assess the quality of groundwater:

Q35. Which of the following statements best describes the level of automation for irrigation management that you have implemented on farm? Please select all that apply.

I use depth sensors in channels to measure water levels remotely	1
I can release gates remotely (via my phone, laptop, desktop)	2
I can turn pumps on and off remotely	3
I can apply water remotely to my field	4
I have sensors (e.g. soil moisture probes) plus software and hardware that allow me to irrigate crop areas remotely with precision	5
I don't use automation tools for irrigation management but am considering solutions for my farm	6
I don't use any automation tools for irrigation management and have no plans to implement any	7

2018 Grower Survey

Survey Questions

Module 7

Automation

[SECTION ASKED TO ALL GROWERS]

Q36. Are you currently using any automation (including automation for irrigation) on your farm? Examples of automation include unpiloted air and ground vehicles, intelligent decision systems, AI, etc.

Yes, I currently use automation on my farm	1
No, but I'm considering options for the future	2
No, and I have no plans to implement the use of automation on my farm	3

Q37. Regardless of whether or not you currently use automation on your farm, please indicate your agreement or disagreement with the following statements in relation to the usefulness of automation on cotton farms:

Automation will save me money on labour costs

Strongly disagree	Disagree	Neither	Agree	Strongly agree
1	2	3	4	5

Automation will improve my work/life balance and allow time away from the farm

Strongly disagree	Disagree	Neither	Agree	Strongly agree
1	2	3	4	5

Automation will allow me more time to work on other important aspects of the farm business

Strongly disagree	Disagree	Neither	Agree	Strongly agree
1	2	3	4	5

Automation will help reduce the effort required to manage workers on my farm

Strongly disagree	Disagree	Neither	Agree	Strongly agree
1	2	3	4	5

Automated technology will do a better job than manual labour approaches on my farm

Strongly disagree	Disagree	Neither	Agree	Strongly agree
1	2	3	4	5

Q38. Regardless of whether or not you currently use automation on your farm, please indicate your agreement or disagreement with the following statements in relation to how easy it is/will be to use automation on your farm:

I have the skills, or I can learn the skills, to use new automated technology on farm

Strongly disagree	Disagree	Neither	Agree	Strongly agree
1	2	3	4	5

I can easily hire others with the skills to operate/maintain automated technology on my farm

Strongly disagree	Disagree	Neither	Agree	Strongly agree
1	2	3	4	5

Automated technology is easy to integrate into my current farm management systems

Strongly disagree	Disagree	Neither	Agree	Strongly agree
1	2	3	4	5

My workers are capable of adapting in their work roles to use automated technology on my farm

Strongly disagree	Disagree	Neither	Agree	Strongly agree
1	2	3	4	5

[ASK THE NEXT FOUR QUESTIONS IF GROWER IS CURRENTLY USING AUTOMATION ON THEIR FARM]

Q39. What are you using automation for on your farm?

Q40. Has this automation required workers to learn new skills to perform their job?

Yes	1
No	2

Q41. Has this automation reduced the number of workers you employ on farm? Please answer for both permanent/year round workers and also for seasonal workers.

Permanent/year round workers

Yes	1
No	2

Seasonal workers

Yes	1
No	2



[ASK QUESTION AND ROWS BASED ON YES ANSWERS TO ABOVE QUESTION – REDUCING NUMBER OF WORKERS EMPLOYED ON FARM]

Q42. Please estimate the reduction in workers (in terms of full time equivalent or FTE) employed on farm due to this automation:

Permanent/year round workers	FTE
Seasonal workers	FTE

[ASK THIS QUESTION IF GROWER IS CURRENTLY USING AUTOMATION ON THEIR FARM]

Q43. Are you considering automation solutions for your farming business, and if so, please describe for what purpose:

[ASK THIS QUESTION IF GROWER IS NOT CURRENTLY USING AUTOMATION ON THEIR FARM, BUT IS CONSIDERING OPTIONS FOR THE FUTURE]

Q44. What automation solutions are you considering for your farming business, and please describe for what purpose:

[ASK THIS QUESTION IF GROWER IS NOT CURRENTLY USING AUTOMATION ON THEIR FARM – BOTH THOSE CONSIDERING SOLUTIONS AND THOSE NOT]

Q45. Why do you currently not use any automation tools on your farm?

Module 8 Workforce

[SECTION ASKED TO ALL GROWERS]

The next questions relate to your business and the workforce you employ.

Q46. In January 2018, how many people were employed in each of the following positions on your farm? Include yourself and family but exclude gin staff.

Entry-level e.g. assistant farm hand or driver who requires supervision or is inexperienced

Full time permanent (excluding temporary 457/TSS visa holders)	Full time temporary 457/TSS visa holders	Part time permanent	Casual back-packers	Casual others

Experienced e.g. experienced farm hand or machinery operator

Full time permanent (excluding temporary 457/TSS visa holders)	Full time temporary 457/TSS visa holders	Part time permanent	Casual back-packers	Casual others

Senior experienced e.g. a supervisor

Full time permanent (excluding temporary 457/TSS visa holders)	Full time temporary 457/TSS visa holders	Part time permanent	Casual back-packers	Casual others

Managerial e.g. farm manager, on-farm agronomist

Full time permanent (excluding temporary 457/TSS visa holders)	Full time temporary 457/TSS visa holders	Part time permanent	Casual back-packers	Casual others

2018 Grower Survey

Survey Questions

Q47. When considering your farm workforce in January 2018, can you please answer the following for each type of position:

How many people employed in each type of position were new to the farm in 2017?

Entry-level e.g. assistant farm hand or driver who requires supervision or is inexperienced	Experienced e.g. experienced farm hand or machinery operator	Senior experienced e.g. a supervisor	Managerial e.g. farm manager, on-farm agronomist

How many who joined in 2017 were new to the cotton industry?

Entry-level e.g. assistant farm hand or driver who requires supervision or is inexperienced	Experienced e.g. experienced farm hand or machinery operator	Senior experienced e.g. a supervisor	Managerial e.g. farm manager, on-farm agronomist

How many vacancies did you have in January?

Entry-level e.g. assistant farm hand or driver who requires supervision or is inexperienced	Experienced e.g. experienced farm hand or machinery operator	Senior experienced e.g. a supervisor	Managerial e.g. farm manager, on-farm agronomist

Q48. Do you plan on recruiting any staff in the next 12 months?

Yes	1
No	2

[ASK QUESTION IF RESPONDENT PLANS ON RECRUITING STAFF IN THE NEXT 12 MONTHS]

Q49. How many staff do you plan to recruit in the next 12 months, in the following positions (including any current vacancies you will try to recruit for)?

Entry-level e.g. assistant farm hand or driver who requires supervision or is inexperienced

Full time permanent (excluding temporary 457/TSS visa holders)	Full time temporary 457/TSS visa holders	Part time permanent	Casual back-packers	Casual others

Experienced e.g. experienced farm hand or machinery operator

Full time permanent (excluding temporary 457/TSS visa holders)	Full time temporary 457/TSS visa holders	Part time permanent	Casual back-packers	Casual others

Senior experienced e.g. a supervisor

Full time permanent (excluding temporary 457/TSS visa holders)	Full time temporary 457/TSS visa holders	Part time permanent	Casual back-packers	Casual others

Managerial e.g. farm manager, on-farm agronomist

Full time permanent (excluding temporary 457/TSS visa holders)	Full time temporary 457/TSS visa holders	Part time permanent	Casual back-packers	Casual others

[ASKED ONLY TO THOSE WHO GREW COTTON DURING 2017-18 SEASON]

Q50. To what degree did you use contractors for any of these operations for your 2017-18 cotton crop?

Ground preparation

0% (None)	1-25%	25-50%	50-75%	75-99%	100% (All)
1	2	3	4	5	6

Planting

0% (None)	1-25%	25-50%	50-75%	75-99%	100% (All)
1	2	3	4	5	6

Fertiliser application

0% (None)	1-25%	25-50%	50-75%	75-99%	100% (All)
1	2	3	4	5	6

Aerial spray application

0% (None)	1-25%	25-50%	50-75%	75-99%	100% (All)
1	2	3	4	5	6



Ground rig spray application

0% (None)	1-25%	25-50%	50-75%	75-99%	100% (All)
1	2	3	4	5	6

Picking

0% (None)	1-25%	25-50%	50-75%	75-99%	100% (All)
1	2	3	4	5	6

Module transport

0% (None)	1-25%	25-50%	50-75%	75-99%	100% (All)
1	2	3	4	5	6

Other (please specify)

0% (None)	1-25%	25-50%	50-75%	75-99%	100% (All)
1	2	3	4	5	6

Q51. Do you have the following safe systems of work in place?

Induction of staff and contractors

Yes	1
No, but in progress	2
No	3

Regularly consult with staff and contractors on WHS issues (i.e. toolbox talks/annual safety review/preseason meeting)

Yes	1
No, but in progress	2
No	3

Review workplace hazards systemically (hazard identification and action planning)

Yes	1
No, but in progress	2
No	3

Train, coaching and mentoring all staff (permanent, casual)

Yes	1
No, but in progress	2
No	3

Emergency planning (i.e. fire, chemical/diesel)

Yes	1
No, but in progress	2
No	3

Injury reporting and recording

Yes	1
No, but in progress	2
No	3

Work Health Safety planning and review

Yes	1
No, but in progress	2
No	3

Q52. Do you manage the following risks in your business/ on farm?

Fire safety

Yes	1
No, but in progress	2
No	3

Electrical safety

Yes	1
No, but in progress	2
No	3

Machinery maintenance

Yes	1
No, but in progress	2
No	3

First aid provisions

Yes	1
No, but in progress	2
No	3

PPE provisions

Yes	1
No, but in progress	2
No	3

2018 Grower Survey

Survey Questions

Q53. Please rate the following statements about your interactions with workers and management of your employees over the 2017-2018 season:

I have encouraged workers to give me their suggestions and feedback about farming matters

Strongly disagree	Disagree	Neither	Agree	Strongly agree
1	2	3	4	5

I have had open discussions about skills development opportunities with workers on farm

Strongly disagree	Disagree	Neither	Agree	Strongly agree
1	2	3	4	5

I have regularly provided feedback to my staff in relation to the performance of their jobs

Strongly disagree	Disagree	Neither	Agree	Strongly agree
1	2	3	4	5

I have been able to trust workers on my farm to perform their job with little supervision

Strongly disagree	Disagree	Neither	Agree	Strongly agree
1	2	3	4	5

Feedback from exit interviews with workers leaving the business has helped me reflect on how I manage workers

Strongly disagree	Disagree	Neither	Agree	Strongly agree
1	2	3	4	5

Q54. Please rate the following statements about the value of workers in your business:

I do not really care who I have employed on farm as long as the job gets done

Strongly disagree	Disagree	Neither	Agree	Strongly agree
1	2	3	4	5

Getting the right employees on farm is critical to my business success

Strongly disagree	Disagree	Neither	Agree	Strongly agree
1	2	3	4	5

It is important to me that workers feel like a valued part of my farm business

Strongly disagree	Disagree	Neither	Agree	Strongly agree
1	2	3	4	5

Q55. Please provide feedback on whether your current staffing arrangements are meeting your business needs:

I am satisfied with the staff we have on farm

Strongly disagree	Disagree	Neither	Agree	Strongly agree
1	2	3	4	5

I find it difficult to get the staff I need for the farm to be at its most productive

Strongly disagree	Disagree	Neither	Agree	Strongly agree
1	2	3	4	5

A lack of adequately skilled staff is negatively impacting my farm business

Strongly disagree	Disagree	Neither	Agree	Strongly agree
1	2	3	4	5

A lack of engaged staff is negatively impacting my farm business

Strongly disagree	Disagree	Neither	Agree	Strongly agree
1	2	3	4	5

Q56. Please provide feedback on the impacts that skilled workers have on your farm business outcomes:

How significant were employees' actions on the yield and quality of the crop produced for 2017-2018?

Employees actions had no impact on production outcomes	1
Accounted for less than 10% of production outcomes	2
Accounted for 10-29% of production outcomes	3
Accounted for 30-49% of production outcomes	4
Accounted for 50-69% of production outcomes	5
Accounted for 70-89% of production outcomes	6
Accounted for 90% or more of production outcomes	7

Q57. In the 2017-2018 season, what shortfall did a lack of adequately skilled staff cost the farm in terms of direct loss, lost income and profit (include costs of mistakes made by inadequately skilled staff and cost to potential profit from production outcomes)?

I did not have a lack of adequately skilled staff on farm	1
I don't know	2
Nothing	3
Less than \$50,000	4
\$50,001 to \$100,000	5
\$100,001 to \$150,000	6
\$150,001 to \$200,000	7
\$200,001 to \$300,000	8
\$300,001 to \$500,000	9
\$500,001 to \$1,000,000	10
\$1,000,001 to \$2,000,000	11
More than \$2,000,000	12



Module 9 Industry Sentiment

[SECTION ASKED TO ALL GROWERS]

This last set of questions asks about your views on your farming business and the cotton industry in Australia.

Q58. Overall, how do you feel about the future of the cotton industry. Would you say you feel...?

Very positive	1
Fairly positive	2
Neutral (neither positive or negative)	3
Fairly negative	4
Very negative	5
I'm not sure	99

Q59. Would you agree or disagree with the following statements about your farming business and the cotton industry:

Cotton is profitable and consistently my crop of choice

Strongly disagree	Disagree	Neither	Agree	Strongly agree
1	2	3	4	5

Research, development & extension drive continuous improvement of the Australian cotton industry

Strongly disagree	Disagree	Neither	Agree	Strongly agree
1	2	3	4	5

Q60. What one or two factors are most limiting the bottom line for your cotton business?

Module 10 Voice of the Grower

[SECTION ASKED TO ALL GROWERS]

Q61. Finally, is there any other feedback or any other issues that you would like to provide back to CRDC at this time?

SURVEY CLOSE

Thank you for your time in completing the survey today.

MORE INFORMATION



Contact CRDC

Ruth Redfern

Communications Manager

CottonInfo & Cotton Research and Development Corporation

E: ruth.redfern@crdc.com.au



Contact Intuitive Solutions

Michael Sparks

Director

Intuitive Solutions

E: msparks@intuitivesolutions.com.au