CRDC

2022 Grower Survey

intuitive solutions

September 2022

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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 Australian cotton industry's Sustainability Framework and associated reporting, the industry's best practice program myBMP, 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.

Background to the 2022 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 (RD&E). This information helps inform CRDC about the benefits of the research it invests in and priority areas for future research. 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 and researchers. The 2022 Grower Survey has been refined by the working group with reference to Grower Surveys undertaken between 2017-2021 and 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 its Strategic Plan objectives and performance measures.

The 2022 Grower Survey included:

- Baseline information about growers and their farm business including respondents' demographics (region, farm area) and season and farm information (yields, area of cotton).
- A number of other focus areas, including:
  - water;
  - crop and soil management;
  - environmental management;
  - staff development;
  - landcare;
  - CRDC; and
  - CottonInfo.
- As some questions are specific to cotton growers in the 2021-22 season, these questions will have a lower sample size compared to most other questions.

The results from the 2022 Grower Survey now follow. Ahead of this, we provide an explanation to assist readers in understanding and interpreting the results in this report.

How the survey was conducted	The 2022 Grower Survey was conducted using a CATI (Computer Assisted Telephone Interviewing) data collection methodology. This included: o Growers being contacted and invited to complete the survey over the phone; o Where this was not possible immediately, an interview appointment time was agreed and the interview completed at the agreed time.
When the survey was conducted	Surveys have usually been conducted in winter, focusing specifically on the preceding crop. CRDC agreed that to ensure consistency over time the Grower Survey should be conducted at the same time each year. The 2022 Grower Survey opened on 8 June 2022 and ran until 23 June 2022. It is noted that there will be a small number of growers who will have not finishing picking at this time.

2021-22 season wrap-up

A look at the 2021-22 season

Australian cotton production rebounded in 2021-22, reaching 5.5 million bales - one of the largest crops on record. This was almost ten times larger than the drought impacted 2019-20 crop of 590,000 bales (the smallest cotton crop in 37 years). The successful season was due to a return to positive conditions, frequent rainfall and stored moisture across the valleys.

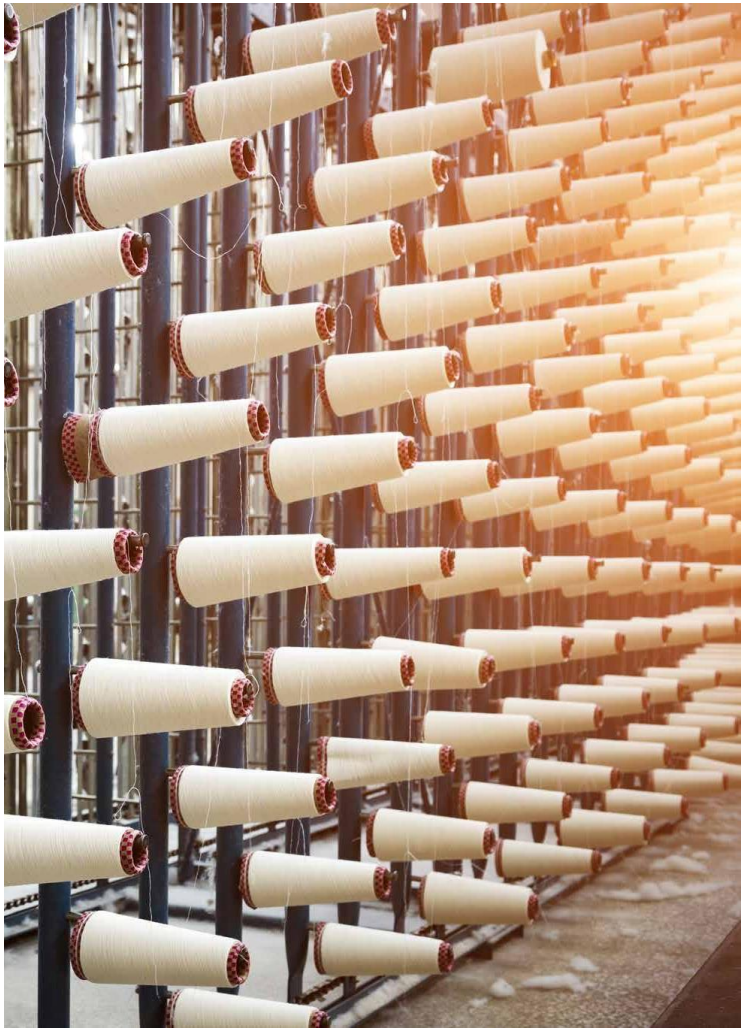
The Australian cotton industry in 2021-22:

- 569,025 hectares – planted into irrigated and dryland cotton, up from 272,000 hectares in 2020-21.
- 5,503,888 bales – produced by the Australian cotton industry, up from 2,809,000 bales in 2020-21.
- 9.67 bales per hectare – the overall average yield (across irrigated and dryland cotton) for the 2021-22 crop, compared to 10.3 bales per hectare in 2020-21.

  (Source: Cotton Australia)

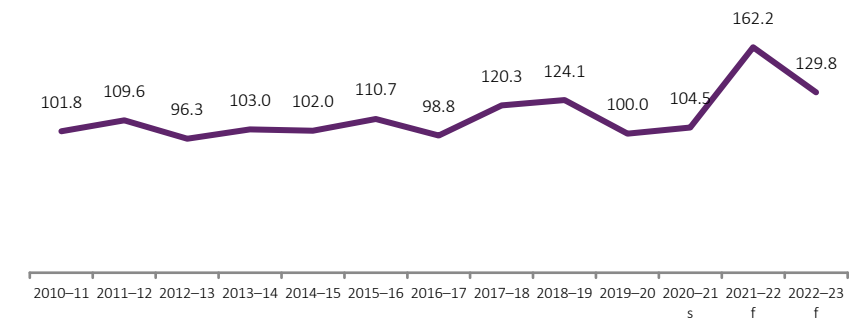
CRDC's investment in 2021-22:

- $18.3 million – CRDC's investment in cotton RD&E on behalf of cotton growers and the Australian Government
- 213 – RD&E projects
- 97 – research partners
- 5 – key program areas: increasing productivity and profitability on Australian cotton farms; improving cotton farming sustainability and value chain competitiveness; building the adaptive capacity of the Australian cotton industry; strengthening partnerships and adoption; and driving RD&E impact.



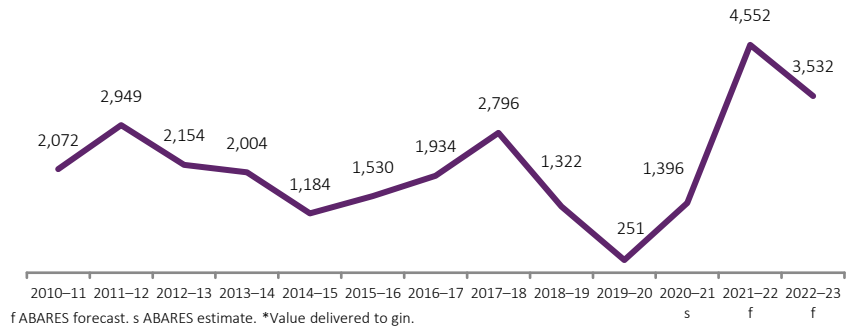
Commodity performance indicators

Index of cotton prices received by farmers (Australia)



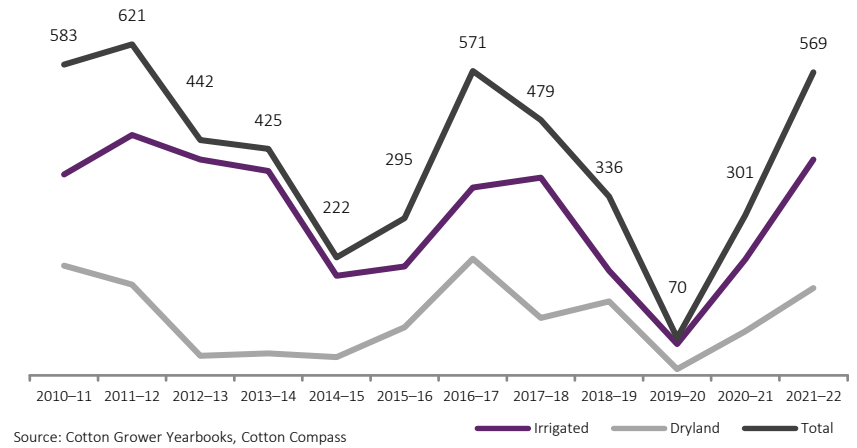
f ABARES forecast. s ABARES estimate.
Notes: The indexes for commodity groups are calculated on a chain–weighted basis using Fisher's ideal index with a reference year of 2019–20 = 100. Indexes for most individual commodities are based on annual gross unit value of production. Prices used in these calculations exclude GST. Details for establishments with estimated value of agricultural operations (EVAO) of $1,500 or more until 1980–81; $2,500 or more from 1981–82 to 1985–86; EVAO of $20,000 or more from 1986–87 to 1990–91; EVAO of $22,500 or more from 1991–92 to 1992–93; EVAO of $5,000 or more from 1993–94 to 2014–15; and EVAO of $40,000 from 2015–16.
Sources: ABARES; Australian Bureau of Statistics

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



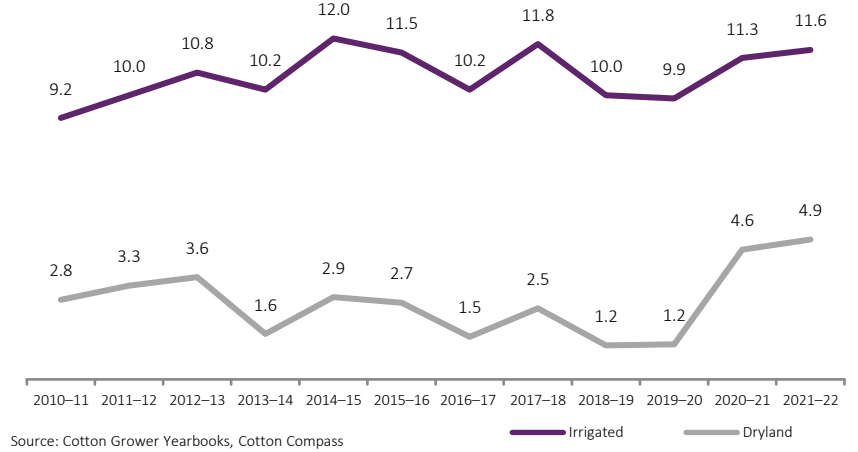
f ABARES forecast. s ABARES estimate. *Value delivered to gin.
Notes: The gross value of production is the value placed on recorded production at the wholesale prices realised in the marketplace. The point of measurement can vary between commodities. Generally the marketplace is the metropolitan market 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. Details for establishments with estimated value of agricultural operations (EVAO) of $1,500 or more until 1980–81; $2,500 or more from 1981–82 to 1985–86; EVAO of $20,000 or more from 1986–87 to 1990–91; EVAO of $22,500 or more from 1991–92 to 1992–93; EVAO of $5,000 or more from 1993–94 to 2014–15; and EVAO of over $40,000 from 2015–16.
Sources: ABARES; Australian Bureau of Statistics

Cotton crop areas (Australia) ('000 ha)



Source: Cotton Grower Yearbooks, Cotton Compass

Average cotton yields (Australia) (bales/ha)



Source: Cotton Grower Yearbooks, Cotton Compass

How to navigate the report

Agricultural traineeships are one of the opportunities for growers to employ and help develop their workforce. Based on the feedback provided, we note:

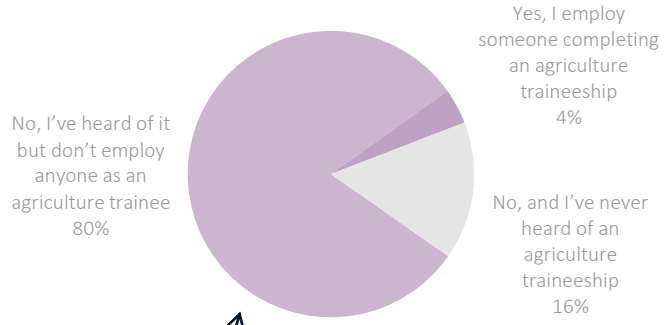
- Only a small proportion of growers (4%) indicated they employ someone completing an agricultural traineeship.
- The majority of growers (80%) were aware of the traineeships but did not currently employ anyone using that vehicle.
- A smaller proportion (16%) were unaware of the traineeships. There remains a need to continue to promote the opportunity to this small cohort.

The commentary to the left provides 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 base represents the cohort of respondents to the question (e.g. all growers who responded to the 2022 survey), and the number that provided an answer to the question (199). Growers did not necessarily answer each question – as a result, the base across questions may vary.

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 example, in Central Queensland 21 respondents answered the question, of which 10% stated they employ someone completing an agriculture traineeship.

Do you currently employ a team member that is undergoing an agriculture traineeship?
Base: All growers; n = 199 (n = 1 could not provide an answer)



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

Key results by Region and Size of Total Farm Area

	Central QLD (n=21)	Darling Downs (n=39)	Macintyre Balonne (n=19)	Northern NSW (n=58)	Macquarie (n=9)	Southern NSW (n=48)	Small (n=71)	Medium (n=96)	Large (n=31)
Yes, employ someone	10%	3%	5%	3%	0%	4%	3%	4%	6%
No, but heard of it	62%	85%	84%	88%	67%	75%	86%	79%	71%
No and never heard	29%	13%	11%	9%	33%	21%	11%	17%	23%

Segments were categorised as follows:

Region (based on Region at Q4)
- 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 – full irrigation, part irrigation or raingrown/dryland - at Q6)
- Small (< 1,000 ha)
- Medium (1,000 – 5,000 ha)
- Large (> 5,000 ha)

Snapshot of key findings

CRDC

We spoke to 200 growers for the 2022 Grower Survey (17.4% based on 1,147 growers listed). Some of the key results are:

2021-22 cotton crop

16%

Total farm area under cotton production in 2021-22

1,056 ha

Grower-reported average of hectares under cotton

11.31 bales/ha

Grower-reported average yield on fully irrigated cotton area

Water

5.66 ML/ha

Average irrigation water applied to cotton on fully irrigated hectares

430.3 mm

In-crop rainfall received between planting and defoliation in 2021-22

1.26 bales/ML

Gross Production Water Use Index on fully irrigated cotton area

Environmental management

49%

Reported using the SataCrop tool in the 2021-22 cotton growing season

76%

Are using weed control, pest control or a combination of both practices in natural areas on farm

53%

Monitor native plants and animals on their farm

CRDC

We spoke to 200 growers for the 2022 Grower Survey (17.4% based on 1,147 growers listed). Some of the key results are:

On-farm workforce profile

90%

Believe it is highly or extremely important for the industry to attract/retain a diverse workforce

45%

Indicated the largest influence on on-farm staff decisions to leave cotton farm businesses is better pay

78%

Prefer on-the-job training/coaching for staff to build capabilities/skills

Landcare

40%

Are aware of the cotton industry partnership with Landcare Australia and Country Road

63%

Believe industry partnerships are highly important or extremely important

66%

Would participate in an industry partnership to restore biodiversity on their farm

CRDC and CottonInfo

90%

Are supportive of CRDC's research investments and activities

94%

Agree that CRDC is a trusted information source

94%

Agree that CottonInfo is a trusted information source

FOCUS AREA

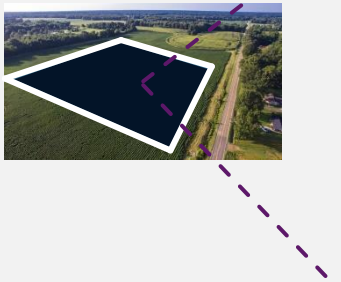
Farm profiles

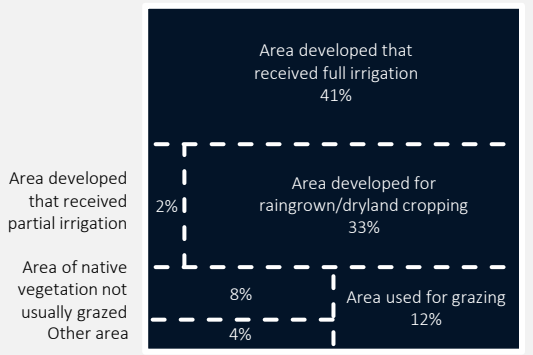
Area and distribution of farm land

Based on the information provided by respondents to the 2022 Grower Survey, we have estimated:

- An average (across all regions and farm sizes) total farm size of 6,704 ha;
- 76% of the land area was developed and available for cropping or other uses including cotton; with
- Growers again this year reporting that the majority of the developed area is either fully irrigated or developed for raingrown/dryland farming; whilst
- 24% of their total farm area remains in use for grazing, native vegetation or other.

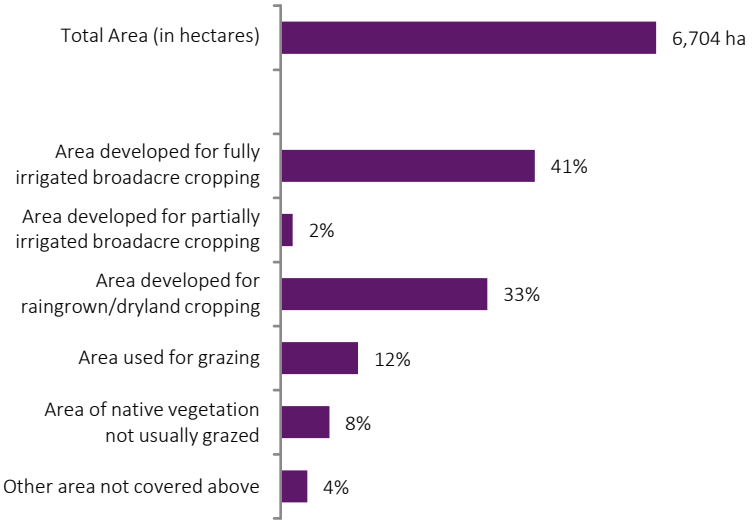
The nature of cotton farming obviously varies across the different growing regions and farm sizes as illustrated in the results shown below.





What is the total area of your farm (in hectares), and of the total area of your farm, what is the area attributed to the following?

Base: All growers (excluding one outlier*); n = 197 (n = 2 could not provide an answer)



Key results by Region and Size of Total Farm Area

	Central QLD (n=20)	Darling Downs (n=39)	Macintyre Balonne (n=18)	Northern NSW (n=57)	Macquarie (n=9)	Southern NSW (n=48)	Small (n=71)	Medium (n=96)	Large (n=30)
Total area (ha)	3,281	3,042	18,483	5,793	4,769	6,655	1,199	3,985	28,433
Full irrigation	36%	37%	31%	33%	25%	60%	52%	39%	21%
Partial irrigation	3%	1%	1%	2%	0%	2%	2%	2%	1%
Raingrown/Dryland	27%	48%	28%	44%	56%	9%	23%	36%	49%
Grazing	21%	6%	25%	8%	15%	15%	10%	14%	14%
Native vegetation	11%	4%	10%	8%	2%	9%	7%	7%	13%
Other	2%	3%	6%	5%	2%	5%	7%	3%	2%

* One outlier was removed from this analysis for having a significantly different farm size to the rest of the respondent base (730,000, next highest reported figures were 117,000, 100,000, 60,000).

Average riparian length and width

The feedback from the 2022 CRDC Grower Survey indicates:

- More than two in three growers (65%) reported having a riparian area on their property.
- Growers with a riparian area reported an average riparian area of 7.31 km in length. While there have been some changes over the last three years, the overall size remains largely consistent with the long-term average of this measure over the past five survey periods at 7.27 km;
- The average width of riparian areas is 186 m. The long-term average of this measure over the past five survey periods is 163 m.

As reported in 2021, the analysis indicates the size of these riparian areas varies across the different growing regions. Not surprisingly also, there is considerable variation across the different farm sizes.

Comparison of reported riparian size across Grower Surveys

	2011 (n=183)	2014 (n=110)	2017 (n=157)	2018 (n=142)	2019 (n=130)	2020 (n=137)	2021 (n=158)	2022 (n=121)
Average length (km)	9	7.5	7.65	6.31	7.58	6.93	8.20	7.31
Average width (m)	Not asked	Not asked	175	169	144	138	178	186

Approximately how long and wide is the riparian area on your property?
Base: All growers with a riparian area on their farm*; n = 121 (n = 13 could not provide an answer)

Average length (in kilometres)

7.31 km

Average width (in metres)

186 m

66 of 187 growers who answered (35%) reported no riparian area on their property.

Key results by Region and Size of Total Farm Area

	Central QLD (n=13)	Darling Downs (n=26)	Macintyre Balonne (n=14)	Northern NSW (n=38)	Macquarie (n=7)	Southern NSW (n=20)	Small (n=32)	Medium (n=67)	Large (n=22)
Average length (km)	7.35	3.66	14.78	7.61	6.43	7.20	3.79	6.68	14.16
Average width (m)	188	186	300	197	130	124	199	171	222

* Results were considered outliers and were removed if reported length was 100km or more (n = 2), or reported width was 1,000m or more (n = 15).

FOCUS AREA

2021-22 cotton crop

Cotton area and farming systems

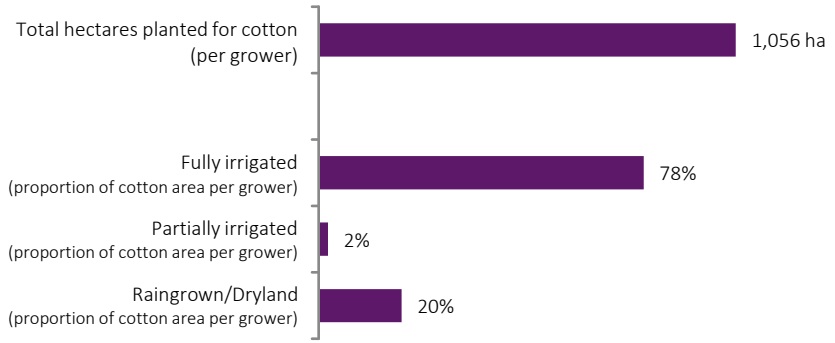
Key information about the growers' area planted for the 2021-22 season was collected during the survey. In previous Grower surveys, a proportion of growers listed on the CRDC database did not grow cotton in that season. For the current survey, the proportion of growers on the CRDC database growing cotton increased to 92%, a substantively higher proportion than in 2021 due to improved seasonal conditions. The feedback from 2021-22 cotton growers indicate that:

Growers' reported average area of cotton planted was 1,056 ha:

- On average, 78% of cotton area per grower was fully irrigated;
- 2% was partially irrigated; and
- 20% was raingrown/dryland.

Just over two in three (69%) were growing cotton on a single irrigation type, with the majority of these (60%) growing cotton only on fully irrigated hectares.

What was the total number of hectares planted for cotton during the 2021-22 cotton growing season? And of these hectares, how many hectares were fully irrigated, partially irrigated or raingrown/dryland?
Base: All growers who grew cotton during the 2021-22 season (excluding one outlier*); n = 184



Key results by Region and Size of Total Farm Area

	Central QLD (n=20)	Darling Downs (n=36)	Macintyre Balonne (n=19)	Northern NSW (n=54)	Macquarie (n=9)	Southern NSW (n=42)	Small (n=61)	Medium (n=93)	Large (n=29)
Total area (ha per grower)	812	578	2,355	1,177	754	926	285	683	3,902
Fully irrigated	73%	61%	89%	69%	100%	100%	77%	80%	72%
Partially irrigated	5%	3%	0%	2%	0%	0%	3%	2%	2%
Raingrown/Dryland	22%	36%	11%	29%	<1%	0%	21%	17%	26%

* One outlier was removed from this analysis for having a significantly different cotton area to the rest of the respondent base (50,000, next highest reported figures were 16,000, 11,600, 10,500).

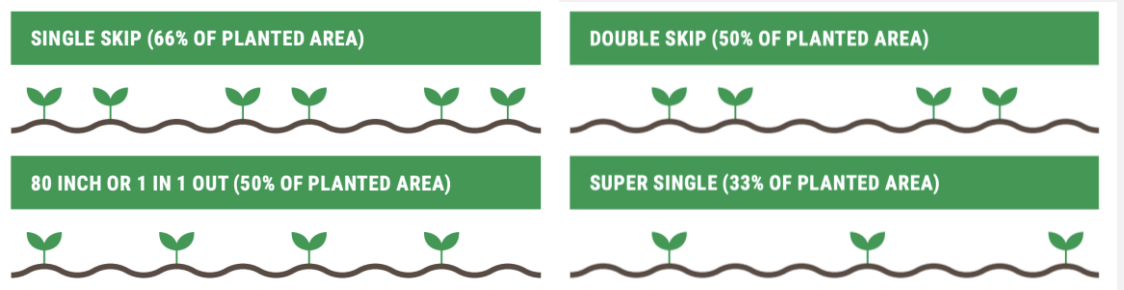
Row configuration for cotton in 2021-22 season

Growers were asked to describe the row configuration used for their fully irrigated and raingrown/dryland cotton areas for the 2021-22 season. The results show:

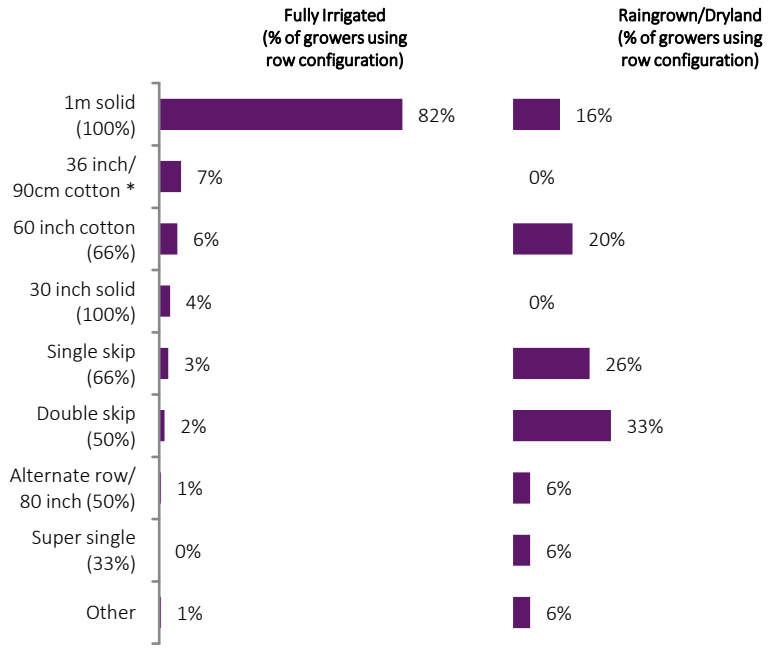
- For fully irrigated areas, a 1m solid configuration was the overwhelming configuration used. A small number of growers reported using 36 inch/90cm, 60 inch cotton, 30 inch solid or a single skip configuration.
- For raingrown/dryland areas, growers were less likely to use a 1m solid configuration (16%) and more likely to be using a single skip (26%) or double skip (33%) configuration.

Results for partially irrigated growers were not reported due to the small sample size.

Examples of row configurations:



Of the cotton hectares, what row configuration did you use?
Base: All growers who grew cotton during the 2021-22 season; n varies
(Fully Irrigated, n = 164, Raingrown/Dryland, n = 70). Part irrigation not reported due to low sample size.



Key results by Region and Size of Total Farm Area (fully irrigated results only)

	Central QLD (n=17)	Darling Downs (n=28)	Macintyre Balonne (n=19)	Northern NSW (n=46)	Macquarie (n=9)	Southern NSW (n=42)	Small (n=52)	Medium (n=85)	Large (n=26)
1m solid (100%)	94%	71%	89%	89%	89%	69%	77%	84%	88%
36 inch/ 90cm cotton *	0%	0%	0%	0%	0%	29%	13%	6%	0%
60 inch cotton (66%)	0%	14%	11%	4%	11%	0%	4%	6%	12%
30 inch solid (100%)	0%	7%	5%	2%	11%	2%	2%	4%	8%
Single skip (66%)	6%	7%	0%	4%	0%	0%	6%	1%	0%
Double skip (50%)	6%	7%	0%	0%	0%	0%	6%	0%	0%
Alternate row/ 80 inch (50%)	0%	0%	0%	2%	0%	0%	0%	1%	0%
Super single (33%)	0%	0%	0%	0%	0%	0%	0%	0%	0%
Other	0%	0%	0%	2%	0%	0%	0%	0%	4%

† Response coded back from "Other (please specify)" answers.

Yields for the 2021-22 cotton growing season

Growers were asked to report on three key indicators for the yields they achieved for the 2021-22 growing season.

These were average yield across their entire crop, and 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 irrigated, partially irrigated and raingrown/dryland areas.

- For fully irrigated areas, the 2022 survey reported an average yield of 11.31 bales per hectare. This reported result is consistent with that reported in 2021 but up from the 2020 result (10.45).
- For raingrown/dryland areas, the average yield was 4.73, up slightly on the 2021 yield result, with the increase reflecting a return to better growing conditions.
- Results for partially irrigated growers were not reported due to the small sample size.

What were your yields for the 2021-22 cotton growing season across the cotton areas?
Base: All growers who grew cotton during the 2021-22 season; n varies
(Fully Irrigated, n = 146, Raingrown/Dryland, n = 58)
Part irrigation not reported due to low sample size.

	Fully Irrigated (bales per ha)	Raingrown/Dryland (bales per ha)
Average yield	11.31 2021: 11.88	4.73 2021: 4.09
Yield achieved by your highest-yielding field (average of grower-reported yield)	13.03 2021: 13.13	5.97 2021: 4.86
Yield achieved by your lowest-yielding field (average of grower-reported yield)	9.09 2021: 10.38	3.83 2021: 3.46
Range of variation from average yield	3.94 2021: 2.74	2.14 2021: 1.40

Key results by Region and Size of Total Farm Area (fully irrigated results only)

	Central QLD (n=14)	Darling Downs (n=25)	Macintyre Balonne (n=17)	Northern NSW (n=40)	Macquarie (n=9)	Southern NSW (n=39)	Small (n=45)	Medium (n=79)	Large (n=22)
Average yield	10.91	9.77	12.55	12.10	11.86	11.01	10.68	11.46	12.07
Highest yield from one field	12.98	11.55	14.40	13.64	12.44	12.84	12.40	12.98	14.42
Lowest yield from one field	7.93	7.42	10.29	9.62	10.86	8.90	8.74	9.12	9.68
Range of variation from average yield	5.06	4.13	4.11	4.02	1.58	3.95	3.67	3.86	4.74

Use of renewable energy for farming operations

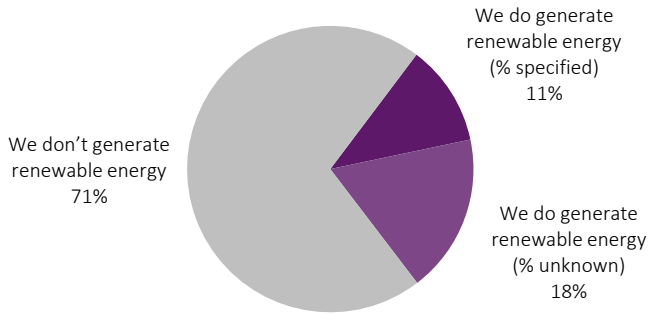
The use of renewable energy for farming operations remains relatively low:

- Less than one in three (29%) growers reporting they do generate renewable energy to support their farming operations;
- The majority (71%) indicating they do not generate renewable energy.

Among the 29% indicating they do generate renewable energy, more than one in two (18% of the 29%) were unable to quantify the proportion of their total energy requirements that is provided by renewables.

The results suggest the use of renewables remains in its early take up stages across the industry.

How much renewable energy did you make use of for the 2021-22 cotton growing season for your farming operations?
Base: All growers who grew cotton during the 2021-22 season; n = 184 (n = 1 could not provide an answer)



Of the n = 21 growers who could recall their renewable proportion of their total energy, 9.6% of their total energy for their farming operations was provided by renewables

Key results by Region and Size of Total Farm Area

	Central QLD (n=20)	Darling Downs (n=36)	Macintyre Balonne (n=19)	Northern NSW (n=54)	Macquarie (n=9)	Southern NSW (n=42)	Small (n=61)	Medium (n=93)	Large (n=29)
Generate energy, % specified	10%	11%	11%	11%	33%	7%	13%	13%	3%
Generate energy, % unknown	20%	25%	21%	17%	22%	10%	16%	18%	21%
Do not generate renewable energy	70%	64%	68%	72%	44%	83%	70%	69%	76%
	Central QLD (n=2)	Darling Downs (n=4)	Macintyre Balonne (n=2)	Northern NSW (n=6)	Macquarie (n=3)	Southern NSW (n=3)	Small (n=8)	Medium (n=12)	Large (n=1)
Mean % renewables of total energy	2.0%	15.5%	7.5%	9.7%	6.7%	7.3%	16.8%	5.5%	1.0%

Total energy use across in-field operations and pumping water

In the 2022 Grower Survey, details were sought about the total energy use across in-field operations and pumping of water. This information was last collected in the 2019 Grower Survey.

- For in-field operations, growers reported using an average of 238 litres of diesel per hectare. This result was consistent with that reported in 2019 (223 L/ha).
- Very few growers reported using bio-diesel for in-field operations.
- The energy used for pumping water was reported at 78 L/ha, a result lower than that reported in 2019 (140 L/ha).
- Electricity use for pumping water was 26 kWh/ha, remaining consistent what that reported in 2019.

Please provide an estimate on what your total energy use was for the 2021-22 cotton growing season across the following operations – grower average per hectares of area planted for cotton

Base: All growers who grew cotton during the 2021-22 season; n varies by category on those who could provide an answer (In-field: Diesel (n = 125), Bio-diesel (n = 161); Pumping water: Diesel (n = 145), Electricity (n = 125))

	Diesel (L)	Bio-diesel (L)/ Electricity (kWh)
Energy used for in-field operations * (grower average/ha planted for cotton)	238 L/ha	3 L/ha 159 of 161 growers did not use Bio-diesel
Energy used for pumping water (grower average/ha planted for cotton)	78 L/ha	26 kWh/ha

Key results by Region and Size of Total Farm Area

	Central QLD (n=14)	Darling Downs (n=29)	Macintyre Balonne (n=13)	Northern NSW (n=34)	Macquarie (n=6)	Southern NSW (n=26)	Small (n=43)	Medium (n=67)	Large (n=14)
Diesel (L/ha) – Energy used for in-field operations	126	173	304	310	160	272	184	199	598
	(n = 18)	(n = 33)	(n = 17)	(n = 46)	(n = 7)	(n = 36)	(n = 56)	(n = 79)	(n = 25)
Bio-diesel (L/ha) – Energy used for in-field operations	0	0	0	9	0	0	0	6	0
	(n = 14)	(n = 35)	(n = 13)	(n = 38)	(n = 7)	(n = 34)	(n = 52)	(n = 77)	(n = 15)
Diesel (L/ha) – Energy used for pumping water	70	47	68	100	86	93	77	85	51
	(n = 14)	(n = 26)	(n = 15)	(n = 34)	(n = 6)	(n = 28)	(n = 43)	(n = 65)	(n = 17)
Electricity (kWh/ha) – Energy used for pumping water	7	71	0	< 1	178	7	44	20	1

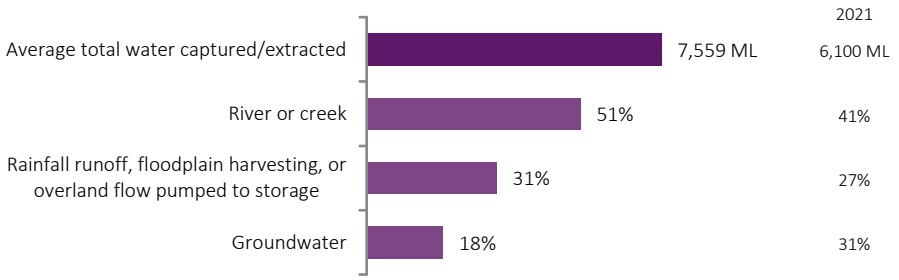
* Full response provided to respondents: "Energy used for in-field operations (ground preparation, in-season operations, harvesting and post-harvest operations excluding transport to gin)"

FOCUS AREA

Water

Water captured/extracted

For the 2021-22 cotton growing season, how much water (in megalitres) was captured or extracted from?
Base: All growers who grew cotton during the 2021-22 season and captured/extracted water; n = 157 *



Key results by Region and Size of Total Farm Area

	Central QLD (n=13)	Darling Downs (n=30)	Macintyre Balonne (n=18)	Northern NSW (n=45)	Macquarie (n=9)	Southern NSW (n=39)	Small (n=51)	Medium (n=84)	Large (n=22)
Total water captured/extracted	4,677	1,885	23,071	5,060	6,780	9,075	1,435	5,161	30,733
River or creek	71%	36%	67%	39%	33%	65%	45%	54%	53%
Rainfall runoff, harvesting, etc.	26%	48%	33%	32%	35%	13%	35%	26%	40%
Groundwater	2%	16%	0%	28%	32%	21%	20%	20%	7%

How much of the water captured or extracted ([total ML from above] megalitres) was used on other crops or lost to operational losses (i.e. blow outs)? †
Base: All growers who grew cotton during the 2021-22 season and captured/extracted water; n = 157 **

41% of growers reported using water on other crops

Of this 41%... → **23%** average % of total ML captured/extracted that was used

31% of growers reported at least some water lost to operational losses

Of this 31%... → **13%** average % of total ML captured/extracted that was lost

Key results by Region and Size of Total Farm Area

	Central QLD (n=13)	Darling Downs (n=30)	Macintyre Balonne (n=18)	Northern NSW (n=45)	Macquarie (n=9)	Southern NSW (n=39)	Small (n=51)	Medium (n=84)	Large (n=22)
% of growers using water on other crops	54%	47%	39%	31%	33%	49%	37%	46%	32%
Of these growers...									
Average % of total ML used	19%	17%	17%	17%	22%	36%	26%	22%	24%
% of growers reporting at least some water lost	69%	27%	33%	31%	11%	28%	24%	29%	59%
Of these growers...									
Average % of total ML lost	21%	2%	16%	9%	5%	18%	14%	9%	19%

* For proportion calculations, responses were only considered where figures for all sources were known (n = 11 removed, n = 146 valid for analysis).
** For proportion calculations, responses were only considered where figures for all sources were known (Other crops: n = 6 removed, n = 59 valid for analysis; Operational losses: n = 1 removed, n = 48 valid for analysis;).

In-crop rainfall, irrigation water and soil moisture deficit

How much in-crop rainfall (in mm) did you receive in the 2021-22 cotton growing season between planting and defoliation?

Base: All growers who grew cotton during the 2021-22 season and could provide a response; n = 159

430.3 mm

2021: 283.4 mm

In-crop rainfall (mm)

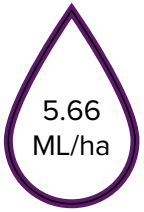
Key results by Region and Size of Total Farm Area

	Central QLD (n=15)	Darling Downs (n=35)	Macintyre Balonne (n=18)	Northern NSW (n=44)	Macquarie (n=9)	Southern NSW (n=34)	Small (n=52)	Medium (n=82)	Large (n=25)
In-crop rainfall (mm)	334.0	669.7	383.8	435.4	366.1	227.8	474.3	412.0	398.8

How much irrigation water (in megalitres per hectare) was applied to cotton during the 2021-22 cotton growing season?

Base: All growers who grew cotton during the 2021-22 season under full or part irrigation and could provide a response; n varies (Fully Irrigated, n = 158). Part irrigation not reported due to low sample size.

Cotton under full irrigation



2021 (n = 133): 6.28 ML/ha

Key results by Region and Size of Total Farm Area

	Central QLD (n=15)	Darling Downs (n=28)	Macintyre Balonne (n=19)	Northern NSW (n=43)	Macquarie (n=9)	Southern NSW (n=42)	Small (n=52)	Medium (n=83)	Large (n=23)
Fully irrigated – Mega litres per ha	5.58	2.84	6.26	5.53	7.56	7.15	4.89	5.81	6.85

What was your estimated soil moisture deficit (in mm) for:

Base: All growers who grew cotton during the 2021-22 season; n varies
(Sowing: Fully Irrigated (excluding two outliers), n = 123, Raingrown/Dryland, n = 51).
(Defoliation: Fully Irrigated (excluding two outliers), n = 118, Raingrown/Dryland, n = 49)
Part irrigation not reported due to low sample size.

	Fully Irrigated (mm)	Raingrown/Dryland (mm)
Sowing	97.1	95.1
	Fully Irrigated (mm)	**Raingrown/Dryland (mm)**
Defoliation/End of season	74.5	111.7

Key results by Region and Size of Total Farm Area (fully irrigated results only)

	Central QLD (n=10)	Darling Downs (n=25)	Macintyre Balonne (n=16)	Northern NSW (n=39)	Macquarie (n=6)	Southern NSW (n=25)	Small (n=38)	Medium (n=65)	Large (n=20)
Sowing	21.5	119.4	175.1	55.5	114.2	117.6	81.5	110.6	82.8
Base:	(n=5)	(n=24)	(n=16)	(n=38)	(n=7)	(n=26)	(n=33)	(n=64)	(n=21)
Defoliation/ End of season	38.0	60.8	113.8	37.6	112.9	117.1	52.6	84.0	79.8

GPWUI: Gross Production Water Use Index

The GPWUI (Gross Production Water Use Index) is an index to benchmark water productivity. This benchmark relates total production (bales) to the total amount of water used, from all sources including irrigation water, rainfall (total or effective) and soil moisture. In the 2022 Grower Survey, an extended section of questions related to water use and the GPWUI was used to provide a more accurate measure. Due to this and a more complex methodology, trend data is not reported.

Calculations were undertaken with help from the Water R&D team at the NSW Department of Primary Industries. For the purposes of calculations for this report, results across fully irrigated only land were used.

The results from the 2022 Grower Survey indicate that across all growers responding to the 2022 survey, the GPWUI was at 1.26 bales/ML. The table below show the variation of this index across the growing regions (ranging from 1.16 in Northern NSW to 1.50 in Macquarie).

Gross Production Water Use Index (average of grower results)
Base: all growers who provided answers to all questions used within GPWUI calculations; n varies (Fully Irrigated, n = 107). Part irrigation not reported due to low sample size.

Full-only irrigated area

1.26 bales/ML

† How GPWUI is calculated (on fully irrigated land):

The following calculation is performed for each individual grower and then averaged to provide an overall measure of GPWUI. Please note that some of these measures were asked to respondents, but are not provided in this report as they are specifically for use in the GPWUI calculation.

Total yield (bales) divided by

- Water held in storages before pumping commenced for 2021-22 season (ML)
- \+ Water captured/extracted from sources (ground water, river or creek, rainfall runoff, floodplain harvesting, or overland flow pumped to storage, etc.) (ML)
- \+ In-crop rainfall (mm) divided by 100 (to convert to ML/ha) X 80% rainfall run-off coefficient X number of cotton ha under full irrigation (ML)
- \+ Assumption of 0.5 ML/ha of change in soil moisture X number of cotton ha under full irrigation (ML)
- − Water used on other crops or lost to operational losses (ML)
- − Left-over water in stores at the end of the 2021-22 cotton season (ML)

Key results by Region and Size of Total Farm Area (Full-only irrigated area)

	Central QLD (n=5)	Darling Downs (n=22)	Macintyre Balonne (n=30)	Northern NSW (n=29)	Macquarie (n=12)	Southern NSW (n=8)	Small (n=29)	Medium (n=65)	Large (n=13)
GPWUI (bales/ML)	1.31	1.25	1.24	1.16	1.50	1.42	1.20	1.29	1.25

† In 2022, it was introduced into the calculation that 20% of in-crop rainfall did not infiltrate the cotton crop, and so 80% of the in-crop rainfall result was used in the calculation.

Barriers to a partially irrigated system

Growers were asked about the barriers they faced in changing to a partially irrigated system. Their responses indicate that:

There is no one dominant barrier to growers transitioning to partial irrigation.

- About one in five (18%) indicated that they believed it would be uneconomical to make a transition with lower yields and margins not delivering the same level of profitability.
- A similar one in five (18%) indicated they did not have access to water on a consistent basis or did not have sufficient water allocations to make this change.
- 17% of growers indicated partial irrigation was a model that didn't suit their farming operations or the set up of their farm.

What do you see as the barriers to changing to a partially irrigated system?
Base: All growers; n = 200

22% - Climate-related - lack of rain / summer rain / too hot

18% - Not economical to do so/low margin

18% - Access to water/water allocations

17% - Doesn't suit our farm/farming operations

6% - Partial irrigation not our preference

6% - Farm not ready/not prepared

5% - Not efficient for us to do this

3% - Cost of water

3% - Capital cost to get ready

16% - Nothing/None

Some of what they said…

"We are never going to get the massive production that we would need to sustain our farm. Obviously the partial irrigation is from an allocation point of view. If we are in a drought situation, we would have to use partial irrigation because we wouldn't have the water volume to do full irrigation, so obviously partial irrigation does come into the play but we certainly need and prefer to reduce our hectares and do a full irrigation on that section rather than doing a partial irrigation on a lot more hectares. Being more productive on a smaller area."

"Well there are no barriers. The only reason we didn't was because there was that much water in the storage system. Bore allocation we didn't even touch it. Double skip or single skip which we plan on doing if it gets dry. We only ever use full watering when we have the water available. When the drought was on for 2.5 years, we just didn't irrigate anything, we didn't have the allocation so we couldn't anyway."

"It is probably just a history of having really dry Jan and sometimes Feb this year has been different. Maybe plan to partially irrigate again next season. Usually end up using more water than planned on partial irrigation. Season dependent. Can plant a bit later and miss the dry part of the season but no idea on weather."

"For myself it's been challenges around availability of help. Staff. Just condensing irrigation and cropping program into a smaller area of fully irrigated area creates less work than partial. Looking at more partial/dryland next season. And we didn't know this season was going to be as wet as it was. Timing of planting decisions."

"Well just for us this year we had plenty of water and not much country developed, so we need to be growing cotton more intensively in the areas available. Out of the country that we have with the area with the ability to be irrigated, we need to be growing a consistent amount of cotton on rotation on a yearly basis."

"Don't have enough land to water. We have too much water to land. So we go back-to-back. Fully irrigate to get more yield per field. Have figured for us this is the best system for us. Potentially we can not water if it has rained as it has this year. Plant as per the water allows."

"Use the fully irrigated area as partial irrigation and only water as required. Set us as flood irrigation and only use water if there is a deficit will stretch out irrigation if water is low we space out irrigation. In terms of set up infrastructure it is set up for full irrigation."

Results above are a subjective coding of verbatim answers from respondents. A list of all verbatims can be found in the supplementary Verbatim Report.

FOCUS AREA

Crop and soil management

Rate of applied nutrients in 2021-22

Please list the rate of applied nutrients for your most typical irrigated, partially irrigated and/or dryland cotton field/s in 2021-22*:

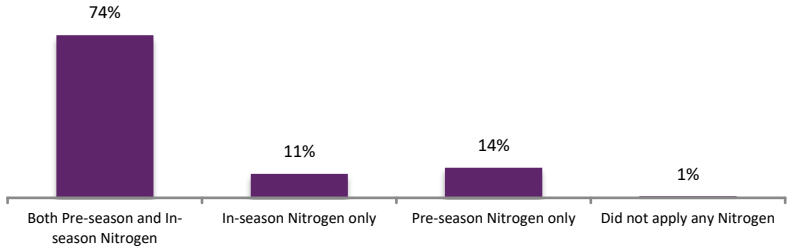
Base: All growers who grew cotton during the 2021-22 season; n varies
(Fully Irrigated, n = 150, Partially Irrigated, n = 11, Raingrown/Dryland, n = 64)

	Fully Irrigated	Partially Irrigated	Raingrown/Dryland
Preseason Nitrogen (kg N/ha)	154.0 2020: 161.4	119.1	50.8
In-season Nitrogen (kg N/ha)	115.4 2020: 92.0	77.8	27.8
Total Nitrogen (kg N/ha)	**269.4** **2020: 253.4**	**196.9**	**78.6**
Nitrogen use efficiency (kg lint/kg of applied N)	25.5 2020: 14.2	16.5	13.0
Total Phosphorus (kg P/ha)	28.3 2020: 44.2	12.6	11.2
Total Potassium (kg K/ha)	18.1 2020: 33.5	13.3	6.6
Total Zinc	2.1 2020: 3.6	1.0	0.8
Total Sulfur	2.7 2020: 4.7	0.1	1.4

Key results by Region and Size of Total Farm Area (across fully irrigated cotton area only)

	Central QLD (n=14)	Darling Downs (n=28)	Macintyre Balonne (n=17)	Northern NSW (n=44)	Macquarie (n=8)	Southern NSW (n=37)	Small (n=51)	Medium (n=80)	Large (n=19)
Preseason Nitrogen (kg N/ha)	205.5	131.6	171.8	165.0	156.1	133.4	154.5	152.4	159.2
In-season Nitrogen (kg N/ha)	146.5	84.7	106.2	90.7	247.3	132.5	106.8	121.1	115.5
Total Nitrogen (kg N/ha)	**351.9**	**216.2**	**278.0**	**255.7**	**403.4**	**265.9**	**261.3**	**273.5**	**274.7**
N-use efficiency (kg lint/kg applied N)	9.5	10.5	77.5	14.9	7.1	35.3	18.9	27.3	35.4
Total Phosphorus (kg P/ha)	35.4	39.1	19.2	14.7	30.5	39.8	29.6	28.9	23.9
Total Potassium (kg K/ha)	39.6	33.3	13.7	13.5	15.5	5.5	18.9	19.0	11.6
Total Zinc	3.8	3.3	0.5	1.4	3.5	2.1	1.7	2.3	1.9
Total Sulfur	5.9	6.0	0.1	2.0	0.0	1.9	2.8	3.0	1.4

Breakdown of preseason and in-season Nitrogen use (across fully irrigated cotton area)



* A small amount of outliers were removed from this analysis for reporting a product rate of nutrients instead of actual rates.

Impact of spray drift on cotton crop

Growers were asked about the impact of spray drift on their cotton crop. These questions were also measured in the 2018 and 2019 Grower Surveys and so provide a comparison point for the 2022 results. The feedback provided by growers suggests that:

- Around one in five growers (22%) reported being affected by spray drift (up from 19% in 2019). As in 2019, the smaller growers were less likely to report being impacted.
- Growers who were affected reported that, on average, 23% of their cotton crop area had been impacted. This result is largely unchanged from the 2019 result (24%).
- There was, as reported by these growers, an estimated average yield impact of 1.2 bales/ha.
- The total estimated production loss for respondents who were able to report figures for both area impacted and yield cost (n = 37) was 11,027 bales.

For the 2021-22 cotton growing season, what area of your cotton crop was impacted by spray drift, and what do you estimate to be the yield cost of this damage?
Base: All growers who grew cotton during the 2021-22 season; n = 184 (n = 1 could not provide an answer)

	% of cotton growers affected	22% 2019: 19%
Of the 22% of cotton growers affected. . .	Average % of cotton crop area impacted	23% 2019: 24%
	Average yield cost (in bales/ha)	1.2 2019: 0.7

Key results by Region and Size of Total Farm Area

	Central QLD (n=20)	Darling Downs (n=36)	Macintyre Balonne (n=19)	Northern NSW (n=54)	Macquarie (n=9)	Southern NSW (n=42)	Small (n=61)	Medium (n=93)	Large (n=29)
% of cotton growers affected	20%	19%	37%	33%	0%	10%	13%	22%	41%
Average % of cotton crop area impacted	52%	20%	16%	25%	-	4%	20%	27%	19%
Average yield cost (in bales/ha)	0.4	0.9	1.9	1.2	-	1.0	0.8	1.2	1.5

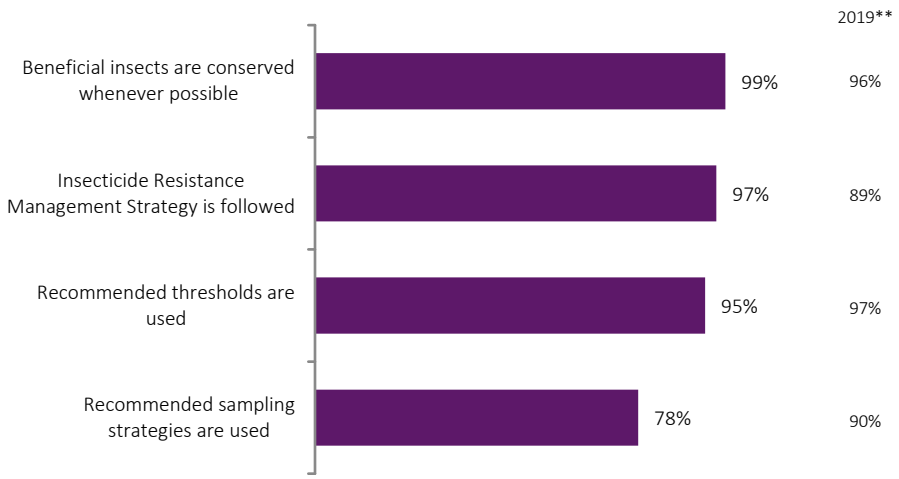
IPM and crop protection practices undertaken

Growers were asked about IPM and crop protection practices. The feedback provided by growers suggests that:

- As in 2019, it is evident that the majority of growers are using most of the practices measured in the research.
- There is now a widespread reported use of three of the four practices, suggesting strong levels of compliance with these across the industry.

With regards to insect pests, disease and weed management in 2021-22 cotton fields, did you use any of the practices listed below?

Base: All growers who grew cotton during the 2021-22 season; maximum n = 184* (n = 1 could not provide an answer)



Key results by Region and Size of Total Farm Area

	Central QLD (n=20)	Darling Downs (n=36)	Macintyre Balonne (n=19)	Northern NSW (n=54)	Macquarie (n=9)	Southern NSW (n=42)	Small (n=61)	Medium (n=93)	Large (n=29)
Beneficial insects are conserved whenever possible	100%	97%	100%	100%	100%	100%	98%	100%	100%
Insecticide Resistance Management Strategy is followed	95%	94%	100%	100%	100%	95%	98%	96%	100%
Recommended thresholds are used	95%	97%	95%	91%	100%	95%	97%	94%	93%
Recommended sampling strategies are used	84%	81%	79%	75%	100%	71%	77%	76%	88%

* A small number of growers could not provide an answer for certain practices: Beneficial insects: n = 184; IRMS: n = 183; Thresholds: n = 183; Sampling: n = 180.
** Answer options in 2019 were worded slightly differently – please refer to the 2019 report for comparison.

Practices on-farm to support soil life

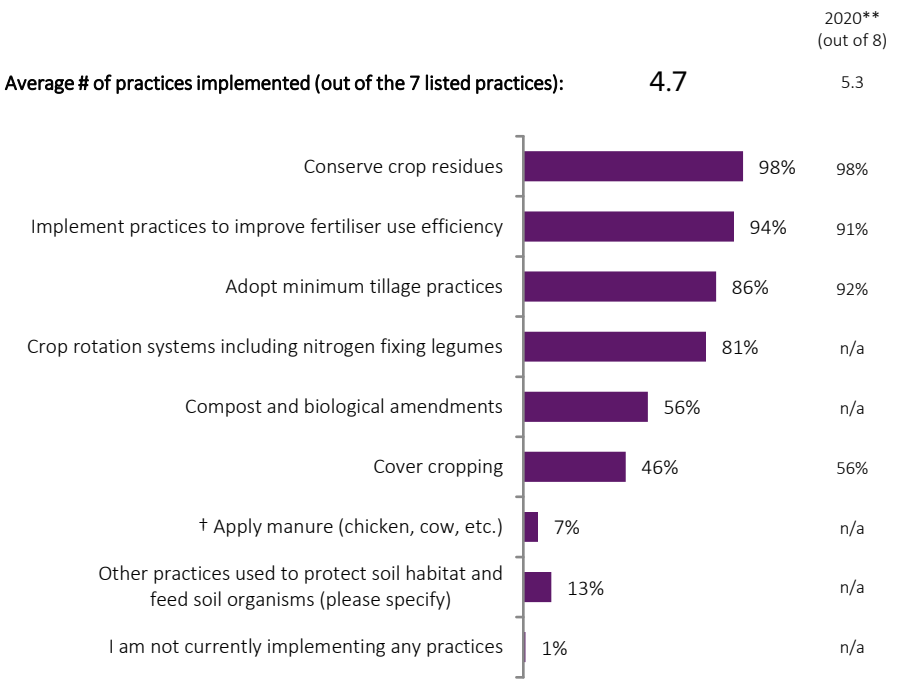
Growers reported using a variety of different practices to support soil health.

Of the 7 practices listed in the survey, farmers reported using on average 4.7 of these. There were only small differences reported across regions (average number of practices used ranged from 4.4 to 5.1), and very little difference depending on the size of the business.

There was widespread implementation of four practices in particular:

- Conserving crop residues;
- Adoption of minimum tillage practices
- Practices to improve fertiliser use efficiency; and
- Crop rotation systems.

Healthy soil is alive. The principles that support soil life are to protect soil habitat and feed soil organisms. Which of the following practices do you currently use on your farm? Please select all that apply.
Base: All growers; maximum n = 199* (n = 1 could not provide an answer)



Key results by Region and Size of Total Farm Area

	Central QLD (n=21)	Darling Downs (n=39)	Macintyre Balonne (n=19)	Northern NSW (n=58)	Macquarie (n=9)	Southern NSW (n=48)	Small (n=71)	Medium (n=96)	Large (n=31)
Average # of practices implemented	4.8	4.9	4.4	4.7	5.1	4.4	4.7	4.7	4.5
Conserve crop residues	95%	100%	100%	98%	100%	96%	99%	98%	97%
Practices to improve fertiliser efficiency	90%	92%	100%	95%	100%	92%	94%	94%	94%
Adopt minimum tillage practices	90%	97%	74%	95%	100%	65%	89%	85%	81%
Crop rotation systems inc. N fixing legumes	81%	82%	84%	90%	89%	69%	82%	79%	87%
Compost/biological amendments	43%	72%	32%	40%	56%	73%	59%	56%	43%
Cover cropping	62%	46%	42%	45%	67%	35%	44%	49%	38%
† Apply manure	14%	3%	11%	7%	0%	6%	6%	6%	6%
Other practices used	5%	18%	11%	9%	44%	8%	11%	11%	19%
Not currently implementing	0%	0%	0%	2%	0%	2%	1%	1%	0%

* A small number of growers could not provide an answer for certain practices: Cover cropping: n = 197; Compost and biological amendments: n = 198.
** In 2020, the answer options presented differed slightly (3 of the 7 practices differ to that asked in 2022). † Response coded back from "Other (please specify)" answers.

FOCUS AREA

Environmental management

Use of the SataCrop tool

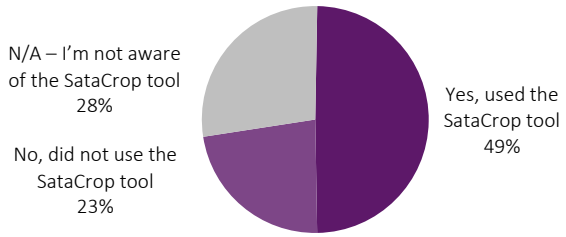
SataCrop is a tool to mitigate the risk of spray drift by allowing operators to understand where sensitive crops are located in proximity to their spray operation. A more detailed explanation of SataCrop can be found on the right. From the feedback provided we note that:

- Almost one in two growers reported having used the SataCrop tool in the current season
- A sizeable cohort of growers (28%) reported not being aware of the tool; while
- The remaining 23% were non-users. The main explanation among this cohort of non-users for not using SataCrop included:
  - The lack of a perceived need
  - Lack of time to invest to get up to speed and then deploy the tool; and
  - Having others (like agronomists) do similar work that SataCrop does.

The SataCrop tool is an industry initiative developed by Cotton Australia and Precision Cropping Technologies (PCT).

SataCrop has the ability to map all crop types, including cotton, grains and tree crops. Growers can log in and plot the location of fields they have planted with different crops each season. Other farmers and spray contractors can review the site when planning spray applications to see the location of potentially sensitive neighbouring crops. This, coupled with vigilance around spray conditions, wind directions, and application helps to reduce adverse effects of spray drift.

For the 2021-22 cotton growing season, did you use the SataCrop tool?
Base: All growers who grew cotton during the 2021-22 season; n = 184 (n = 1 could not provide an answer)



Key results by Region and Size of Total Farm Area

	Central QLD (n=20)	Darling Downs (n=36)	Macintyre Balonne (n=19)	Northern NSW (n=54)	Macquarie (n=9)	Southern NSW (n=42)	Small (n=61)	Medium (n=93)	Large (n=29)
Yes, used	35%	47%	53%	54%	56%	52%	33%	55%	66%
No, did not use	35%	19%	11%	26%	22%	19%	26%	23%	17%
N/A – not aware	30%	33%	37%	20%	22%	29%	41%	23%	17%

Why did you choose not to use the SataCrop tool during the 2021-22 cotton growing season?
Base: All growers who grew cotton during the 2021-22 season AND did not use the SataCrop tool; n = 42

31% - No need

19% - No time

14% - No reason

14% - Others do this work for me

12% - Can't see the benefits

12% - No/Limited technical capability

10% - Use other platforms

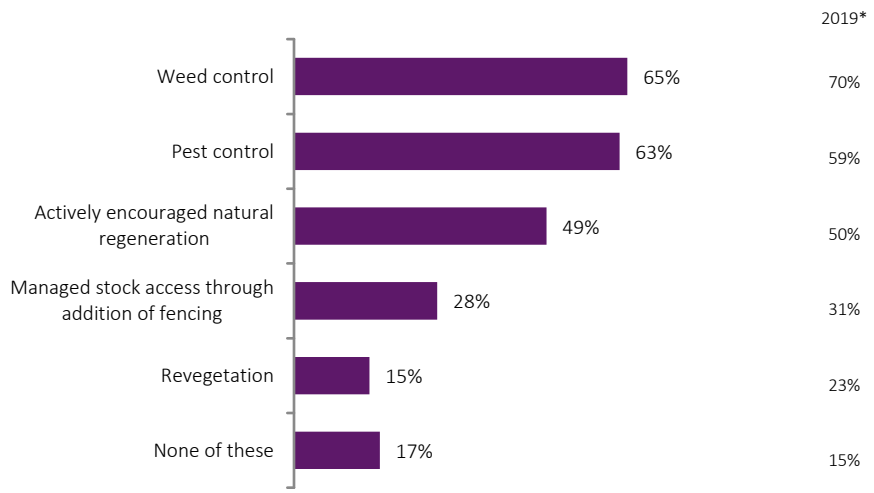
Results above are a subjective coding of verbatim answers from respondents. A list of all verbatims can be found in the supplementary Verbatim Report.

Management activities in natural areas in the past 12 months

Growers were asked what management activities they have undertaken in natural areas on their farms in the past 12 months. The results show that:

- Over three in four (76%) are using weed control, pest control or a combination of both practices. While there have been some small changes since 2019, the movement in use of these management practices has been small.
- Growers were most likely to use weed and pest control as well as actively encourage regeneration, with fencing to manage stock access and revegation also undertaken.
- The use of management practices varies considerably across region (for example weed control ranges from 79% in Southern NSW to just 37% in Macintyre-Balonne.

In natural areas on farm, what management activities have you undertaken in the past 12 months? Please select all that apply.
Base: All growers; n = 198 (n = 2 could not provide an answer)



Key results by Region and Size of Total Farm Area

	Central QLD (n=21)	Darling Downs (n=39)	Macintyre Balonne (n=19)	Northern NSW (n=57)	Macquarie (n=9)	Southern NSW (n=48)	Small (n=71)	Medium (n=96)	Large (n=30)
Weed control	76%	54%	37%	63%	67%	79%	69%	63%	60%
Pest control	57%	51%	58%	72%	78%	65%	49%	69%	77%
Actively encouraged natural regeneration	43%	44%	47%	47%	67%	54%	41%	53%	53%
Managed stock access – fencing	19%	15%	37%	28%	44%	35%	18%	29%	43%
Revegetation	0%	10%	5%	16%	11%	25%	15%	17%	7%
None of these	14%	23%	37%	14%	11%	10%	23%	15%	10%

* The question in 2019 listed 8 activities and an "Other (please specify)" option.

Awareness of tools and research

The 2022 research explored growers awareness of three different digital technology tools and research as part of the Cotton Landcare Tech Innovations 2023 project (CottonInfo biodiversity tool, QUT research around acoustic monitoring sensors and the UNE research on direct seeding techniques).

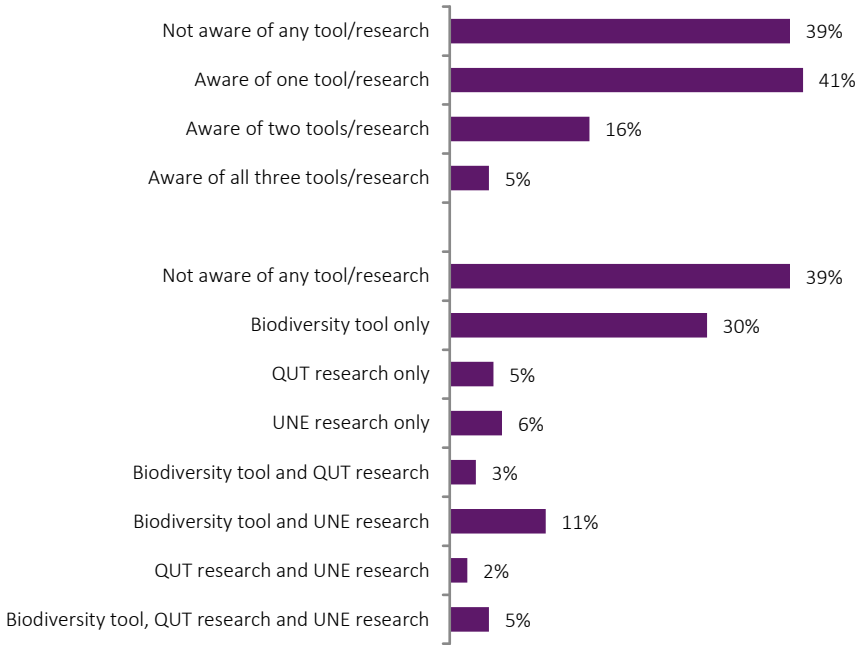
The survey shows that:

- Almost four in ten (39%) growers reported not being aware of these programs or tools.
- The remaining (61%) were aware of at least one but just 21% reported being aware of two or more of these.
- Awareness is strongest for the biodiversity tool (48%). Even with this tool, there is ample room to increase grower awareness.

Creating and developing growers awareness and understanding of the tools and research being supported and managed by CRDC should provide some downstream satisfaction dividends.

Creating a storyline around the 'what's in it for me' benefits for growers will be important to both attract the attention and interest of growers in these tools/research.

Are you aware of any of the following tools/research?
Base: All growers; n = 200



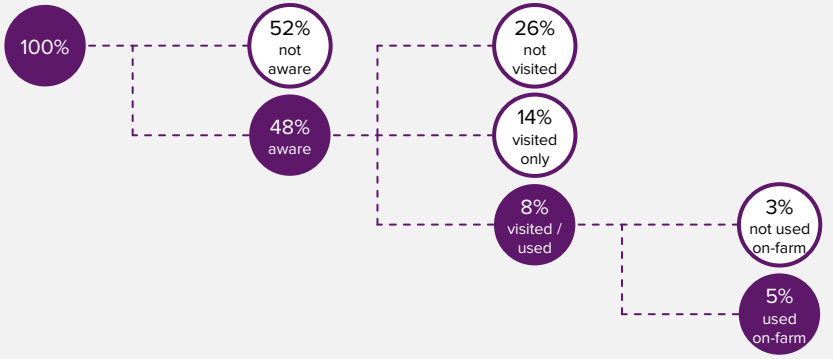
Key results by Region and Size of Total Farm Area

	Central QLD (n=21)	Darling Downs (n=39)	Macintyre Balonne (n=19)	Northern NSW (n=58)	Macquarie (n=9)	Southern NSW (n=48)	Small (n=71)	Medium (n=96)	Large (n=32)
Not aware of any tool/research	29%	44%	58%	34%	44%	40%	38%	39%	44%
Aware of one tool/research	52%	36%	32%	33%	56%	44%	51%	31%	44%
Aware of two tools/research	14%	18%	5%	24%	0%	15%	8%	23%	13%
Aware of all three tools/research	5%	3%	5%	9%	0%	2%	3%	7%	0%
Not aware of any tool/research	29%	44%	58%	34%	44%	40%	38%	39%	44%
Biodiversity tool only	33%	28%	16%	17%	56%	38%	37%	24%	31%
QUT research only	5%	5%	16%	7%	0%	0%	4%	2%	13%
UNE research only	14%	3%	0%	9%	0%	6%	10%	5%	0%
Biodiversity tool and QUT research	0%	5%	0%	3%	0%	4%	6%	1%	3%
Biodiversity tool and UNE research	14%	13%	5%	16%	0%	8%	3%	19%	6%
QUT research and UNE research	0%	0%	0%	5%	0%	2%	0%	3%	3%
Biodiversity tool, QUT and UNE research	5%	3%	5%	9%	0%	2%	3%	7%	0%

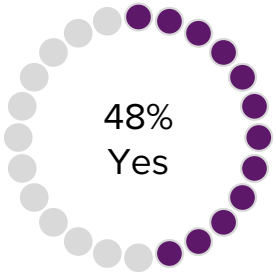
Awareness of ‘Managing biodiversity in cotton landscapes’ tool

Growers were asked about their awareness and use of the CottonInfo web-based tool ‘Managing biodiversity in cotton landscapes’ which provides regional biodiversity asset and priority management actions for threatened and iconic species.

- About one in two growers reported being aware of the online tool. Awareness is largely consistent across regions and farm sizes.
- Of those aware, 46% have at least visited the online tool. This equates to around 22% of all growers.
- Of those aware, 17% have visited and used the tool, with just over half (56%) of these growers having used the tool on their farm. This equates to approximately 5% of all growers.
- The results illustrate creating awareness is an important but only first step in translating to on-farm use. Encouraging growers to trial and then use the tool on their farm remains a significant challenge.



Are you aware of the CottonInfo web-based tool ‘Managing biodiversity in cotton landscapes’ which provides regional biodiversity asset and priority management actions for threatened and iconic species?
Base: All growers; n = 200

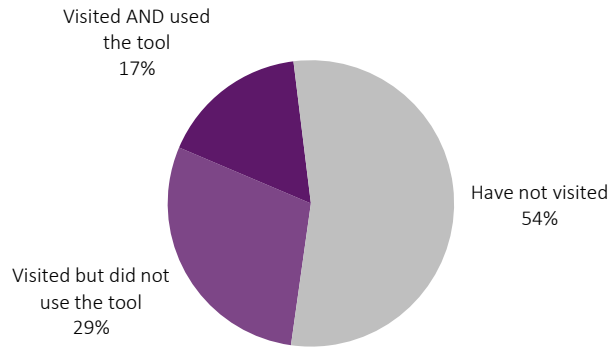


Key results by Region and Size of Total Farm Area

	Central QLD (n=21)	Darling Downs (n=39)	Macintyre Balonne (n=19)	Northern NSW (n=58)	Macquarie (n=9)	Southern NSW (n=48)	Small (n=71)	Medium (n=96)	Large (n=32)
Yes	52%	49%	26%	45%	56%	52%	48%	51%	41%
No	48%	51%	74%	55%	44%	48%	52%	49%	59%

Use of the ‘Managing biodiversity in cotton landscapes’ tool

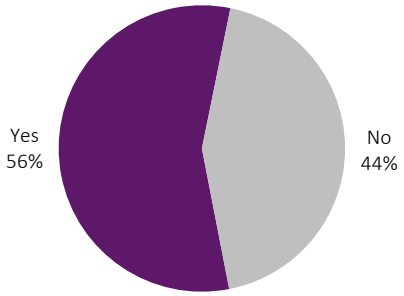
Have you visited/used the tool?
Base: All growers who are aware of the tool; n = 96



Key results by Region and Size of Total Farm Area

	Central QLD (n=11)	Darling Downs (n=19)	Macintyre Balonne (n=5)	Northern NSW (n=26)	Macquarie (n=5)	Southern NSW (n=25)	Small (n=34)	Medium (n=49)	Large (n=13)
Visited AND used the tool	27%	11%	20%	15%	40%	12%	6%	22%	23%
Visited but did not use the tool	9%	37%	0%	23%	40%	40%	35%	27%	23%
Have not visited	64%	53%	80%	62%	20%	48%	59%	51%	54%

Have you used the tool to manage biodiversity on your farm?
Base: All growers who have visited AND used the tool; n = 16 *



Key results by Region and Size of Total Farm Area

	Central QLD (n=3)	Darling Downs (n=2)	Macintyre Balonne (n=1)	Northern NSW (n=4)	Macquarie (n=2)	Southern NSW (n=3)	Small (n=2)	Medium (n=11)	Large (n=3)
Yes	67%	100%	0%	75%	50%	33%	0%	73%	33%
No	33%	0%	100%	25%	50%	67%	100%	27%	67%

Awareness of QUT/UNE research

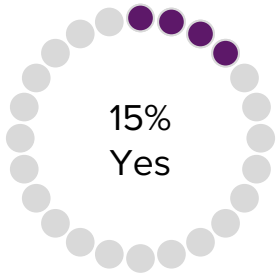
Awareness among growers of the Queensland University of Technologies research to develop acoustic monitoring sensors that can be deployed on farm to identify a subset of bird and microbat species was much lower at just 15% of all growers.

The results do vary across regions (zero among the small number of Macquarie growers in the survey compared to 24% of growers in Northern NSW).

Growers were also asked about their awareness of the University of New England's direct seeding research investigating different methodologies for undertaking revegetation on cotton farms such as the use of tractors and drones. The results show that:

- About one in four (24%) reported being aware of the research
- Awareness was strongest among medium size growers (34%) and lowest among larger growers (9%).
- Awareness varied across regions (zero among the small group of Macquarie based growers who responded to the survey and 38% among Northern NSW growers who responded to the survey).

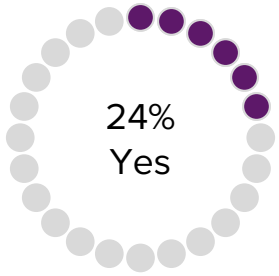
Are you aware of the Queensland University of Technologies research to develop acoustic monitoring sensors that can be deployed on farm to identify a subset of bird and microbat species?
Base: All growers; n = 200



Key results by Region and Size of Total Farm Area

	Central QLD (n=21)	Darling Downs (n=39)	Macintyre Balonne (n=19)	Northern NSW (n=58)	Macquarie (n=9)	Southern NSW (n=48)	Small (n=71)	Medium (n=96)	Large (n=32)
Yes	10%	13%	21%	24%	0%	8%	13%	14%	19%
No	90%	87%	79%	76%	100%	92%	87%	86%	81%

Are you aware of the University of New England's direct seeding research investigating different methodologies for undertaking revegetation on cotton farms such as the use of tractors and drones?
Base: All growers; n = 200

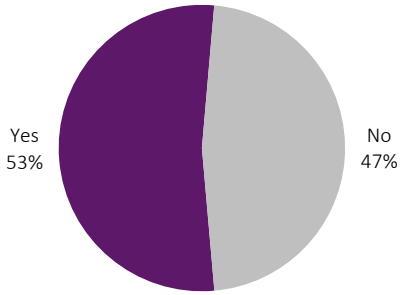


Key results by Region and Size of Total Farm Area

	Central QLD (n=21)	Darling Downs (n=39)	Macintyre Balonne (n=19)	Northern NSW (n=58)	Macquarie (n=9)	Southern NSW (n=48)	Small (n=71)	Medium (n=96)	Large (n=32)
Yes	33%	18%	11%	38%	0%	19%	15%	34%	9%
No	67%	82%	89%	62%	100%	81%	85%	66%	91%

Monitoring native plants and animals on farm

Do you monitor native plants and animals on your farm?
Base: All growers; n = 199 (n = 1 could not provide an answer)



Key results by Region and Size of Total Farm Area

	Central QLD (n=21)	Darling Downs (n=39)	Macintyre Balonne (n=19)	Northern NSW (n=58)	Macquarie (n=9)	Southern NSW (n=48)	Small (n=71)	Medium (n=96)	Large (n=31)
Yes	43%	31%	47%	66%	56%	58%	49%	56%	52%
No	57%	69%	53%	34%	44%	42%	51%	44%	48%

How do you monitor native plants and animals on your farm?
Base: All growers who reported monitoring native plants and animals on farm; n = 105

77% - Visual inspection

- 62% - No further info
- 12% - No recording
- 3% - With recording

16% - Agronomist/others do it

4% - Other methods for recording

3% - Not specifically, just leave them alone

Some of what they said…

"We have. My daughter in law works in that field. She sets up camera traps to take photos of various species of animals. A year ago we discovered a tiger snake on my place and got it and let it go, and she said there's no such thing as a tiger snake in your area. They've rewritten the text."

"We do take notice. People think that if you're not taking pictures/logging it that you're not interested in it. I've been by myself here for 18 months and it's just not possible. I've been noticing the same amount of small lizards. A lot of frogs. We're not actively monitoring but we are observing constantly because it's part of our livelihood to know what's going on."

"We know what's on our farm but we don't formally do it. We know what's on there but we monitor it informally. We think we're onto the second or third generation of koalas."

"Animals I see if I've got too many kangaroos. When you go past your lucerne paddock and see its grey instead of green, it means you've got too many kangaroos on it. We also have a 300 acre wetland where we observe swan and ducks, occasionally brolgas but they're a bit of a novelty."

"Scientists that come to monitor wetlands. We also monitor for the Office of Environment and Heritage (OEH). We generally keep an eye on things then call OEH if we notice things. Support bird and frog breeding programs."

"Mainly with the animals, we take note of the animals observe them at times, there's not that many native plants here, mainly just a bit of grasses on the roadways on the property."

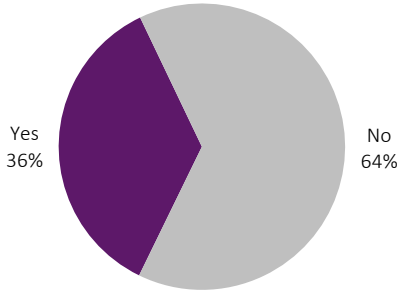
Results above are a subjective coding of verbatim answers from respondents. A list of all verbatims can be found in the supplementary Verbatim Report.

Undertaken revegetation projects on farm

The 2022 study collected feedback from growers around any revegetation projects undertaken on-farm. The results show that:

- Just over one in three growers reported having undertaken revegetation projects.
- Of these growers (have undertaken a revegetation project), most (56%) have done so in the last 5 years, with 20% of growers indicating projects undertaken in the last 12 months.
- Most of these growers report having used tubestock to revegetate.

Have you undertaken revegetation projects on your farm?
Base: All growers; n = 199 (n = 1 could not provide an answer)



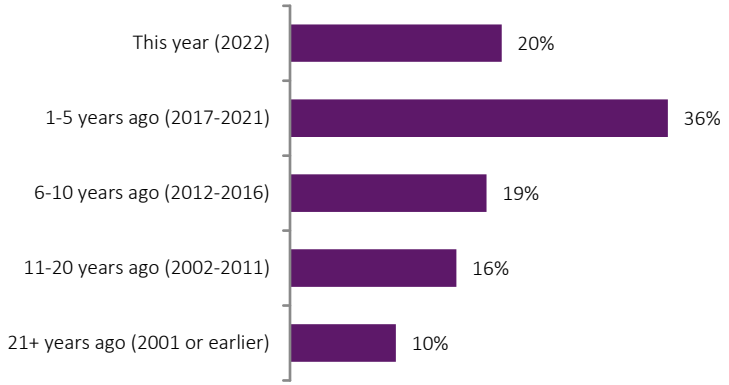
Key results by Region and Size of Total Farm Area

	Central QLD (n=21)	Darling Downs (n=39)	Macintyre Balonne (n=19)	Northern NSW (n=58)	Macquarie (n=9)	Southern NSW (n=48)	Small (n=71)	Medium (n=96)	Large (n=31)
Yes	14%	28%	32%	38%	78%	40%	28%	41%	39%
No	86%	72%	68%	62%	22%	60%	72%	59%	61%

Revegetation projects on farm – last undertaken and method used

What year did you last do this work?

Base: All growers who have undertaken revegetation projects on farm in the past; n = 70
(n = 1 could not provide an answer)



Key results by Region and Size of Total Farm Area

	Central QLD (n=3)	Darling Downs (n=11)	Macintyre Balonne (n=6)	Northern NSW (n=21)	Macquarie (n=7)	Southern NSW (n=19)	Small (n=20)	Medium (n=39)	Large (n=11)
This year (2022)	0%	0%	0%	29%	14%	26%	20%	15%	36%
1-5 years ago (2017-2021)	0%	45%	33%	43%	43%	26%	35%	31%	55%
6-10 years ago (2012-2016)	67%	9%	17%	10%	29%	26%	15%	26%	0%
11-20 years ago (2002-2011)	33%	27%	50%	5%	0%	16%	20%	15%	9%
21+ years ago (2001 or earlier)	0%	18%	0%	14%	14%	5%	10%	13%	0%

Which method did you use?

Base: All growers who have undertaken revegetation projects on farm in the past; n = 71

61% - Tubestock

27% - Direct seeding

4% did both

17% - Other specified:

Key results by Region and Size of Total Farm Area

	Central QLD (n=3)	Darling Downs (n=11)	Macintyre Balonne (n=6)	Northern NSW (n=22)	Macquarie (n=7)	Southern NSW (n=19)	Small (n=20)	Medium (n=39)	Large (n=12)
Tubestock	0%	64%	67%	55%	86%	68%	55%	72%	33%
Direct seeding	67%	18%	17%	23%	0%	37%	40%	18%	33%
Oither	33%	18%	17%	27%	14%	5%	15%	13%	33%

"Let it grow back to diversity and natural vegetation."
"Natural germination utilisation."
"Natural regeneration."
"Planting by hand."
"Planting of some trees along a designated area."
"Restricting access. Revegetation of cultivation paddocks."
"Riparian repair, planting second story trees."
"Till the soil to help natural growth with a stick rake."

FOCUS AREA

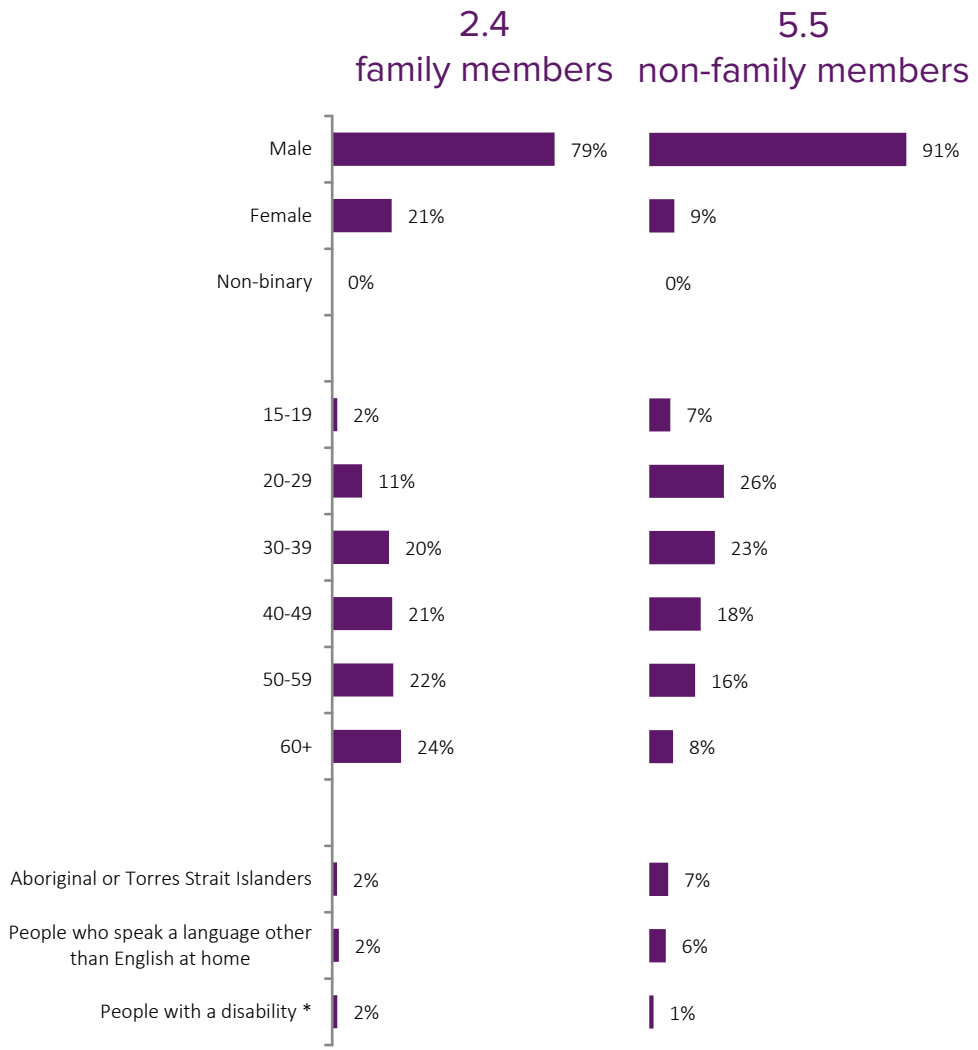
On-farm workforce profile

Family and non-family members on-farm

The 2022 Grower Survey collected feedback from growers about their staff. A brief profile of the on-farm staff is shown opposite and illustrates that:

- In total there are on average 8 people employed on farms.
- Clearly this varies across farm sizes. The feedback provided by growers indicates:
  - Small farm businesses have on average 4.3 staff
  - Medium sized farm business have 5.6 staff
  - Large farm businesses reported having an average of 23.4 staff.
- About one in three (30%) of these staff are family members, a result which underscores the importance of family in the running of the farm businesses. Not surprisingly, smaller farm businesses are more likely to have a higher representation of family members than the larger farm operations.
- 21% of family members that work on-farm are female. According to 2021 Census data, the national agricultural average for women working in the cotton growing industry (family or non-family) is 25%.
- The average age** of family members was 46.9 years, a result which reflects the age of the farm owners. By comparison, the average age of non-family members was reported to be 38.1 years, indicating a much younger profile of non-family staff.
- 7% identify as Aboriginal & Torres Strait Island (ATSI) non-family members working on farm. According to 2021 Census data, 7% of people employed in the cotton growing industry identify as ATSI.
- 6% of non-family members on-farm speak a language other than English at home. According to 2021 Census data, 9% of people employed in the cotton growing industry speak a language other than English at home.

A standardised estimate across farm size (calculated as the number of staff employed per 1,000 hectares) was 4.4 staff per 1,000 hectares. This compares to 3.9 staff employed per 1,000 hectares in the 2021 Grower Survey and 4.1 staff employed per 1,000 hectares in the 2020 Grower Survey.



* Full response provided to respondents: "People with a disability (any limitation, restriction or impairment which restricts everyday activities and has lasted, or is likely to last, for at least six months)"
** Average age was calculated using midpoints of range categories (e.g. 24.5 representing the 20-29 category) and 64.5 for the 60+ category.

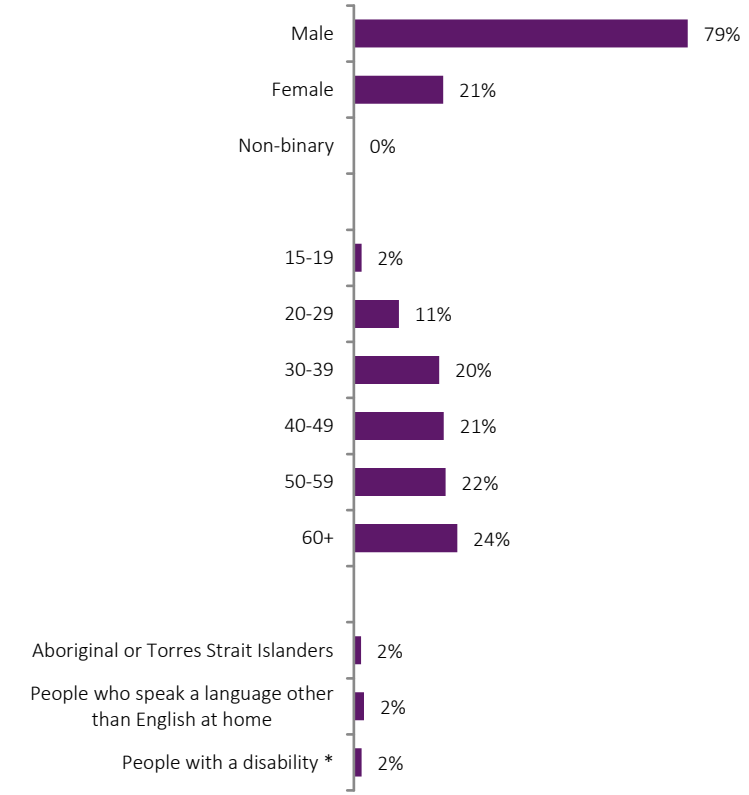
Family members on-farm – overall and details

How many family members, including yourself if applicable, work on farm?
Base: All growers; n = 199 (n = 1 could not provide an answer)

2.4 family members

Average number reported across growers

What is the gender mix of these family members? What are the ages of these family members? Of these family members, how many are…?
Base: All growers who reported at least one family member on-farm; n = 179



* Full response provided to respondents: "People with a disability (any limitation, restriction or impairment which restricts everyday activities and has lasted, or is likely to last, for at least six months)"

Key results by Region and Size of Total Farm Area

	Central QLD (n=21)	Darling Downs (n=39)	Macintyre Balonne (n=19)	Northern NSW (n=58)	Macquarie (n=9)	Southern NSW (n=48)	Small (n=71)	Medium (n=96)	Large (n=31)
Average number reported	2.7	2.1	1.8	2.4	2.1	2.8	2.4	2.5	1.9

Key results by Region and Size of Total Farm Area

	Central QLD (n=20)	Darling Downs (n=37)	Macintyre Balonne (n=12)	Northern NSW (n=54)	Macquarie (n=9)	Southern NSW (n=42)	Small (n=71)	Medium (n=90)	Large (n=17)
Male	88%	80%	74%	76%	96%	75%	79%	81%	69%
Female	12%	20%	26%	24%	4%	25%	21%	19%	31%
Non-binary	0%	0%	0%	0%	0%	0%	0%	0%	0%
Base:	(n=20)	(n=37)	(n=12)	(n=54)	(n=9)	(n=42)	(n=71)	(n=90)	(n=17)
15-19	5%	1%	4%	<1%	0%	3%	2%	1%	1%
20-29	5%	14%	2%	15%	7%	9%	10%	10%	13%
30-39	19%	12%	21%	18%	39%	28%	12%	25%	26%
40-49	23%	17%	23%	26%	26%	16%	22%	20%	25%
50-59	31%	23%	10%	24%	7%	19%	22%	22%	20%
60+	16%	32%	39%	17%	20%	26%	30%	22%	15%
Base:	(n=20)	(n=37)	(n=12)	(n=54)	(n=9)	(n=42)	(n=71)	(n=90)	(n=17)
ATSI	0%	0%	0%	3%	0%	1%	1%	2%	6%
LOTE	5%	5%	0%	1%	0%	2%	2%	3%	0%
With disability	0%	5%	1%	0%	0%	3%	3%	1%	1%

Non-family members on-farm – overall and details

How many non-family members, including yourself if applicable, work on farm?
Base: All growers; n = 199 (n = 1 could not provide an answer)

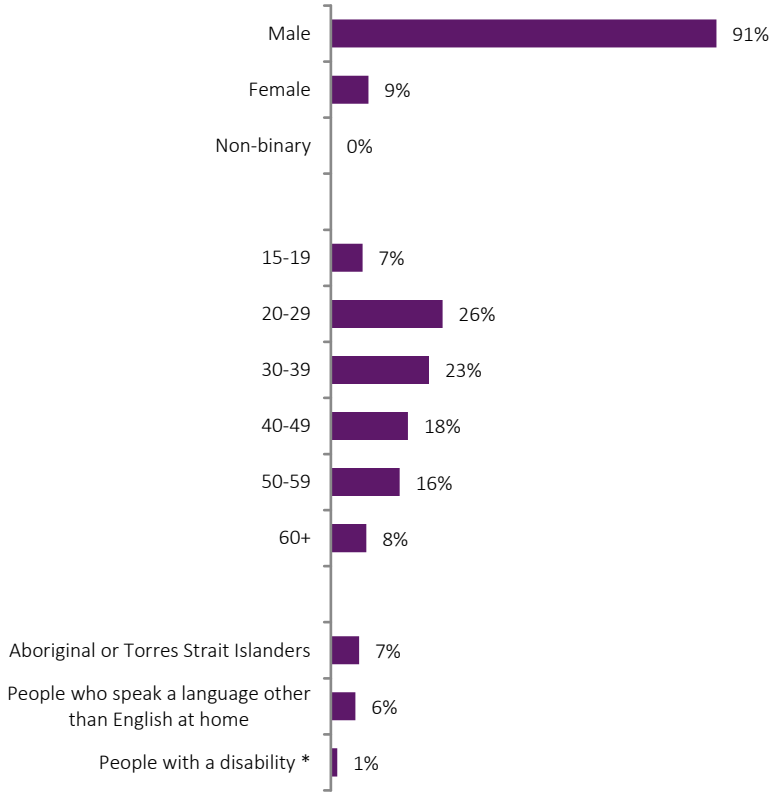
5.5 non-family members

Average number reported across growers

Key results by Region and Size of Total Farm Area

	Central QLD (n=21)	Darling Downs (n=39)	Macintyre Balonne (n=19)	Northern NSW (n=58)	Macquarie (n=9)	Southern NSW (n=48)	Small (n=71)	Medium (n=96)	Large (n=31)
Average number reported	1.8	2.6	15.6	6.6	4.9	3.8	1.9	3.1	21.5

What is the gender mix of these non-family members? What are the ages of these non-family members? Of these non-family members, how many are…?
Base: All growers who reported at least one non-family member on-farm; n = 155



Key results by Region and Size of Total Farm Area

	Central QLD (n=13)	Darling Downs (n=30)	Macintyre Balonne (n=18)	Northern NSW (n=46)	Macquarie (n=8)	Southern NSW (n=36)	Small (n=41)	Medium (n=85)	Large (n=28)
Male	92%	90%	90%	92%	93%	91%	92%	93%	84%
Female	8%	10%	10%	8%	7%	9%	8%	7%	16%
Non-binary	0%	0%	0%	0%	0%	0%	0%	0%	0%
Base:	(n=13)	(n=30)	(n=18)	(n=46)	(n=8)	(n=36)	(n=41)	(n=85)	(n=28)
15-19	1%	7%	7%	8%	12%	9%	6%	9%	6%
20-29	28%	28%	22%	28%	31%	26%	14%	30%	31%
30-39	37%	10%	21%	23%	30%	31%	19%	26%	21%
40-49	13%	24%	25%	17%	17%	15%	21%	17%	19%
50-59	21%	24%	17%	12%	3%	13%	31%	11%	11%
60+	0%	8%	9%	11%	7%	5%	9%	7%	12%
Base:	(n=13)	(n=30)	(n=18)	(n=46)	(n=8)	(n=36)	(n=41)	(n=85)	(n=28)
ATSI	2%	2%	9%	10%	8%	3%	6%	5%	12%
LOTE	7%	1%	5%	6%	3%	10%	4%	6%	7%
With disability	0%	3%	0%	2%	0%	1%	4%	1%	<1%

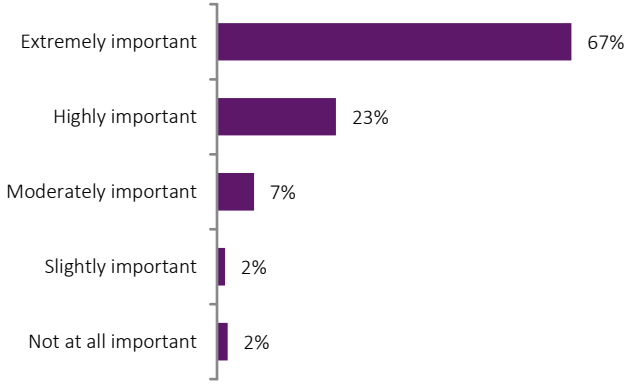
* Full response provided to respondents: "People with a disability (any limitation, restriction or impairment which restricts everyday activities and has lasted, or is likely to last, for at least six months)"

Importance of industry to attract/retain a diverse workforce

The strategy of maintaining diversity in the cotton workforce was explored in the research. The results from the 2022 Grower Survey show that:

- The overwhelming majority of growers (90%) reported that it was important (extremely or highly) for the cotton industry to attract and keep workers of different ages, genders, nationality and race.
- Two in three rated this as 'extremely important', highlighting the priority growers see for this approach.
- The results were very consistent across segments – across regions and farm size. There is then a clear consensus view on the importance of this approach for the cotton industry.

How important is it for the industry have a focus on attracting and keeping workers of different ages, genders, nationality and race within the agricultural workforce, in particular the cotton workforce?
Base: All growers; n = 200



Key results by Region and Size of Total Farm Area

	Central QLD (n=21)	Darling Downs (n=39)	Macintyre Balonne (n=19)	Northern NSW (n=58)	Macquarie (n=9)	Southern NSW (n=48)	Small (n=71)	Medium (n=96)	Large (n=32)
Extremely important	67%	54%	68%	60%	78%	81%	66%	69%	63%
Highly important	33%	31%	16%	28%	11%	10%	25%	23%	16%
Moderately important	0%	10%	11%	9%	11%	4%	6%	6%	13%
Slightly important	0%	3%	5%	0%	0%	2%	1%	0%	6%
Not at all important	0%	3%	0%	3%	0%	2%	1%	2%	3%

Importance of industry to attract/retain a diverse workforce

Retaining staff remains an ongoing challenge of cotton farm business, as it does for business in other agricultural sectors. The three main 'push' and 'pull' factors motivating employees to leave were identified as being:

- Better pay – this was more often than not identified as better pay in competing industries (particularly mining).
- The workload and hours required to be worked. In many responses, growers noted the reluctance of particularly younger workers to be prepared to 'put up with' the long hours and hard work.
- The influence of having access to adequate local community and facilities. This includes access to acceptable and affordable accommodation, schools and local services (health, supermarkets, sport etc.). In several cases, growers reflected on the anxiety coming from workers' partners around this factor.

Thinking about the last 2 years, what do you see are the factors that have the strongest influence on on-farm employee decisions to leave yours or other cotton farm businesses?
Base: All growers; n = 200. Respondents could provide up to three factors.

45% - Better pay
22% - Work too hard/hours too long
22% - Local community and facilities (schools etc.), social life
16% - Location of our farm
11% - Conflict with manager/others
9% - Seasonal nature of work
7% - Just wanted a change
6% - Personal reasons/retired
5% - Better conditions
5% - For a promotion
4% - Impact of drought
2% - COVID-19 related

8% - No idea

Some of what they said…

"People who disagree, they don't jell, you can start someone and they might disagree or not jell with other employees. Financial - we are competing with other places that pay the same dollars per hour to not have to work as many hours a week or whatever it might be."

"Availability. Just no-one out here anymore. The drought for the last 6 years stripped the towns of workers. Had to go elsewhere for work. Hard to find skilled workers now."

"The hours that you have to work - not all the time but if you're harvesting, you're busy and you can't say pick your kids up after school, not that you work these hours all the time."

"Different opportunities. Being a family farm, not an opportunity to go higher, CEO and manager is family. If someone is looking to be farm manager, that is why they would leave."

"Conditions – housing, lifestyle. On-farm housing, quality of infrastructure, rent agreements or whether you give them the house for free. Also power and water."

"I suppose its probably the rate of pay in comparison to what the mines can offer in the area. Same workforce for 6 years. Never had a problem with it."

"Trouble attracting them to the business to start with, also to the area as it is isolated, getting them to move from regional to rural."

"Money – so much demand for labour at the moment, everyone is short-staffed so people are prepared to pay exorbitant amounts of money."

"Massive social problem. Not a balanced community, too many single men, no women. Makes retaining anyone other single men impossible."

Results above are a subjective coding of verbatim answers from respondents. A list of all verbatims can be found in the supplementary Verbatim Report.

Having a plan/strategy to keep on-farm staff in the business

While the 'end game' is the same, most growers adopt a different strategy towards staff retention.

The results from the 2022 Grower Survey show that:

- Just over one in three (36%) don't see they have any problems with staff retention. This is much stronger among smaller growers where the number of external staff employed is small.
- There remains an active appetite among growers to strengthen their approaches to staff retention – 24% have a plan but are looking to do things more effectively and 14% see it as a priority but don't have a plan in place.
- The results suggest an unmet demand for additional support and advice in this area.

Which of the following best describes where you are in having a plan/strategy to keep on-farm staff working in your business?
Base: All growers; n = 199 (n = 1 could not provide an answer)

Key results by Region and Size of Total Farm Area

	Central QLD (n=21)	Darling Downs (n=39)	Macintyre Balonne (n=19)	Northern NSW (n=58)	Macquarie (n=9)	Southern NSW (n=48)	Small (n=71)	Medium (n=96)	Large (n=31)
Have an effective plan/strategy	19%	15%	11%	17%	56%	13%	14%	23%	3%
Looking for new approaches	14%	13%	47%	31%	0%	27%	14%	22%	55%
A priority, but no plan/ strategy at this time	10%	10%	16%	9%	44%	17%	13%	14%	16%
Other priorities on our farm	14%	5%	5%	5%	0%	0%	7%	5%	0%
No problem with keeping employees	38%	51%	21%	33%	0%	40%	46%	32%	26%
Other (please specify)	5%	0%	0%	0%	0%	4%	1%	2%	0%
† N/A - don't have employees	0%	5%	0%	5%	0%	0%	4%	2%	0%

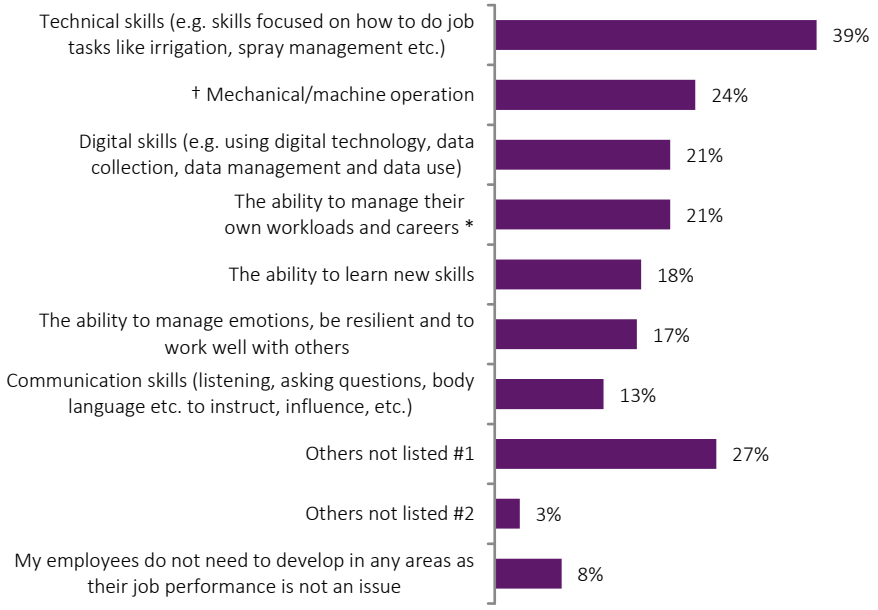
† Response coded back from "Other (please specify)" answers.

Improvements in skill areas

When asked to describe which skill areas growers are looking to see improvements in their on-farm staff, the survey results show that:

- There is a range of different skill areas where growers see an opportunity for increased competency of their staff.
- Technical on-farm skills was clearly the area most often mentioned. Growers identified a range of focus areas here, but reflected the need to upskill these on-farm technical capabilities.
- The importance of mechanical skills came through in the survey responses – this was centred around machine licences, operation and skills. Growers are clearly identifying these core competencies as an area where there is an opportunity to provide greater value back to the farm business.
- Other skill areas mentioned but not listed include business skills, general farm skills, completing tertiary / TAFE education, and safety / OH&S skills.

Businesses are always looking to improve the productivity and efficiency of their on-farm staff. What would be the skill areas where you would like to see improvements? Please provide us with up to three skill areas.
Base: All growers; n = 199 (n = 1 could not provide an answer)



Key results by Region and Size of Total Farm Area

	Central QLD (n=21)	Darling Downs (n=39)	Macintyre Balonne (n=19)	Northern NSW (n=58)	Macquarie (n=9)	Southern NSW (n=48)	Small (n=71)	Medium (n=96)	Large (n=31)
Technical skills	48%	28%	58%	36%	56%	38%	32%	44%	35%
† Mechanical/ machine operation	24%	23%	11%	28%	56%	23%	24%	23%	29%
Digital skills	38%	13%	21%	24%	22%	19%	18%	24%	16%
Ability to manage own workloads/careers	5%	21%	26%	26%	22%	19%	23%	20%	23%
Ability to learn new skills	14%	21%	21%	21%	0%	17%	11%	22%	19%
Ability to manage emotions, etc.	10%	23%	11%	22%	11%	10%	20%	16%	16%
Communication skills	10%	18%	5%	16%	11%	13%	8%	17%	10%
Other #1	29%	31%	32%	22%	56%	23%	28%	21%	42%
Other #2	0%	5%	0%	2%	0%	6%	4%	2%	3%
Do not need to develop in any areas	5%	5%	16%	5%	0%	10%	10%	9%	0%

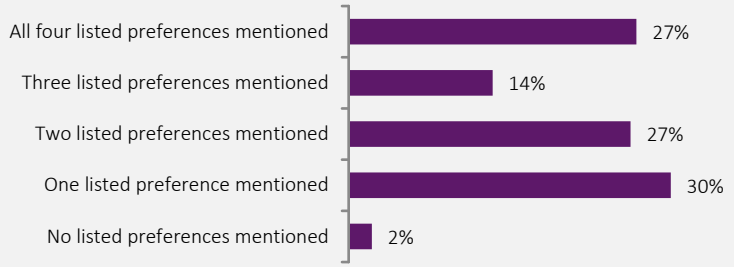
* Full response provided to respondents: "The ability to manage their own workloads and careers (e.g. proactivity, strategic thinking, time management, career self-management)".
† Response coded back from "Other (please specify)" responses.

Preference for staff to get the training/support required

There are many ways in which employers can provide training and support for staff in developing their skills and competency. Among growers who identified that their staff could further develop their skills:

- The majority (78%) saw on-the-job training as one of their preferences for delivering the support. There was also some interest in having the resources available to assist in their on-the-job training for staff.
- Formal training opportunities also attracted some support with most (67%) having a preference for formal off-farm training as a way of delivering the content required.

What was evident from the feedback was that growers did see a mix of these delivery channels is likely to be required to meet grower preferences.



Thinking about these skill areas where you think there might be opportunities for improvement, how would you prefer your staff to get the training or support required to build their capabilities in these areas? Please select all that apply.

Base: All growers who indicated employees need development in at least one area; n = 184

Key results by Region and Size of Total Farm Area

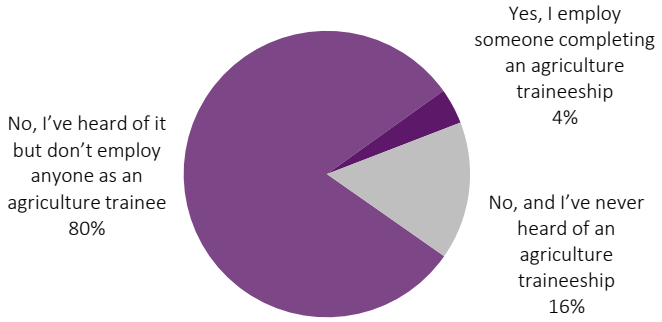
	Central QLD (n=20)	Darling Downs (n=37)	Macintyre Balonne (n=16)	Northern NSW (n=55)	Macquarie (n=9)	Southern NSW (n=43)	Small (n=64)	Medium (n=87)	Large (n=32)
On-the-job training/ coaching	75%	81%	75%	80%	78%	74%	73%	82%	78%
Make use of formal off-farm training	60%	73%	69%	67%	89%	60%	61%	70%	69%
Access to on-the-job training resources	50%	51%	81%	47%	44%	49%	48%	48%	66%
Make use of formal online training	40%	35%	38%	36%	33%	35%	36%	34%	41%
Other (please specify)	5%	11%	13%	4%	11%	9%	6%	9%	9%

Staff member undergoing an agricultural traineeship

Agricultural traineeships are one of the opportunities for growers to employ and help develop their workforce. Based on the feedback provided, we note:

- Only a small proportion of growers (4%) indicated they employ someone completing an agricultural traineeship.
- The majority of growers (80%) were aware of the traineeships but did not currently employ anyone using that vehicle.
- A smaller proportion (16%) were unaware of the traineeships. There remains a need to continue to promote the opportunity to this small cohort.

Do you currently employ a team member that is undergoing an agriculture traineeship?
Base: All growers; n = 199 (n = 1 could not provide an answer)



Key results by Region and Size of Total Farm Area

	Central QLD (n=21)	Darling Downs (n=39)	Macintyre Balonne (n=19)	Northern NSW (n=58)	Macquarie (n=9)	Southern NSW (n=48)	Small (n=71)	Medium (n=96)	Large (n=31)
Yes, employ someone	10%	3%	5%	3%	0%	4%	3%	4%	6%
No, but heard of it	62%	85%	84%	88%	67%	75%	86%	79%	71%
No and never heard	29%	13%	11%	9%	33%	21%	11%	17%	23%

Barriers to employing an agricultural trainee

As reported earlier, the majority of growers don't currently employ any staff via an agricultural traineeship. The barriers for growers in utilising this channel for staff was reported as including:

- Finding staff willing to commit to a traineeship
- The capability of the available talent pool
- Finding information about how to access traineeships and the talent pool

It should be noted that a significant proportion of growers (27% of this cohort) simply noted they had no need for an agricultural trainee.

What is stopping you from employing someone as an agricultural trainee?
Please select all that apply.
Base: All growers who indicated having heard of the agricultural traineeship (but do not employ one); n = 160

Key results by Region and Size of Total Farm Area

	Central QLD (n=13)	Darling Downs (n=33)	Macintyre Balonne (n=16)	Northern NSW (n=51)	Macquarie (n=6)	Southern NSW (n=36)	Small (n=61)	Medium (n=76)	Large (n=22)
Finding staff willing to commit to traineeship	0%	27%	25%	27%	33%	31%	23%	28%	27%
† Quality/Capability of young people	15%	9%	13%	10%	17%	3%	7%	9%	18%
Providing ongoing full-time employment	0%	12%	6%	10%	0%	3%	8%	7%	5%
Finding info on traineeship options	8%	3%	19%	6%	0%	6%	5%	8%	5%
Access to traineeship training locally	8%	6%	0%	8%	0%	0%	5%	5%	0%
Lack of available accommodation	8%	3%	0%	4%	0%	3%	2%	4%	5%
Duration of training/ providing time off	0%	0%	0%	6%	0%	6%	2%	5%	0%
Quality of training	0%	3%	0%	4%	0%	0%	5%	0%	5%
Cost of training	0%	0%	0%	4%	0%	3%	5%	0%	5%
Lack of government incentives	0%	0%	6%	4%	0%	0%	3%	0%	5%
Clarity about meeting pay requirements	0%	0%	0%	2%	0%	0%	2%	0%	0%
Other (please specify)	23%	21%	25%	14%	0%	11%	15%	18%	9%
† About to/Plan to start the process	0%	3%	19%	10%	17%	14%	0%	12%	27%
† No need for trainee	46%	30%	13%	24%	33%	25%	39%	22%	5%
† Nothing	8%	6%	13%	12%	0%	8%	11%	7%	14%

* Full response provided to respondents: "Clarity about how I meet correct pay requirements (e.g. Are they paid at trainee awards, or at pastoral award?)".

† Response coded back from "Other (please specify)" responses.

FOCUS AREA

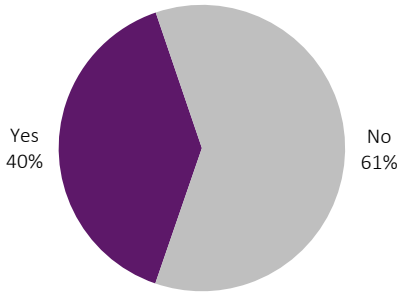
Landcare

Awareness of industry partnership with Landcare/Country Road

The feedback from growers responding to the 2022 Grower Survey show that:

- Just four in ten (40%) reported that they were aware of the cotton industry partnership with Landcare Australia and Country Road.
- Awareness varied across regions - from the strongest level of 56% in Macquarie and 47% in Northern NSW to the lowest level of 21% in Macintyre.
- Smaller (34%) and medium (48%) growers were more likely to report being aware of the partnership than the larger growers (28%). This is a somewhat unexpected response given that larger growers are typically more aware than their small counterparts.

Are you aware of the cotton industry partnership with Landcare Australia and Country Road providing growers financial and technical assistance to restore biodiversity in cotton landscapes?
Base: All growers; n = 200



Key results by Region and Size of Total Farm Area

	Central QLD (n=21)	Darling Downs (n=39)	Macintyre Balonne (n=19)	Northern NSW (n=58)	Macquarie (n=9)	Southern NSW (n=48)	Small (n=71)	Medium (n=96)	Large (n=32)
Yes	33%	38%	21%	47%	56%	35%	34%	48%	28%
No	67%	62%	79%	53%	44%	65%	66%	52%	72%

Importance of industry partnerships

Most growers indicated that industry partnerships (like the one with Landcare) are important for the cotton industry.

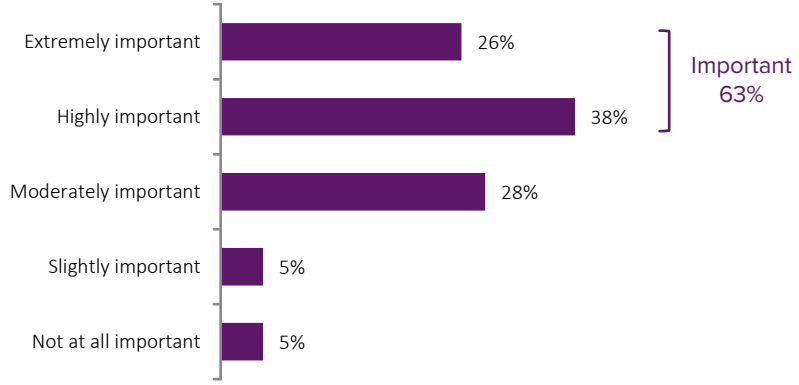
Again smaller (71%) and medium (67%) growers were more likely to rate these partnerships as important than larger growers (34%). The level of perceived importance does vary across regions.

Perhaps not surprisingly, growers aware of the Landcare partnership were more likely than growers not aware to say that these partnerships were important (71% v 58%).

Are you aware of the cotton industry partnership with Landcare Australia and Country Road providing growers financial and technical assistance to restore biodiversity in cotton landscapes?

	Yes (n=79)	No (n=121)
Extremely important	34%	20%
Highly important	37%	38%
Moderately important	19%	34%
Slightly important	5%	4%
Not at all important	5%	4%

How important do you think industry partnerships are (such as the partnership with Landcare Australia and Country Road)?
Base: All growers; n = 200



Key results by Region and Size of Total Farm Area

	Central QLD (n=21)	Darling Downs (n=39)	Macintyre Balonne (n=19)	Northern NSW (n=58)	Macquarie (n=9)	Southern NSW (n=48)	Small (n=71)	Medium (n=96)	Large (n=32)
Extremely important	24%	18%	16%	31%	67%	25%	27%	29%	9%
Highly important	48%	31%	32%	34%	22%	44%	44%	38%	25%
Moderately important	24%	31%	32%	29%	11%	27%	18%	26%	56%
Slightly important	5%	5%	16%	3%	0%	2%	3%	5%	6%
Not at all important	0%	15%	5%	2%	0%	2%	8%	2%	3%

Importance of industry partnerships

Why did you rate your importance about industry partnerships as you did?
Base: All growers who rated "**extremely important**" or "**highly important**"; n = 126

33% - Creating/Improving community awareness/perceptions

13% - Good for the industry (no further info)

13% - Shows farmers care for the environment

12% - Collaboration is positive

11% - Using expertise from all sources is good

10% - United industry

9% - Providers growers with information/advice

9% - Sharing information/knowledge

Some of what they said…

"Important to be in contact with our end suppliers and show them what we are doing on farm. It's about being transparent and honest about how we produce food & fibre on our farm and how we communicate that to consumers. Important for the industry to show our credentials in the sustainability space and how we are conserving the environment for future generations."

"It's about the social licence for farming & that removes one of the disconnects between rural & urban. If they can understand that at the management level, hopefully that will filter down & that connection will return. Some of it the farmers don't do because of the cost & if there is someone else sharing the financial responsibility/burden they will engage."

"A lot of it is about perception of the industry. Making people think more of cotton growers. Because as an industry we do not have a good name and we need to work towards that with as little government help as possible as we are doing really well as far as it goes. Cotton has almost no waste as a crop and a good yield per hectare. Good to get this info out there."

Why did you rate your importance about industry partnerships as you did?
Base: All growers who rated "**moderately important**", "**slightly important**" or "**not at all important**"; n = 74

15% - Doesn't create any impact

14% - Don't know anything about this/not aware

12% - Just window dressing/no value

12% - No importance to me/not on my radar

4% - Just a marketing exercise

3% - Don't trust Landcare

3% - Symbolism

Some of what they said…

"Simply because there's a small % of farms that possibly have a greater focus on them. They tend to be the ones that have these others areas within them that require attention and care, but that's not the case for every cotton farm. Would be highly important if represented to whole industry. Moderately because it only represents a few."

"I guess because I see there's other priorities within the industry that has to come before the environmental stuff. For us at the moment it's the price structures. Inputs, cost of diesel, power, fertilizer. Far greater need to address those issues over environmental stuff."

"There is a lot of hard work and there needs to be an incentive. Getting into these partnerships, you need to be wary of impacts external to the project. Also factors out of your control that will influence the project - such as drought."

"It's not a high priority for us, but I can see that like market feedback and talking to consumers to try the right image, so like with the wool industry with mulesing, so that something like that doesn't happen with the cotton industry."

Results above are a subjective coding of verbatim answers from respondents. A list of all verbatims can be found in the supplementary Verbatim Report.

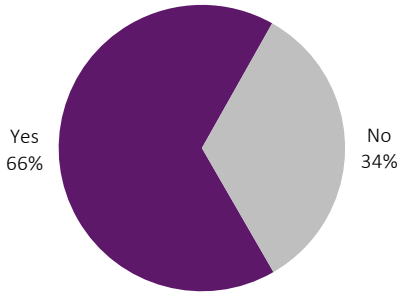
Interest in participation of partnership

When asked about their preparedness to participate in the Landcare partnership, the feedback indicates that:

- Two in three growers (66%) reported that they were prepared to participate;
- Awareness of these partnerships doesn't appear to impact growers willingness to be part of the partnership - 66% of those growers already aware of the partnership were prepared to participate compared to 67% of those not previously aware of the partnership.
- Seeing the partnerships as important does however have an influence on growers willingness to participate. There remains then a challenge to provide clarity about the benefits and dividends for growers and the industry of the partnerships that the industry develops.

There is a strong disposition among growers to be involved in efforts to restore biodiversity on their farm.

Would you participate in the partnership or similar to restore biodiversity on your farm?
Base: All growers; n = 197 (n = 3 could not provide an answer)



Key results by Region and Size of Total Farm Area

	Central QLD (n=21)	Darling Downs (n=39)	Macintyre Balonne (n=19)	Northern NSW (n=56)	Macquarie (n=9)	Southern NSW (n=48)	Small (n=71)	Medium (n=95)	Large (n=30)
Yes	62%	56%	68%	68%	67%	79%	61%	72%	63%
No	38%	44%	32%	32%	33%	21%	39%	28%	37%

FOCUS AREA

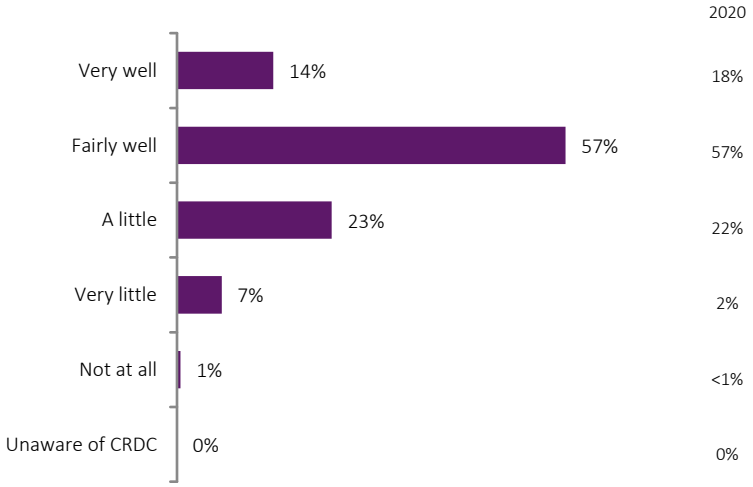
CRDC

Understanding what CRDC does

The 2022 study collected feedback from growers about their engagement and experience with CRDC. The results from the 2022 Grower Survey show that:

- All growers surveyed reported being aware of CRDC.
- The overwhelming majority of growers report being familiar with what CRDC does (71% understand what CRDC does very or fairly well). Importantly, only a small number of growers indicated low levels of familiarity. These results are largely consistent with the 2018 and 2020 survey results.
- There remains about one in three (30%) who report they have 'a little' or 'very little' understanding of what CRDC does. This is a salient reminder that while the overall results continue to be positive, there will be a continuing need to keep all growers updated, informed and aware of the roles, responsibilities and outcomes achieved by CRDC.

How well would you say you understand what the Cotton Research and Development Corporation (CRDC) does?
Base: All growers; n = 200



Key results by Region and Size of Total Farm Area

	Central QLD (n=21)	Darling Downs (n=39)	Macintyre Balonne (n=19)	Northern NSW (n=58)	Macquarie (n=9)	Southern NSW (n=48)	Small (n=71)	Medium (n=96)	Large (n=32)
Very well	10%	13%	11%	17%	33%	13%	8%	17%	19%
Fairly well	57%	64%	63%	60%	44%	42%	61%	56%	50%
A little	24%	13%	21%	17%	22%	38%	25%	19%	25%
Very little	10%	8%	5%	5%	0%	8%	6%	7%	6%
Not at all	0%	3%	0%	0%	0%	0%	0%	1%	0%
Unaware of CRDC	0%	0%	0%	0%	0%	0%	0%	0%	0%

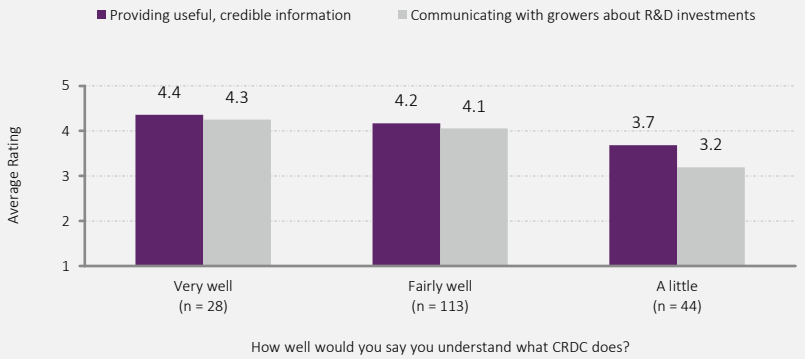
CRDC's performance

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

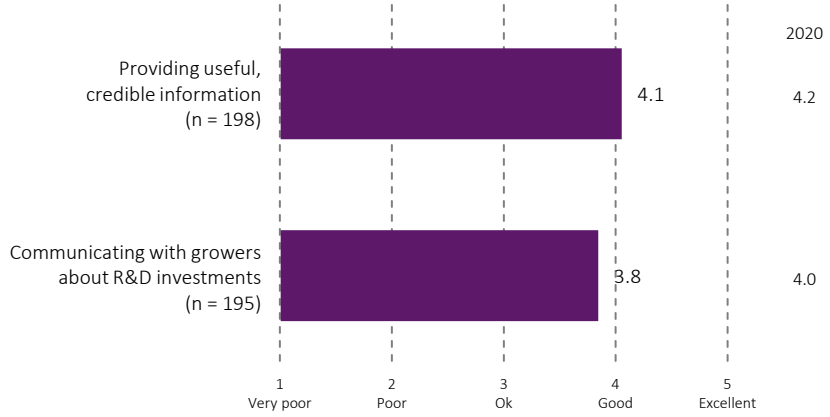
- Providing useful, credible information (rating 4.1 out of a maximum rating of 5); and
- Communicating with growers (rating 3.8).

Pleasingly, these results are largely consistent across all regions and across farms of different sizes. That said, growers in Central QLD were somewhat more critical in their ratings. It's unclear whether other factors have contributed to this result.

The analysis opposite reflects the value in building growers understanding of what CRDC does – those growers who understand very well what CRDC does reported even stronger ratings on CRDC providing useful, credible information and communicating with growers.



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

	Central QLD (n=21)	Darling Downs (n=38)	Macintyre Balonne (n=19)	Northern NSW (n=58)	Macquarie (n=9)	Southern NSW (n=47)	Small (n=71)	Medium (n=95)	Large (n=31)
Providing useful, credible information	3.6	4.1	4.1	4.1	4.0	4.1	4.0	4.1	4.0

	Central QLD (n=21)	Darling Downs (n=38)	Macintyre Balonne (n=18)	Northern NSW (n=57)	Macquarie (n=9)	Southern NSW (n=46)	Small (n=70)	Medium (n=93)	Large (n=31)
Communicating with growers about R&D investments	3.7	4.1	3.8	3.9	3.8	3.7	3.7	3.9	3.8

Support of CRDC's research investments and activities

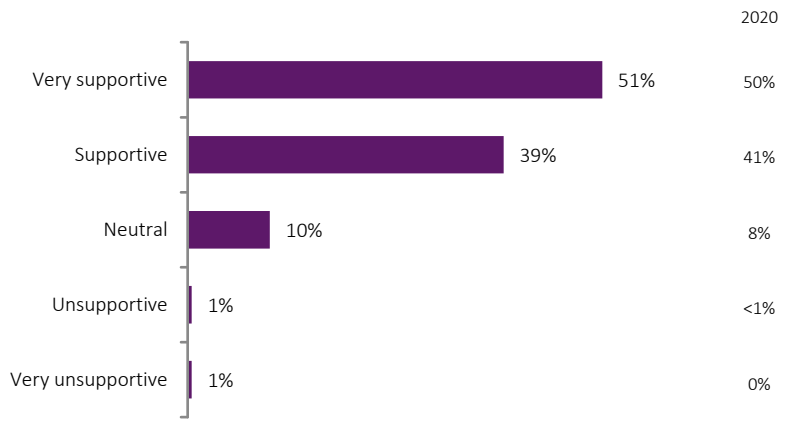
Growers are overwhelmingly supportive of CRDC's research investments and activities with:

- One in two (51%) of growers reporting they were 'very supportive'; with
- A further four in ten (39%) describing themselves as 'supportive'

Once again, the results are largely consistent across all regions and across farms of different sizes.

The results indicate an improvement from the same measure collected in 2018 but consistent with those reported in 2020.

Overall, how supportive are you of CRDC's research investments and activities?
Base: All growers; n = 200



Key results by Region and Size of Total Farm Area

	Central QLD (n=21)	Darling Downs (n=39)	Macintyre Balonne (n=19)	Northern NSW (n=58)	Macquarie (n=9)	Southern NSW (n=48)	Small (n=71)	Medium (n=96)	Large (n=32)
Very supportive	38%	62%	63%	48%	33%	48%	52%	51%	44%
Supportive	52%	31%	26%	43%	56%	35%	35%	40%	44%
Neutral	10%	8%	11%	9%	0%	15%	13%	7%	13%
Unsupportive	0%	0%	0%	0%	11%	0%	0%	1%	0%
Very unsupportive	0%	0%	0%	0%	0%	2%	0%	1%	0%

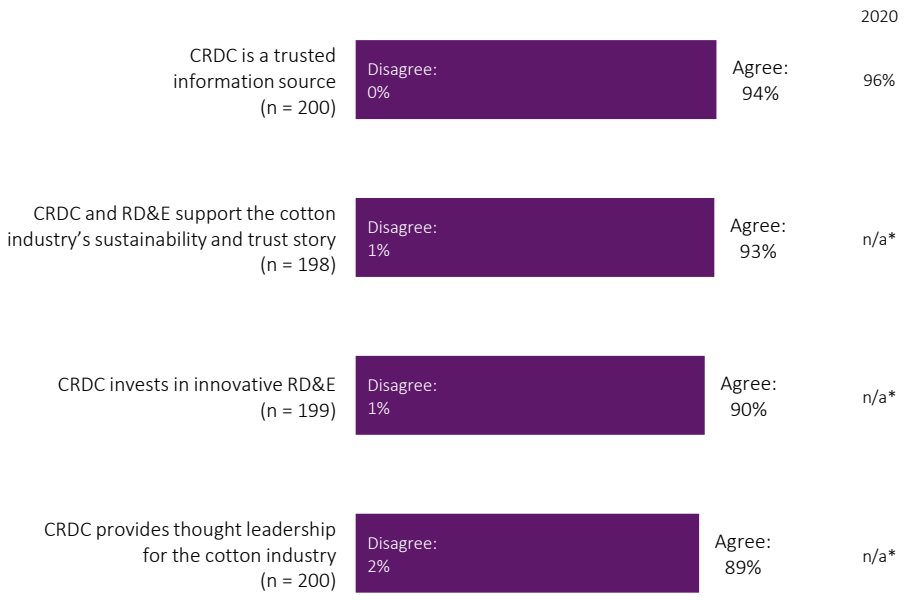
Sentiment about CRDC

Growers were asked for a qualitative assessment of CRDC. The feedback from the 2022 Grower Survey shows that growers overwhelmingly agree that CRDC:

- Is a trusted information source;
- Supports the industry's sustainability and trust story;
- Invests in innovative RD&E; and
- Provides thought leadership for the industry.

These are clear strong foundational elements for the healthy CRDC–grower relationship.

Thinking about CRDC, do you agree or disagree that…
Base: All growers (excluding "N/A" answers); n varies



Key results by Region and Size of Total Farm Area (% agree)

	Central QLD (n=21)	Darling Downs (n=39)	Macintyre Balonne (n=19)	Northern NSW (n=58)	Macquarie (n=9)	Southern NSW (n=48)	Small (n=71)	Medium (n=96)	Large (n=32)
CRDC is a trusted info source	90%	97%	84%	97%	89%	92%	93%	94%	94%

	Central QLD (n=21)	Darling Downs (n=39)	Macintyre Balonne (n=19)	Northern NSW (n=57)	Macquarie (n=9)	Southern NSW (n=48)	Small (n=70)	Medium (n=95)	Large (n=32)
CRDC/RD&E support sustainability/trust	90%	97%	84%	91%	78%	98%	96%	93%	88%

	Central QLD (n=21)	Darling Downs (n=39)	Macintyre Balonne (n=19)	Northern NSW (n=57)	Macquarie (n=9)	Southern NSW (n=48)	Small (n=71)	Medium (n=96)	Large (n=31)
CRDC invests in innovative RD&E	71%	92%	89%	93%	78%	96%	92%	89%	94%

	Central QLD (n=21)	Darling Downs (n=39)	Macintyre Balonne (n=19)	Northern NSW (n=58)	Macquarie (n=9)	Southern NSW (n=48)	Small (n=71)	Medium (n=96)	Large (n=32)
CRDC provides thought leadership	81%	95%	84%	91%	78%	90%	92%	89%	84%

* Question is new to the 2022 research.

FOCUS AREA

CottonInfo

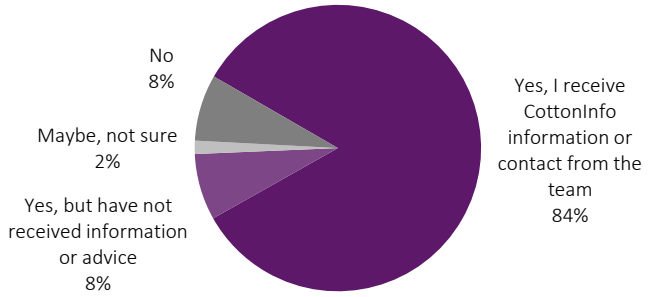
Awareness of CottonInfo

The results from the 2022 Grower Survey show that:

- The overwhelming majority of growers are aware of CottonInfo and receive information or contact from the CottonInfo team.
- Based on the feedback provided, CottonInfo is reaching almost nine in ten growers.
- Awareness of CottonInfo is consistent across all regions and farm sizes.

The results indicate the majority of growers (84%) have had some level of engagement (receiving information or contact) with CottonInfo.

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 = 200



	Yes, I receive info or contact from the team	Yes, but have not received info or advice	Maybe, not sure	No
2020	87%	6%	2%	5%

Key results by Region and Size of Total Farm Area

	Central QLD (n=21)	Darling Downs (n=39)	Macintyre Balonne (n=19)	Northern NSW (n=58)	Macquarie (n=9)	Southern NSW (n=48)	Small (n=71)	Medium (n=96)	Large (n=32)
Yes, I receive info or contact from the team	81%	77%	95%	86%	89%	81%	75%	90%	84%
Yes, but have not received info or advice	5%	15%	0%	3%	0%	10%	11%	5%	6%
Maybe, not sure	0%	0%	0%	2%	11%	2%	1%	1%	3%
No	14%	8%	5%	9%	0%	6%	13%	4%	6%

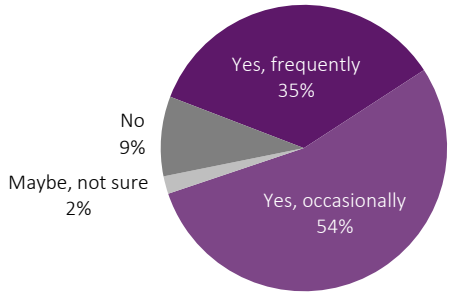
Source information from CottonInfo

Growers were asked to provide an assessment of the frequency with which they sourced information from CottonInfo. Results show that:

- Just over one in three (35%) reported they accessed these resources 'frequently'. This result was up slightly up from 27% in 2020.
- A further 54% reported accessing these resources occasionally (down from 59% in 2020).

The results indicate that farms of all sizes were accessing resources. This is a change from 2020 and suggests more consistent, frequent contact across the industry. That said, results do vary across regions with some clearly more engaged than others (Northern NSW 47% frequent contact compared to 26% in Macintyre-Balonne).

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 = 200



	Yes, frequently	Yes, occasionally	Maybe, not sure	No
2020	27%	59%	4%	10%

Key results by Region and Size of Total Farm Area

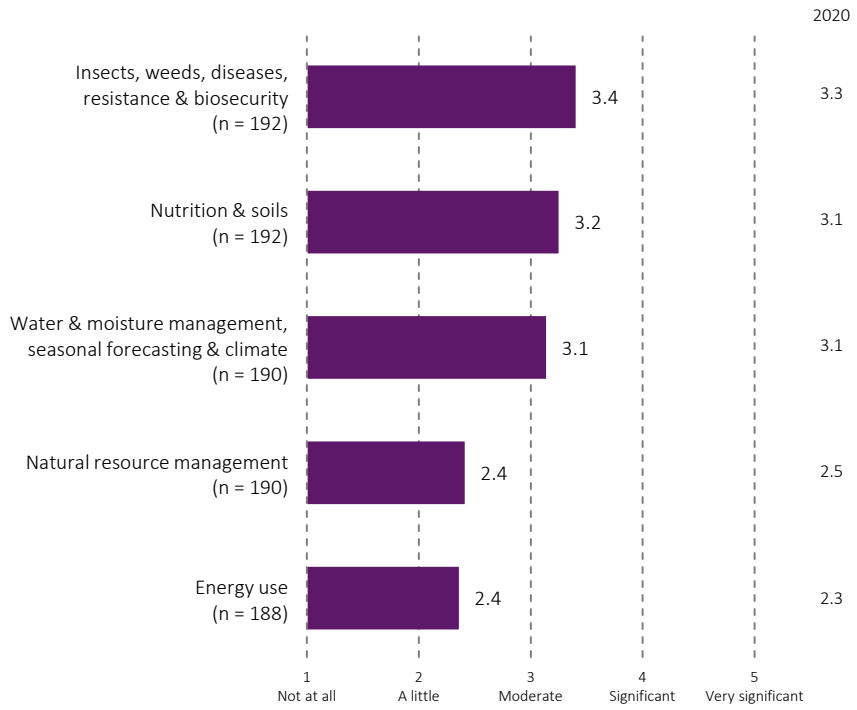
	Central QLD (n=21)	Darling Downs (n=39)	Macintyre Balonne (n=19)	Northern NSW (n=58)	Macquarie (n=9)	Southern NSW (n=48)	Small (n=71)	Medium (n=96)	Large (n=32)
Yes, frequently	29%	31%	26%	47%	56%	27%	35%	35%	34%
Yes, occasionally	67%	62%	68%	40%	44%	58%	51%	58%	47%
Maybe, not sure	0%	3%	0%	2%	0%	4%	1%	3%	0%
No	5%	5%	5%	12%	0%	10%	13%	3%	19%

Assists on improving practices on-farm

Growers were asked to provide an assessment of the resources and information CottonInfo provides in improving on-farm practices. The results show that:

- A positive assessment of the improvement achieved by the resources provided in three key areas:
  - insects, weeds, diseases, resistance & biosecurity;
  - nutrition & soils; and
  - water & moisture management, seasonal forecasting & climate; and
- There were slightly lower ratings on the improvements offered of the resources relating to NRM and energy use. These results are consistent with those reported in 2020.

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



Key results by Region and Size of Total Farm Area

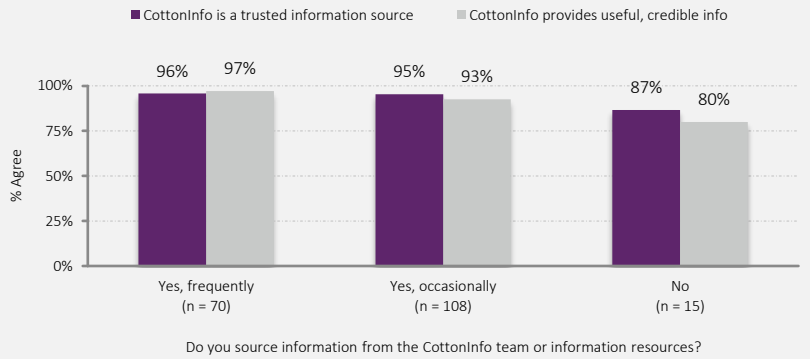
	Central QLD (n=21)	Darling Downs (n=38)	Macintyre Balonne (n=18)	Northern NSW (n=55)	Macquarie (n=9)	Southern NSW (n=46)	Small (n=69)	Medium (n=95)	Large (n=27)
Insects, weeds, diseases, resistance & biosecurity	3.2	3.4	3.3	3.4	4.1	3.4	3.3	3.5	3.3
	(n=21)	(n=38)	(n=18)	(n=55)	(n=9)	(n=46)	(n=69)	(n=95)	(n=27)
Nutrition & soils	3.3	3.2	3.3	3.2	3.9	3.2	3.1	3.3	3.3
	(n=21)	(n=39)	(n=18)	(n=53)	(n=9)	(n=45)	(n=68)	(n=94)	(n=27)
Water & moisture management, seasonal forecasting & climate	2.9	3.1	3.4	3.3	3.7	2.9	2.9	3.2	3.4
	(n=21)	(n=36)	(n=19)	(n=53)	(n=9)	(n=47)	(n=69)	(n=94)	(n=26)
Natural resource management	2.3	2.5	2.7	2.5	2.2	2.2	2.4	2.4	2.5
	(n=21)	(n=37)	(n=18)	(n=54)	(n=9)	(n=45)	(n=69)	(n=93)	(n=25)
Energy use	2.3	2.4	2.5	2.3	2.4	2.3	2.3	2.3	2.5

Sentiment about CottonInfo

Growers were asked for a qualitative assessment of CottonInfo and the resources provided to cotton growers. The feedback from the 2022 Grower Survey shows that growers overwhelmingly agree that CottonInfo:

- Is a trusted information source (94% agree); and
- Provides useful, credible information (93% agree).

Pleasingly, the results are even stronger among the cohort who frequently access CottonInfo resources.

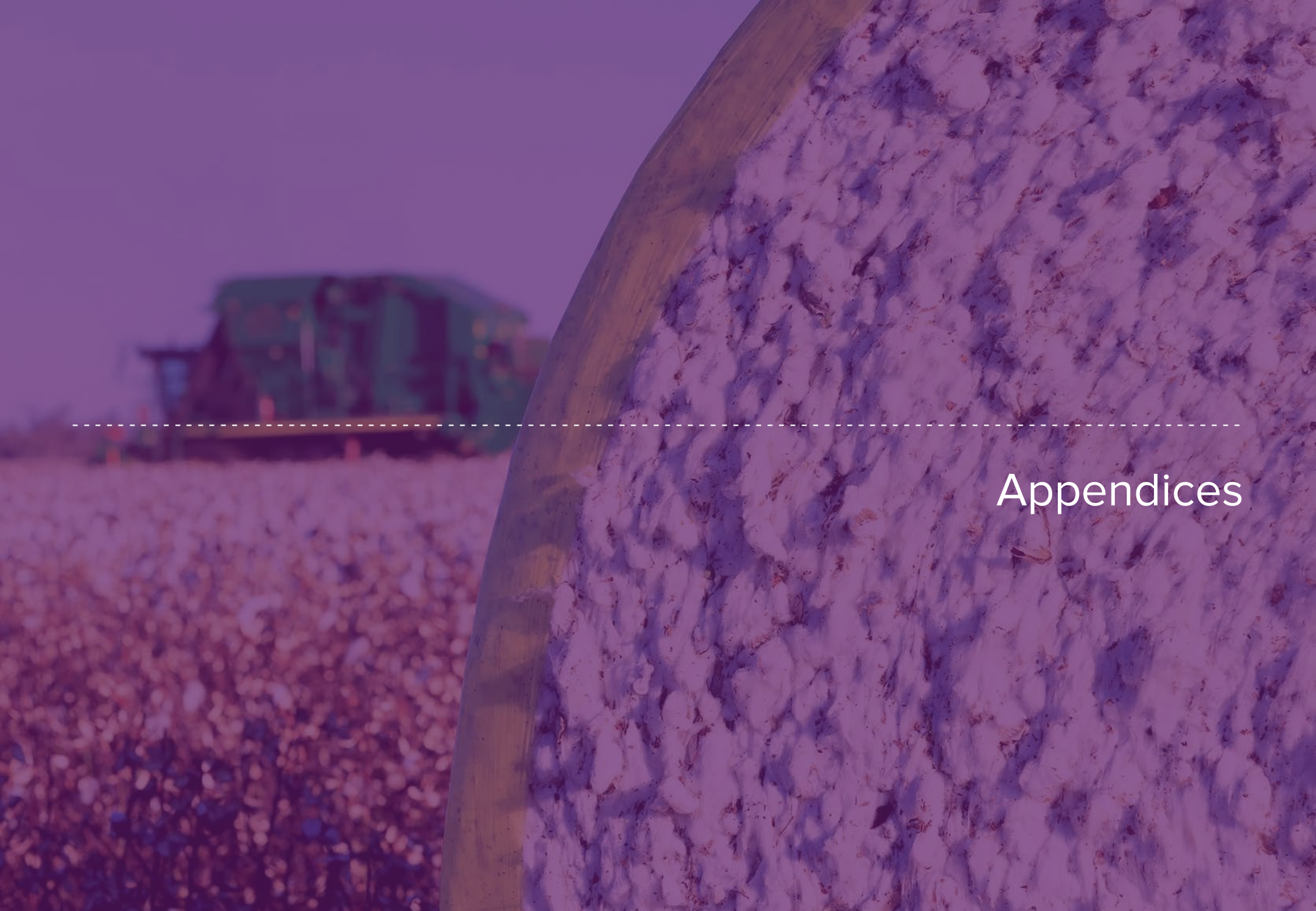


Thinking about CottonInfo, do you agree or disagree that…
Base: All growers (excluding "N/A" answers); n varies

Key results by Region and Size of Total Farm Area (% agree)

	Central QLD (n=21)	Darling Downs (n=38)	Macintyre Balonne (n=19)	Northern NSW (n=57)	Macquarie (n=9)	Southern NSW (n=47)	Small (n=68)	Medium (n=96)	Large (n=31)
CottonInfo is a trusted info source	90%	89%	95%	96%	100%	96%	93%	95%	97%

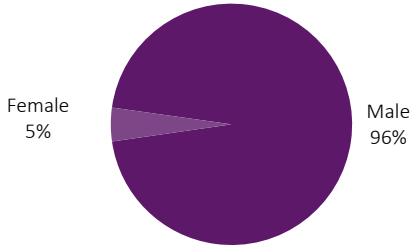
	Central QLD (n=21)	Darling Downs (n=39)	Macintyre Balonne (n=19)	Northern NSW (n=57)	Macquarie (n=9)	Southern NSW (n=47)	Small (n=69)	Medium (n=96)	Large (n=31)
CottonInfo provides useful, credible info	81%	87%	89%	98%	100%	96%	93%	92%	97%



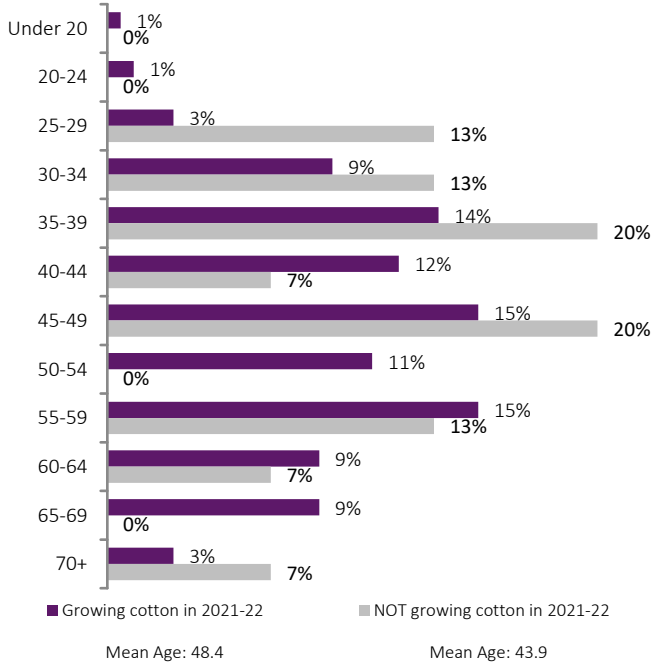
Appendices

Gender, age, region and description of farming business

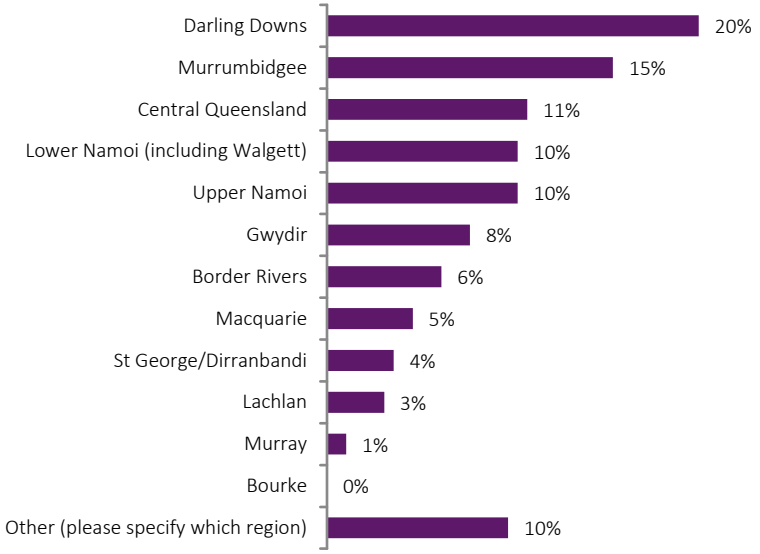
Which gender do you identify with?
Base: All growers; n = 200



Which age category do you belong to?
Base: All growers; n = 200



In which region are you located?
Base: All growers; n = 200

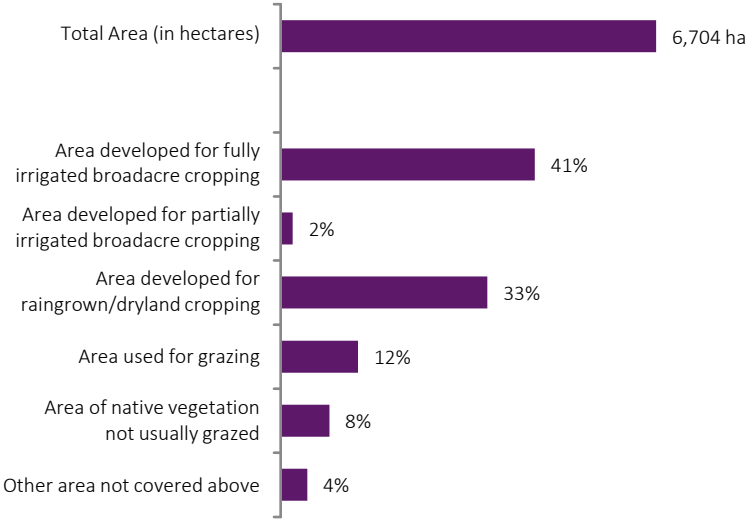


How would you describe your farming business?
Base: All growers; n = 200

Historical data of land area/distribution

What is the total area of your farm (in hectares), and of the total area of your farm, what is the area attributed to the following?

Base: All growers (excluding one outlier*); n = 197 (n = 2 could not provide an answer)



	2021 Results	2020 Results	2019 Results	2018 Results	2017 Results
Total Area (in hectares)	7,008 ha	3,510 ha	4,404 ha	5,674 ha	8,020 ha
Area developed for fully irrigated broadacre cropping	37%	43%	40%	41%	39%
Area developed for partially irrigated broadacre cropping	2%	2%	2%	3%	3%
Area developed for raingrown/dryland cropping	36%	34%	34%	32%	33%
Area used for grazing	18%	16%	16%	17%	19%
Area of native vegetation not usually grazed	3%	4%	3%	4%	6%
Other area not covered above	3%	3%	4%	3%	n/a

* One outlier was removed from this analysis for having a significantly different farm size to the rest of the respondent base (730,000, next highest reported figures were 117,000, 100,000, 60,000).

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, p̂ 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											
Survey Estimate	30	50	75	100	150	200 (# surveys completed)	250	300	500	1,000	1,500	2,000
10%	n/a	n/a	n/a	± 5.88%	± 4.80%	**± 4.16%**	± 3.72%	± 3.39%	± 2.63%	± 1.86%	± 1.52%	± 1.31%
20%	n/a	± 11.09%	± 9.05%	± 7.84%	± 6.40%	**± 5.54%**	± 4.96%	± 4.53%	± 3.51%	± 2.48%	± 2.02%	± 1.75%
30%	n/a	± 12.70%	± 10.37%	± 8.98%	± 7.33%	**± 6.35%**	± 5.68%	± 5.19%	± 4.02%	± 2.84%	± 2.32%	± 2.01%
40%	± 17.53%	± 13.58%	± 11.09%	± 9.60%	± 7.84%	**± 6.79%**	± 6.07%	± 5.54%	± 4.29%	± 3.04%	± 2.48%	± 2.15%
50%	± 17.89%	± 13.86%	± 11.32%	± 9.80%	± 8.00%	**± 6.93%**	± 6.20%	± 5.66%	± 4.38%	± 3.10%	± 2.53%	± 2.19%
60%	± 17.53%	± 13.58%	± 11.09%	± 9.60%	± 7.84%	**± 6.79%**	± 6.07%	± 5.54%	± 4.29%	± 3.04%	± 2.48%	± 2.15%
70%	n/a	± 12.70%	± 10.37%	± 8.98%	± 7.33%	**± 6.35%**	± 5.68%	± 5.19%	± 4.02%	± 2.84%	± 2.32%	± 2.01%
80%	n/a	± 11.09%	± 9.05%	± 7.84%	± 6.40%	**± 5.54%**	± 4.96%	± 4.53%	± 3.51%	± 2.48%	± 2.02%	± 1.75%
90%	n/a	n/a	n/a	± 5.88%	± 4.80%	**± 4.16%**	± 3.72%	± 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 (np̂ < 10 or n(1-p̂) < 10).

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 2022 Grower Survey was conducted using a CATI (Computer Assisted Telephone Interviewing) data collection methodology. This included:

- Growers being contacted and invited to complete the survey over the phone;
- Where this was not possible immediately, an interview appointment time was agreed and the interview completed at the agreed time.

Sample

In total, a sample of n = 889 unique growers was provided by CRDC, with n = 200 surveys completed (completion rate of 22.5%). A breakdown of the number of surveys completed by Region is located below.

Region	Sample Size	Completed Surveys
Overall	**889**	**200**
Central Queensland	65	21
Darling Downs	159	39
Macintyre – Balonne	102	19

Region	Sample Size	Completed Surveys
Northern NSW	321	58
Macquarie	76	9
Southern NSW	133	48
Other	33	6

Questionnaire

Growers were asked to complete a 33 minute survey which covered a range of topics related to their cotton growing experience both on and off-farm.
Key areas of interest included:

- Farm profiles
- 2021-22 cotton crop
- Water
- Crop and soil management
- Environmental management
- On-farm workforce profile
- Landcare
- CRDC
- CottonInfo

Timing

The survey was launched on 8 June 2022 and remained open until 23 June 2022.

Want more information?

Contact CRDC

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Cotton Research and Development Corporation
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Contact Intuitive Solutions

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Director
Intuitive Solutions
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