Ag Excellence Alliance

De-risking seeding program – Adoption of key management practices for the success of dry and early sown crops

Baseline Survey Report

4-IMX2CLR
May 2024

Australian Government
Department of Agriculture, Fisheries and Forestry

Future Drought Fund

AgExcellence ALLIANCE

This project received funding from the Australian Government's Future Drought Fund

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Baseline Survey Report

Summary of key findings

- *The majority of farmers, (86%) will sow into dry soils, with just over half feeling like they were confident in doing so.*
- *28% of respondents would sow between 81 and 100% of their programs.*
- *45% of respondents said that the main driver for the decision to dry seed is to fit it in the seeding program.*
- *71% sow to a specific calendar date.*
- *Canola is the main crop to be seeded early and dry, followed by barley and wheat.*
- *Both summer and pre-seeding weed control, is seen as the highest priority in preparation for seeding dry.*
- *The biggest adjustment farmers make when seeding dry is adjusting the seeding depth and seeding rate.*
- *Pre and post emergent herbicides usage was identified as the greatest knowledge gap when seeding dry.*

Survey Aim:

This survey is intended to capture baseline information about producers' knowledge, understanding and adoption of dry seeding with the intention of de-risking the seeding program.

The survey investigates what are the main drivers for their decisions to sow early or dry, and to identify where the knowledge gaps exist.

The survey was conducted voluntarily and mostly online, by farmers across the 14 farming systems groups involved with the project across southern Australia. The survey was open from November 2023 to April 2024 and there was a total of 200 respondents.

This project is funded through the Future Drought Fund - Extension and Adoption of Drought Resilience Farming Practices grant.

Respondent Overview:

Questions 1 to 4 were relating to the demographic of respondents.

Respondents were from a across the project area with some areas having a greater representation than others, and some respondents answered only some of the key questions.

Figure 1: Location of 14 Farming Systems Groups involved with the project.

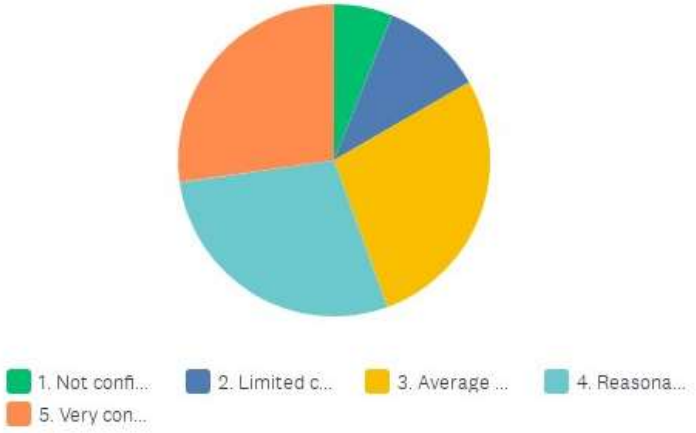
94.5% (189) Survey respondents were primary producers, the other 5.5% or respondents were consultants, agronomists, researchers, and extension officers.

48% or respondents described their farming operation as cropping only and the other 52% were mixed cropping and livestock.

2.5% (5) respondents were irrigators and the remaining 97.5% (195) of respondents were dryland croppers.

Survey Results:

Question 5: How confident are you with seeding into dry soils?



		% of respondents	No. of respondents
1.	Not confident at all	6.1%	12
2.	Limited confidence	10.5%	21
3.	Average confidence	27.8%	55
4.	Reasonably confident	28.3%	56
5.	Very Confident	27.3%	54
	TOTAL	100%	198

Question 6: Do you sow into dry soils?

	% of respondents	No. of respondents
Yes	86.08%	167
No	13.92%	27
TOTAL	100%	194

Question 7: If you answered no in question 6, what stops you from making the decision to sow into dry soils?

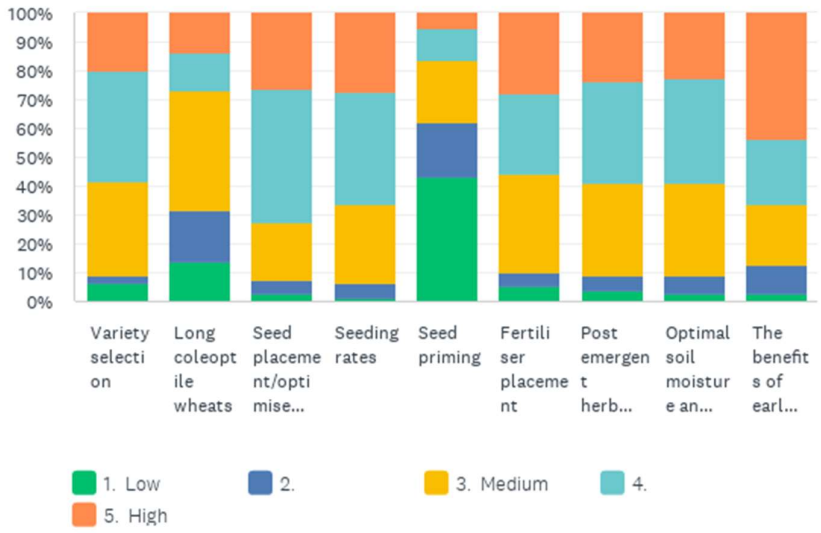
"Date, variable and sub soil moisture."
"Chemical efficacy. Increasing non wetting sand. Making vulnerable areas that have little soil cover worse."
"Risk."
"Non-wetting (soils), and my father."
"Risk, our rain crystal ball is only slightly better that BOM's, (our crystal ball is better than the BOM's because we can assess on experience of local patterns but given the really strange patterns of the last few years, that's getting less accurate too)."
"Weed seed bank and weather forecaster."

Question 8: If you answered yes in question 6, what percentage of your program would you be willing to sow dry?

	% of respondents	No. of respondents
0 to 20%	6.7%	5
21 to 40%	22.7%	17
41 to 60%	21.3%	16
61 to 80%	21.3%	16
81 to 100%	28%	21
TOTAL	100%	75

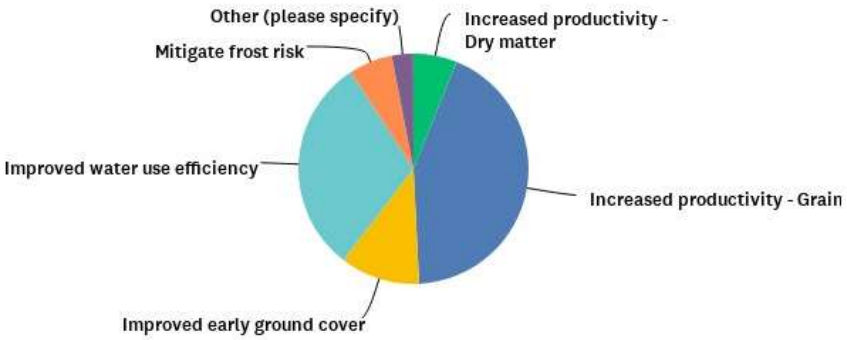
"Just start and keep going til we finish."
"50% if we had to but have been lucky enough with breaks and soil moisture last few years has been a much smaller percentage."
"100% but would change crop plan if dry was persisting ie hold off on canola if it looked like no rain coming".
"If paddocks are weed free, 100%."
"50% so we don't get caught out. The rains always come."
"25% dependant on forecast and commodity price."
"Depends on the season. 100% if we have to."
"Fitting in the seeding program."
"If I were, (dry seeding) I would put our canola program and lupins."
"Up to 100% if the rain hasn't come."
"Depends on rain. Start canola Mid/late April. It can be relaxing because you're not chasing moisture."
"I start on Anzac day and get as much as I can done. Will depend on the season. Average 50%"
"Depends on the season. Start at a specific time regardless."
"Average 33%. Have a set time on when I start to seed, and will depend on when it starts raining."

Question 9: What is your level of understanding of the following topics for dry seeding?



	1. Low % (No)	2. % (No)	3.Med % (No)	4. % (No)	5. High % (No)
Variety Selection	6.4 (5)	2.5 (2)	33 (26)	37.9 (30)	20.2 (16)
Long Coleoptile Wheats	13.9 (11)	17.7 (14)	41.8 (33)	12.7 (10)	13.9 (11)
Seed placement/optimised sowing depth	2.5 (2)	5 (4)	20 (16)	46.3 (37)	26.2 (21)
Seeding rate	1.2 (1)	5 (4)	27.6 (22)	38.6 (31)	27.6 (22)
Seed priming	43 (34)	19 (15)	21.5 (17)	11.4 (9)	5.1 (4)
Fertiliser placement	5.1 (4)	5.1 (4)	34.2 (27)	27.8 (22)	27.8 (22)
Post emergent herbicide selection and/or timing	3.8 (3)	5 (4)	32.5 (26)	35 (28)	23.8 (19)
Optimal soil moisture and nutrient levels	2.5 (2)	6.2 (5)	32.5 (26)	36.2 (29)	22.6 (18)
The benefits of early ground cover	2.5 (2)	10 (8)	21.2 (17)	22.5 (18)	43.8 (35)

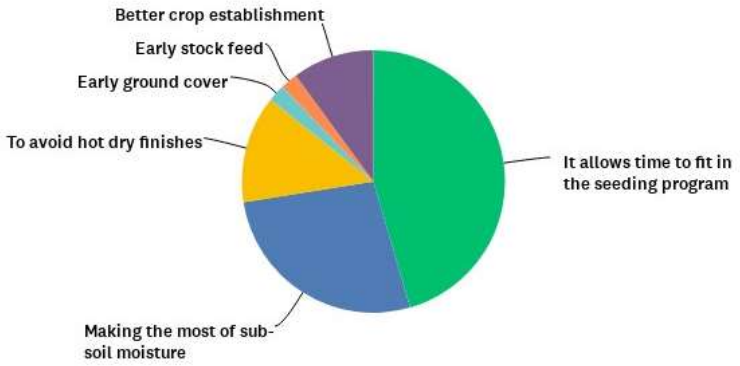
Question 10: What is most important to you when considering the success of dry seeding?



	% of respondents	No. of respondents
Increased productivity – dry matter	6.1%	12
Increased productivity – grains	43.1%	85
Improved early ground cover	11.2%	22
Improved water use efficiency	30.5%	60
Mitigate frost risk	6.1%	12
Other	3%	6
TOTAL	100%	197

Other responses:
"Seed placement and sowing depth."
"Decreased waterlogging risk."
"Timing of sowing for the whole program."
"Getting the crop established; water use efficiency, frost, logistics, unpredictable season break."

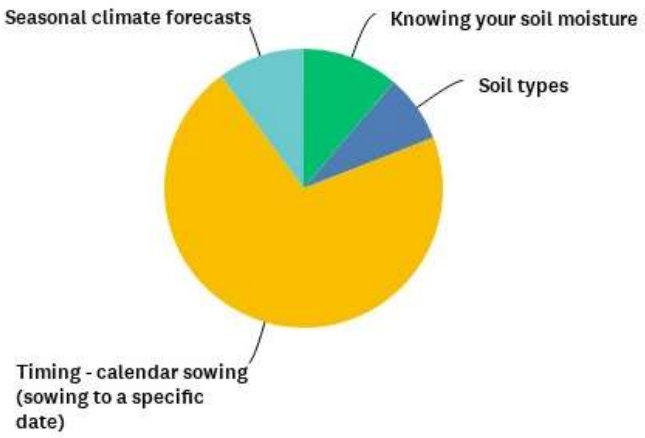
Question 11: What is your main driver for you decision to dry seed?



	% of respondents	No. of respondents
It allows time to fit in the seeding program	45.5%	86
Making the most of sub-soil moisture	27%	51
To avoid hot dry finishes	13.3%	25
Early ground cover	2.1%	4
Early stock feed	2.1%	4
Better crop establishment	10%	19
TOTAL	100%	189

Other comments:
"To get early bulk in lentils."
"All of the above."
"Avoid waterlogging/increase crop competition."
"Risk management."
"Sowing in the correct window for the variety."
"No rain pre sowing."
"Spread risk."
"Finishing date."
"Maximising productivity."
"Try to get all of it done before it gets too wet."

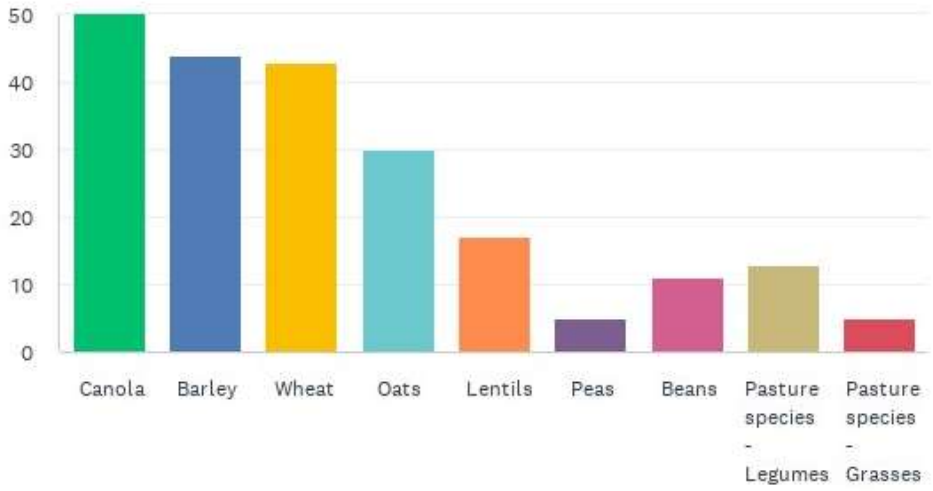
Question 12: What are your triggers for dry seeding?



	% of respondents	No. of respondents
Knowing your soil moisture	11.2%	10
Soil types	7.9%	7
Timing – calendar sowing (sowing to a specific date)	70.8%	63
Seasonal climate forecasts	10.1%	9
TOTAL	100%	89

Other comments:
"Mid to late March."
"Early rains."
"A combination of the top 3." (Soils moisture, soil type and timing).
"Soil type and timing of opening rain. If it's later in May and we haven't had a moisture start we will start dry sowing our loam paddocks so we can get the rest in, in good time."
"All of the above."
"(To) Fit the cropping program in."

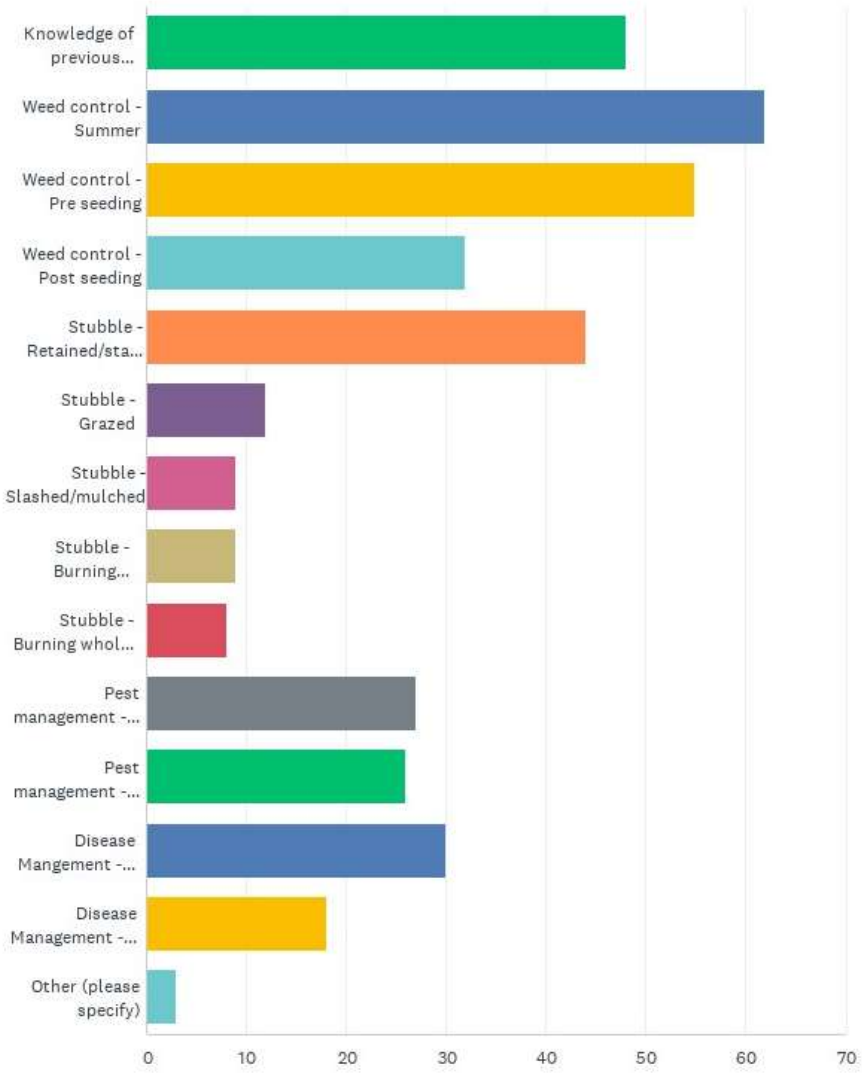
Question 13: What crop types and varieties are more likely to be seeded dry or early?



	% of respondents	No. of respondents
Canola	62.5%	50
Barley	55%	44
Wheat	53.8%	43
Oats	37.5%	30
Lentils	21.3%	17
Peas	6.3%	5
Beans	13.8%	11
Pasture species – legumes	16.3%	13
Pasture species - grasses	6.3%	5
TOTAL	100%	80 (+10)

NB: Lupins weren't given as an option within the survey, but 10 respondents indicated that they were most likely to so lupins early.

Question 14: How do you prepare the paddock for dry or early seeding? (Select all relevant options)



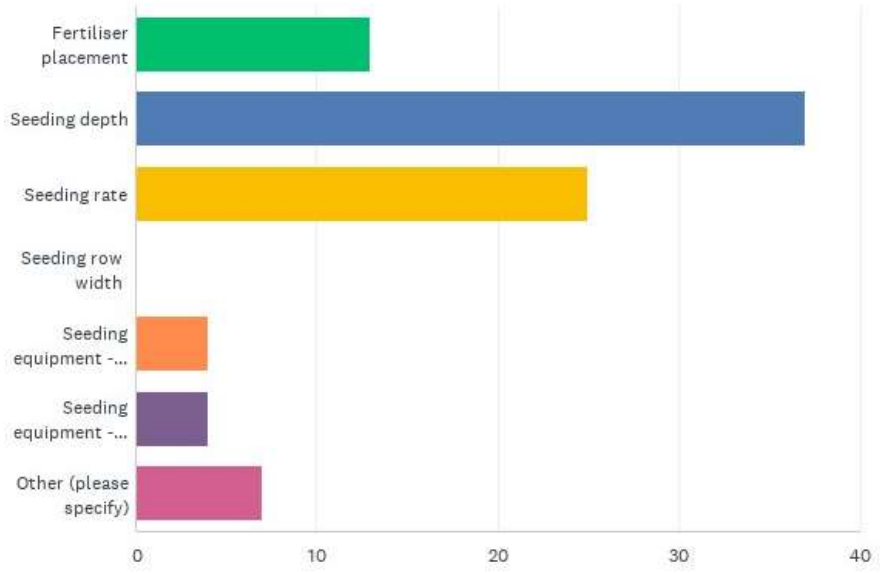
	% of respondents	No. of respondents
Knowledge of previous seasons residual herbicides and plant back	61.5%	48
Weed control – Summer	79.5%	62
Weed control – Pre-seeding	70.5%	55
Weed control – Post seeding	41%	32
Stubble – Retained/standing	56.4%	44
Stubble – Grazed	15.4%	12
Stubble – Slashed/mulched	11.5%	9
Stubble – Burning windrows	11.5%	9
Stubble – Burning whole paddock	10.3%	8
Pest management – Seed treatment	34.6%	27
Pest management – Post seeding/early emergence	33.3%	26
Disease management – Seed treatment	23.1%	30
Disease management – Post seeding/early emergence	3.8%	18
Other	23.1%	3
TOTAL	100%	78 (multiple answers)

Other options:
"Choose clean paddocks first and hope for rain."
"Choose clean paddocks."
"Speed (of) tilling."

Question 15: Do you modify the seeding method when dry seeding?

	% of respondents	No. of respondents
Yes	59%	46
No	41%	52
TOTAL	100%	78

Question 16: If yes, what adjustments do you make?



	% of respondents	No. of respondents
Fertiliser placement	26%	13
Seeding depth	74%	37
Seeding rate	50%	25
Seeding row width		
Seeding equipment – Disc	8%	4
Seeding equipment – Tyne	8%	4
Other	14%	7
TOTAL	100%	50

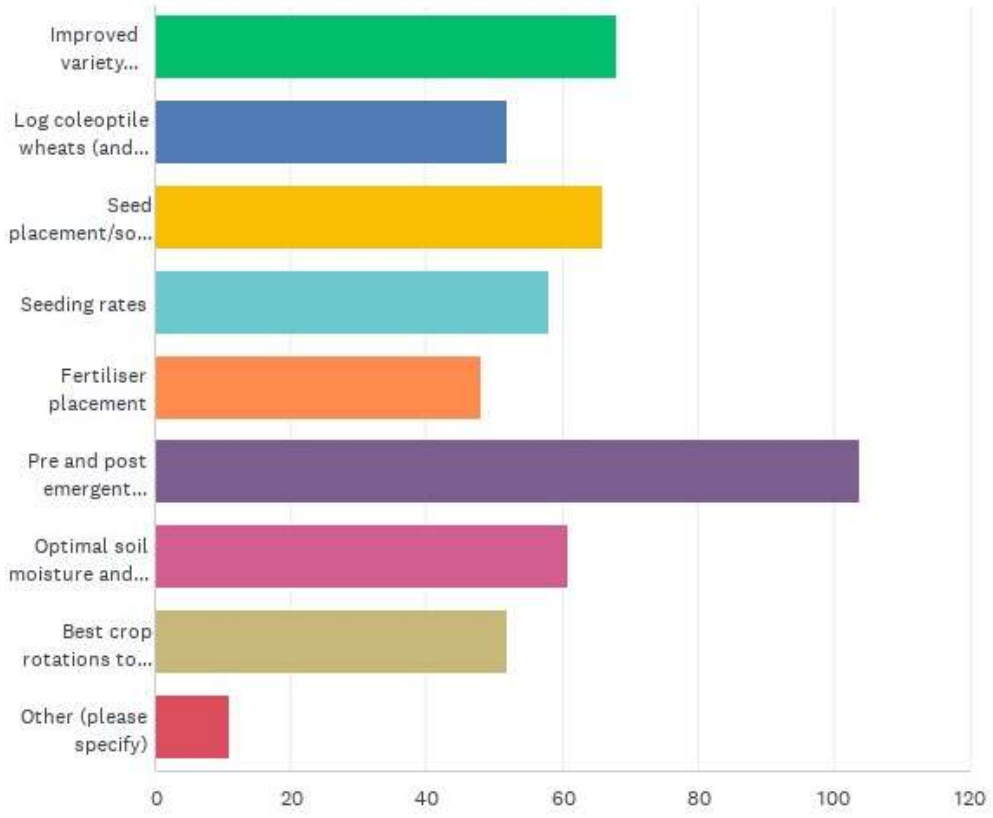
Other comments:
"Pre-emergent product choice."
"Less speed. (There is) more soil throw in dry conditions."
"Canola – use DBS to separate fertiliser placement."
"Chemical package."
"Go slower."
"Use soil wetters".

Question 17: Please discuss how and why you make these adjustments.

"If sowing completely dry with rain coming then sow normal depth. If sowing into a drying profile with no rain coming. We may sow shallow so sowing into completely dry soil. If sowing dry with no rain coming, then sow deep."
"Decrease up front urea."
"Some products need moisture to aid binding- these won't be used dry."
"Increase seeding rate in order to have a buffer in case of a false germination."
"Sow seed closer to moisture."
"Avoid toxicity."
"Less N fertiliser upfront for root burn, always can put it on later. Sow shallower so gets emergence quickly when it rains."
"In case of large germinating rain and to get crop away as quick as possible when it does rain".
"Based on date, soil moisture conditions, seed quality, seeder bar design/capability, all around getting the crop up evenly and with vigour."
"Fertiliser deeper and seed shallow"
"I don't want a small rain event to give a staggered germination."
"If moisture at depth will sow lower. If big rain forecast will sow deeper to give better seed and chemical separation."
"To help with weed competition."
"Plant deet to avoid small amounts of rain."
"Seeding depth reduced. The old boys say it's always good to see a few seeds on top of the ground when dry sowing…If there is heavy rain after dry seeding, it may cause sowing slots to slump and seed will be too deep or it may crust surface, so hence shallower seeding depth is preferable- our equipment isn't precision, so there's a bit at all depths which I feel is a good compromise."
"Try and sow into moisture if it is there. Increase the rate if not sowing into moisture."
"Sow deeper as not to germinate on light rain and run out of moisture. More accurate seed placement and minimal soil disturbance re disc."
"To give best chance of success."
"To get the crop in the ground and preserving as much moisture as possible and not going too deep to cause crusting."
"To minimise soil disturbance and maintain soil moisture."
"To deeper to chase moisture".
"The wetter will hopefully allow an establishment off a small rain."
"To chase moisture, or to protect from deep moisture so it will wait for the rain."
"Deeper sowing based on available soil moisture."
"Seed shallow."
"I want it to be thick."
"Crop germination, seed closer to moisture in dry conditions to allow for quick germination."
"Chase soil moisture."
"Seed shallow to capture early rain."

“Slower seeds.”
“To optimise seed placement – ground is tough (when dry).”
“To allow for a slightly lower germination rate.”
“Optimise germination.”
“Seed deeper when dry.”
“When wet I do not seed as deep, and I reduce seeding rate.”

Question 18: What would you like to know more about dry seeding? (Select all relevant options)



	% of respondents	No. of respondents
Improves variety selection	37.8%	68
Long coleoptile varieties	28.9%	52
Seed placement/sowing depth	36.7%	66
Seeding rates	32.2%	58
Fertiliser placement	26.7%	48
Pre and post emergent herbicide selection and/or timing	57.8%	104
Optimal soil moisture and nutrient levels	33.9%	61
Best crop rotations to prepare a paddock for dry seeding	28.9%	52
Other	6.1%	11
TOTAL		180 (Multiple options selected)

Other options:

"More research on sodic soil management to reduce dispersion and risk from heavy rain post sowing."

"Theres plenty of info on the above - I'd just like a better forecast to make the decision with. Hindsight is usually always focused on what you would do differently with the above points. Accurate forecasting is critical."

"High risk options e.g. Canola."

"Problems with disc sowing."

"Success rates."

"Disc vs Tynes. Moisture and fertiliser."

"Volatilization of urea."

"Different types of seeder set-ups, seed priming."

"Wetters and rates of germinations for canola. Can be tough to germinate."

"How early is too early."

"Done, really feel like I need to know more."

Question 19: Please comment on anything else you would like to share:

"Soil moisture, weed growth, crop variety and time of flowering (frost risk) all impact the decision making."

"Where there is a risk taken, there is reward."

"In my opinion this is a poor survey. There are many triggers for dry seeding which need to be evaluated. This survey doesn't bring them out very well."

"(You) have to pick soil types not all are suitable and some knowledge of weather. Need info like this https://farmweathersa.blogspot.com/"

"Aim to wait for the wet break and don't waste the opportunity to kill early germinating weeds, but if it's getting later in the seeding window it's a good tool to know to manage an earlier germination on a fair portion of your whole country. Short term gains to be made on the right season."

"We lose more crop from too much rain around sowing rather than from dry sowing. Cereals nearly always come up eventually if sown dry, they are very robust."

"Dry sowing is an essential logistical practice for ensuring crops go into the ground in preparation for a timely start to the season. There is often moisture vapour in a well-structured no-till soil which seems completely dry but can still shoot the seed and keep it alive until the autumn break occurs. Be worth reading many of the papers from John Passioura, CSIRO, around the robust results from dry sowing… https://www.publish.csiro.au/cp/fulltext/cp20066"

"One thing to consider is the impact of staggered germination i.e. if there is enough moisture to germinate some but not all the paddocks. How does that impact the rest of the season? Worth also considering teaching people about keeping additional seed varieties for if dry seeding goes pear shaped and they have to spray crop out and resow a shorter season variety."

"The new chemical packages and how they hold up to dry seeding is a knowledge gap."

"Finishing farming this year (retirement) so not future focussed."

"What impacts are there if I sow dry on yield, quality and pest and disease risk. Are there risks I am not considering when I spend money sowing."

"Different machines."

"Must be something better than Maximus (barley)."

"What are the toxic levels of fertilizer down the chute?"

"I am confident in seeding canola dry but would say I am a 3 when it comes to cereals."

"Weed control, cereal disease control, or we need to have very high levels of confidence that rain is coming, and a reasonable soil moisture profile to dry seed - if not we may as well take the money we spend on seed, operations, and fertiliser to the races."

Further information

Further information about the De-risking the seeding program project, and the farming systems groups that are involved, please go to: [De-Risking the Seeding Program – AG Excellence]

Key Contact: Rachel May, rachel@agex.org.au


moisture
dry
seed
sowing
rain
soil
seeding
germination
sow
crop
deeper
deep
depth
fertiliser
ground
season
shallow
risk
canola
impact
germinate
weed
early
completely
crusting
confidence
staggered
worth
timely
robust
optimise
disease
shallower
variety
later
wet
disc
spend
types
toxicity
profile
control
disturbance
tough
forecast
decision
rate
focused
reduce
increase
chemical
considering
conditions
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management
quality
success
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placement
quick
break
seeder
seeds
cereals
urea
wetters
rates