

Agronomy & weeds

Innovative agronomy to smash weeds

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Grassroots Agronomy



WEED
smart
every weed every seed
every farm every year





Take home messages

- Think beyond herbicides – agronomy first
- HWSC comes in many forms – bale, burn, graze, mill or rot
- Weed seed capture in chaff requires attention to detail
- Stack 'big six' for six years – combination of all the tools

Herbicide resistance – diversity needed

- Australia has 50 weed species resistant to 11 modes of action – Chris Preston
- Use non-chemical options to **COMPLEMENT** herbicides
- Harvest weed seed control (HWSC) will control resistant weeds
- **BUT** must combine with the big six stack – drive down seedbanks

Big 6 stack – agronomy & profit

1. Stop seed set
2. HWSC
3. Double knock
4. Mix & rotate
5. Crop competition
6. Pasture phase

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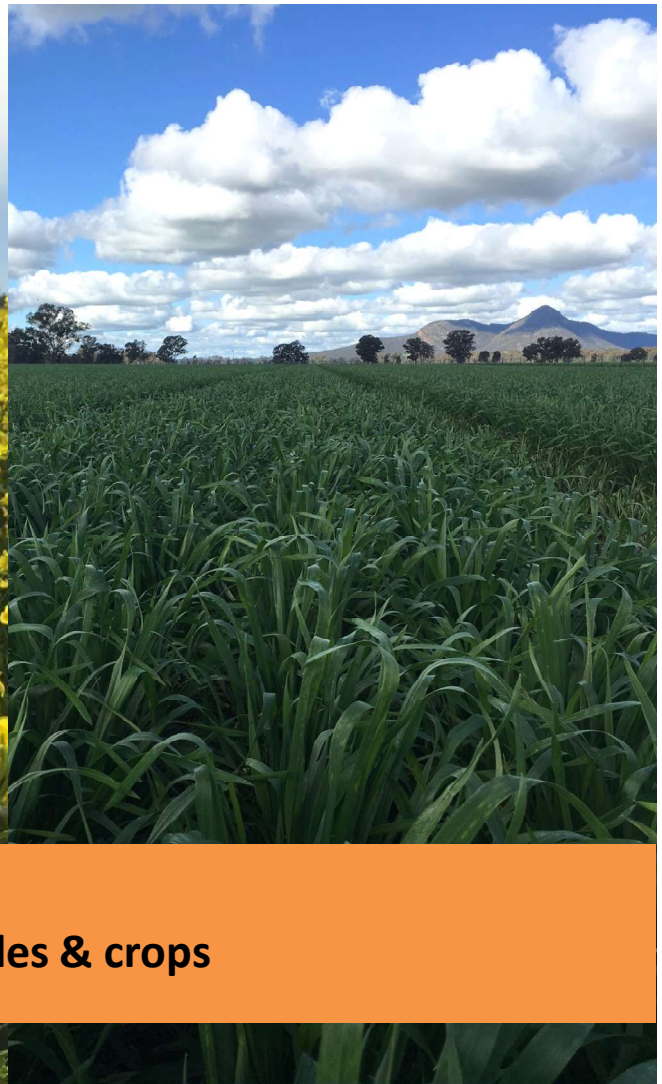
1. Stop seed set – Croptop/hay



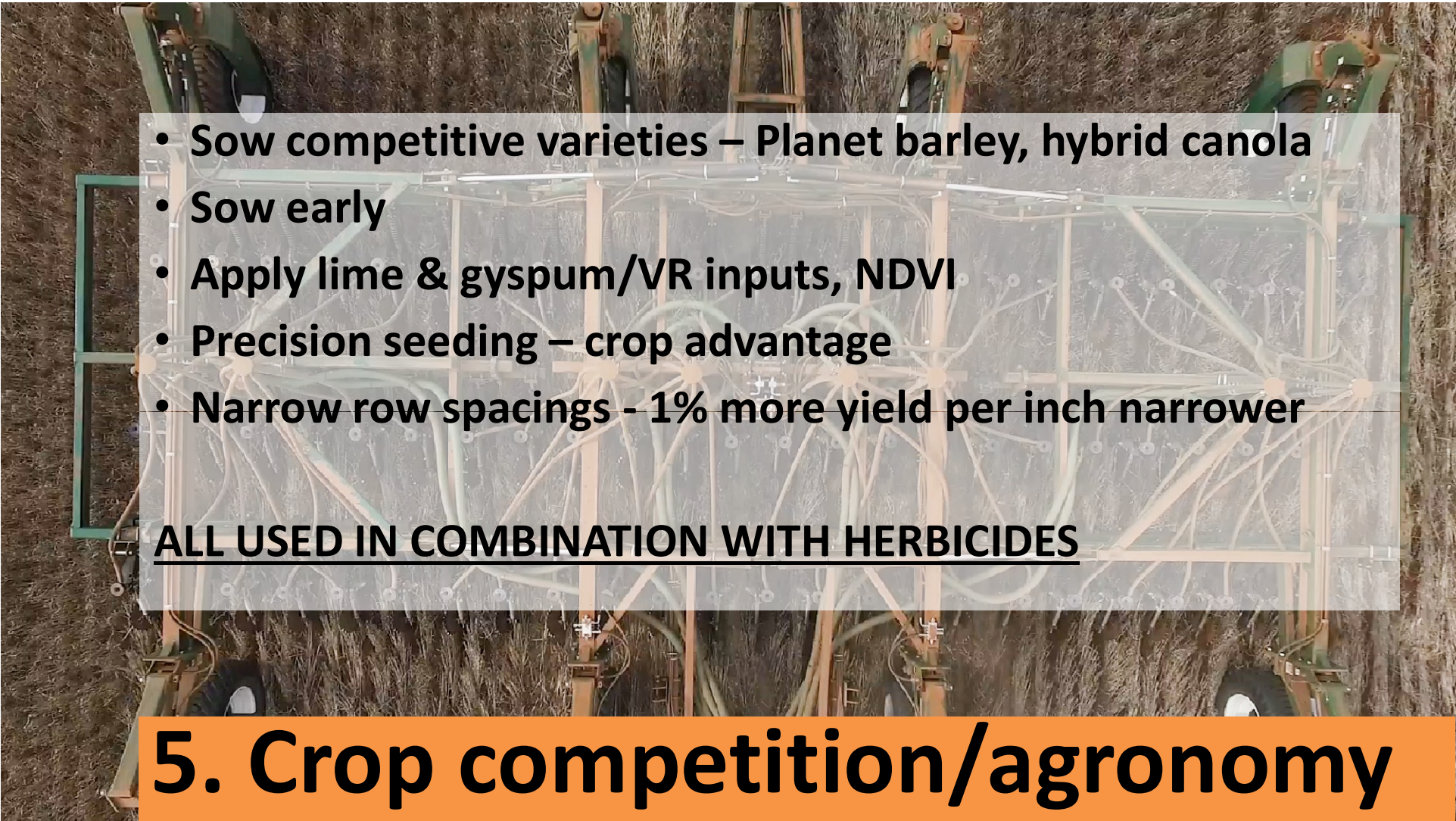
2. Harvest weed seed control



3. Double knock - preserve glyphosate



4. Mix & Rotate - herbicides & crops

- 
- Sow competitive varieties – Planet barley, hybrid canola
 - Sow early
 - Apply lime & gypsum/VR inputs, NDVI
 - Precision seeding – crop advantage
 - Narrow row spacings - 1% more yield per inch narrower

ALL USED IN COMBINATION WITH HERBICIDES

5. Crop competition/agronomy





6. Pasture phase - silage/hay, grazing fallow



HWSC – how does it work?

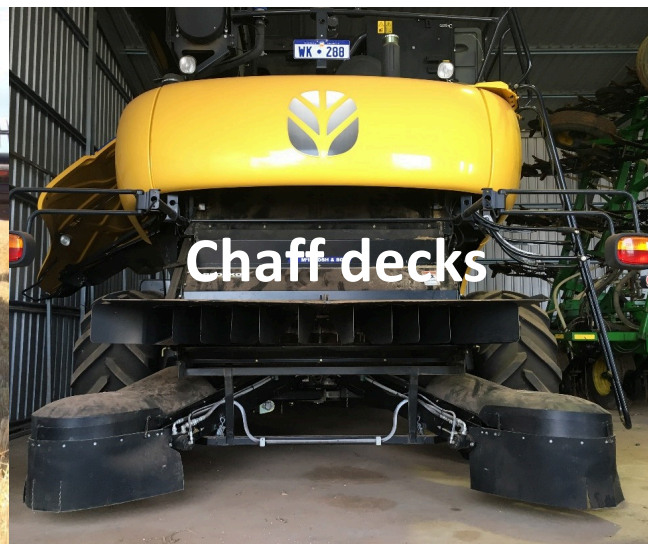
- Seed retention at harvest – collect weed seeds
- Ryegrass, wild radish, brome – retain 77-95% of seeds above 15cm
- Harvest height & crop maturity will influence success
- Consider crop type, row spacing & harvest moisture



Narrow windrow burn



Chaff lining



Chaff decks

HWSC – 6 options



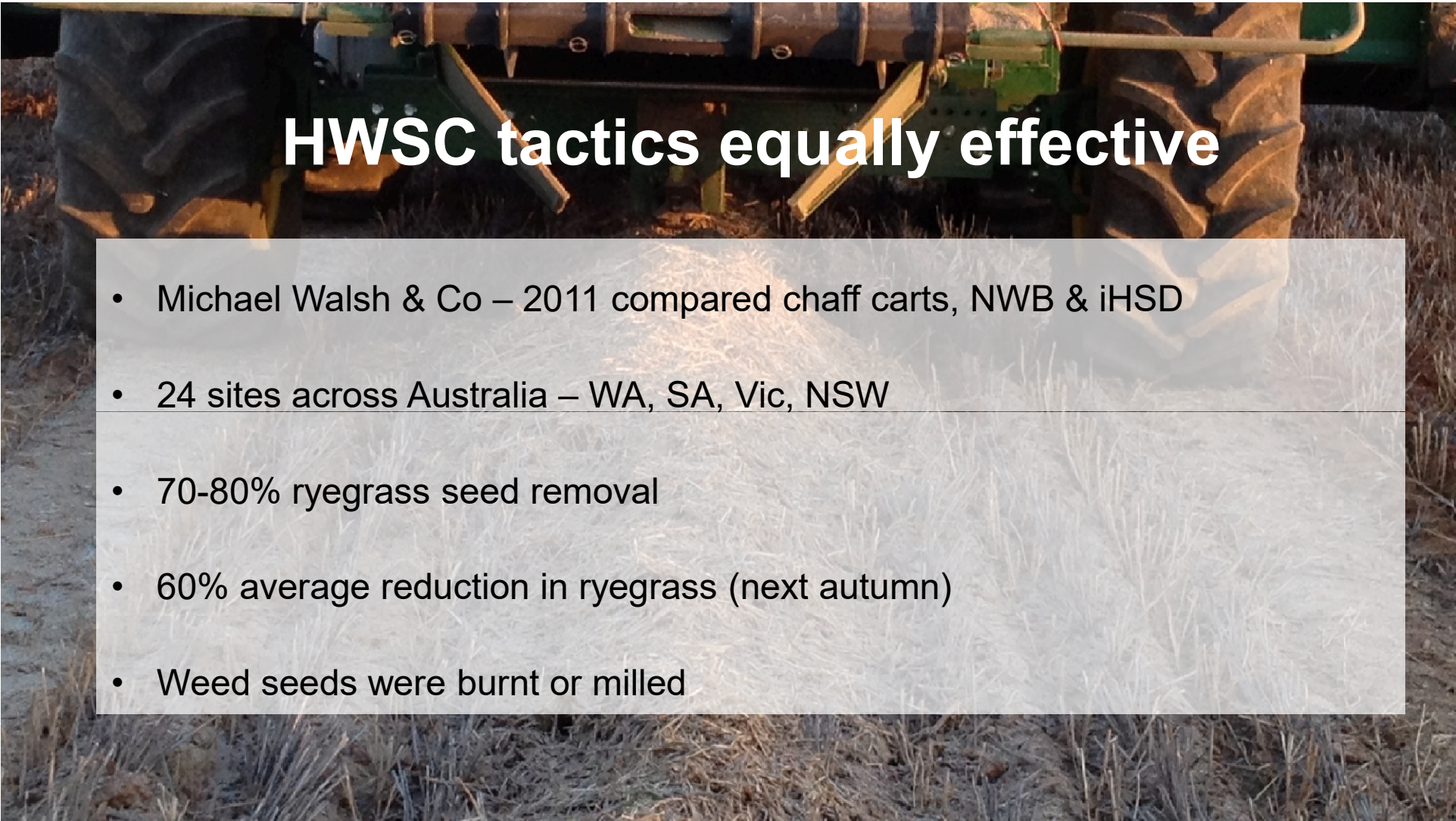
Chaff cart



Bale direct



iHSD & Seed Terminator



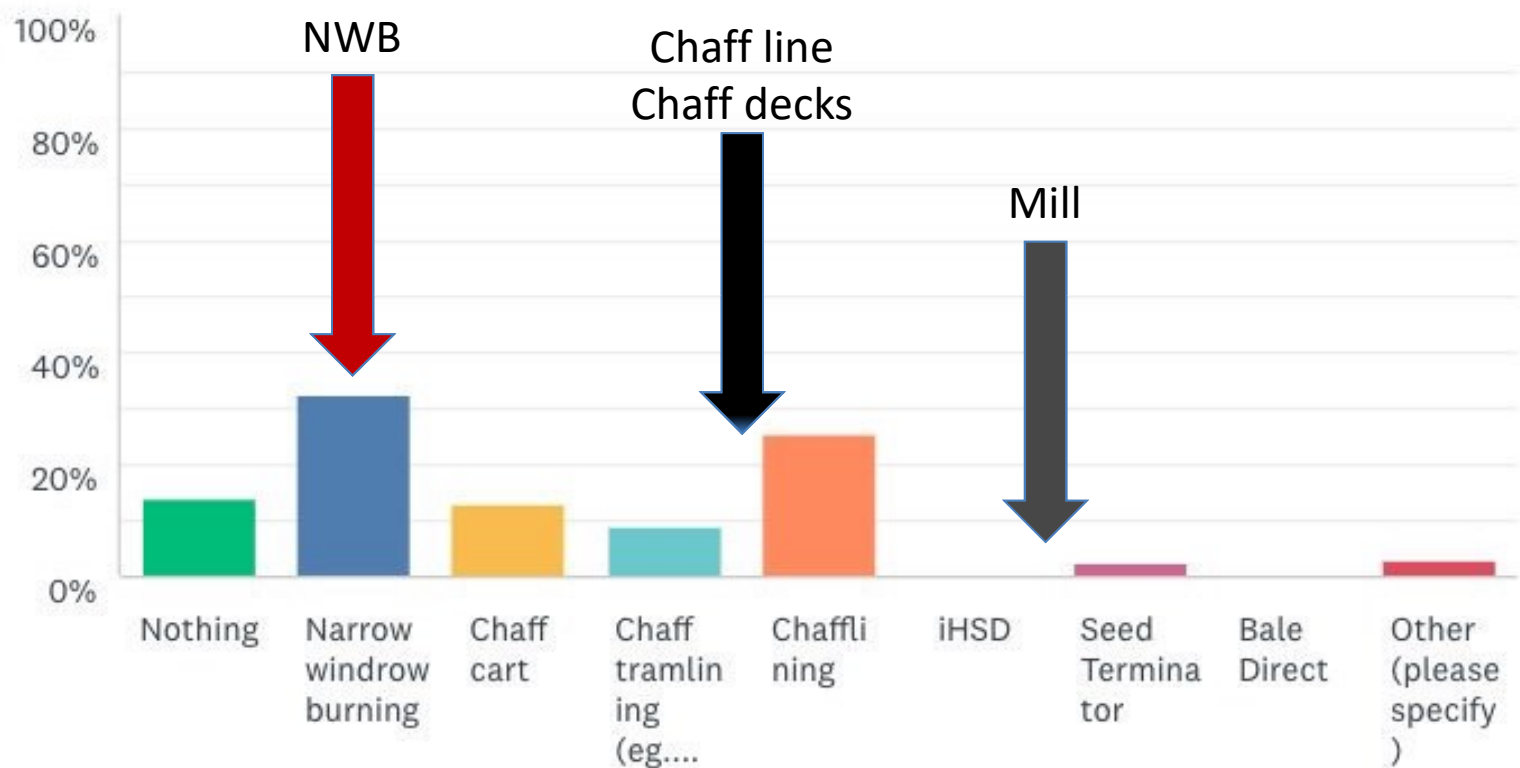
HWSC tactics equally effective

- Michael Walsh & Co – 2011 compared chaff carts, NWB & iHSD
- 24 sites across Australia – WA, SA, Vic, NSW
- 70-80% ryegrass seed removal
- 60% average reduction in ryegrass (next autumn)
- Weed seeds were burnt or milled

HWSC adoption – 270 growers



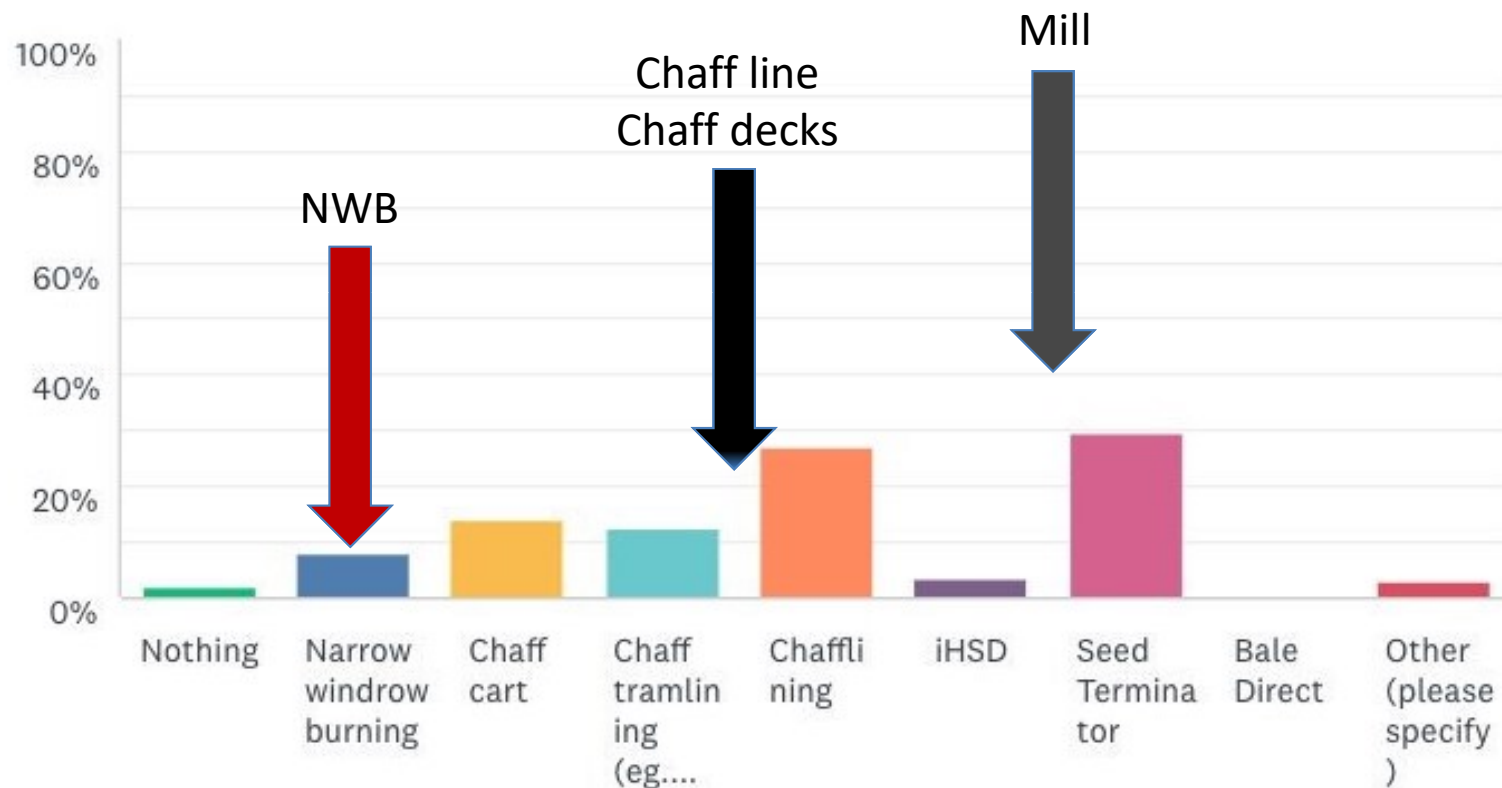
Which HWSC are you using 2017 harvest?



HWSC adoption – 270 growers



Which HWSC option do you plan to use in 3 years time?



Narrow Windrow Burn – \$250

✓ Low cost, easy harvest set up, kills weed seeds

✗ □ Burning escapes, smoke, groundcover/nutrient loss, community issues

Residue removal

- Chaff & straw 40-100%

Best fit

- Low-medium rainfall, isolated areas, canola, pulses

Farming system

- Continuous cropping & mixed farming

Glenvar Bale Direct - \$340,000

✓ Collect weed seeds, no burning, sell bales

✗ ☐ Cost, nutrient removal, market access

Residue removal

- Chaff & straw 40-50%


Best fit

- Medium-high rainfall, access to markets for bales

Farming system

- Continuous cropping & mixed farming





Chaff carts - \$15,000 - \$80,000

- ✓ Feed value for sheep, effective weed seed collection
- ✗ □ Header setup, burning of piles, smoke, community issues

Residue removal

- Chaff only 10-25%

Best fit

- Low-medium rainfall, cereals, pulses, canola

Farming system

- Mixed farming – Ed Riggall data

A combine harvester is shown from a rear-three-quarter view, moving through a field of harvested grain. The machine is red and yellow, with 'OVER' and 'SIZE' visible on its side. A semi-transparent white text box is overlaid on the left side of the image, containing text about chaff lining. The background shows a clear blue sky with some clouds and a distant treeline.

Chaff lining - \$250-\$4500

- ✓ Low cost, no burning, seeds rot, grazing value
- ✗ ☐ Header setup, seeding, mice & insects in chaff rows, no data on rotting

Residue removal

- 15% chaff only

Best fit

- Low, medium & high rainfall, cereals, (pulses, canola)

Farming system

- Continuous cropping & mixed farming (graze chaff lines)



A combine harvester with a chaff deck attachment is shown from a rear perspective, working in a field. The harvester is dark green and black, with a red triangle warning sign on the back. The chaff deck is a large, horizontal, light-colored metal structure at the rear. The field is golden-brown, and the sky is blue with some light clouds.

Chaff decks - \$17,000

- ✓ No burning, seeds rot, suits CTF, no dust on 3m tramlines, Weed lining
- ✗ ☐ Mice & insects in chaff rows, header setup, data on rotting

Residue removal

- 15% chaff only

Best fit

- Low, medium & high rainfall, cereals, (pulses, canola)

Farming system

- CTF Continuous cropping & CTF mixed farmers



CTF Weed lining – dense populations

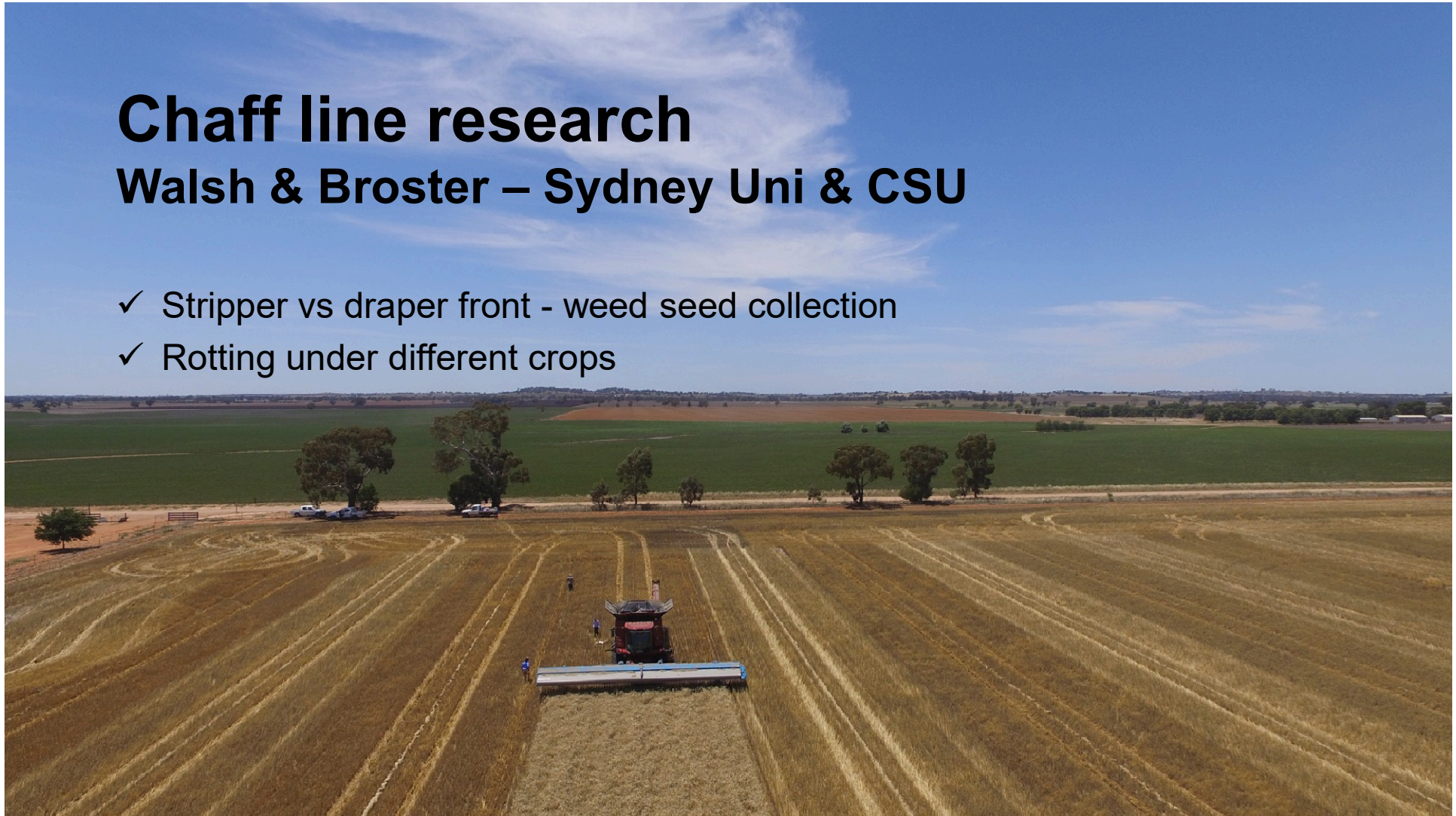
Warwick & Di Holding, Yerong Creek



Chaff line research

Walsh & Broster – Sydney Uni & CSU

- ✓ Stripper vs draper front - weed seed collection
- ✓ Rotting under different crops



Seed Terminator & iHSD - \$100,000-\$160,000

- ✓ No burning, 90-99% weed seeds destroyed, fully proven, Aust. innovation
- ✗ ☐ Cost, still in development stage, header setup

Residue removal

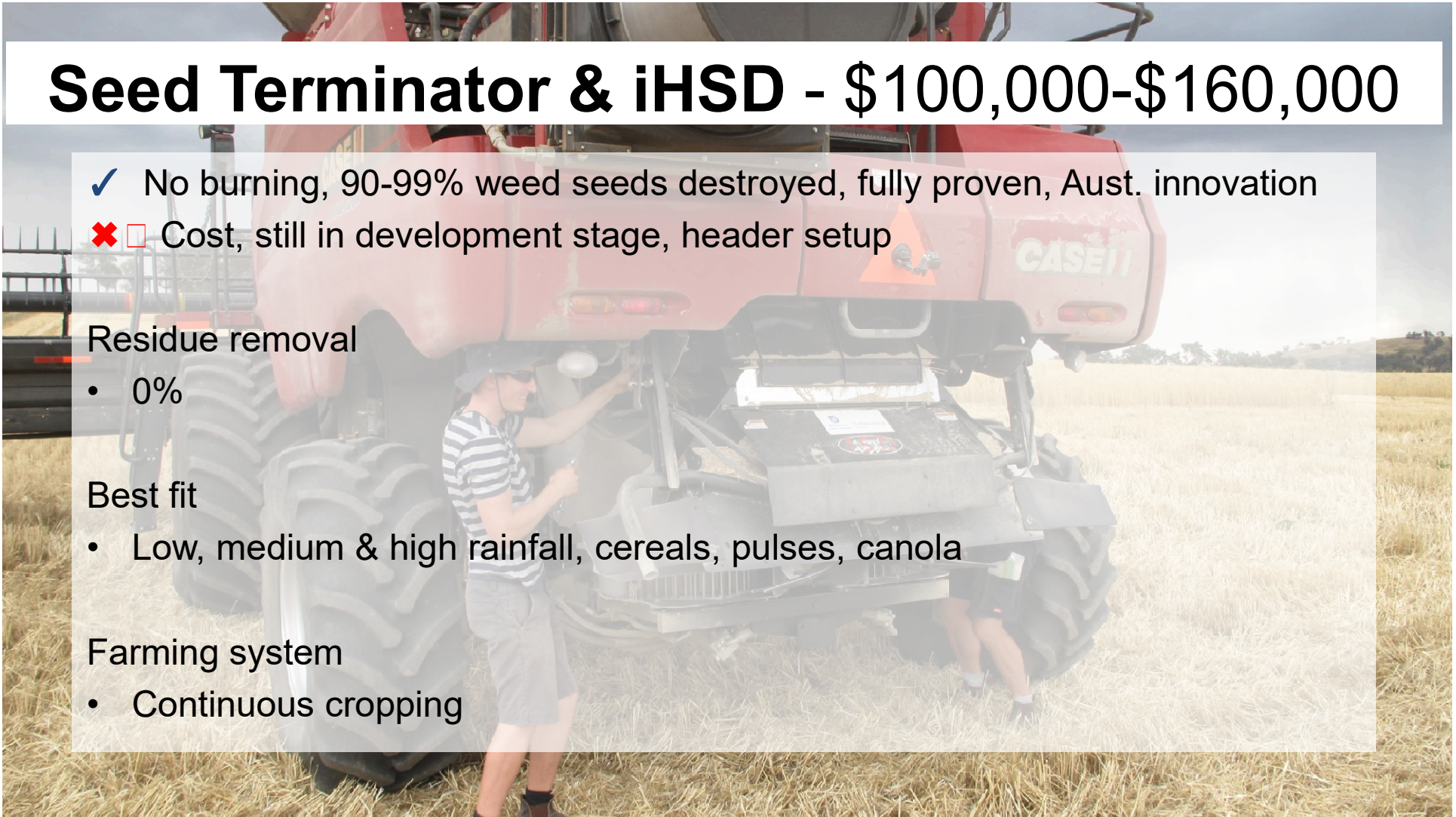
- 0%

Best fit

- Low, medium & high rainfall, cereals, pulses, canola

Farming system

- Continuous cropping



An aerial photograph of a combine harvester operating in a field of mature, golden-brown crops. The harvester is positioned centrally, moving from the top towards the bottom of the frame. A semi-transparent white rectangular box is overlaid on the center of the image, containing text. The harvester's header and grain chute are visible, and the rows of the field are clearly defined on either side.

HWSC challenges

- Low adoption in SE Aust.
- Burning – groundcover & smoke ‘NWB worse than a normal stubble fire’
- Difficult in high yielding crops, wet harvest, green weeds

Slow the header down, cut low

- Ryegrass seed retention & height – John Broster, CSU
- 98% wheat @ 40cm – 88% ryegrass @ 10cm
- YET ↓ row spacing, ↑ crop competition push ryegrass up canopy

Wrap up

- **Rotation & diversity – it all counts**
- **Grower shift away from NWB to chaff lining or chaff decks**
- **Big 6 + herbicides = profit (& smash resistance)**
- **Share your experiences – good & bad**

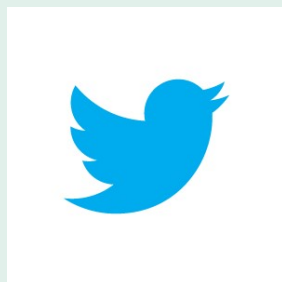
More information:



WeedSmart www.weedsmart.org.au



AHRI Insight www.ahri.edu.au



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