

Cotton and irrigated wheat crop rotations

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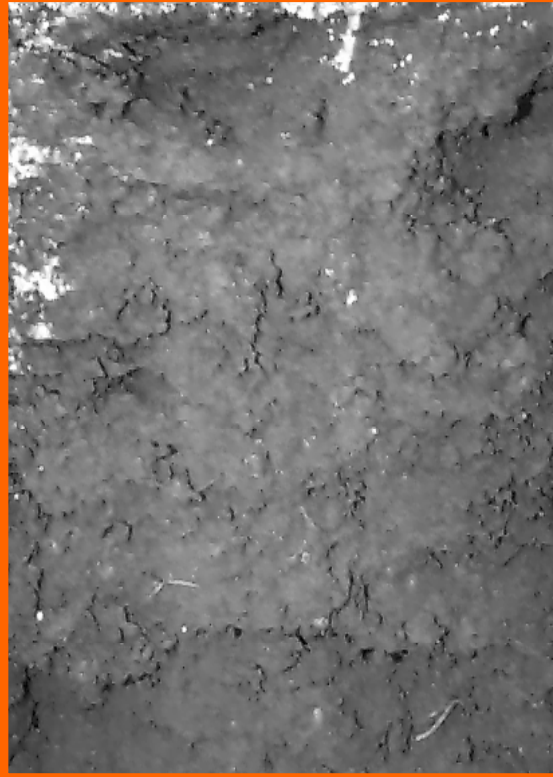


Outline

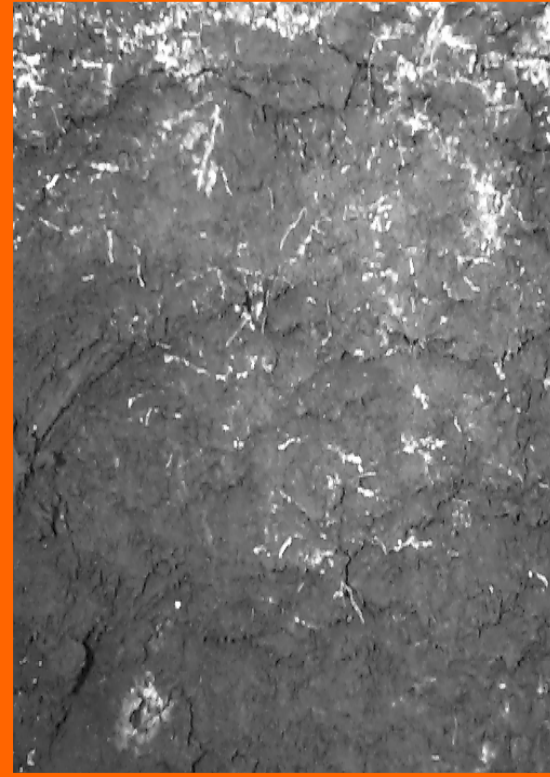
- Synergies between irrigated wheat and cotton production
 - what happens in the soil (vertisols)
- Recommendations 2008

Drive soil productivity

Soil depth
↓



Cotton – Cotton
conventional tillage

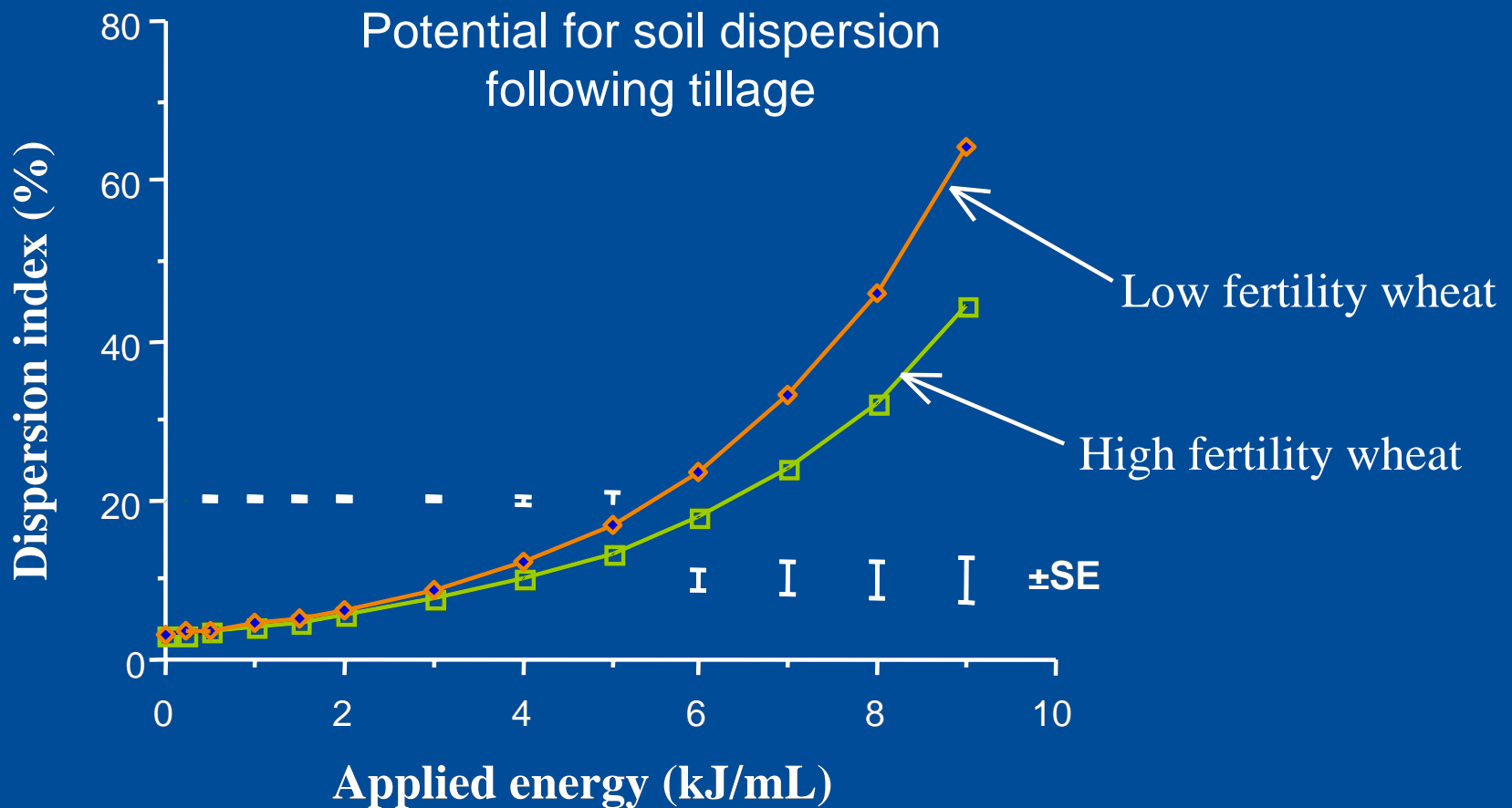


Cotton – Cotton
Permanent beds

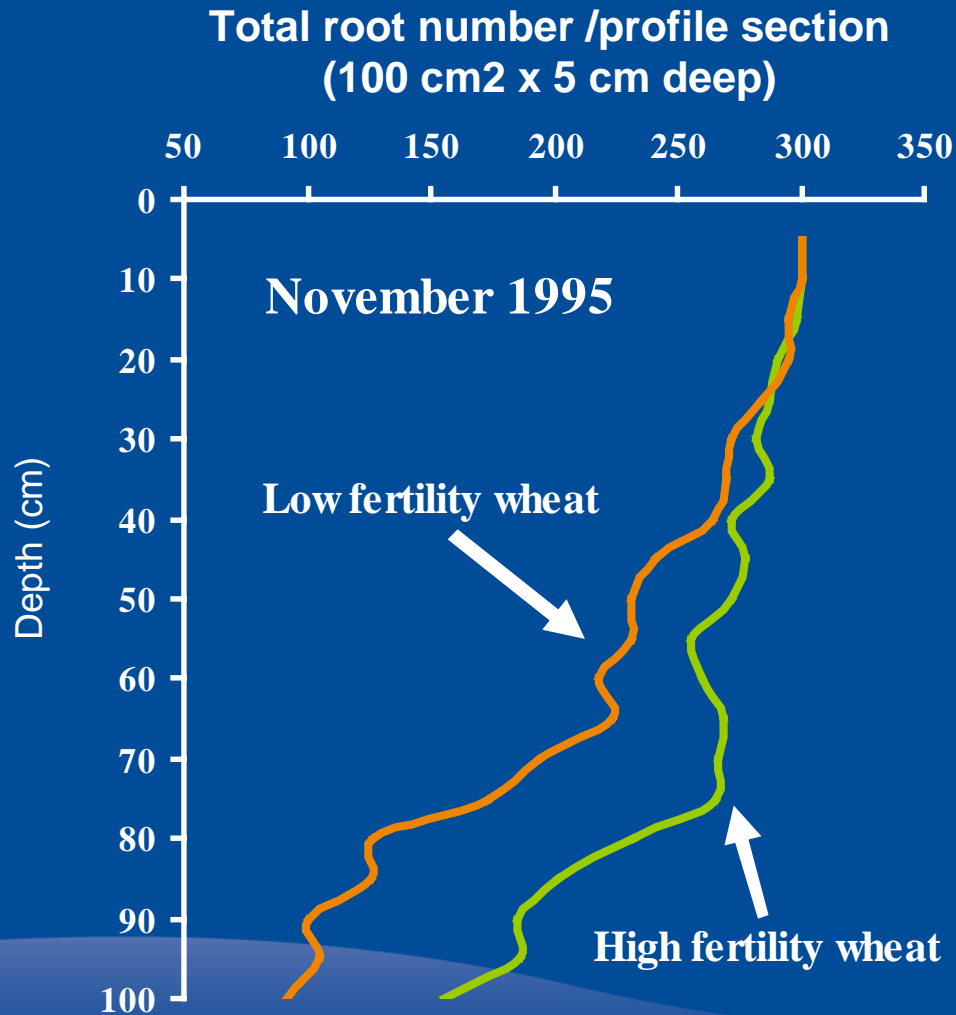


Cotton – Wheat
Permanent beds

Protect structure in the topsoil



Use the subsoil



Greater nutrient cycling

Nutrient kg/ha	N	P	K	S
<i>Wheat stubble</i>				
Fertilised wheat	165	20	193	15
Unfertilised wheat	94	15	138	11
<i>Cotton stubble</i>				
Fertilised wheat	145	12	89	30
Unfertilised wheat	108	9	61	21

Farming systems trials

1990s – high fertility wheat vs low fertility wheat

- 👍 Higher wheat yields
- 👍 Similar cotton yields
- 👍 Similar gross margins

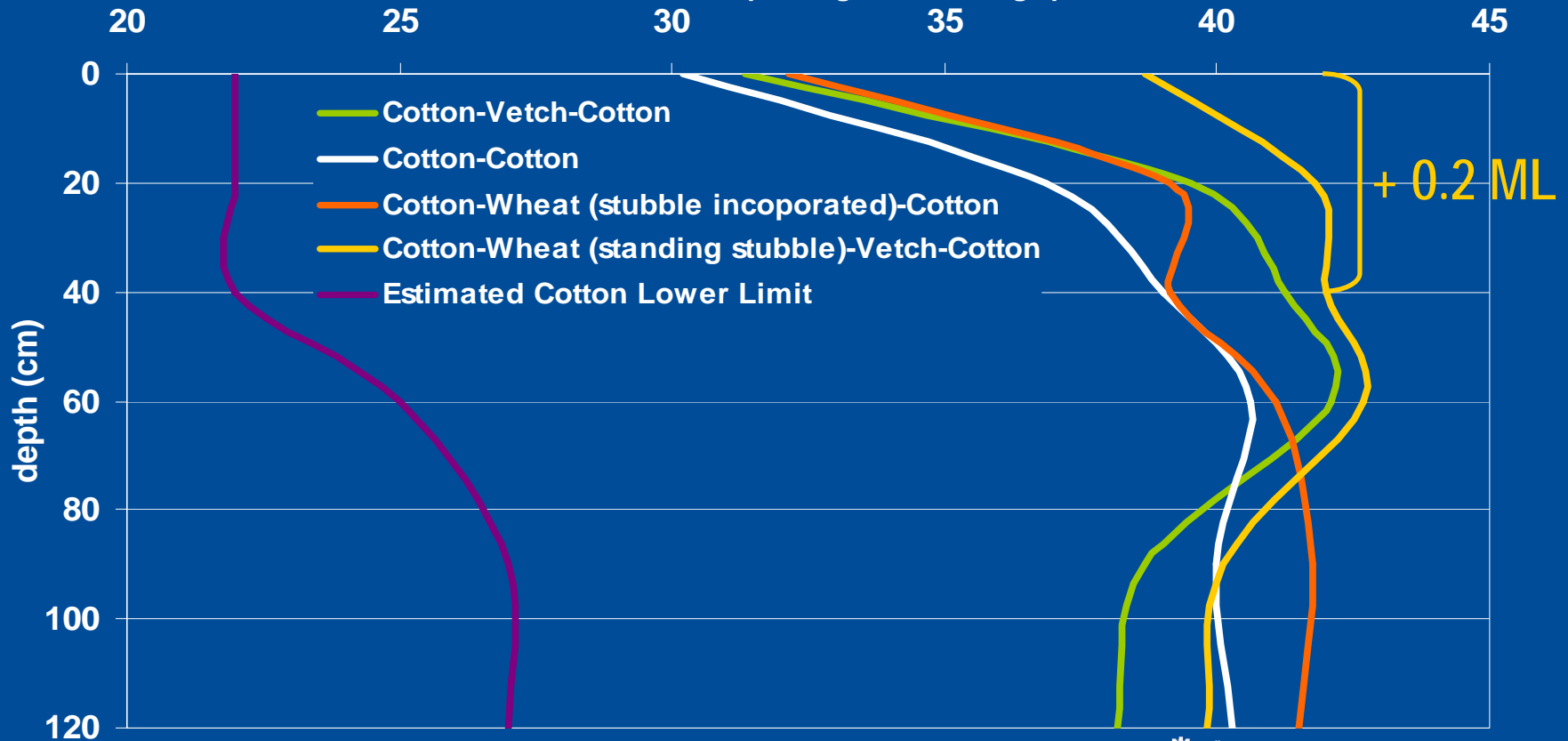
Recently

06/07 – cotton yield +2 b/ha

07/08 – similar yields

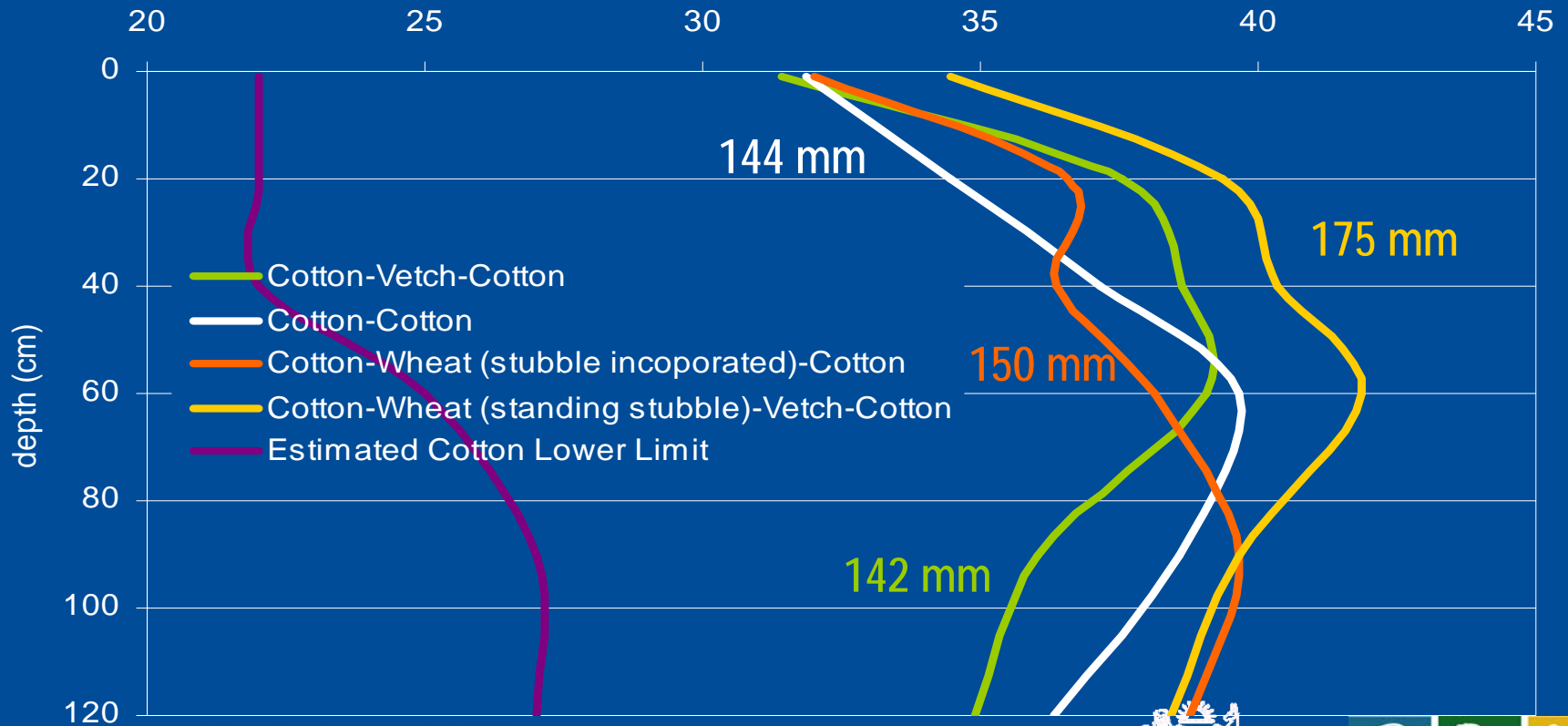
Change soil-water interactions

Soil Water Content (%), 1/Nov/2007. ACRI long term rotation trial.
1 week after cotton planting and watering up.



Change soil-water interactions

Soil Water Content (%) 28 Dec 2007. ACRI long term rotation trial.
After 100 mm rainfall - starting with 27 mm on 4 Dec, finishing with 26 mm on 23 Dec



Synergies in summary

- 👍 **Topsoil is more resilient to tillage**
- 👍 **Greater use of nutrients and water in the subsoil**
- 👍 **Greater infiltration of rainfall and irrigation**
- 👍 **Slower evaporation of topsoil moisture**

- 👍 **Potential for higher cotton yields, particularly in hot seasons**

Recommendations 2008

Recommendations 2008

Spend time in your crop



Recommendations 2008

Monitor and record key growth stages

Z31 / first node / start of jointing / start of stem extension

Z49 / flag leaf fully emerged / awn peep

Z65 / anthesis 50% / mid flowering

- 👍 Trigger points for key management decisions
- 👍 End of season analysis

Recommendations 2008



Growing eight tonnes a hectare of irrigated wheat in southern NSW

John Lacy

Rice Farming Systems Leader, Yanco Agricultural Institute

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Cropcheck Project Officer, NSW DPI, Finley

Over the past 15 years, many irrigation farmers have aimed to achieve 7 to 8 t/ha wheat yields. The success rate has been around 1 in 10, with few, if any, farmers consistently obtaining yields in this range.

There are two major limiting factors:

- The first is excessive vegetative growth during winter and spring, which makes lodging more likely. Lodging also occurs when soils are saturated during irrigation, which greatly reduces the anchoring strength of plants, particularly at high plant densities (Stapper 2006). Lodging is a major risk when high yields are being targeted. It may lead to high screenings, low test weight, increased risk of weather damage and a slowed harvest.
- The second major factor limiting yields is foliar diseases such as Septoria tritici blotch (until the mid 1990s) and yellow leaf spot (*Pyrenophora tritici-repentis*).

Other factors impacting on achieving 8 t/ha yield potential and grain quality include black point, leaf death tipping, late watering, waterlogging, screenings, difficulty of predicting nitrogen needs and delays in topdressing nitrogen in wet winters.

Given that, due to these limitations, the chance of achieving a high yield is low, most farmers have adopted a low risk but profitable strategy of targeting a 4 to 5 t/ha yield and watering only once, in spring, particularly when water allocations have

been low. Although this has been a successful strategy, and returns per megalitre are attractive, the potential for lifting yield and profit per megalitre of water is limited.

Targeting 5 t/ha or 8 t/ha?

Up until the first node wheat growth stage, the risks in targeting a yield of 8 t/ha are not much higher than those of targeting a 5 t/ha crop. This is because the costs in establishing an 8 t/ha crop are similar to those for a 5 t/ha crop.

If crop prices, crop potential or water security are lower than planned, the decision can be made at the first node stage to target a 5 t/ha crop instead of an 8 t/ha crop.

The biggest difference between 5 t/ha and 8 t/ha is the extra management needed in achieving 8 tonnes, chiefly extra monitoring to ensure crops meet the key management checks or practices for higher yields. Neglecting one particular keycheck factor or a combination of factors may cause significant yield loss, reducing the chances of attaining a yield of 8 tonnes.

What this Primefact covers

This Primefact outlines a nitrogen management strategy which minimises the risk of overvegetative and lodged crops.

This nitrogen management strategy has been combined with the latest 'Irrigated Wheatcheck' best management practices. This combination greatly increases the ability to grow high yielding profitable wheat crops for each hectare and each megalitre of water.



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Based on sound science



Validated by 2,500 fields



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Cotton Catchment Communities CRC

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IRRIGATED WHEATCHECK

Pre-irrigated, Spring irrigated and Non-irrigated Paddocks
Return this front page **after establishment** to your local District Agronomist
NB: Shading indicates essential information

GENERAL DETAILS

Name and Postal Address: Phone: Fax:

Paddock Name: Property Name:

Variety: Sown area: ha Target yield: t/ha Target protein: %

Irrigation system: pre-irrigated only / spring irrigated/ non-irrigated

Topsoil texture: sandy loam / loam / clay loam / clay Topsoil colour: red / grey / red & grey

Paddock History

Date fallowed after stubble or pasture: .../.../... Grass when fallowed: nil / low / mod / high

Fallow method: cultivation / spray / burn Soil structure (friability): poor / mod / good

Follows a break crop? yes/no Years since cereal:

Year	Winter		Summer	
	Crop/Pasture (inc. % clover)		Crop/Pasture (inc. % clover)	
Last year				
2 years ago				
3 years ago				
4 years ago				

IRRIGATION LAYOUT

Layout: bordercheck / contour / laser contour bankless channel / beds / spray

Landformed? yes/no Year: Slope: 1: or%

SOIL

Test date: .../.../... Please attach any additional soil test results

pH(CaCl₂): Colwell Pmg/kg Al% Organic Carbon%

Total Available Nitrogen (Deep N): kgN/ha Soil nitrogen fertility status: low / mod / high

Paddock Preparation

Cultivation	Date	Area(ha)	Cultivation	Date	Area(ha)

Direct drill/no till? yes/no Controlled traffic? yes/no

FERTILISERS

(Describe all fertilisers used up to and including sowing, including lime and gypsum)

Fertiliser	Date	Area (ha)	Rate (kg/ha)	Application method	Timing
					Presowing/At sowing
					Presowing/At sowing
					Presowing/At sowing
					Presowing/At sowing

CHEMICALS

(Describe all products used up to and including sowing, including fallow chemicals)

Product	Date	Rate	Target 1	Target 2	Application method	Control
						%
						%
						%
						%

Herbicide resistance? yes/no If yes, relevant herbicide and weed:

SOWING

Sowing date: .../.../... Sowing rate:kg/ha Sowing depth:cm Row space:cm

Crop undersown? yes/no Subsoil moisture >50%? yes/no Sown in to moisture? yes/no

Soil moisture depth: cm Ground cover:%

Seed treated? yes/no If yes, product? Seed germination:%

Sowing method: combine / air seeder / other Point width:cm

Point type: Emergence date: .../.../...

Establishment density (Av. of 10 sites) plants/m row or plants/m²

Is your establishment good / mod. / poor? % crop with weak/patchy establishment:

Use Wheatcheck



Systematic



How many of the 'checks' are achieved?



Spreadsheet available

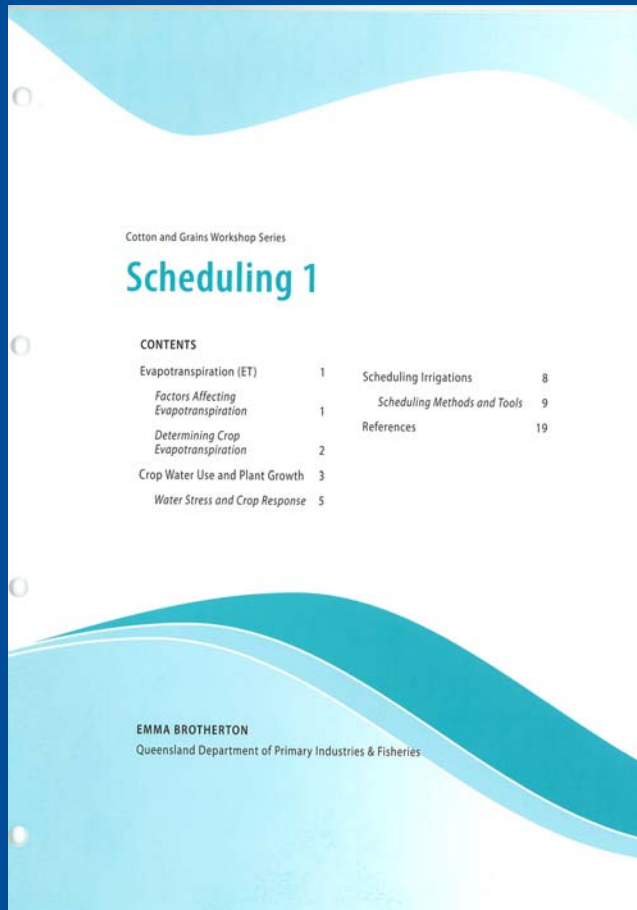


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Cotton Catchment Communities CRC

Recommendations 2008



Irrigation Scheduling

- 👍 Visual cues are too late
- 👍 Probes?
- 👍 ET_0 and Crop Coefficients

Recommendations 2008

Start thinking about options for stubble management

- 👍 Capture rainfall through the summer fallow
- 👍 Contain nutrients worth \$\$\$\$\$\$\$\$\$
- 👍 Harvest options
- 👍 Plan crop rotation



Cotton–Wheat crop rotations

Healthier soil = a bigger buffer

- 👍 Nutrient availability
- 👍 Soil-water availability