

# IRRIGATED WHEAT FACT SHEET

## NORTHERN REGION

### ACHIEVABLE YIELDS FOR IRRIGATED WHEAT

Irrigated wheat can yield up to eight tonnes per hectare in the northern region, given good management and adequate water around flowering time.

#### KEY POINTS:

- ▶ Irrigated wheat can yield 8 t/ha in the northern region.
- ▶ A wheat crop of 8 t/ha requires 500 to 550 millimetres of water.
- ▶ Frequent irrigation around flowering, control of lodging and good disease control are keys to achieving high yields.

Southern New South Wales growers have often achieved irrigated wheat yields of more than 8 t/ha, with up to 11 t/ha reported for exceptionally well-managed crops in favourable years.

However, growers in northern NSW and Queensland have rarely attempted to grow

high-yielding irrigated wheat crops and have been unsure what yields are possible in their region.

The GRDC-funded Achievable Yields project examined the potential yield of irrigated wheat using a combination of on-farm monitoring, small-plot experiments and the Agricultural Production Systems Simulator (APSIM) computer model.

#### Yield potential

Wheat yields of 8 t/ha and more can be achieved under irrigation.

Commercial crops of 8 t/ha were harvested at Walgett, NSW, in 2008 and Brookstead, Queensland, in 2011, and experimental plots of commercial varieties yielded more than 8 t/ha at Narrabri, NSW, and Emerald, Queensland, in 2011.

APSIM modelling indicates that yields of 8 t/ha are achievable across most of the northern region (see Table 1) with well-managed crops of quick-maturing varieties, such as Kennedy<sup>®</sup>.

The simulations show that the potential for yields of this size is influenced by weather conditions during the growing season, particularly around flowering. In years when August and September are hot, wheat will flower earlier and have less time to fill grain, so maximum yields will be lower.

High yields are achievable only in well-managed crops that are not affected by lodging, pests, disease, frost or extreme weather events.

#### Water use

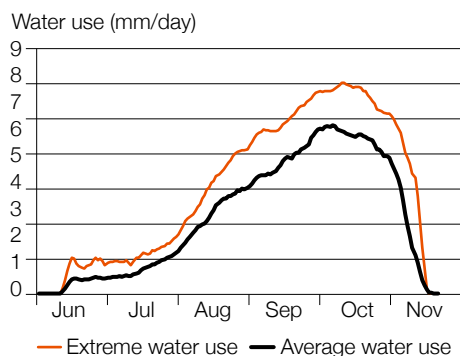
A wheat crop of 8 t/ha requires 500 to 550 millimetres of water.



*Furrow irrigated wheat at Rolleston, central Queensland, in 2009.*

PHOTO: ALLAN PEAKE

**FIGURE 1** Simulated daily water use (evapotranspiration) for a fully irrigated, quick maturing wheat crop sown on 8<sup>th</sup> June at Wee Waa, based on long term climate data. The graph shows both average (all years) and extreme (top 10 per cent of years) daily water use.



This is the amount needed by the crop for evapotranspiration; the water used by the plant or evaporated from the soil surface. It does not include water lost through drainage, runoff, or distribution losses which can vary greatly between farms, soil types and irrigation equipment.

### Furrow area

Furrow-irrigated crops can yield less per total paddock area than crops grown under centre-pivot and lateral-move irrigation systems because of the area of unsown furrows. Unsown furrow gaps of 50 to 60 cms can reduce yield by up to 10 per cent in a two-metre bed system and up to 20 per cent in a one-metre bed system.

Yield losses due to furrows can be minimised by sowing to the edge of the furrow. Experienced irrigators advise against sowing in the furrow because this restricts water flow.

### Lodging and disease

Lodging risk and diseases must be controlled to achieve high wheat yields.

The risk of lodging can be significantly reduced by using agronomic techniques to manage crop growth.

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**TABLE 1** Simulated maximum yield (t/ha)\* and water use (mm of evapotranspiration) range for 90 per cent of years\*\* for quick maturing irrigated wheat (Kennedy<sup>(b)</sup>) in the absence of lodging, disease, pest and frost damage.

Location	Full irrigation		Pre-irrigation + one in-Crop irrigation		Pre-irrigation only	
	Yield (t/ha)	Water use (mm)	Yield (t/ha)	Water use (mm)	Yield (t/ha)	Water use (mm)
Emerald	6.2-7.8	360-480	3.3-5.9	260-360	1.8-4.9	160-290
Dalby	7.0-9.5	430-550	4.4-7.6	330-420	2.8-5.7	240-360
St George	6.4-8.2	360-480	4.2-6.9	270-380	2.3-5.7	170-310
Goondiwindi	6.8-8.7	410-490	4.0-7.2	300-400	2.1-6.2	200-350
Walgett	6.7-8.3	420-500	3.9-7.0	290-410	2.1-6.0	190-350
Gunnedah	7.6-9.6	440-540	4.9-8.5	350-470	3.1-7.7	250-410

\* for wheat grown under centre-pivot or lateral-move irrigation systems, or well-grown two metre beds with narrow furrows

\*\*excludes the top and bottom 5 per cent of years

Crops with thick, leafy canopies at the end of tillering are more likely to lodge, so lodging management involves a package of measures to reduce crop growth during tillering. These measures include variety selection, management of soil and fertiliser nitrogen, seeding rates and plant growth regulators.

Disease control is also critical to achieving high yields in irrigated wheat crops, particularly if disease-susceptible varieties are grown.

### Irrigation scheduling

Poor irrigation timing can limit the yield of irrigated wheat crops.

To achieve high wheat yields growers need to irrigate the crop frequently during the critical period from flag-leaf emergence to the middle of grain fill.

As seen in Table 1 and Figure 1, high-yielding wheat uses a lot of water, particularly once temperatures increase in spring.

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## USEFUL RESOURCES

**Reducing lodging risk in irrigated wheat Fact Sheet**

**Disease management in irrigated wheat Fact Sheet**

**Irrigated wheat: Best practice guidelines in cotton farming systems**

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## MORE INFORMATION

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