

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[®].

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

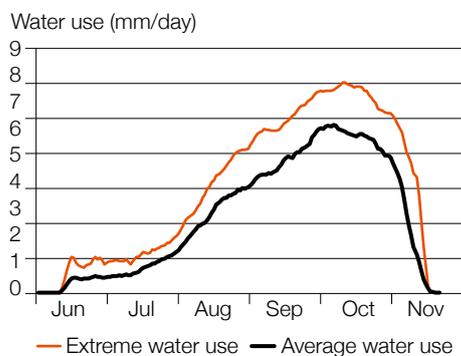
A wheat crop of 8 t/ha requires 500 to 550 millimetres of water.



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 8th 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.

DISCLAIMER

Any recommendations, suggestions or opinions contained in this publication do not necessarily represent the policy or views of the Grains Research and Development Corporation. No person should act on the basis of the contents of this publication without first obtaining specific, independent professional advice.

The Corporation and contributors to this Fact Sheet may identify products by proprietary or trade names to help readers identify particular types of products.

We do not endorse or recommend the products of any manufacturer referred to. Other products may perform as well as or better than those specifically referred to. The GRDC will not be liable for any loss, damage, cost or expense incurred or arising by reason of any person using or relying on the information in this publication.

CAUTION: RESEARCH ON UNREGISTERED PESTICIDE USE

Any research with unregistered pesticides or of unregistered products reported in this document does not constitute a recommendation for that particular use by the authors or the authors' organisations.

All pesticide applications must accord with the currently registered label for that particular pesticide, crop, pest and region.

Copyright © All material published in this Fact Sheet is copyright protected and may not be reproduced in any form without written permission from the GRDC.

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^(b)) 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.

Acknowledgements: Allan Peake, CSIRO Sustainable Agriculture Flagship; farm management teams at ACRI Narrabri, CSIRO Gatton and DEEDI in Emerald.

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

Available online at:
www.grdc.com.au

or available free from
Ground Cover Direct: 1800 110 044
ground-cover-direct@canprint.com.au
plus postage and handling.

MORE INFORMATION

**Allan Peake, Project Leader,
Irrigated Grain Farming Systems,
CSIRO Sustainable Agriculture
Flagship**
07 4688 1137
allan.peake@csiro.au