



7m tonnes of grain off irrigation - making it happen

Bryan Clark

Executive Officer, IREC

in a nutshell

- A recently published scoping study clearly demonstrates the potential for a 363% increase in grain production from winter crops in the southern Murray-Darling Basin, using the volume of water currently used
- The study makes 35 recommendations, based on a rationale that investment in research, extension and education is critical to closing the gap between current and potential crop yields
- The study underwrites the value of a new winter cereal breeding program for irrigation, that will commence this autumn

A scoping study of the potential for grain production in the southern Murray-Darling Basin has shown that with the right genetics, the right agronomy, and the right market opportunities, seven million tonnes of grain could be produced each year.

The Irrigated Cropping Forum (ICF) has been successful in gaining support from the Grains Research and Development Corporation (GRDC) for a dedicated plant breeding program aimed at producing high yielding winter cereals for irrigation.

The aim of the program is to improve the genetic capability of winter cereals (wheat, barley and triticale) to easily produce 10 t/ha under full irrigation, to lift the value of winter cereal production in southern NSW and northern Victoria. It is hoped that this new project can build on the previous excellent work on the characteristics of irrigated wheat production by Dr Maarten Stapper of CSIRO Plant Industry – see article on pages 4–6 of this edition.

The newly-funded program is the first step in producing winter cereals specifically bred to perform at the top end of the production scale under irrigation. This is opposed to the current situation of varieties being bred for dryland production parameters and then having water applied and often failing when they are pushed towards genetic yield potential.

What is the production potential?

In developing the cereal breeding project for irrigation, it was argued that a potential production level of five million tonnes of winter cereals was possible. This argument was based on the assumption that if it were possible to produce 10 t/ha of winter cereals across 500,000 ha of irrigated land, from the Lachlan Valley to the Victorian Goulburn-Murray valleys, then the region would produce five million tonnes of grain annually.

To validate the new cereal breeding project and answer the production potential question, GRDC provided funding for a scoping study to “ground truth” the five million tonnes of grain scenario. Supporting funds were provided by the NSW Department of State and Regional Development and the Riverina Regional Development Board. The study was conducted by Dennis Toohey of Dennis Toohey and Associates of Albury.

The major objective of the scoping study was a comprehensive assessment of potential for grain production based on the irrigation water resources of the southern Murray-Darling Basin. The other objectives are listed as follows.

- To provide a comprehensive assessment of the irrigated grain crops within the NSW valleys of Lachlan, Murrumbidgee and Murray and the Goulburn-Murray area of northern Victoria.
- To report upon the major end users and markets for irrigated grain crops and include discussion on principal trends.
- To discuss the reforms of the past decade of the water industry and collate findings from published works of their impacts upon decisions of irrigation farmers.
- To undertake a preliminary assessment of the area of land devoted to irrigated grain crops in the study area and include discussion on principal trends.
- To undertake a preliminary review of the theoretical production potential of the identified irrigated grain crops and of those leading management matters requiring addressing when growing these crops.

The grain crops studied in this project are grouped into six sub-types:

- winter cereals
- winter oilseeds



- winter pulses
- summer cereals
- summer oilseeds
- summer pulses.

Absolute potential is 7.9 million tonnes

The scoping study has confirmed that the five million tonnes scenario is possible within the study area. In fact a key finding of the study was that if wheat was the best crop to be producing in the region, and so had all of the available water in an average year applied to it, the total potential production from the region would exceed 7.9 million tonnes based on current trial yields, with an estimated farm gate value of over \$1.2 billion annually.

To put this finding in context, this means that the irrigated areas of the southern Murray-Darling Basin could produce the same volume of wheat as the rest of NSW does, or all of Victoria and South Australia combined, or about half that of Western Australia or Queensland.

However....

On a more realistic note, it is more reasonable to assume that the water would continue to be used on a range of crops both summer and winter, so if we assume that the current area and water use for rice and other summer enterprises is roughly maintained, and the remainder of the water is used on winter crops, the potential production would be about 3.4 million tonnes from a range of winter cereals, oilseeds and pulses. This is a huge increase from the current production position of about 930,000 tonnes.

Possible production estimates were modelled for five grains, namely wheat (milling and biscuit), faba beans, canola, soybeans and maize. Table 1 shows the current and potential wheat production from 231,100 ha with a 55% share of the southern Murray-Darling Basin extracted water resource of 1058 GL. The data suggest production expands from 715,000 tonnes presently (average yield assumed to be 3.0 t/ha) to 2,727,000 tonnes (with average yields increasing to 11.8 t/ha). The change in output from Present to Possible for the five grains modelled is a 363% increase whilst using the same volume of water.

Challenge to lift water productivity

One very serious issue and opportunity arising from the

scoping study is the relative productivity of winter crops under irrigation compared with dryland equivalents. Current water use efficiency of irrigated winter cereals was found to be low (10 kg/mm/ha for wheat). However there is significant potential for improvement from current levels to achieve the dryland target of around 22 kg/mm/ha as shown in Figure 1. Similar gains in other crops are also possible.

Report validates growth potential

The scoping study report makes 35 recommendations, based on a rationale that investment in research, extension and education is critical to closing the gap between current and potential crop yields. The recommendations address the issues that the productivity of irrigated crops needs to increase and the crops need to become more profitable. If irrigated cropping is profitable, farmers will become attracted to irrigated cropping and become enthusiastic investors in best practice irrigated cropping, leading to a closing of the gap between current and potential irrigated cropping yields.

The reports' core recommendations are associated with:

- productivity, profitability and sustainability
- water use efficiency benchmarks
- watering crops to potential
- maintaining healthy soils

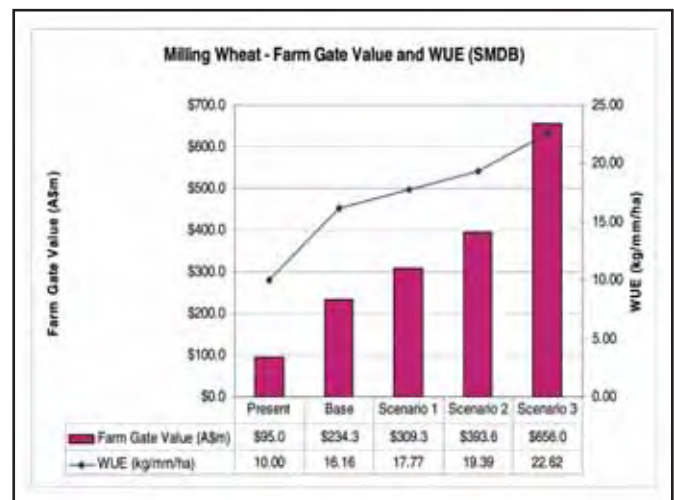


Figure 1: Returns and water use efficiency (WUE) of wheat under various scenarios

Crop	Base water resource ¹ (ML)	Area ² (ha)	Present production ³ (t)	Base production ⁴ (t)	Possible production ⁵ (t)
Wheat	1,058,492	213,112	715,344	1,710,227	2,727,119
Canola	29,346	8,708	17,416	24,904	77,500
Faba beans	20,000	5,935	20,772	24,926	65,875
Soybean	29,751	4,020	10,855	14,071	35,782
Maize	124,830	16,711	165,438	193,846	471,247
Totals	1,262,419	266,486	929,824	1,967,975	3,377,523


1. Modelled share by crop of the SMDB long-term average irrigation resource of 4.910 GL and remains constant in this table. 2. Modelled area of crops remains constant in this table. Other notes refer to the main report.



The scoping study clearly demonstrates that there is potential for significant increases in grain production from winter crops in the southern Murray-Darling Basin. This underwrites the value of the new winter cereal breeding program for irrigation, and the report may also assist GRDC in considering future investment in programs to improve the viability and sustainability of high yielding production systems in irrigation regions.

The cereal breeding program will commence this autumn under the control of Andrew Milgate, a wheat breeder with the NSW DPI team in Wagga Wagga, but the project is being supported by a wider consortium of partners including EGA, Australian Grain Technologies (AGT), CSIRO Plant Industries

and their alliance with partners from New Zealand through the Ausgrainz alliance, as well as Barley Breeding Australia. The work is also supported by the AWB who will be assisting the project with quality assessments and information about desirable quality characteristics from the irrigation areas.

For those interested in the details of this work, the scoping study executive summary and the full scoping study report will be available from the ICF website www.icf.org.au 

Further information

Bryan Clark

T: 02 6960 1550

M: 0428 645 232

E: bryan@irec.org.au