



Valuable lessons in 2007 for Riverina grain growers on irrigation

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in a nutshell

- Cereal yields in 2008 will benefit from good retention of moisture from summer rains – in 2007 barley grown on summer moisture and no spring irrigation yielded 3–5 t/ha
- Layout appears to be a critical influence in good yield for cereals – in 2006 a survey showed average wheat yield on contour layout to be 3.8 t/ha compared with 6.9 t/ha on beds
- The last few dry years has resulted in more cereal crops in the same paddock than ideal, so cereal paddocks should be chosen carefully to minimise disease risk
- Break crops such as canola, faba beans, field peas and chick peas should be considered given their good price prospects

In 2007, irrigation grain growers experienced one of the most difficult winter crop growing seasons on record but a number of key lessons can be taken into the important 2008 winter crop season.

There were some very good results in 2007 on previous summer crop moisture. Growers have reported barley yields from 3 to 5 t/ha with no additional irrigation in spring. Unfortunately there is very little summer crop around this year so it is even more important to conserve the summer storm moisture we have been receiving. Retaining fallow rainfall will involve controlling weeds, retaining stubble cover and keeping cultivations to a minimum.

About a third of the rainfall received during the fallow period should be available to a following crop. With the recent summer storms a good fallow should result in at least another 70 mm of moisture available for the winter crop. In a lot of cases however this moisture has been lost due to less than ideal timing of weed control and growers having to rely on cultivation for weed control due to shortages in chemical supply.

A number of growers in the district have been monitoring soil moisture levels in fallows using gypsum blocks so they know "what is in the bank" at the start of the winter cropping season. The equipment is also important in summer crops for irrigation scheduling to keep crops stress free. Some summer crops however require a stress to improve seed set, eg seed lucerne, and the equipment allows farmers to read moisture levels deeper in the profile.

What has history to teach us?

A look at weather records over the last 30 years gives an indication of the range of yields that could be achieved, in theory, using fallow and growing season rainfall, ie the rain falling from April to October, without additional irrigation water. When growing season rainfall (GSR) ranges from 150 to 250 mm, with good agronomic management, yields of



Figure 1. Soil moisture levels can be monitored using gypsum blocks to better understand likely crop requirements for water.



wheat can range from 1.4 to 2.1 t/ha (Figure 2). This has happened in about 40% of years. Yields in the range of 2.7 to 4.3 t/ha are theoretically possible in 40% of years when GSR is 250 to 400 mm, the wetter than average years. The last two seasons have had GSR of 100 to 150 mm which results in expected yields of 0.8 t/ha.

These figures show the variability that exists in our rainfall, and emphasise the importance of irrigation water to achieve acceptable yields and returns on our higher input system.

Unfortunately the last two seasons have been a combination of worst case scenarios, with very little growing season rainfall and very low water allocations.

A case of when as well as how much

The distribution of the growing season rainfall also has a big bearing on the end result. **When** the rain falls is critical on our heavy irrigation soils and in 2007, crops died in late winter/early spring due to the soil type/plant population interaction. Heavier clay soils will hold more water but also make it hard for plants to extract the water as the soil dries out.

Note that the figures here are based on water conversion figures of 15 kg of grain for every mm of rainfall, which is possible with good agronomic practice such as sowing on time, good soil fertility, disease management and crop rotation.

Timing of nitrogen topdressing of irrigated crops was difficult last season as good rain events did not occur for nearly three months. The topdressing window of late July to

early August for many crops was dry, so topdressing timing was compromised. In many cases crops lost potential before they could be irrigated in spring.

This coming season, timing of topdressing with a rain event coupled with the outlook for spring allocation will be important to maintain crop potential. In some cases growers may have to apply topdressing nitrogen earlier than ideal if a good rain event occurs during mid tillering. Late winter rainfall will again be critical so the start of the irrigation season can occur before crops lose potential in early spring.

More barley in short term

Growers were happy with barley performance compared to wheat in 2007 and there is likely to be a shift to more barley in the short term. Barley has a number of advantages over other cereals. There are no stripe rust issues in barley, it has less chance of being frosted, has a shorter growing season and requires less water to finish.

The barley variety Gardiner has been the dominant variety on irrigation for a number of years but some of the newer varieties coming through such as Hindmarsh with very good straw strength should be considered. Note that Hindmarsh has not been approved as a malting variety for 2008. Hindmarsh is more erect than Gardiner and has a later sowing window than Gardiner.

If the barley crop is to be grown as a dryland crop it should be sown at dryland rates and varieties such as Buloke should be considered.

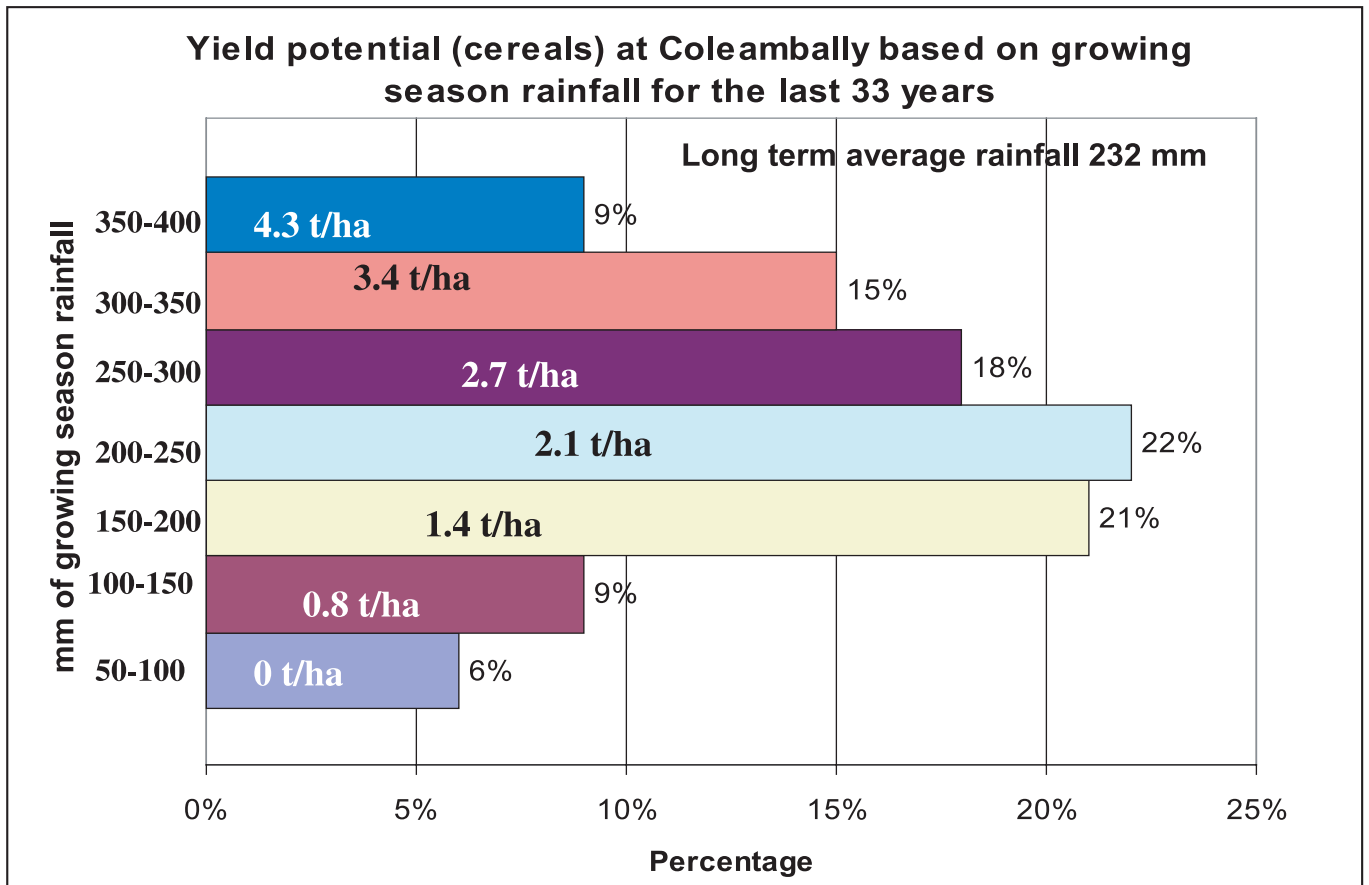


Figure 2. The yield potential for cereals based on growing season rainfall at Coleambally for the last 33 years.



The results from the ICF High Yielding Cereal trial at Yanco and Kerang in 2007 gave a good insight into the yield potential of wheat, durum wheat, barley and triticale varieties grown under southern irrigation systems (see article on pages 7-10). The ranking of varieties, both released and unreleased lines, and quality traits will however be of more importance to growers as the trial proceeds over the next few years.

The challenge for advisors and growers will be to lift yields across districts by improving management of constraints such as soil pH, soil structure and irrigation layouts.

Yield variability *IS* real

A grower survey of 53 wheat and barley crops in Coleambally during 2006 highlighted the variation in yields that does exist in the real world.

About half of the wheat crops were grown on contour layouts (includes sodsown crops) with an average yield of 3.8 t/ha. Around 18% of crops were grown on border check layouts with an average yield of 5.1 t/ha and 30% of crops were grown on beds with an average yield 6.9 t/ha.

This data shows the yield advantage of the better layouts and suggests that growers may move to permanent raised bed paddocks on dedicated sections of their farm. There is increased interest in different layouts to reduce labour such as beds in bays without having to use siphons.

Large variations in water use efficiency in the survey from 7–26 kg/mm/ha can also be partly accounted for with growers being “water short” and not willing or unable to water wheat out in spring. Other factors such as late sowing and lack of suitable rotations have also influenced water efficiency.

Strive for balanced rotations

The low allocations of the last few years have resulted in very little balance in crop rotations so it is likely that there will be an increase in cereal diseases, which can limit production. If possible growers should choose cereal paddocks that are lower in risk of having major disease or weed problems. Break crops such as canola, faba beans, field peas and chickpeas are also good options with price prospects looking good.

More balance in the 2008 winter crop mix would be a wise management decision for the future. 🌱

Further information

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Figure 3. Layout has a strong influence on yield with cereals grown on beds yielding higher than other layouts in 2006; as well as providing greater flexibility for cropping options in summer and winter.



Figure 4. Rotations should be carefully considered after this run of dry years, advises the author (pictured), to minimise the risk of cereal diseases.