SEASONAL CROP OUTLOOK

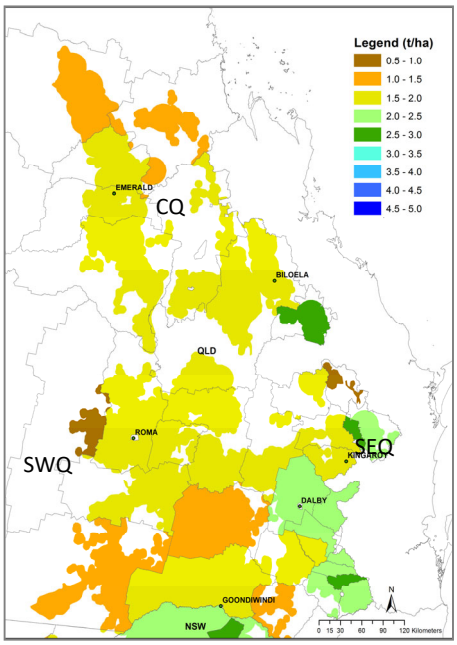
Wheat – July 2019

SUMMARY

The current winter crop outlook for the state as a whole indicates a predicted median crop yield well below the long-term expectation (19th percentile ranking relative to all years). This incorporates current *soil water conditions* and the *seasonal rainfall outlook* based on the southern oscillation index. There is however some variation within the state's cropping region. While most parts of QLD's cropping region have a very much reduced chance of this year's wheat crop being above the long-term median, some parts of CQ have an increased chance for an above median crop. This early in the season, widespread above average rainfall is needed across all parts of the state's cropping region during the next couple of months. This will induce late planting opportunities and is needed to improve the current below average wheat crop expectations across most of QLD.

GENERAL CONDITIONS

Average rainfall was recorded in June for parts of CQ and SEQ. Although this would have induced further winter crop plantings in most regions, large variation existed in total rainfall amounts. In contrast, most parts of FAR SWQ recorded below average rainfall during June. Furthermore, below to very much below average rainfall was recorded during October to end of June (i.e. fallow and sowing period) across most parts of QLD's cropping region. Rainfall during June was not sufficient to fully recharge soil water levels across most of the state's winter cropping region. Specifically, soil moisture profile levels are around one-third (20-30%) of the potential for most of SWQ, while parts of northern SEQ have soil moisture at close to half-full profiles (50%). In contrast, most of northern CQ has replenishment of soil moisture levels to above 70% (Map 2).

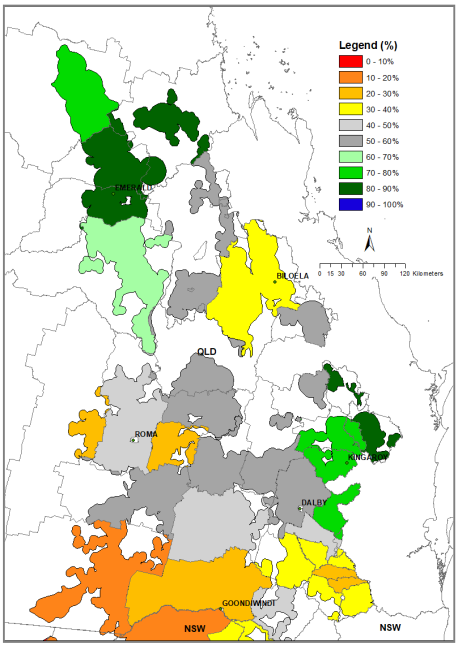


Map 1: Simulated long-term median shire yield derived from the last 119 years using current technology.

The recent pattern of the SOI, "consistently negative" for the May-June period, indicates a *much reduced chance* for receiving above average rainfall in most parts of the state's winter cropping region over the next 3-months (www.longpaddock.qld.gov.au). This however, will change depending on the movement in the SOI as the season progresses over the next month. Crops sown into profiles with low soil water are more dependent on in-crop rainfall, and in such situations forecasts based on SOI phases can be most useful. At this early stage, atmospheric indicators of ENSO, although still warmer than normal, have moved into an El Niño neutral mode (www.bom.gov.au/climate/enso).

OUTLOOK

This regional wheat crop outlook is based on the assumption of cropping after summer fallow. The benchmark for this outlook is the simulated long-term median shire wheat yield within the broad cropping region of Queensland (Map 1). The median yield is based on predicted performance over the past 119-years using an agro-climatic model for wheat with long-term rainfall records (see descriptive note for more details). The probability of exceeding the long-term median shire wheat yield for the coming season is shown in Map 3. Any areas coloured in yellow to red have a reduced chance of exceeding the median yield, whereas areas coloured in green to blue have an increased chance.



Map 2: Aggregated soil water recharge status (%) as at 1st July 2019. Summer fallow simulated from 1st of October 2018.

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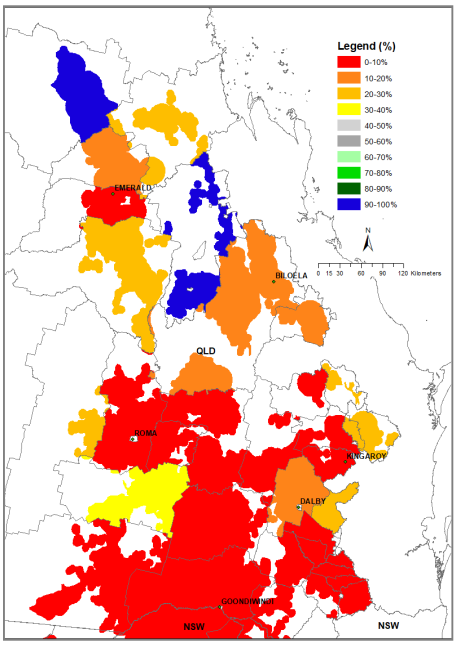
Map 3 is derived by considering conditions up to the end of June and projecting forward based on rainfall conditions in years from the historical record with SOI phase similar to this year - "consistently negative" in May/June. The calculation of benchmark yields and outlook chances do not take into account effects of poor crop nutrition or damage due to pests, diseases, frosts or extreme events. This outlook is derived assuming only a summer (short) fallow period. The current state wheat outlook, at this early stage in the season, is for a very much reduced chance of exceeding the long-term median across most of the state's cropping area. Specifically, most of the state's cropping region has a very much reduced chance (< 30%) to have predicted yield outcomes above the long-term median yield. In contrast some parts of CQ have a very much increased chance of yield outcomes being above the long-term median expectation for that region. Widespread above average rainfall during the next couple of months will be critical to induce further plantings and significantly improve the current wheat yield outlook for most of the southern QLD winter cropping region.

It should be noted that at this stage of the season, there is a wide range of likely yield outcomes for the 2019 season (see State Outlook section) as most of the growing season remains in the projected forecast. The current seasonal climate forecast skill will improve towards the end of July. Updating of actual climate and thus shortening of the forecast period will cause the range of yield outcomes to narrow towards the final realised yield at the end of the season.



Map 3: Probability of exceeding the long-term simulated median shire wheat yield.

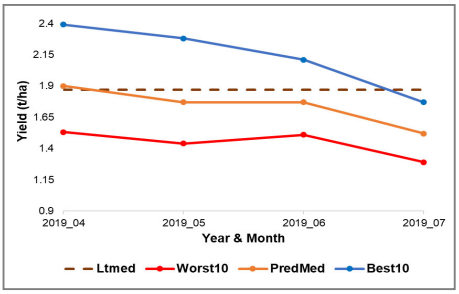
Poor Crop Chance

With the sowing window nearing its end in most regions, most parts of southern QLD are showing significantly increased chances for wheat yield falling in the bottom 10% of all years (data not shown).

It should be noted that these values are calculated as broad indicators for shire scale. They do not apply to farm level.

State Outlook

At present, this early in the winter crop season, the current state wheat outlook shows a forecast median yield at the end of June of 1.52 t/ha. The predicted state yield is 19% below the long-term median expectation of 1.87 t/ha (Graph A). There is however, a 10% chance that the state yield could be lower than 1.29 t/ha or higher than 1.77 t/ha. However, keep in mind that it is still early in the growing season and that widespread above average rainfall during (contrary to the rainfall outlook) the next two months is needed to induce late sowings and improve the yield outlook across the state.



Graph A: State level yield forecast trajectories (10th, 50th and 90th percentiles).

At regional level, Southwest Qld (SWQ), Southeast Qld (SEQ) and Central Qld (CQ) (see Map 1), the forecast yield (t/ha) ranges are as follows:

Region	Worst 10%	Median (50%)	Best 10%	LT-median
SWQ	0.91	1.10	1.41	1.63
SEQ	1.54	1.91	2.27	2.37
CQ	1.52	1.58	1.80	1.69

**Worst 10% - bottom 10th percentile and Best 10% - 90th percentile relative to all years.*

Forecast medians for most southern parts of QLD are below the long term median expectation for regional wheat yields. More specifically, deviations of the forecast median yields from the regional long-term (LT) median expectations were -32%, -19% and -6% below the LT-median yield expectation for SWQ, SEQ and CQ, respectively. The SOI phase of "consistently negative" at end of June indicates a very much reduced chance for above average rainfall in most parts of the state's cropping region rainfall over the next 3-months. There remains, however, quite a wide range of possible outcomes that will depend on conditions in the remainder of the growing season. Widespread above average rainfall (contrary to the very much below average rainfall outlook) is needed over July to August to improve the current poor outlook to the wheat cropping season across most southern parts of the state's winter cropping region. Given the increasing skill in forecasts as the season progresses, it is advisable to closely monitor progress of the SOI over the next couple of months.

Descriptive Note:

The seasonal wheat outlook is based on the integration of (i) a simple agro-climatic wheat stress index model (Oz-Wheat MII) (i.e. Bare fallow routine - Ritchie, 1972; Wheat stress index model adapted from - Fitzpatrick and Nix, 1969; Nix and Fitzpatrick, 1969), which is sensitive to water deficit or excess during the growing season, (ii) actual climate data up to the forecasting date and (iii) projected climate data after that date. These projected data are drawn from historical analogue years based on similarity to the prevailing phase of the Southern Oscillation Index (SOI) (Stone et al., 1996). The Oz-Wheat model is run from the end of the wheat crop the year before sowing in order to account for the influence of the summer fallow on starting soil moisture conditions. The model input parameters for each shire (i.e. potential available water content, planting rain & stress index period) have been selected based on the best fit when calibrated against actual shire wheat yields from the Australian Bureau of Statistics (ABS) for the period 1976 – 2000, 2005, 2010 & 2015 (MII). Cross validated spatial correlation when predicting the shire wheat yields for the 2000 season (MI) was 0.8 across all main wheat producing shires in Australia (Potgieter et. al., 2006). For the updated MII 75% of the 237 shire have $R^2 > 0.60$.