SEASONAL CROP OUTLOOK

Wheat – May 2021

SUMMARY

At present, this early in the winter crop growing season, starting soil water conditions and the seasonal rainfall outlook indicate that chances are for a close to average wheat yield during the 2021 wheat-growing season at an aggregated state (QLD) level. However, a large variation in predicted yield outcomes exists within the state's cropping region. Specifically, while most parts of QLD have chances similar to climatology (50:50) for an above average wheat yield, some parts of SEQ and SWQ have slightly reduced chances of this year's wheat crop being above the long-term median for that region. This early in the season, widespread above average rainfall is needed across all parts of the state's cropping region during the next few months. This is needed to induce good planting opportunities and improve current winter cropping conditions across the state. However, the likely range of yield outcomes is still very wide. This range will narrow considerably over the next few months as the outlook is updated through the season.

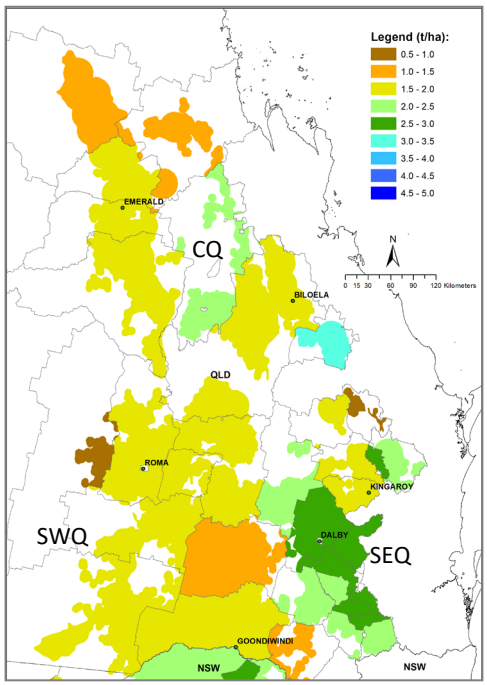
GENERAL CONDITIONS

After some very much above average rainfall was recorded during March 2021 most parts of Queensland's winter cropping region received average rainfall during April. Furthermore, rainfall recorded during the six months from November 2020 to end of April 2021, was below to very much below average across almost the entire state's cropping region. The exception was for some southern parts of SWQ that received above average rainfall for that period. This has resulted in available soil water levels recharged to above 70% of the potential available water content (PAWC) for almost all of that region. The exception was for most of southern CQ and northern SEQ, which mainly recorded below average rainfall and therefore replenishment of soil moisture levels close to 50% of PAWC for most of that region (Map 2).

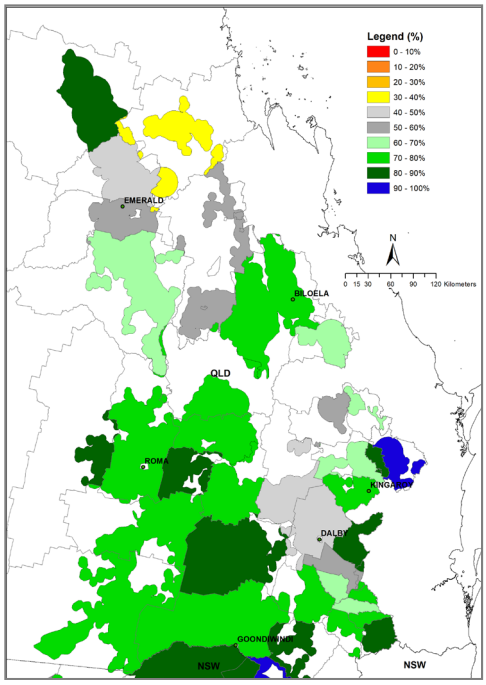
The recent pattern of the SOI, "near zero" for the March-April period, indicates a slightly reduced chance for above average rainfall in most parts of the state's winter cropping region over the next 3-months (www.longpaddock.qld.gov.au). However, this will change depending on the movement in the SOI 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 for ENSO are in an El Niño NEUTRAL mode. Progress of the climate indicators such as the SOI and sea surface temperature anomalies can be followed here (www.bom.gov.au/climate/enso).

OUTLOOK

This regional wheat crop outlook assumes 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 121-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.



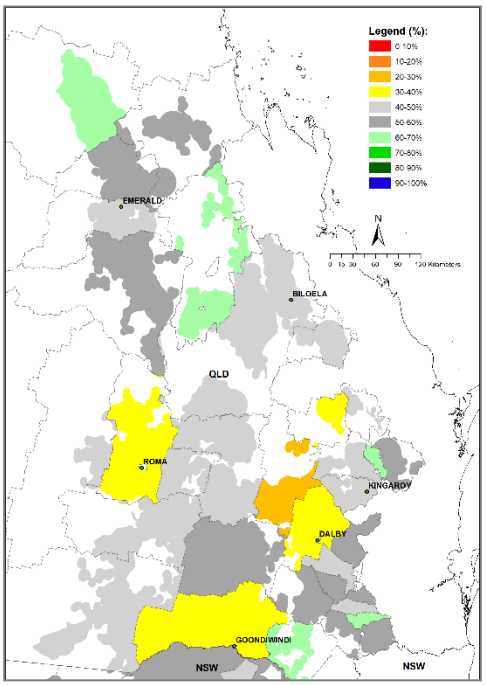
Map 1: Simulated long-term median shire yield derived from the last 120-years with current technology.



Map 2: Aggregated soil water recharge status (%) as at 1st May 2021. Short summer fallow simulated from 1st of October 2020.

Map 3 is derived by considering conditions up to the end of April and projecting forward based on rainfall conditions in years from the historical record with SOI phase like this year - "near zero" in March/April. The calculation of benchmark yields and outlook chances do not consider 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 very early stage in the season, varies across most of the state's cropping area. Specifically, equal chances exist (50:50) of exceeding the long-term median yield for most parts QLD winter cropping region. The exception is for some parts of southern QLD having slightly reduced chances (30% to 40%) of exceeding the long-term shire yield expectation. It is anticipated that area planted to winter crops will increase from last winter season in most parts of QLD, mainly due to the previously drier than average summer and winter seasons experienced. However, widespread above average rainfall during the next few months is needed to induce plantings and improve the current wheat yield outlook for most of the state's 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 2021 season (see State Outlook section) as all 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.

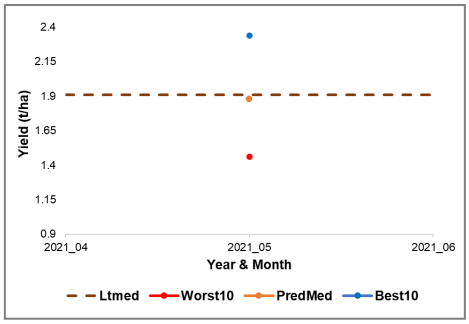
Poor Crop Chance

At present, this early in the growing season, there are no regions with an increased chance for predicted wheat yield being below the bottom 10% yield 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 season, the current state wheat outlook shows a forecast median yield at the start of May of 1.88 t/ha, which is slightly below the long-term median of 1.91 t/ha (Graph A). There is however, a 10% chance that the state yield could be lower than 1.46 t/ha or higher than 2.34 t/ha. However, keep in mind that it is very early in the growing season and that widespread above average rainfall during the next 3-months is needed to induce good sowing conditions and improve the outlook at shire and regional scales.



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	1.22	1.65	2.19	1.67
SEQ	1.70	2.35	2.77	2.39
CQ	1.29	1.76	2.31	1.72

Forecast medians for SWQ (1.65 t/ha), SEQ (2.35 t/ha) and CQ of 1.76 t/ha are close to the long-term median expectation for regional wheat yields. The SOI phase of "near zero" at end of April indicates a slightly 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. However, 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 1 October the year before sowing 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 $R^2 > 0.60$.