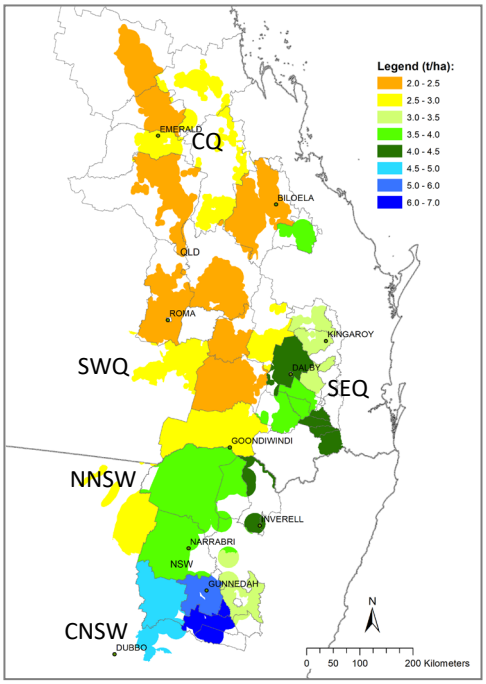
SEASONAL CROP OUTLOOK

Sorghum: December 2020

SUMMARY

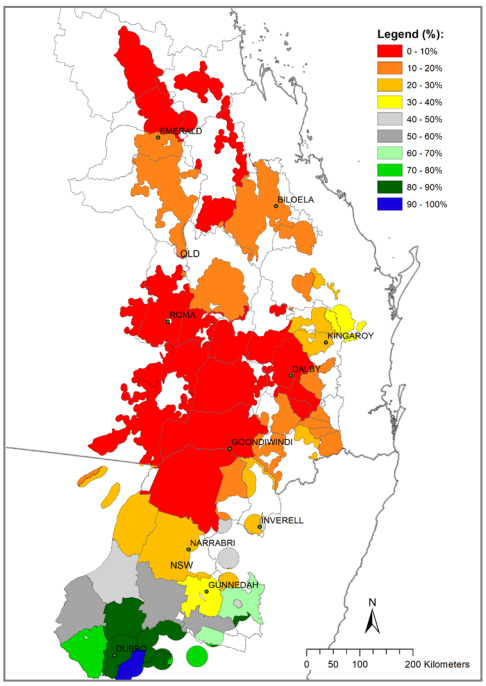
At this early stage of the 2020/21 summer crop season, current soil water conditions and seasonal rainfall outlook indicate a reasonable chance for an average yielding sorghum crop. There remains, however, large variation in the outlook among local regions. Most areas in QLD have sorghum yield expectations close to the long-term median yield, while most areas in Central QLD and Central New South Wales have sorghum yield expectations slightly above the long-term median yield for that region. The exception is for parts of SEQ, which have yield expectations slightly below the long-term median yield. Widespread average to above average rainfall is needed, during the next month to overcome severe stored moisture deficiencies and to induce good summer plantings across all areas of the north-eastern Australian (NEAUS) summer cropping region. This crop outlook is based on a crop-free (fallow) period through the winter season and therefore areas with longer fallow practices are likely to have better yield prospects for the coming season. It should be noted, this is still early in the growing season, and the range of likely sorghum yield outcomes remains wide.



Map 1: Simulated long-term median shire yield derived from 1901 to 2019 using 2021 technology.

GENERAL CONDITIONS

The protracted drier than normal winter and spring period continued into early summer across almost the entire NEAUS summer cropping region resulting in highly depleted soil moisture levels. Rainfall recorded during November was very much below average for most of the summer crop region and resulted in very few planting dry land opportunities (less than 60k ha up to early November for NEAUS). Furthermore, estimated stored soil moisture levels (simulated through winter fallow using APSIM) remained low (<30%) except for most parts of central NSW, which have soil moisture levels above 50% of potential available soil moisture (Map 2). Widespread above average rainfall is needed over the next couple of months to induce good planting opportunities across the entire summer cropping region. The recent pattern of the SOI, i.e. "consistently positive", at the end of November indicates slightly increased chance of receiving above average rainfall for most of the summer grains cropping region over the next 3-months (www.longpaddock.qld.gov.au). Note: this outlook is only applicable to a short winter fallow cropping system (~7 month fallow period).

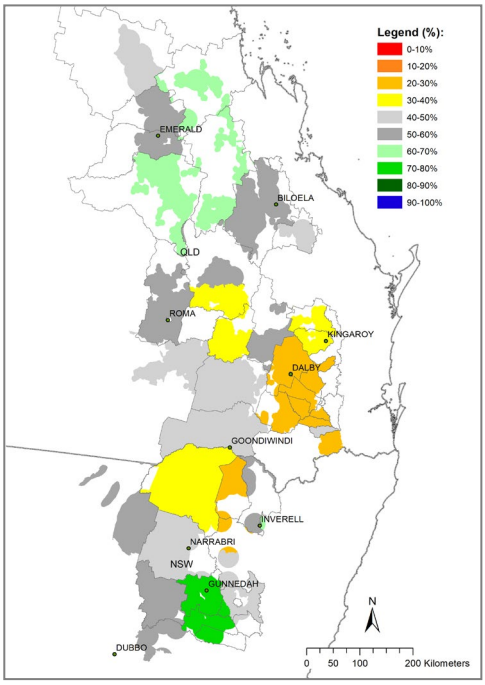


Map 2: Aggregated soil water recharge status (%) as at 1st December 2020. A short 7-month winter fallow was simulated from 1st of April 2020 to end of November 2020.

OUTLOOK

The benchmark for this outlook is the simulated long-term median shire sorghum yield within the broad NEAUS cropping region (Map 1). The median yield is based on simulated performance over the past 120-years using an agro-climatic model for sorghum with long-term rainfall records. Probability of exceeding the long-term shire median yield for this year is shown in Map 3. Any areas coloured in light grey, yellow and red have a poor to very poor chance of having crops above the long-term median yield, whereas areas coloured in dark grey, green and blue have good to very good chances of producing higher yielding crops. Map 3 is derived by considering conditions up to date and projecting forward based on rainfall conditions in years with SOI phase similar to this year i.e. "consistently positive" at the end of November. 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 (e.g. heat waves).

The current outlook is the combination of recharge of starting soil moisture profiles and the current rainfall outlook based on SOI phase analogue years from history with the same phase as at the end of November 2020. This resulted in an average chance (50:50) of exceeding the long-term median yield for most areas in the NEAUS summer grain region (Map 3). More specifically, most of CQ and central NSW regions have a slightly increased chance (60% to 70%) of exceeding the long-term median shire yield. In contrast, parts of SEQ have a slightly reduced chance (20% to 30%) of exceeding the long-term median yield for that region. At this early stage of the season, the range of likely yield outcomes for the 2020/2021 season (see State Outlook below) is still wide as much of the growing season remains in the projected forecast. Updating each month, as the season progresses, causes the range of yield outcomes to narrow towards the final realised yield at the end of the season. *Note: Final summer crop yield is usually more affected by in-crop rainfall and temperatures (during crop growth) than by the soil moisture at sowing, although this remains an important factor*.



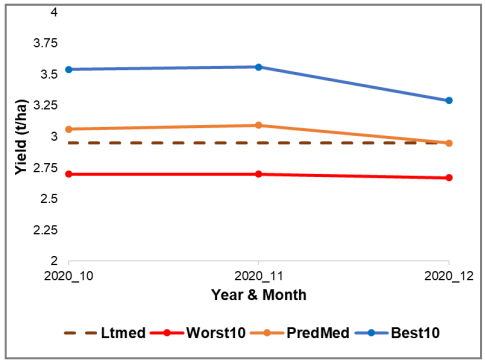
Map 3: Probability of exceeding the long-term simulated median shire sorghum yield.

Poor Crop Chance

At present, this early in the growing season, parts of SEQ have a slightly increased chance for sorghum crop yield falling below the 10th percentile yield of all years (data not shown). It should be noted that these values are calculated as broad indicators for shire scale and do not apply to farm level.

State Outlook

The current regional outlook shows the forecast median yield for the entire NEAUS sorghum-cropping region on the 1st December is 2.95 t/ha, which is the same as the long-term median of 2.95 t/ha (Graph A). There is however, a 10% chance that the state yield could be lower than 2.67 t/ha, or higher than 3.29 t/ha. At local regional level, Queensland (QLD), central Qld (CQ), southwest QLD (SWQ), southeast Qld (SEQ) and northern NSW (NNSW) (Map 3), the forecast yield (t/ha) ranges are as follows:



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

Region	Worst 10%	Median (50%)	Best (%)	Lt Median
CQ	1.87	2.48	2.77	2.45
SEQ	2.51	3.13	4.15	3.62
SWQ	2.02	2.3	2.85	2.33
QLD	2.17	2.56	3.07	2.72
NNSW	3.21	3.57	3.95	3.55

**Lt Median: long-term median.*

At this early stage of the season, SEQ and QLD have predicted yield outcomes slightly below the long-term regional sorghum yield expectation. The remainder of the summer cropping region has predicted yield outcomes close to or slightly above the long-term sorghum yield. However, a wide range of possible outcomes still exists. This will narrow as the season progresses and the actual climate experienced is incorporated in the analysis. The current SOI phase of "consistently positive" indicates a slightly increased chance to receive above average rainfall in most parts of NEAUS summer cropping region over the next 3-months. Widespread above average rainfall is needed over the next couple of months to recharge soil profiles and induce good planting opportunities across the entire region.

Descriptive Note:

The seasonal sorghum outlook is based on the integration of (i) a simple agro-climatic sorghum stress index model (i.e. Bare fallow routine - Ritchie, 1972; Sorghum 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 sorghum model was ran from 1 April the year before harvest in order to account for the influence of the winter fallow on starting soil moisture conditions. The model shire input parameters (i.e. plant available water content, planting rain & stress index period) have been selected based on the best fit when calibrated against actual shire sorghum yields from the Australian Bureau of Statistics (ABS) census years for the period 1983 to 2000, 2006, 2011, & 2016. Oz-Sorghum MII showed correlations (r) ranging from 0.62 to 0.93 within the main sorghum producing shires (35) of NE Australia. These shires contribute to 96% of total average production of all sorghum producing shires.