SEASONAL CROP OUTLOOK

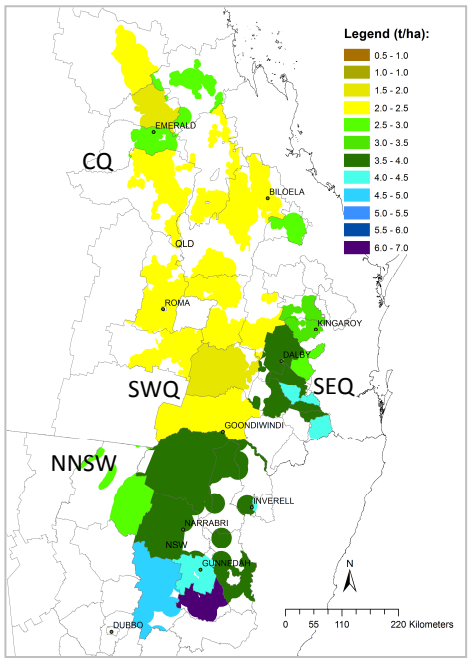
Sorghum – November 2016

SUMMARY

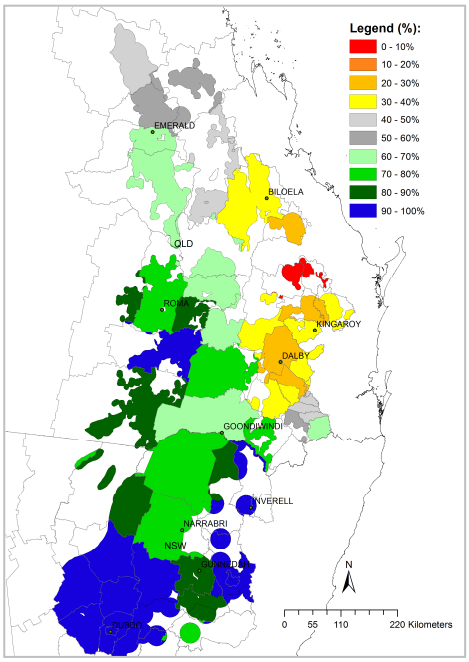
At this early stage, current soil water conditions and seasonal rainfall outlook indicate a high chance of an above average yielding sorghum crop for the 2016/17 summer growing season. There remains, however, variation in the outlook among local regions. Most areas in CQ and SEQ are showing slightly above average crop yield expectations, while most areas in southern SWQ and NNSW are having sorghum yield outcomes well above the long-term expectation. ***It should be noted***, this is still early in the growing season and the range of likely sorghum yield outcomes remains wide. Widespread average to above average rainfall is needed, during the next couple of months to induce good summer plantings and improve the current crop outlook across all areas of the north-eastern Australian (NEAUS) summer cropping region.

GENERAL CONDITIONS

After an exceptionally wet winter, spring started slightly drier with below average rainfall during October recorded for most parts of QLD's summer cropping region. Conversely, most parts in SWQ and NNSW, recorded average to above average rainfall during that period. Currently, estimated stored soil moisture levels (simulated through winter fallow using APSIM) varied across the summer cropping region. Most areas of CQ region have soil water recharge levels close to or slightly above 50% of the total plant available soil water capacity (50% to 70%), while most areas in SWQ and NNSW have recharged to above ¾ (>75%) of the available soil moisture profile levels. Conversely, most areas in SEQ have only recharged to around 50% of the total water holding capacity of mostly deeper soil moisture profile soils (Map 2). Although some very early plantings occurred in some southern parts of the summer grains region, 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. "rapidly falling" for the Sept-Oct period, indicates a highly scattered pattern and slightly reduced chance of receiving above average rainfall for most of the summer grains cropping region over the next 3-months (www.longpaddock.qld.gov.au). ENSO remains in a near "neutral" range with most of the sea surface temperatures (SSTs) in the central tropical Pacific Ocean cooled and correspondingly the SOI returned to near zero values (http://www.bom.gov.au/climate/enso/tracker/). *Note: this outlook is only applicable to a winter (short) fallow period.*



Map 1: Long-term median simulated shire sorghum yield (115 years)



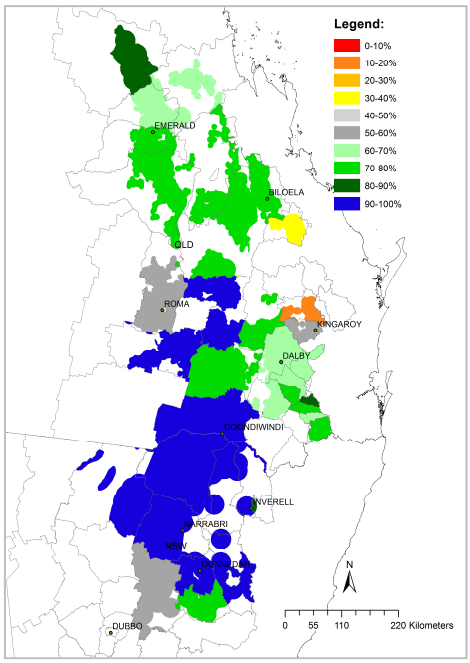
Map 2: Aggregated soil water recharge status (%) as at 1st November 2016. Winter fallow simulated from 1st of April 2016.

OUTLOOK

This regional sorghum crop outlook is based on the assumption of cropping after winter fallow. 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 predicted performance over the past 115-years using an agro-climatic model for sorghum with long-term rainfall records (see descriptive note for more details). 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 (end of October) and projecting forward based on rainfall conditions in years with SOI phase similar to this year - "rapidly falling" in the September to October period. 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 profile levels and the current crop outlook based on SOI phase analogue years from history similar to the phase as the end of October 2016. This resulted in the current crop outlook for above average chances (50% to 80%) of exceeding the long-term median yield for most areas in QLD cropping region. The exception is most of NNSW, which are showing a high chance of exceeding the long-term median shire yield (70% – 90%). *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.*

At this early stage of the season, the range of likely yield outcomes for the 2016/2017 season (see Regional Outlook section) 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.



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

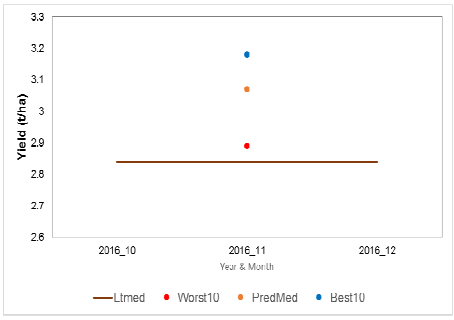
Poor Crop Chance

At present, this early in the growing season, chances for this season's sorghum crop to fall below the worst 10% (crop yield) of all years remains close to the long-term expectation (i.e. below the worst 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

The current regional outlook shows the forecast median yield for the entire NE AUS' sorghum-cropping region at the end of October as 3.07 t/ha, which is above the long-term median of 2.84 t/ha (Graph A). There is however, a 10% chance that the state yield could be lower than 2.89 t/ha, or higher than 3.18 t/ha. At local regional level, Queensland (QLD), central Qld (CQ), south west QLD (SWQ), south east Qld (SEQ) and northern NSW (NNSW) (Map 1), the forecast yield (t/ha) ranges are as follows:



Graph A: NE AUS sorghum yield forecast trajectories (Ltmed: long-term median, Worst10: 10th, PredMed: 50th and Best10: 90th percentiles).

Region	Worst 10%	Median (50%)	Best (%)	Lt median
CQ	1.60	2.39	2.50	2.17
SEQ	2.98	3.68	3.87	3.47
SWQ	2.07	2.26	2.39	2.07
QLD	2.14	2.65	2.85	2.50
NNSW	3.56	3.70	3.94	3.41

At this early stage of the season, all southern regions are showing yield expectations above the long-term regional sorghum yield expectation. However, a wide range of possible outcomes still exists, which will narrow as the season progresses and the actual climate experienced is incorporated in the analysis. The current SOI phase ("rapidly falling") indicates chances to receive above average rainfall are slightly reduced in most parts of NE AUS summer cropping region over the next 3-months. Widespread above average rainfall is needed over the next couple of months to 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 is run 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 – 2000, 2006, 2011. Oz-Sorghum MII showed cross-validated correlations (r) ranging from 0.6 to 0.92 within the main sorghum producing shires of NE Australia (35 in total). These shires contributes to 96% of total average production of all sorghum producing shires. (For more detail see Potgieter et. al., 2005)