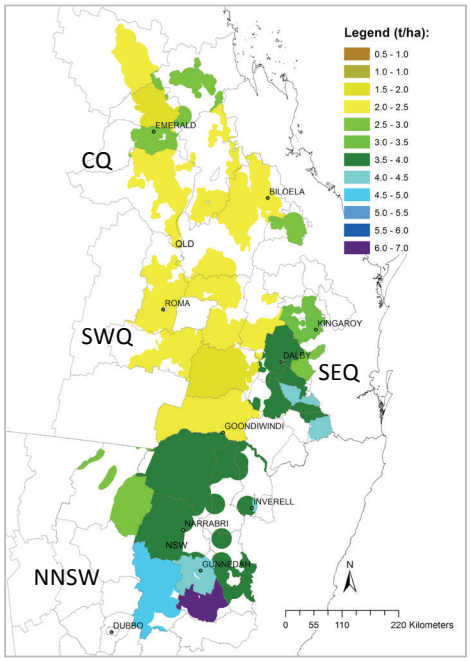
SEASONAL CROP OUTLOOK

Sorghum – March 2017

SUMMARY

At this late stage of the season, predicted average crop yield is estimated as 2.94 t/ha, which is slightly above (65th percentile) the long-term median expectation for north eastern Australia's (NEAUS) summer cropping region. However, large variation exists across regions with a spatial yield dipole between northern and southern parts of NEAUS. Predicted sorghum yields for Queensland (QLD), and northern New South Wales (NNSW) are 2.45 t/ha and 3.59 t/ha, respectively. Within QLD, Central Queensland (CQ) has a below median forecast yield of 1.7 t/ha, which falls in the bototm 20% of all years, while southeast QLD (SEQ) has a forecast median yield of 3.47 t/ha, which is similar to the long term median for that region. Southwest QLD (SWQ) has a predicted yield of 2.18 t/ha, which is slightly above (67th percentile) the long-term median yield expectation. Note that large local variation in crop yields exist within shires. In addition, this crop outlook is based on a crop-free (fallow) practice through the winter season and therefore areas with longer fallow practices are likely to have better yield prospect.



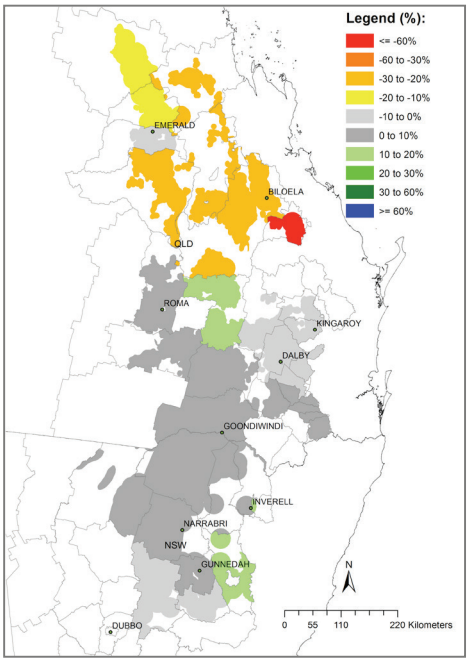
Map 1: Long-term median simulated shire sorghum yield (115 years)

GENERAL CONDITIONS

Although the summer cropping season started off favourably, the second half of the season has experienced abnormally dry and hot conditions across most of the NEAUS cropping region. During the previous three months, including February, below to very much below average rainfall was recorded across most of the broad summer cropping region. This was further exacerbated by abnormally high maximum temperatures experienced during February across most parts of that region. The recent extreme temperatures recorded in most of the cropping region will have a negative impact on final crop yields and its full impact may not be accounted for in this outlook. In addition, crops following long fallow will have higher soil water recharge levels and such conditions are not considered in this report. The recent pattern of the SOI i.e. "consistently near zero" for the Jan-Feb period, indicates chances similar to climatology (i.e. 50:50) of receiving above average rainfall for most of the summer grains cropping region over the next 3-months (www.longpaddock.qld.gov.au).

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). The percentage departure of the forecast median for this season from the long-term median shire sorghum yield is given in Map 2. Map 3 shows the current forecast shire median yield ranked relative to all years. Any areas coloured in light grey, yellow or red have a poor to very poor chance of having crops above the long-term median yield, whereas areas coloured in dark grey, green or blue have good to very good chances of producing higher yielding crops. Map 2 & 3 are derived by considering conditions up to date (end of February) and projecting forward based on rainfall conditions in years with SOI phase similar to this year - "consistently near zero" in the January to February 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).



Map 2: Percentage departure of the current forecast median shire yield from the long-term shire median yield.

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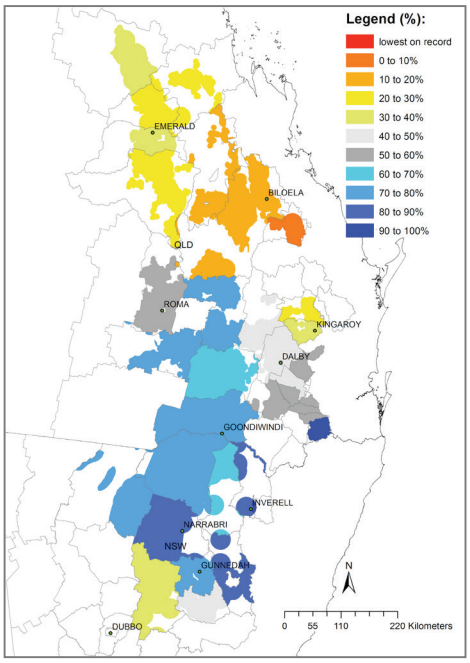
Yield outcomes vary geographically across most of the NEAUS summer cropping region. Map 2 shows that most areas in NNSW and SWQ have forecast yield expectations slightly above the long-term median (0 – 10%), while some southern parts of SEQ have forecast yields close to the long-term median expectation for that region. Most of northern Darling Downs in SEQ are showing reduced yield outcomes below the long-term median for that region. Coversely, almost all of CQ are showing yield outcomes in the bottom 20th to 30th percentile ranked relative to all years (Map 3). Furthermore, predicted yield departures for CQ are likely to fall very much below the long term median expectation (i.e. < -30%). Finally, it should be noted that extreme heat waves will have a compounding negative impact on final crop yield as well as grain quality as is the case during this season for most of the NEAUS summer cropping region. *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 it remains important in final crop yield expectations.*

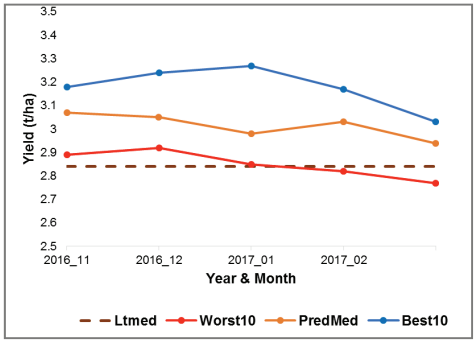


Map 3: Forecast median shire yield ranked relative to all years (%)

Poor Crop Chance

At present, this late in the growing season, chances for this season's sorghum crop to fall below the worst 10% (crop yield) of all years have increased in most parts of southern CQ, while the remainder of the cropping region is showing chances close to the long-term expectation of being below the bottom 10% yields of all years (Data not shown).

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



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

State Outlook

The current regional outlook shows the forecast median yield for the entire NEAUS sorghum-cropping region at the end of January as 2.94 t/ha, which is similar to the long-term median of 2.84 t/ha (Graph A). There is however, a 10% chance that this yield could be lower than 2.77t/ha, or higher than 3.03 t/ha. At local regional level, Queensland (QLD), central Qld (CQ), southwest QLD (SWQ), southeast Qld (SEQ) and northern NSW (NNSW) (Map 1), the forecast yield (t/ha) ranges are as follow:

Region	Median (50%)	DFY (%)	Percentile (%)	Lt median
CQ	1.72	-21	20	2.17
SEQ	3.47	0	51	3.47
SWQ	2.18	5	67	2.07
QLD	2.45	-2	45	2.50
NNSW	3.59	5	72	3.41

DFY is the percentage departure of the forecast shire median yield from the long-term shire median sorghum yield.

The protracted below average rainfall during the last three months resulted in predicted median yields shifting downward across all regions. Specifically, predicted yield in CQ is now falling in the bottom 20% of all years, while SWQ and NNSW have predicted median yields in the 67th and 72nd percentiles ranked relative to all years, respectively. For SEQ, predicted median yield is expected to be close to the long-term median expectation for that region as a whole. The current SOI phase ("consistently near zero") indicates chances to receive above average rainfall are close to climatology (50:50) in most parts of NEAUS summer cropping region over the next 3-months. Widespread average rainfall is needed over the next couple of months to ensure good crop growth conditions, especially around grain filling for those areas that had late planted crops. The impact of extreme weather events including protracted high temperatures as occurred during early February is not fully accounted for by this methodology. Finally, this report only discusses the likely sorghum yield if a crop was planted and is therefore not a total production estimate.

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)