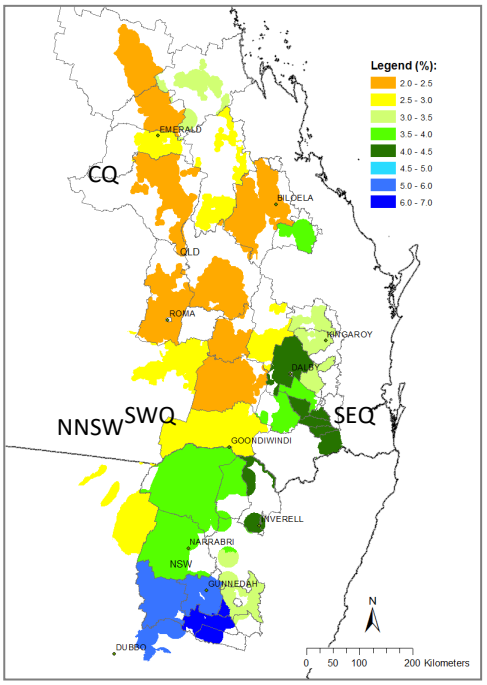
SORGHUM OUTLOOK: MARCH 2023

SUMMARY

The sorghum crop across the entire Australian summer grain region, for 2022/23, is predicted to be above long-term median. At a national level (NEAUS) the forecast yield now has converged to 3.25 t/ha, which is above the 74th percentile compared to all years. However, there remains large variation in the outlook among local regions. Specifically, almost all areas of NNSW and CQ have predicted yields well above the long-term median expectation, while most areas in southern QLD (SEQ and SWQ) have sorghum yield expectations close to the long-term median for that region. This crop outlook is based on a crop-free (short fallow) period through the winter season and therefore areas with longer fallow practices are likely to have better yield prospects for the coming season.



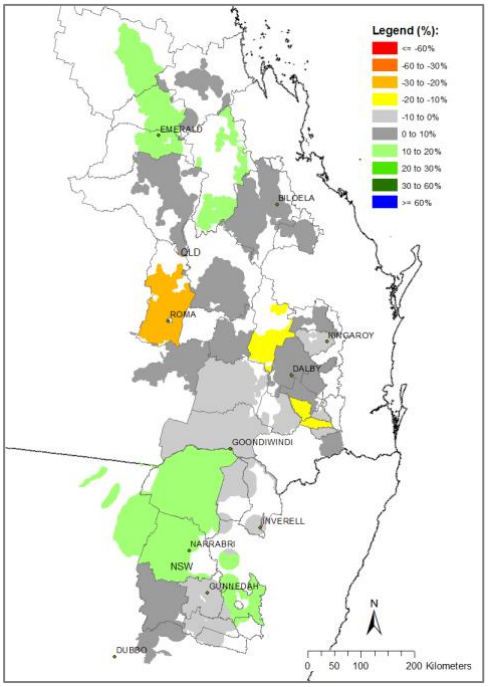
Map 1: Simulated long-term median shire yield derived from 1901 to 2022 using 2023 technology.

GENERAL CONDITIONS

Rainfall during February was below to very much below average for most parts of south-eastern QLD and northern NSW. The exception was most parts of northern CQ, which received average rainfall. During the previous six months rainfall recorded was mainly average to below average for most parts of SEQ and SWQ, while CQ and NNSW received above average rainfall for that period. The recent pattern of the SOI, i.e., "Consistently Positive", at the end of February indicates an equal chance (50:50) of receiving above or below average rainfall for most of the summer grains cropping region (www.longpaddock.qld.gov.au). Almost all ocean and atmospheric indicators for ENSO are showing that La Niña has weakened and likely to return to a Neutral ENSO phase. Progress of the climate indicators such as the SOI and sea surface temperature anomalies can be followed here (www.bom.gov.au/climate/enso). Note: this outlook is only applicable to a short winter fallow cropping system (i.e., No winter crop during 2022 season).

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 122-years using an agro-climatic model for sorghum with long-term rainfall records. 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 and red have a poor to extremely poor chance of having crops above the long-term median yield, whereas areas coloured in dark grey, green, and blue have moderate to high chances of producing higher yielding crops. Maps 2 & 3 are derived by considering conditions up to the end of February 2023 and projecting forward based on rainfall conditions in years with SOI phase similar to this year i.e., "Consistently Positive" at the end of February. 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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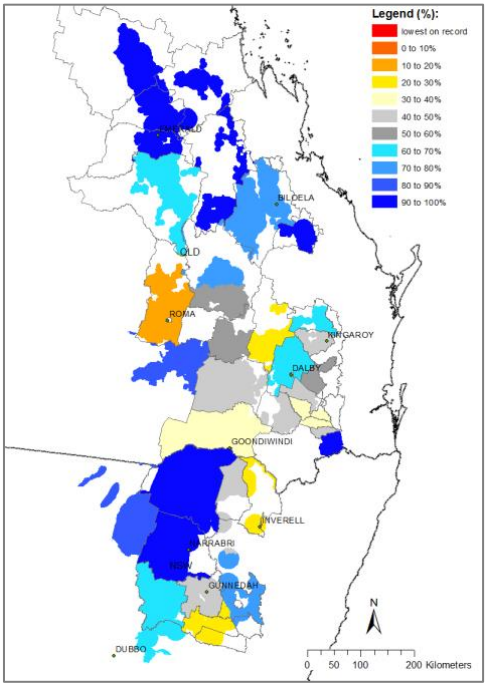
Yield outcomes vary geographically across most of the NEAUS summer cropping region. Map 2 shows that for this season, most areas in NNSW, CQ have positive forecast median yield deviations of 10% to 20% above the long-term median, while most areas in SWQ and SEQ have forecast median yield deviations (-10% to 10%) close to and in some sub-regions below the long-term median (-30% to – 10%) for that region. Furthermore, as shown in Map 3, almost all yield outcomes in NNSW and CQ are in the top tercile (>30%) compared to all yield expectations over the last 122 years. In contrast, some parts of SWQ and SEQ are showing yield outcomes in the 30th to 60th percentile range. *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. The probability of yield outcomes presented here does not directly translate to total production figures*.



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

Cropping AREAS

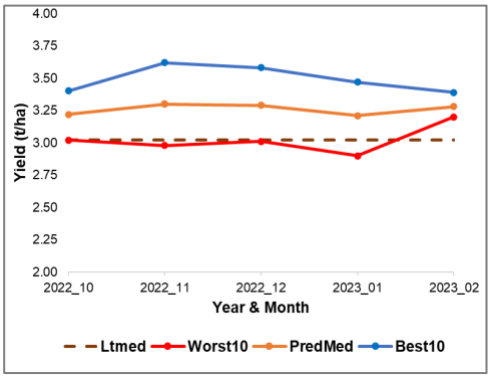
As at early February, the total green summer crop area from north of Dubbo is around 1.82 M hectares, i.e., 21% of the total potential land use (LU) cropping area (dry land and irrigated) across the entire NEAUS. At a regional scale, this equates to around 22%, 12%, 32% and 22% relative to the total available LU area for NNSW, SWQ, SEQ and CQ, respectively. Most of the areas in CQ are likely irrigated cotton since sorghum is sown mainly from Jan to mid-February. Note: Areas sown to summer crops (sorghum (main summer crop), cotton (irrigated mainly), maize, sunflower, mungbeans etc..), were derived from green-up by utilising high-resolution satellite imagery (return period of 5-days and from after 15th September) and mathematical algorithms applied to current land use cropping patterns. In addition, the first GCM-driven sorghum yield forecast was done as a prototype but is not shown here (source: CropVision ARC LP).

REGIONAL OUTLOOK

The current regional outlook shows a forecast yield of 3.25 t/ha (8% above the long-term median yield). The forecast distribution has now converged to above the long-term simulated median yield (3.02 t/ha) for the NEAUS sorghum-cropping region (Graph A). 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:

Region	Median (50%)	DFY (%)	Percentile (%)	Lt Median
CQ	2.75	10	85th	2.49
SEQ	3.66	-1	49th	3.69
SWQ	2.30	-5	40th	2.43
QLD	2.83	1	57th	2.79
NNSW	3.95	8	84th	3.65

**Lt Median: long-term median.*



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

The forecast distribution has now further converged to above the long-term median for of NEUAS. This is due to sown summer crops approaching maturity and commencing of harvest across most of the southern regions. Crop yield prospects in SEQ and SWQ are close to the long-term median, while summer cropping prospects in CQ and NNSW are for an above average yield expectation. However, a range of outcomes still exists at sub-regional level. The current SOI phase of "Consistently Positive" shows chances similar to climatology (50:50) across most regions for rainfall over the next 3-months.

Disclaimer: Crop industry forecast, and outlook reports are based on data collated by researchers at The University of Queensland and should only be used as a guide when making business decisions.

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 run from 1 April the year before harvest 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.

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