SORGHUM OUTLOOK: NOVEMBER 2023

SUMMARY

At this early stage of the 2023/24 summer crop season, current soil water conditions and seasonal climate forecast indicate a high chance for a close to average (3.10 t/ha, 52^{d} percentile) yielding sorghum crop. However, some variation in the outlook exists among local regions. Drier than average conditions during October persisted and resulted in soil moisture levels remaining well below average across most of the summer cropping region. This delayed sowing of summer crops across most of the NEAUS cropping region. This crop outlook is based on a crop-free (fallow) period through the winter season and areas with such longer fallow practices are likely to have better yield prospects for the coming season. Widespread above average rainfall is needed over the next couple of months to induce widespread planting opportunities across the entire region.

GENERAL CONDITIONS

Below to very much below average rainfall was recorded during October 2023 for the entire NEAUS summer cropping region. Rainfall during the last three months was similarly poor across the entire summer cropping region. This drier/hotter period continues to limit sowing oppurtunities and impacted the current crop yield prospects across almost the entire summer cropping region of NEAUS. This resulted in estimated stored soil moisture levels (simulated through a short winter fallow using APSIM) to remain below one-third (30%) of the total available soil moisture capacity across the entrire summer cropping region (Fig. 2). The recent long-range climate forecast at the end of October is indicating a high chance of a drier and hotter than average outlook for the November to January period across most parts of the NEAUS cropping region (http://www.bom.gov.au/climate/outlooks). However, some variability exists among regions specifically for parts of NSW and southern QLD, which are having average chances (40% to 60%) of exceeding the long-term median rainfall for that period. At this stage, all atmospheric indicators are firmly set in an El Niño event. Thus, increasing the likelihood for a drier and hotter than normal start to the current summer cropping season. Progress and updates of these ENSO indicators can be followed here (www.bom.gov.au/climate/enso).

OUTLOOK

The benchmark for this outlook is the simulated long-term median shire sorghum yield within the NEAUS cropping region (Fig. 1). The median yield is based on predicted performance over the past 123 years using an Agro-climatic model for sorghum with long-term rainfall records (see descriptive note for more details). Figure 3 shows the probability of exceeding the long-term shire median yield for the current summer cropping season. 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. Aggregated yield predictions were generated by considering conditions up to the end of October 2023 and projecting forward based on climate ensembles generated from ACCESS-S2 (see details for references). 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). This outlook assuming only a winter (short) fallow period.

The current crop outlook has slightly improved to an average chance (50:50) for exceeding the long-term median yield across most of the NEAUS summer cropping region. More specifically, most southern QLD and NSW areas have an average to above average (40% to 70%) chance of exceeding the long-term median yield (Fig. 3). However, most of CQ, has an below average chance (30% to 40%) 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 2023/2024 season (see Regional Outlook below) is still wide as much of the growing season remains in the projected forecast.

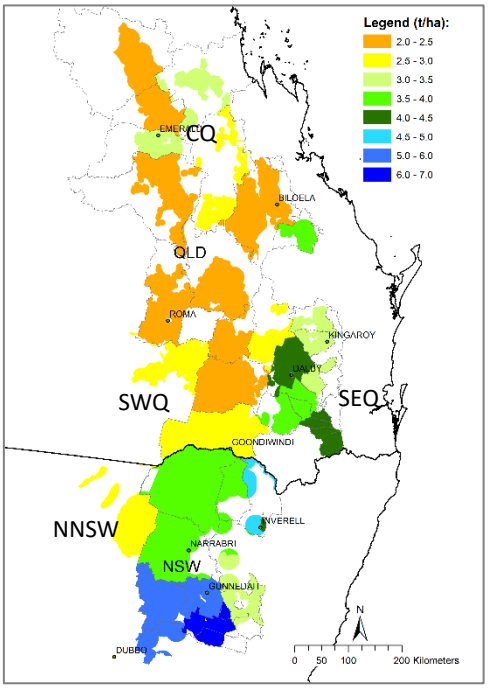

Figure 1: Simulated long-term median shire yield derived from 1901 to 2022 using 2023 technology.

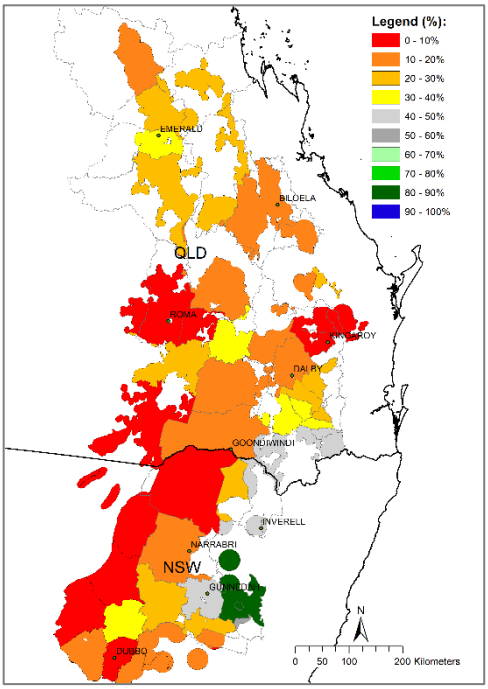

Figure 2: Aggregated soil water recharge status (%) as of 1st November 2023. A short 9-month winter fallow was simulated from 1st of March 2022 to end of October 2023.

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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 a key factor.*

Summer Cropping

At present, areas sown up to the end of September remained low. This resulted in total areas currently *not* cropped (fallowed), relative to all potential available cropping area (dryland and irrigated), to be close to 3 M and 7 M for QLD and NEAUS summer cropping regions, respectively. This is 33% and 73% above the total long-term median fallowed area compared to 2016-2022 for QLD and NEAUS cropping regions, respectively. However, variation exists across sub-regions and planted areas will depend on receiving widespread summer rainfall during the next two months. Total aggregated areas were derived by using high-resolution satellite imagery (return period of 5-days) and mathematical algorithms applied to current land use cropping patterns (source: CropVision ARC LP).

Regional Outlook

The current regional outlook shows the forecast median yield for the entire NEAUS sorghum-cropping region on the 1st November is 3.10 t/ha, which is similar to the long-term median (Fig. 4). At local regional level, Queensland (QLD), central Qld (CQ), southwest QLD (SWQ), southeast Qld (SEQ) and northern NSW (NNSW) (Fig. 3), the forecast yield (t/ha) ranges are as follows:

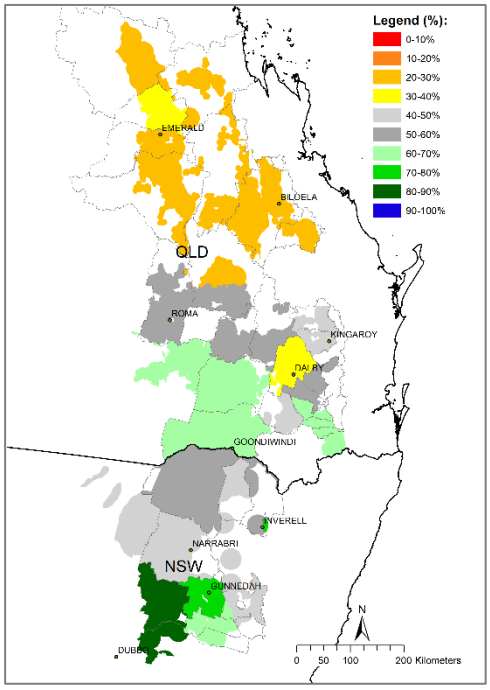

Figure 3: Probability of exceeding the long-term simulated median shire sorghum yield.

Region	FMed (t/ha)	Percentile	Lt Median
QLD	2.76	43d	2.82
CQ	2.10	22d	2.51
SEQ	3.63	45th	3.71
SWQ	2.63	69th	2.47
NNSW	3.77	58th	3.71

**Fed: Forecast Median; Percentile: Ranking of FMed relative to all years; Lt Median: long-term median*

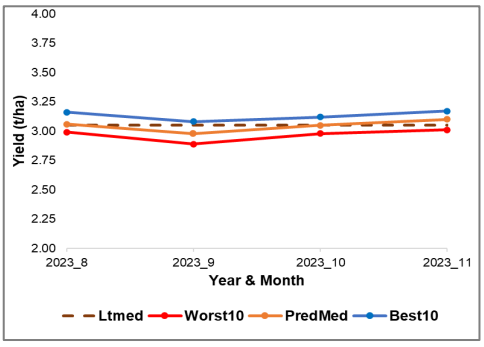

Figure 4: State level yield forecast trajectories (10th, 50th and 90th percentiles).

At a state level (QLD) the outlook is for an average yielding sorghum crop. However, some variability exists between regions. The forecast median yields for SWQ and NNSW have slightly improved to 2.63 t/ha and 3.77 t/ha and are close to or slightly above the long-term median expectation, respectively. The exception is for a below average median yield of 2.10 t/ha predicted for most of CQ. While SEQ has a predicted yield close to the long-term median yield.

Disclaimer: Crop industry forecast, and outlook reports are based on data collated by researchers at The University of Queensland, and it 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 daily climate ensembles generated by ACCESS-S2 (http://www.bom.gov.au/climate/outlooks/#/rainfall/summary) and downscaled (Schepen et. al., 2020a - doi.org/10.1002/joc.6346; 2020b - doi.org/10.1016/j.agrformet.2020.107991) for every long-term climate station and crop producing shire. 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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