SEASONAL CROP OUTLOOK

Sorghum: February 2022

SUMMARY

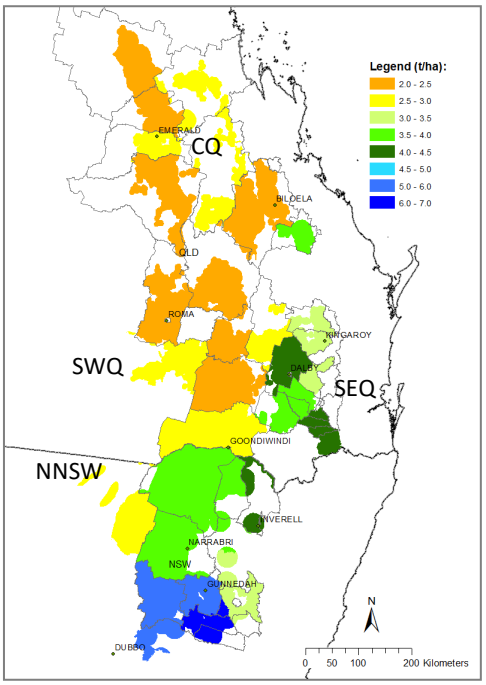
The prospects for an above average sorghum crop for the entire Australian summer grain region for 2021/22 are extremely favourable. There remains, however, some variation in the outlook among local regions. Most areas in central Queensland (CQ) have sorghum yield expectations close to the median, while most areas in southern QLD (SWQ & SEQ) and northern New South Wales (NNSW) have sorghum yield expectations above to very much above the long-term median yield. Furthermore, maturity has been reached in most areas, while harvesting has commenced for early planted crops in most of the southern regions of NEAUS summer cropping area. 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.

GENERAL CONDITIONS

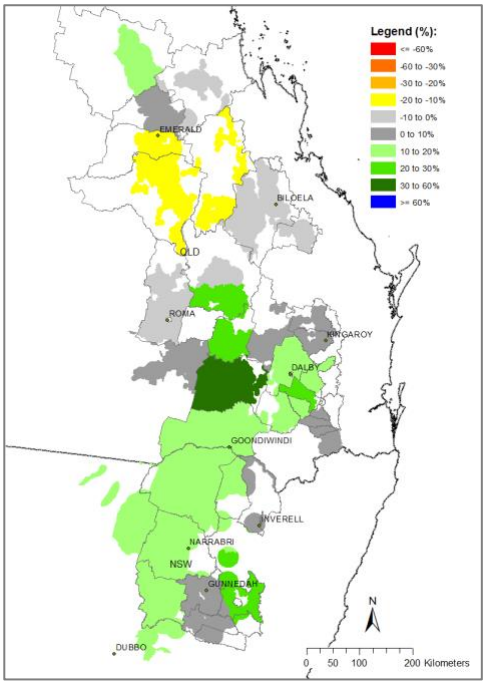
Rainfall during January 2022 was average to below average across most parts of the NEAUS summer cropping region. However, above to very much above average rainfall was recorded during the last 3-months. The recent pattern of the SOI (i.e., "consistently positive") at the end of January indicates an average to slightly above average chance of receiving above average rainfall across the summer grains cropping region over the next 3-months (www.longpaddock.qld.gov.au). Atmospheric indicators for ENSO are now showing a well-established "La Niña" system. This is likely to further increase the chances for a wetter than normal summer to autumn period. The impact will however vary across the region. 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 (~9-month fallow period).

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 predicted performance over the past 121-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. Maps 2 & 3 are derived by considering conditions up to date (end of January) and projecting forward based on rainfall conditions in years with SOI phase the same as this year - "consistently positive" in the December to January 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 1: Simulated long-term median shire yield derived from 1901 to 2020 using 2021 technology.



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

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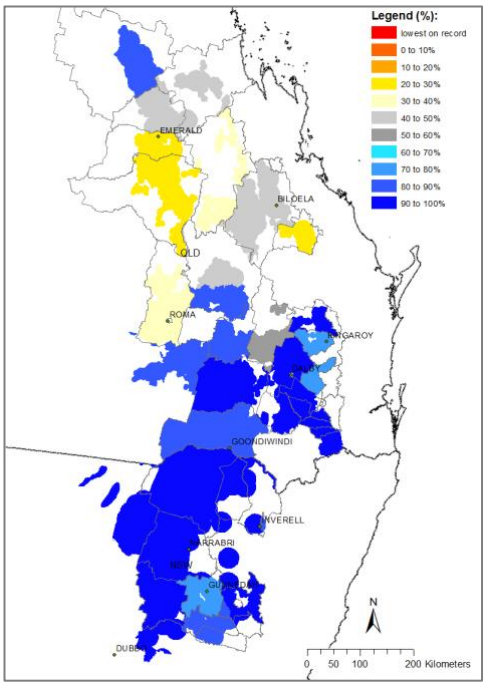
The current outlook combines effects of the recharge of soil moisture profiles and the current rainfall outlook, which is based on analogue years from history with the same SOI phase as at the end of January 2022. Map 2 shows that for this season, almost the entire region has positive forecast median yield deviations. Yield outcomes vary geographically across most of the NEAUS summer cropping region. Specifically, most areas of southern QLD and northern NSW have predicted yield deviations between 10 to 30% above the long-term median. The exception is for parts of CQ, which are having deviations close to or below their long-term median yield. Furthermore, as shown in Map 3, almost all yield outcomes in NSW and southern QLD (SWQ & SEQ) are in the top 10% (90th percentile or higher) of likely yield outcomes compared to all yield expectations over the last 121 years. In contrast, parts of CQ are having yield outcomes in the 20th to 50th 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.*

SUMMER CROP AREAS

Total areas planted to summer crops (mainly Sorghum, Cotton and mungbeans with some forage) were derived by utilising high-resolution satellite imagery (return period of 5-days) and mathematical algorithms applied to current land use cropping patterns. This resulted in, as at 25th January 2022, a total area sown to all summer crops of around 1.75 M hectares (dry land ~ 1.28 M and Irrigated ~ 460k) across the entire NEAUS summer cropping region (source: CropVision ARC LP).



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

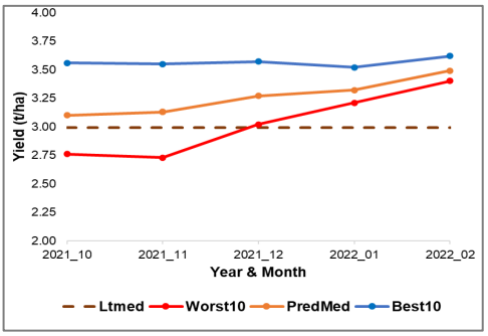
REGIONAL OUTLOOK

The current regional outlook shows a forecast yield of 3.49 t/ha with the entire forecast distribution now above the long-term simulated median yield (2.99 t/ha) for the NEAUS sorghum-cropping region (Graph A). There is however, a 10% chance that the state yield could be lower than 3.40 t/ha, or higher than 3.62 t/ha. At 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	Worst 10%	Median (50%)	Best (%)	Lt Median
CQ	2.08	2.41	2.61	2.47
SEQ	4.18	4.20	4.22	3.66
SWQ	2.65	2.77	2.97	2.38
QLD	2.96	3.10	3.22	2.75
NNSW	4.02	4.13	4.33	3.60

**Lt Median: long-term median.*

With summer crops approaching maturity and harvest across most of the southern regions of NEUAS. All regions have yield expectations above the long-term sorghum yield expectation of each region. The exception is for CQ, which has a predicted median close to the long-term yield. The current SOI phase of "consistently positive" indicates an average to slightly above average chance to receive above average rainfall in most parts of the NEAUS summer cropping region over the next 3-months.



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

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 simulated from 1st 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.