

CUMULUS

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AGRICULTURE'S
♥ BEAT**



SEASONAL OUTLOOK

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Photo credit: R Kuschke

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Current conditions

Large parts of the summer-grain production region experienced relatively favorable conditions so far this summer. Late-winter to early summer was characterized by wetter than normal conditions over the western to southern interior, traditionally a late-summer rainfall region. The northeastern parts of the summer rainfall region, where rainfall tends to reach a maximum earlier in the summer, experienced relatively dry conditions, but a few rainfall events resulted in favorable planting conditions into Mpumalanga. Recently, more widespread rainfall also spread into the northeastern half of South Africa. Going forward, relatively wet conditions are expected to occur, according to medium-term outlooks, over large parts as we approach December.

Because seasonal forecast systems consider Sea Surface Temperatures (SSTs) as a major factor to predict coming conditions, it is worthwhile to take note of current SST anomalies. In general, current patterns reflect anomalies usually associated with higher rainfall than the norm over southern Africa – and lower rainfall over Equatorial East Africa. Most importantly, these include:

- Anomalously cool SSTs over the central equatorial parts of the Pacific Ocean. These are at La Niña thresholds and indicative of a weak La Niña in progress.
- The Subtropical Indian Ocean Dipole (SIOD) pattern is positive, (relatively warm water south of Madagascar, cooler than normal water further northeast). This positive phase of the SIOD suggests a further positive effect as there exists a positive association between rainfall over the South African summer rainfall region and the Subtropical Indian Ocean Dipole.

Given the current SST anomaly patterns across the Globe, seasonal forecasts from most international institutions favor La-Niña-like rainfall patterns over sub-Saharan Africa. These include anomalously wet conditions expected over the summer rainfall region of South Africa for most of the coming summer, with the temperature outlook calling for normal to below-normal maximum temperatures, associated with the expected wetter conditions and more extensive cloud cover than normal.

El Niño / La Niña and seasonal forecasts

The Australian Bureau of Meteorology points out that La Niña conditions may strengthen.

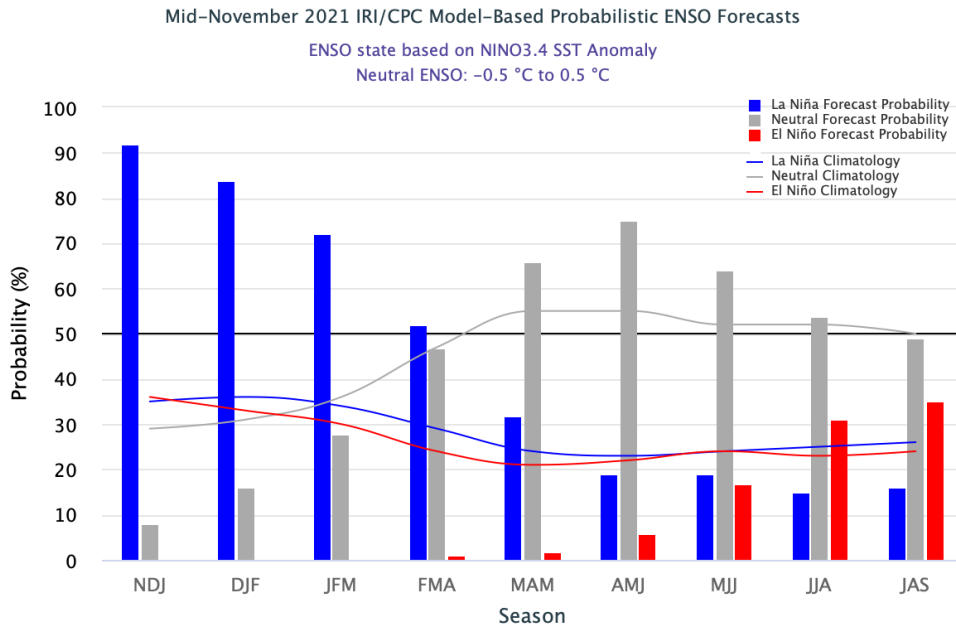
(Updated 23 November): Key atmospheric and oceanic indicators of the El Niño–Southern Oscillation (ENSO) show an established La Niña. Tropical Pacific Sea surface temperatures (SSTs) are close to La Niña thresholds, with models indicating further cooling is likely. Atmospheric indicators including the Southern Oscillation Index (SOI), trade wind strength, and equatorial cloudiness have demonstrated a response to this oceanic cooling and are typical of La Niña conditions. The latest 90-day SOI ending 21 November was +8.6.

The current model outlooks suggest this La Niña will persist until the late southern hemisphere summer or early autumn 2022. All models surveyed by the Bureau indicate SSTs will meet NINO3.4 La Niña thresholds in December and January with a majority also predicting thresholds will be met in February 2022.....*Australian Bureau of Meteorology* - <http://www.bom.gov.au>

The International Research Institute for Climate and Society (IRI) also expects La Niña conditions to strengthen.

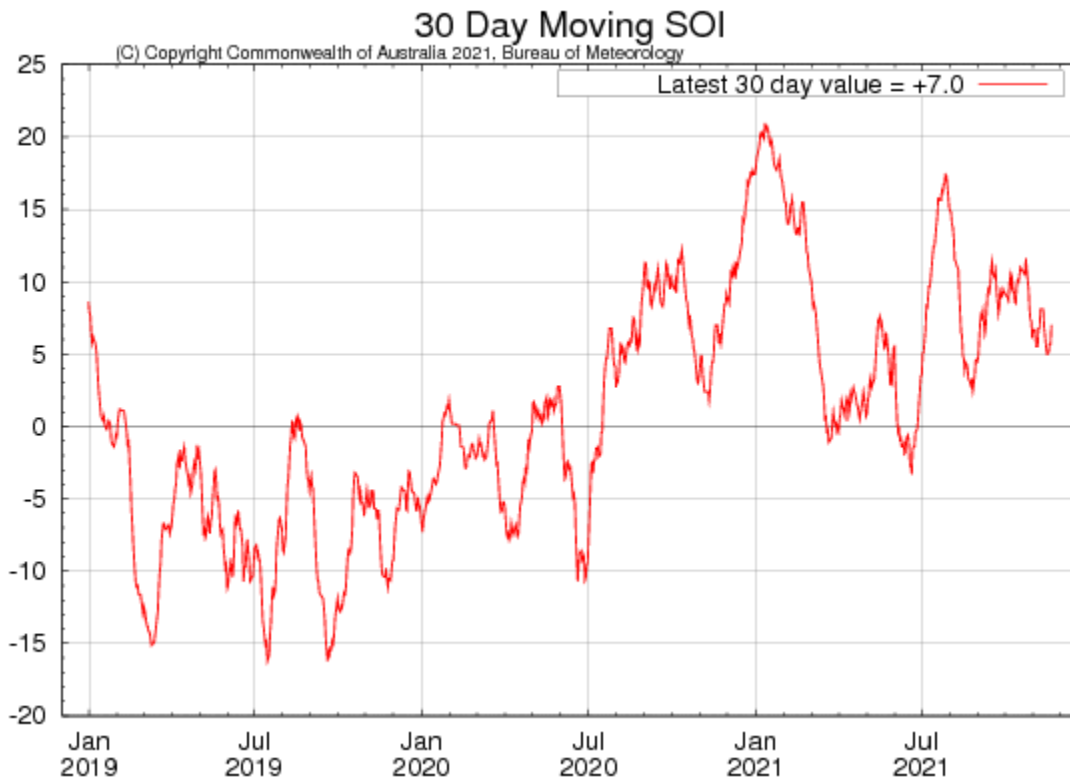
According to the IRI (Updated 19 November): In mid-November, Sea Surface Temperatures remain well below normal (-0.8C) in the central-eastern equatorial Pacific. The evolution of key oceanic and atmospheric variables is consistent with La Niña conditions, and therefore, a La Niña Advisory remained in place for Nov 2021. A large majority of the models predict SSTs to cool further or stay below-normal during boreal winter, and then return to ENSO-neutral levels during spring. Similar to the most-recent official CPC/IRI ENSO Outlook issued on November 11, this objective model-based ENSO outlook also anticipates a continuation of the La Niña event with high probability during Nov-Jan, persisting until Feb-Apr, with a return

to ENSO-neutral conditions with high probabilities for rest of the forecast period (see bar-graph below).... *International Research Institute for Climate and Society- <http://iri.columbia.edu/>*



International Research Institute for Climate and Society- <http://iri.columbia.edu/>

Likelihood for La Niña (blue) of El Niño (red) conditions during the next few months, showing the IRI's expectation of La Niña conditions to continue into our mid-summer.



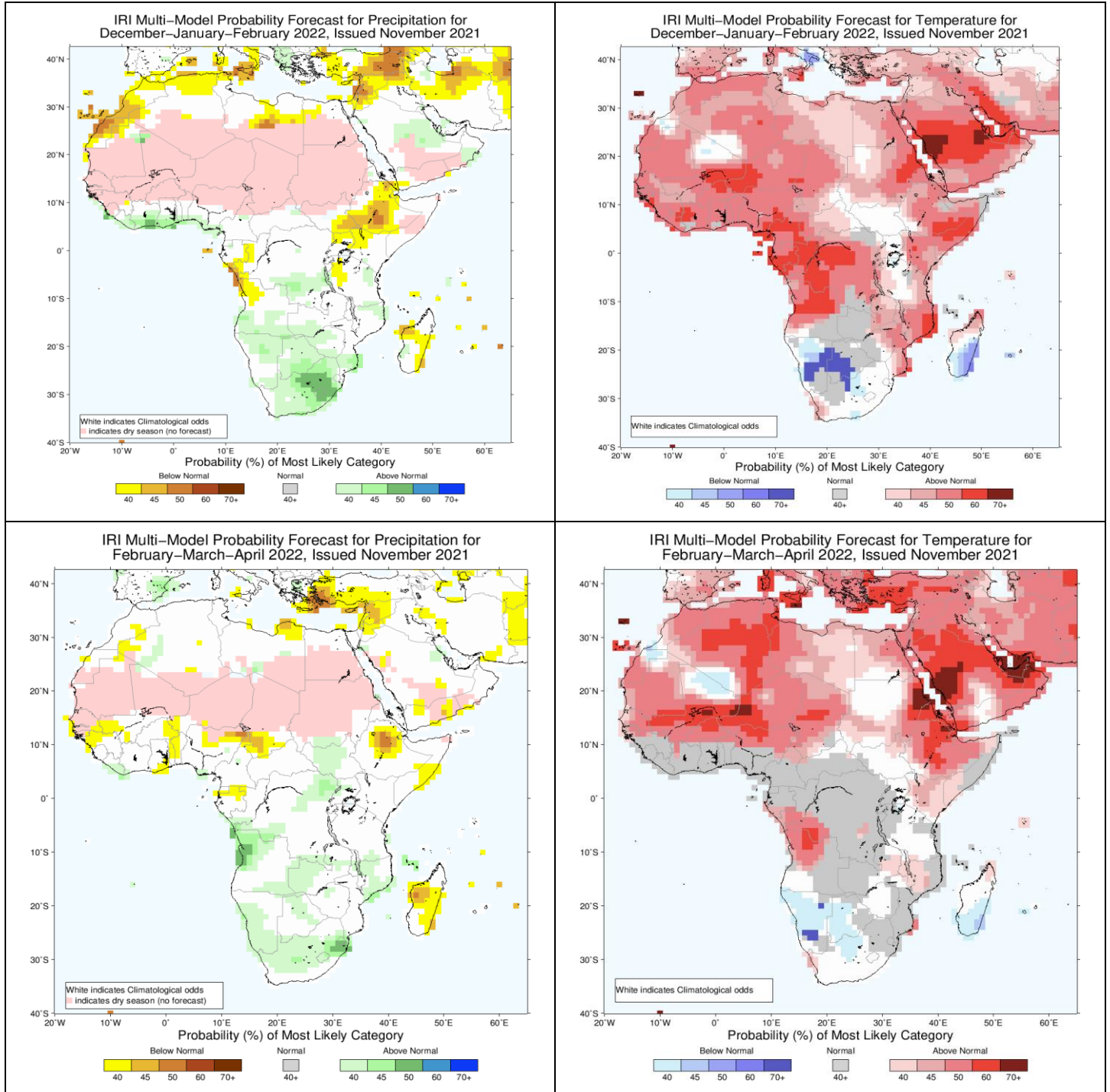
Australian Bureau of Meteorology - <http://www.bom.gov.au>

The Southern Oscillation Index is positive and within the La Niña threshold (larger than +7), indicating atmospheric circulation patterns consistent with La Niña conditions.

Seasonal forecasts issues by various international institutions

IRI

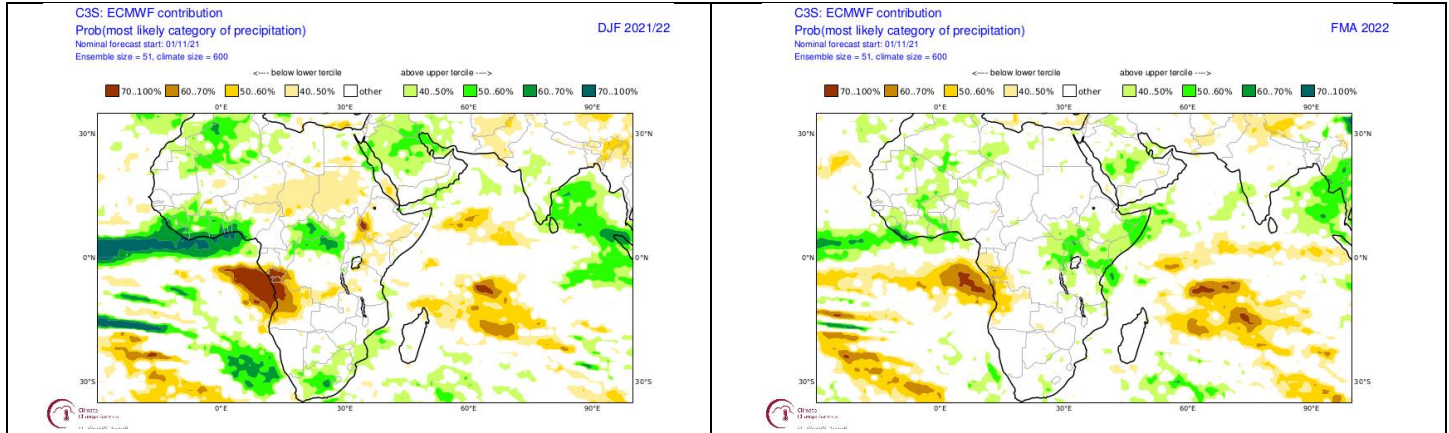
The seasonal forecast by the IRI for Africa favours relatively wet conditions for both early and late summer 2021/22 over South Africa, with the wet signal somewhat stronger during the December-February period than for the February – April period. Coupled with the relatively wet conditions expected over the interior, temperatures are expected to remain near normal to below normal. An exception is the West Coast where warmer conditions are expected, related to stronger easterlies that support summer rainfall over the interior.



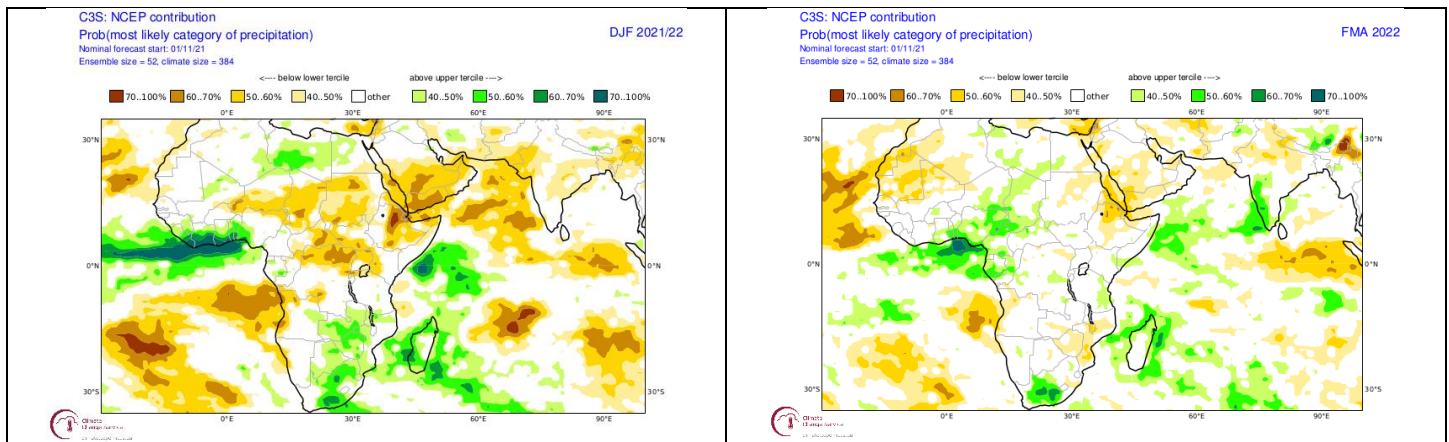
Probabilistic forecasts for rainfall (left) and temperatures (right) for mid-summer (October – December 2021/22; top) and mid-to-late summer (December – February 2022; bottom) (Forecast issued in 2021-11 by the IRI - <http://iri.columbia.edu/>).

ECMWF, NCEP, UKMO

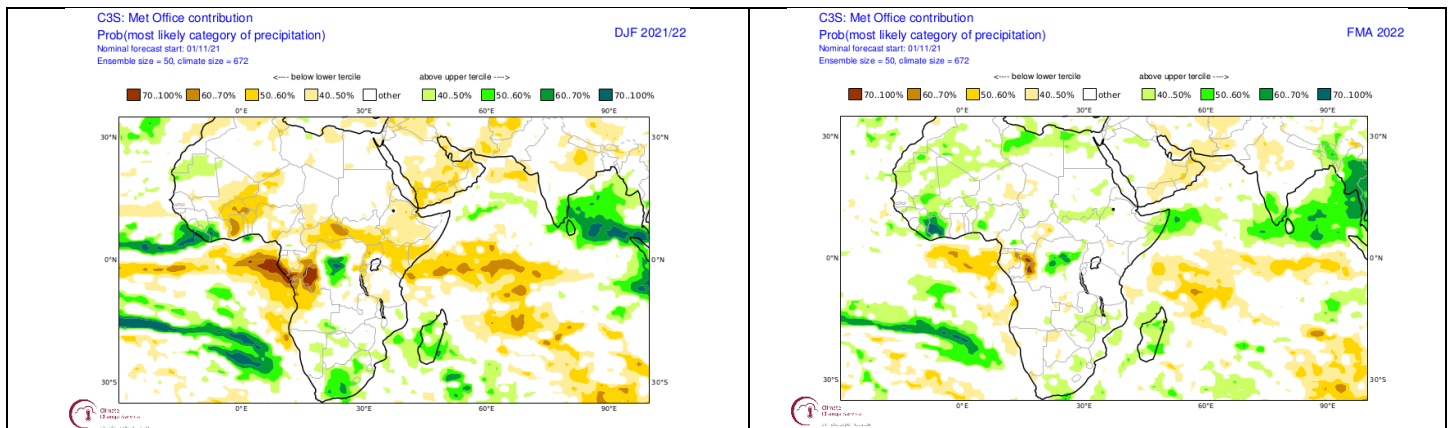
Seasonal forecasts by these institutions, as published by the COPERNICUS Programme (<https://climate.copernicus.eu/seasonal-forecasts>) for both mid-summer and late summer, reflect similar patterns with regards to rainfall for southern Africa as those by the IRI. The signal for relatively wet conditions over the summer rainfall region of South Africa is somewhat stronger for mid-summer than late summer (FMA). This is partly associated with the observed moderate La-Niña.



Probabilistic forecasts by the European Centre for Medium-Range Weather Forecasts for rainfall for mid-to-late-summer (December - February 2021/22; left) and late summer (February-April 2022; right) (Forecasts issued in 2021-11).



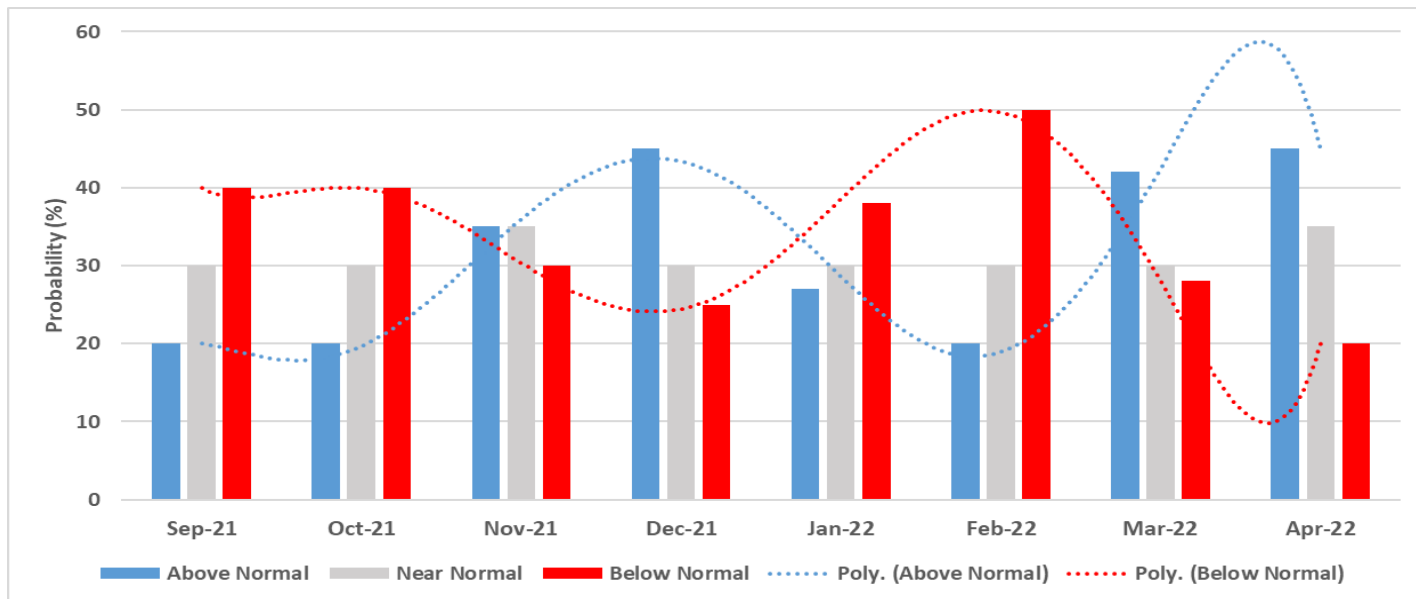
Same as above, but forecasts issued by the National Centres for Environmental Prediction.



Same as above, but forecasts issued by the UK Met Office.

CUMULUS seasonal outlook, based on decadal variability

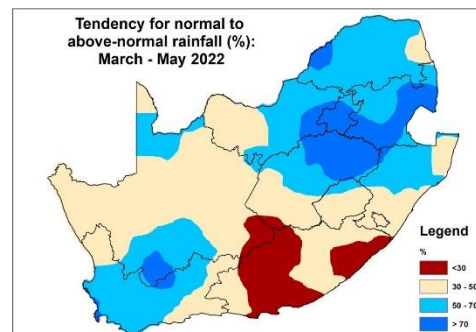
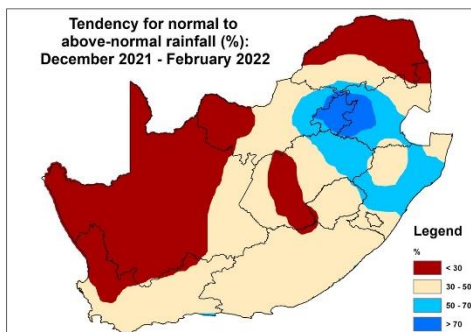
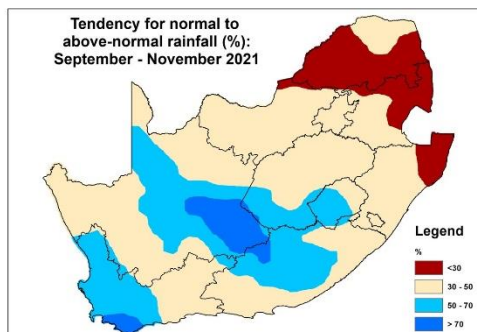
This outlook is based on the typical observed rainfall patterns over the **north-eastern half** of the country (including most of the summer grain production region), as associated with the cyclic variability of the global climate system. Summers that are similar to 2021/22 more often experience a seasonal rainfall curve that compares to normal conditions as indicated in the bar graph below, with wetter conditions focussing on December and March while drier than normal conditions focus on October and February:



Probabilistic forecast for rainfall over the summer rainfall region, based on the natural cyclic nature of the climate system as seen in decadal variability, per month for the period September 2021 – April 2022 (Forecast issued in 2021-09).

Typical patterns during similar summers, over the north-eastern half of the summer rainfall region, are:

- September – 20 October: Relatively dry conditions over the north-eastern half of the summer rainfall region
- 20 October – 20 November: Near-normal rainfall over the north-eastern half of the summer rainfall region
- 20 November – 15 January: Near-normal to above-normal rainfall over the north-eastern half of the summer rainfall region
- 15 January – late February: Below-normal rainfall over the north-eastern half of the summer rainfall region
- March - April: Above-normal rainfall over the north-eastern half of the summer rainfall region



Typical patterns during summers analogous to 2021/22: Early summers during similar years tend to be relatively wet over the western parts of the country while drier than normal over the north-eastern parts of the country (map on the left). During December – February, relatively dry conditions tend to occur over the western and northern parts while rainfall tends to be above normal over parts of the eastern interior and into KZN (map in the centre). By late summer (March – May – map on the right), similar years tend to see above-normal rainfall over large parts of the summer rainfall region.

Sources of information

Seasonal forecasts: Published by the COPERNICUS Programme (<https://climate.copernicus.eu/seasonal-forecasts>)

Rainfall, temperature and wind maps over South Africa for the past week:

Agricultural Research Council - Institute for Soil, Climate and Water (ISCW) – Climate Data Bank. Data recorded by the automatic weather station network of the ARC-ISCW.

Vegetation condition maps: Copernicus Global Land service, distributed by VITO.

Information related to: ENSO, IOD and SOI:

Australian Bureau of Meteorology - <http://www.bom.gov.au>

Climate Prediction Center - <http://www.cpc.ncep.noaa.gov>

International Research Institute for Climate and Society- <http://iri.columbia.edu/>

Information related to the SAM:

The Annular Mode Website - <http://www.atmos.colostate.edu/ao/index.html>

SST map:

NOAA Climate Prediction Center - <http://www.cpc.ncep.noaa.gov>

Daily conditions over South Africa:

CSIR NRE (National Resources and the Environment)

“CSIR NRE produces forecasts on an experimental basis, doesn’t guarantee the accuracy of the daily forecasts and cannot be held accountable for the results of decisions taken based on the forecasts”

Tropical cyclone/hurricane/typhoon information:

Weather Underground - <http://www.wunderground.com>

Cooperative Institute for Meteorological Satellite Studies (CIMMS) - Tropical Cyclone Group -<http://tropic.ssec.wisc.edu/>

Tropical Cyclone Centre La Reunion -http://www.meteo.fr/temps/domtom/La_Reunion/webcmrs9.0/anglais/index.html

Information on drought conditions over the USA:

NOAA National Weather Service - <http://www.weather.gov>

United States Drought Monitor - <http://droughtmonitor.unl.edu>

Precipitation and temperature outlooks for the coming week:

Center for Ocean-Land-Atmosphere Studies (COLA) and Institute of Global Environment and Society (IGES) – <http://Wxmaps.org>

“COLA and IGES make no guarantees about and bear no responsibility or liability concerning the accuracy or timeliness of the images being published on these web pages. All images are generated by COLA and do not represent the actual forecasts issued by the National Weather Service. These products are not a substitute for official forecasts and are not guaranteed to be complete or timely. The underlying data are the direct product of the various operational forecast models.