



**National Agro-meteorological Committee (NAC) Advisory on the
2022/23 summer and autumn seasons
Statement from Climate Change and Disaster Risk Reduction
07 DALRRD 2022**

04 April 2023

Considering the seasonal climate watch as produced by the South African Weather Service (SAWS), the following advisory guidelines are suggested. It is emphasized that these advisories are broad guidelines and should be interpreted considering the local aspects of the region such as soil types, cultural preferences, and farming systems. Depending on the region, the prioritization of the guidelines will differ. The basic strategy to follow would be to minimize and diversify risk, optimize soil water availability and to manage the renewable resources (rainwater and grazing) to uphold sound farming objectives. Long-term mitigation strategies should be considered by implementing techniques to enhance in-field water harvesting by reducing run-off and improving infiltration. Reduced tillage methods are very important in this regard, as is basin tillage, to capture rainwater in the drier areas. **The provinces should further simplify, downscale and package the information according to their language preference and if possible, use local media and farmers' days to disseminate the information. Users are advised to be on the look-out and act on the daily extreme weather warnings as well as the monthly advisory.**

I. CURRENT CONDITIONS

Figure 1

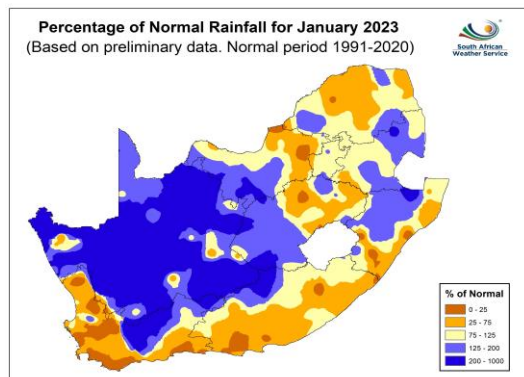


Figure 2

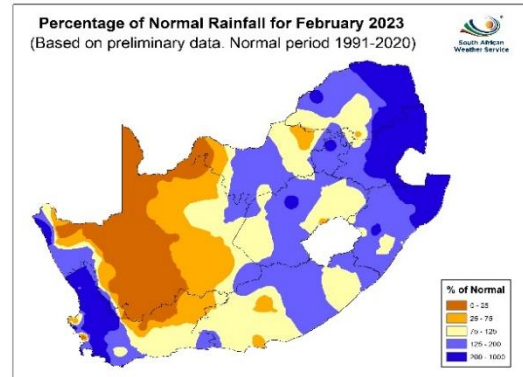


Figure 3

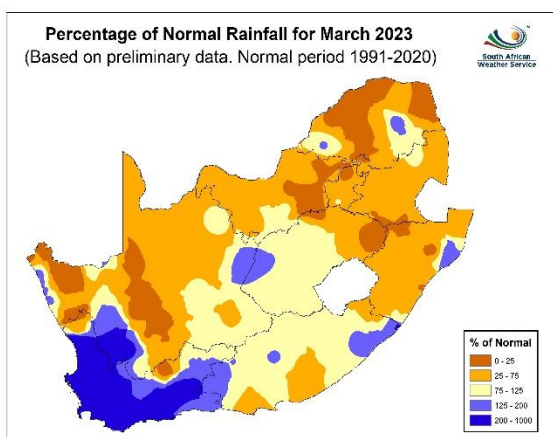
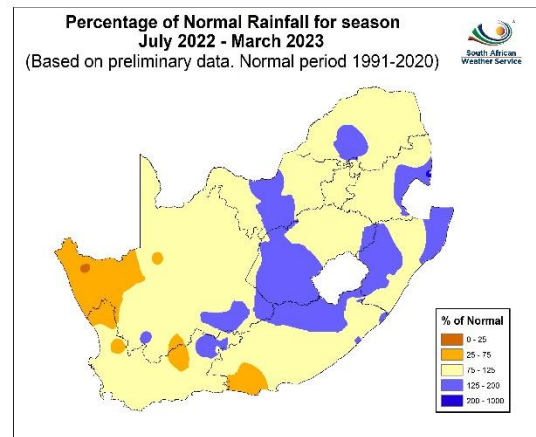
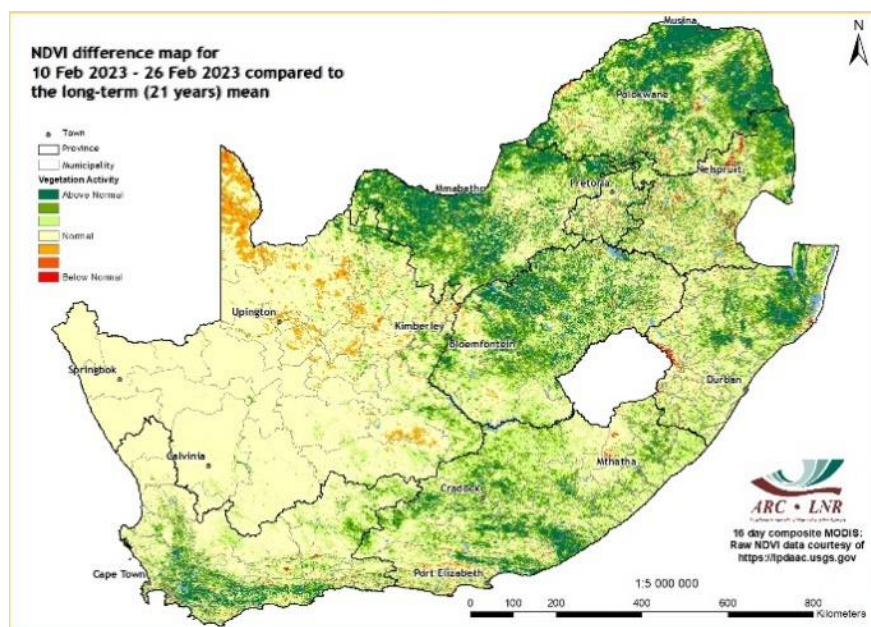


Figure 4



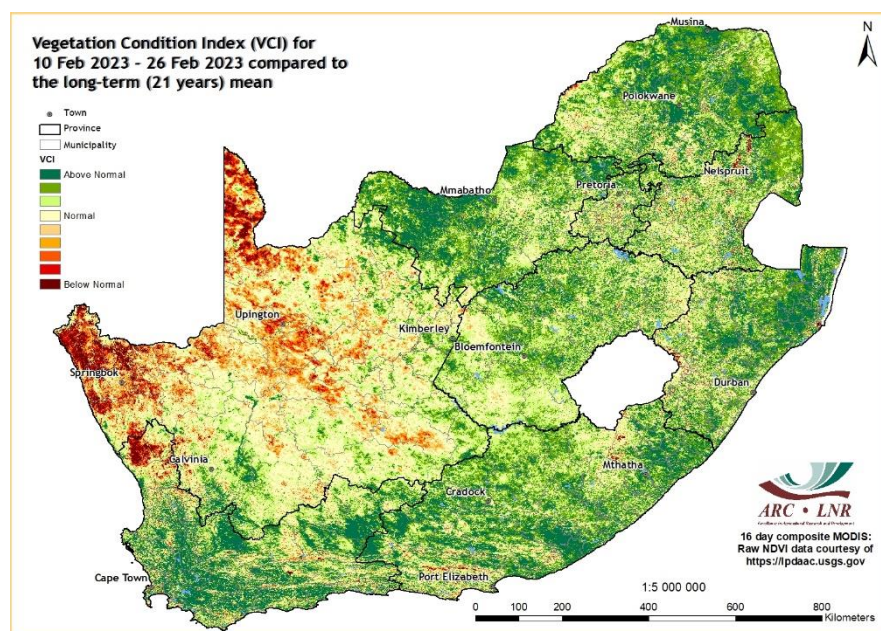
In January, above normal rainfall was received over most of the western interior of the country, parts of KwaZulu-Natal and Mpumalanga. The remainder of the country received near normal to below normal rainfall (**Figure 1**). In February, above normal rainfall was received over the eastern half of the country and over the extreme western parts of the country. Other parts of the country received near normal to below normal rainfall (**Figure 2**). In March above normal rainfall was received over the south-western parts of the country becoming normal over most of the Eastern Cape and Free State (**Figure 3**). The remainder of the country received below normal rainfall. For the season July 2022 – March 2023, above normal rainfall was received in the central parts of the country while other parts of the country received near normal rainfall (**Figure 4**). Some areas in the Northern Cape, Western Cape and south-western parts of the Eastern Cape received below normal rainfall.

NDVI map: 10 – 26 February 2023 compared to the long-term mean



Compared to the historical averaged vegetation activity, the 16-day NDVI map for February shows that parts of the Northern Cape experienced below-normal vegetation activity. Other areas around the country experienced normal to above-normal vegetation activity.

VCI map: 10 – 26 February 2023 compared to the long-term mean



The 16-day VCI map for February compared to the long-term mean indicates below-normal vegetation conditions in the Northern Cape. The remainder of the country experienced above-normal vegetation conditions.

(The VCI is a better indicator of water stress than the NDVI).

II. CONDITIONS IN THE PROVINCES DURING FEBRUARY/MARCH

Eastern Cape

NIL REPORT.

Free State

Normal to above normal rainfall was received. The veld condition has grown due to good rains received. However, it is starting to wilt especially in valleys and swamps because of the seasonal change. Livestock condition is very good. Farmers are advised to continue with supplementary feeding as the winter season is approaching and dosing of flocks against internal parasites and pulpy kidney. Autumn pastures are in excellent condition especially those that are under irrigation. They are green and have developed good growth and bulk development. The average level of major dams has decreased as compared to the previous year during the same period (100% in 2023; 104% in 2022).

Gauteng

Above normal rainfall was received. The veld and livestock are in good condition. Farmers have been advised to put measures in place for pests and diseases on livestock. The average level of major dams has slightly decreased as compared to the previous year during the same period (100% in 2023; 101% in 2022).

KwaZulu-Natal

Above normal rainfall was received over most parts. The veld and livestock conditions are good. Summer crops are in various stages of ripening, but some are still affected by water logging and assessments of these areas continues. Crops that have been planted early in the season look ready for harvesting whereas those planted late are not yet ready. The summer pasture season is slowly coming to an end, and most farmers have already started baling. Incidents of veldfires have been reported in the province and farmers were advised to put precautionary measures in place to prevent further impact. The average level of major dams has increased as compared to the previous year during the same period (90% in 2023; 88% in 2022).

Limpopo

Normal to above normal rainfall was received. Farmers in most areas under irrigation have harvested their vegetable crop and dry land farmers continues to harvest late summer crops. Improved conditions of livestock were observed in areas where grazing has improved. Farmers are continually advised to buy feeds to supplement and to destock older animals to prevent mortalities and production losses. The veld condition is improving due to good rains received and is in reasonable condition in all districts. There were reports of flooding in the Waterberg district where damages incurred was waterlogged soil in grazing areas. The province continues to monitor these areas. The average levels of major dams has increased to 90% in 2023, as compared to 88% of 2022.

Mpumalanga

Above normal rainfall was received. Grain crops are growing well and are in good condition, except those that were affected by floods. Harvesting of vegetables continues. Livestock is in fair to good condition. Irrigated pastures are in good condition and growing well, while in other areas the veld condition is fair to good following rain received. The average level of major dams has increased to 99% in 2023 compared to 93% in 2022 during the same time.

Northern Cape

NIL REPORT.

North West

Mostly normal to above normal rainfall was received. Crops are in reasonable to poor condition because of the January hot conditions. The veld and livestock are in reasonable condition. Mortalities were experienced due to lightning in Ngaka Modiri Molema and Dr Ruth Segomotsi Mompati Districts. The province continues to monitor these areas and issues warnings in this regard. The average level of major dams has increased as compared to previous year during the same period (87% in 2023 and 74% in 2022).

Western Cape

Above normal rainfall was received in the western part of the province, with normal to below normal rainfall in the south eastern and central parts of the province. The average minimum and maximum temperatures were normal. The fruit harvest season is progressing very well. Apples, pears, table, and wine grapes are currently being harvested. Damage to fruit by incidents of hail and strong winds was reported in the Witzenberg Valley (Ceres) and the Langkloof and farmers were encouraged to be on the look-out of these conditions to protect their fruits. Veld and planted pasture conditions is mostly normal, with below normal conditions in Matzikama, Little and Central Karoo. Livestock is in a reasonable condition as farmers continue to provide supplementary fodder. Outbreaks of bluetongue in livestock were reported in the West Coast District, which is normal for this time of the year with the increase in vectors such as muggies after the rains and higher temperatures. The warm and dry weather conditions caused various wildfires. The average level of major storage dams has decreased to 52%, compared to 61% in 2022.

Information on level of dams is obtained from the Department of Water and Sanitation

Available: <https://www.dwa.gov.za/Hydrology/Weekly/Province.aspx>

Dam levels as at 2023/03/27

III. AGRICULTURAL MARKETS

Livestock domestic markets

FNB stated that meat prices are expected to follow the normal seasonal upside into the easter period, but gains will be limited due to the deteriorating consumer welfare with food inflation at a 15-year high. The summer season is expected to end on a positive note with good build-up of grass cover ahead of winter in a few months. Favourable production conditions will boost background efforts in an environment of elevated feed costs. However, the lingering El Nino weather pattern in recent forecasts poses upside risk to prices in the longer term as a deterioration in conditions may derail herd rebuilding and induce stock liquidation.

Producer prices for selected livestock commodities	Beef	Mutton	Pork	Poultry
Open market: Class A / Porker / Fresh whole birds (R/kg)	54.25	84.08	33.08	33.80
Open market: Class C / Baconer / Frozen whole birds (R/kg)/mutton	47.89	63.58	34.45	33.12
Contract: A2/A3* / IQF (*includes fifth quarter) (R/kg)	54.04	83.78	-	32.35
Import Parity (R/Kg)	53.90	93.64	45.72	33.05
Weaner Calves / Feeder Lambs (R/kg)	34.50	39.74	-	-

FNB: 2023/03/23

Major grain commodities

According to ABSA, the SAFEX maize prices traded sideways. Prices continue to trade below both U.S. and Argentina export parity prices, while SAFEX wheat prices followed global price decreases,

decreasing by 2.2%. On the local oil seed market SAFEX Soybean prices increased by 3.9%; they are 1.4% higher compared to a month ago.

	Future Prices (2023/03/28) R/ton				
Commodity	Mar-23	May-23	Jul-23	Sep-23	2023/12
White maize	3 995.00	3 965.00	3 885.00	3 967.00	4 081.00
Yellow maize	4 056.00	4 096.00	4 084.00	4 158.00	4 251.00
Wheat	6 672.00	6 699.00	6 738.00	6 664.00	6 499.00
Sunflower	8 672.00	8 712.00	8 950.00	9 185.00	9 397.00
Soybeans	8 236.00	8 246.00	8 392.00	8 506.00	8 676.00

SAGIS: 2023/03/30

IV. SADC REGION

The February Famine Early Warning Systems Network (FEWS NET) reported that as the lean season peaks across the region, Crisis (IPC Phase 3) outcomes are present across typically deficit-producing areas of Zimbabwe and Lesotho, southern parts of Malawi, southwestern Angola, conflict-affected areas of Cabo Delgado in Mozambique, and in Kasai, Maniema, Tanganyika, Ituri, and North and South Kivu in the DRC. However, some households in Rutshuru and Djugu, DRC, are experiencing significant food consumption gaps and are likely in Emergency (IPC Phase 4) due to the impact of the conflict. In surplus-producing areas of Zimbabwe, Malawi's central and northern regions, and much of DRC and Mozambique, Stressed (IPC Phase 2) and Minimal (IPC Phase 1) outcomes are expected. The start of the harvest season in March and April is expected to improve access to staple food crops for poor households across southern Africa. In January, main-season cereals are in vegetative to reproductive stages, but crop conditions are mixed due to variations in rainfall across the region. Throughout January, dry and hot conditions negatively impacted crops in southern Angola, Zimbabwe, Mozambique, and northern and eastern Madagascar. In western areas of southern Africa, delayed planting may negatively impact the 2023 harvest due to the limited growing window. The dry spells also affected agricultural activities like weeding and fertilizer application, reducing labor and income opportunities for poor households. Additionally, labor demand and wage rates for labor remain below normal across many parts of the region due to lower-than-normal liquidity for better-off households.

FEWS NET further reported that in the DRC, clashes continue between M23 and local militias in Rutshuru and Masisi despite the recently signed Luanda accords, which recommend that the M23 rebels, among others, withdraw from conquered territories. The ongoing conflict is continuing to displace households. In early January 2023, nearly 1,000 newly displaced households were received in the Kanyarutshinya camp in Nyiragongo. According to OCHA, 554,000 people have been displaced since the beginning of the M23 crisis, with little likelihood of participating in the next agricultural season. Maize prices in January continued to rise seasonally, with prices remaining above last year's levels due to rising fuel and fertilizer costs and depreciating domestic currencies. Price increases are expected to continue through February but are likely to ease with the start of the green harvest in March. Although most economies are probably past peak inflation levels, the deceleration is expected to be slow. Operational challenges related to power cuts and energy price adjustments in Zambia, Zimbabwe, South Africa, Lesotho, and Malawi are also impacting domestic prices of food and non-food needs.

[The Integrated Food Security Phase Classification (IPC) is a set of standardized tools that aims at providing a "common currency" for classifying the severity and magnitude of food insecurity.]

Source: <http://www.fews.net/southern-africa>

Summary of the reports

Above normal rainfall was received in the central and eastern parts of the country in February. In March the rainfall decreased in most summer rainfall areas, while the Western Cape received above normal rainfall. Crops are in reasonable condition while others have been impacted by floods that occurred earlier in the year and the dry and hot temperatures that occurred in January. As the veld has recovered in most summer rainfall areas, the fuel load will present a concern towards the winter season for conditions favourable for veld fires. The veld and livestock are in reasonable to good condition. Livestock mortalities were reported in North West province due to lightning. There were veld fires in KwaZulu-Natal and Western Cape. The average level of major dams across provinces has increased in most provinces but decreased in the Western Cape, Northern Cape, and the Free State provinces.

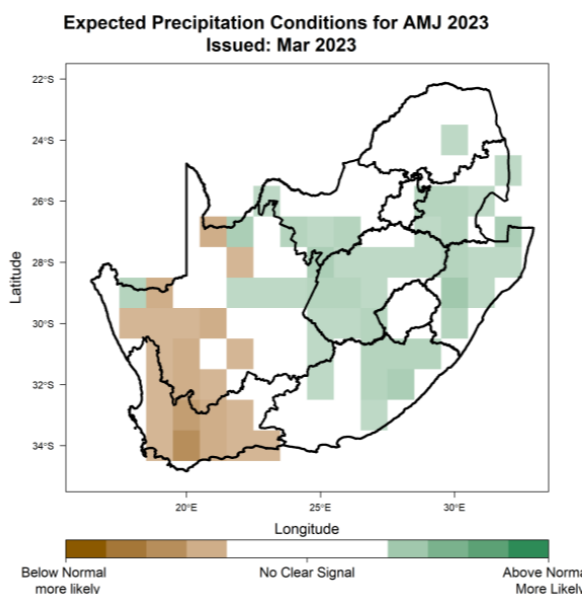
IV. MONTHLY CLIMATE OUTLOOK

Seasonal Climate Watch: April to August 2023

State of Climate Drivers

The El Niño-Southern Oscillation (ENSO) is currently in a La Niña state, and forecasts indicate that it will likely return to a neutral state by autumn (Mar-Apr-May). However, ENSO's impact is limited for the coming seasons until the next summer season which may be impacted by an El Nino state if early predictions are correct. Caution is advised however as changes in the ENSO prediction may change during winter and only monitoring is advised at this stage.

Figure 1 – Rainfall



The multi-model rainfall forecast indicates above-normal rainfall for the north-east of the country and below-normal rainfall for the south-west during all predicted seasons. As most of the rainfall during winter is expected in the far south-west, the below-normal rainfall conditions in those areas are expected to have a significant impact.

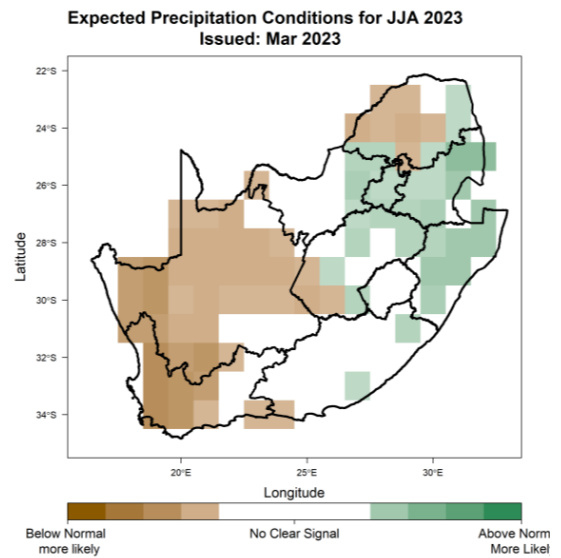
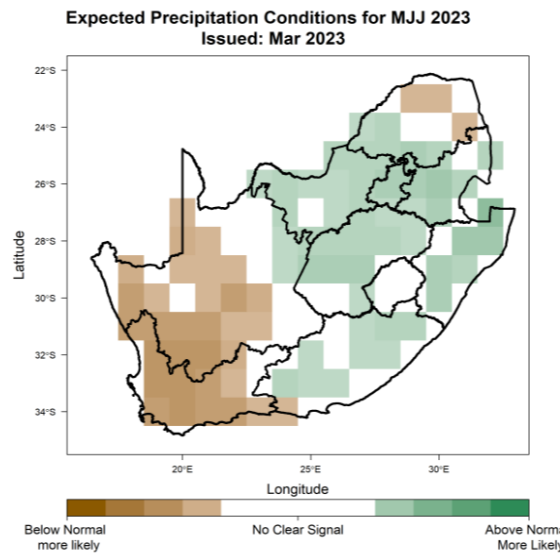
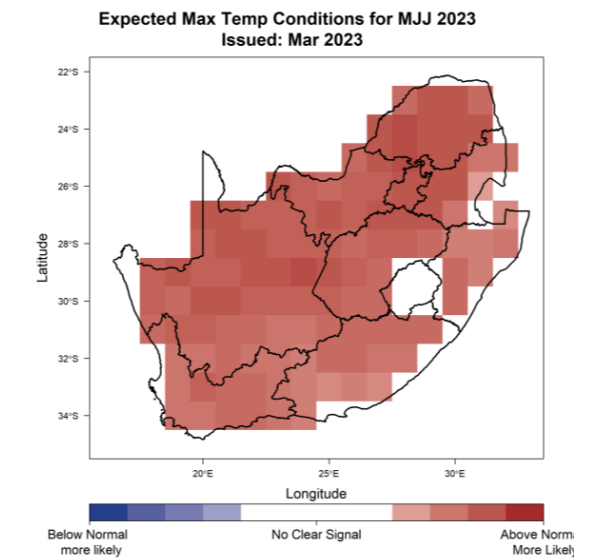
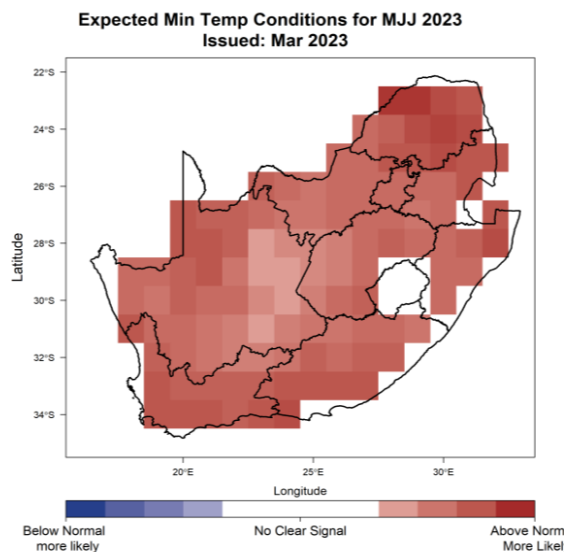
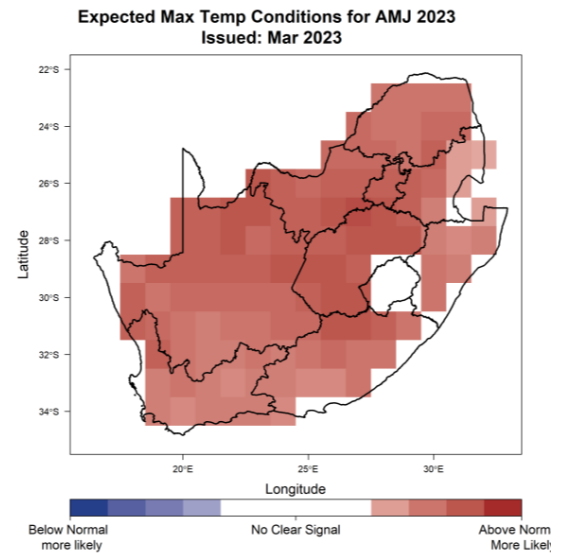
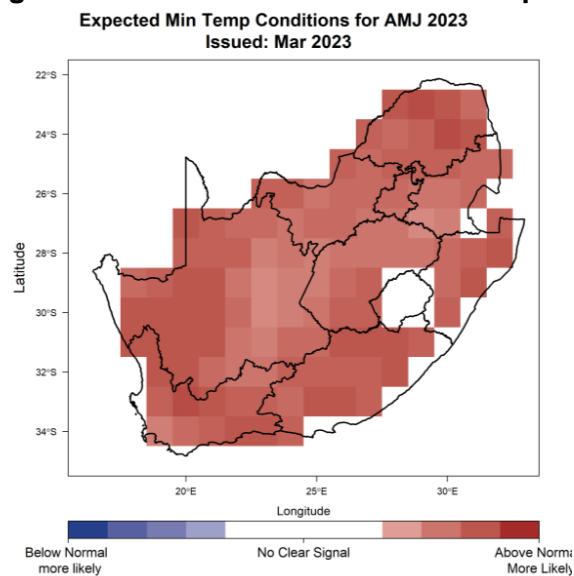
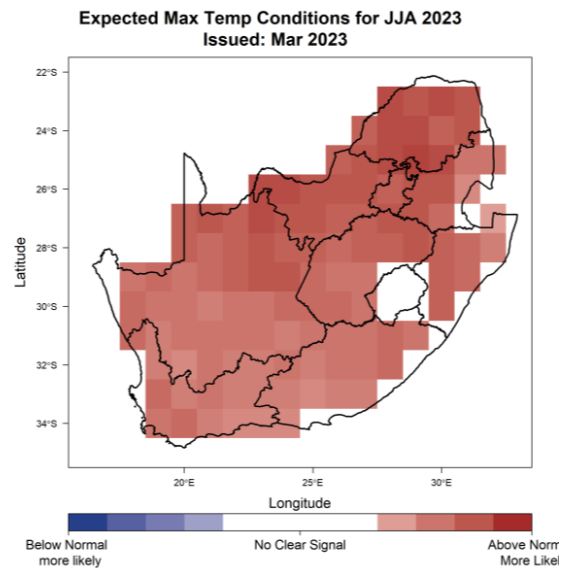
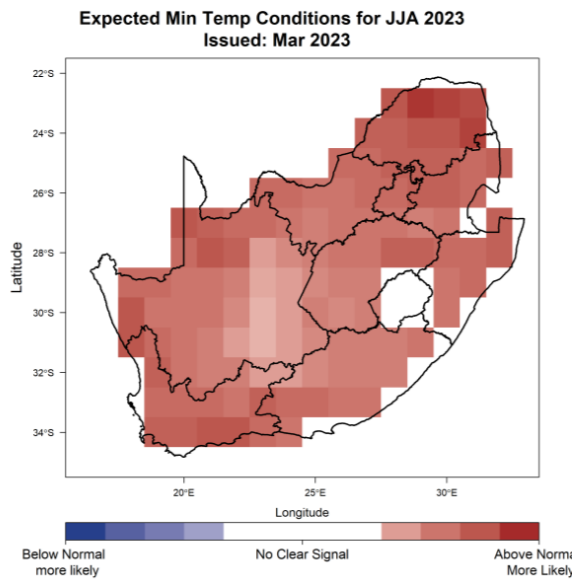


Figure 2 – Minimum and Maximum temperatures





Minimum and maximum temperatures are expected to be mostly above-normal countrywide for the forecast period.

In summary, below normal rainfall is anticipated in winter rainfall areas during autumn and winter. Above normal rainfall is expected in the northeastern parts of the country. Temperatures are expected to be above normal. Farmers are encouraged to continually check updates i.e., seasonal forecasts and utilize 7-day weather forecasts for short term planning.

With the above forecast in mind, the following strategies are recommended:

V. SUGGESTED STRATEGIES

A. Rain-fed crop production

Crop management:

- Control weeds regularly.
- Scout for pests and diseases regularly and control where necessary.
- Practice water harvesting techniques e.g., construction of basins, contours, ridges.

B. Irrigation farming

- Remove all weeds containing seeds but keep other vegetative rests on the land because that will reduce evaporation.
- Check and repair all tools and machinery especially where there are water leaks.
- Be aware of the state of regional water resources and whether it will be adequate for irrigation.
- Timing of irrigation - rather late afternoon or early evening to reduce evaporation.
- Manage irrigation so that the plant receives water only when needed.

- Consider using drip irrigation as it saves water by allowing it to drip slowly straight to the roots.
- Avoid over irrigation because that can create problems e.g., water logging and diseases.
- Adhere to water restrictions when issued.

C. Domestic and home garden water use

- Conserve existing water supplies.
- Eradicate water weeds.
- Limit water waste and losses.
- Repair leaking pipes.
- Re-use water and retain high quality.
- Harvest water during rainy days.

D. Stock farming

- Keep stocking rates conservative and even lower to protect grazing.
- Never exceed carrying capacity of plant associations.
- Provide lots of drinking points where possible.
- Provide additional fodder and enhance nutritional value of dry grazing/feed with licks:
 - Phosphorous deficiency is a major problem.
 - Licks should (in most cases) provide:
 - Phosphorous.
 - Urea (to help with the break-down of dry vegetation).
 - Salt.
 - Molasses.
- Deficiencies differ according to vegetation composition/soil properties/climate.
- Analysis of vegetation/soil samples can benefit the decision for supplement composition.
- Sell mature, marketable animals (to help prevent overstocking/ overgrazing).
- If grazing is in danger, herd animals into pens where different animals can be segregated and fed separately.

E. Grazing

- Subdivide your grazing area into camps of homogeneous units (in terms of species composition, slope, aspect, rainfall, temperature, soil and other factors) to minimise area selective grazing as well as to provide for the application of animal management and veld management practises such as resting and burning.
- Determine the carrying capacity of different plant associations.
- Calculate the stocking rate of each, and then decide the best ratios of large and small animals, and of grazers or browsers.
- Provide periodic full growing-season rests (in certain grazing areas) to allow veld vigour recovery to maintain veld productivity at a high level as well as to maintain the vigour of the preferred species.
- Do not overstock at any time to avoid overgrazing.
- Eradicate invader plants.
- Periodically reassess the grazing and feed available for the next few months and start planning.
- Spread water points evenly.

F. Pests and diseases

Crops

- Fruit crop farmers should regularly scout for pests and diseases and contact the local agricultural office for advice on best control measures. Farmers should further implement phytosanitary measures.

Livestock

- Follow the vaccine routine and consult with the local veterinarian.

G. Veld fires

Provinces and farmers are advised to maintain firebreaks in all areas. An owner of the land who is obliged to prepare and maintain a firebreak must ensure that, with due regard to the weather, climate, terrain and vegetation of the area, the following is taken care of in terms of installing firebreaks (Chapter 4 of the National Veld and Forest Fire Act No. 101 of 1998):

- It must be wide enough and long enough to have a reasonable chance of preventing a veld fire from spreading to or from neighbouring land.
- It does not cause soil erosion and
- It is reasonably free of flammable material capable of carrying a veld fire across it.
- Firebreaks may be temporary or permanent.
- Firebreaks should consist of fire-resistant vegetation, non-flammable materials, bare ground or a combination of these.
- Firebreaks must be in such a way as to minimize risk to the resources being protected.
- Erosion control measures must be installed at the firebreak.

Firebreaks can be made through the following methods:

- Mineral earth firebreak:
 - Through ploughing, grading, other earth movement.
- Use of herbicides.
- Use animals to overgraze specifically to minimise fuel.
- Strategic placement of burned areas,
 - Not to be done on days with fire hazard (windy and dry/hot).
- Plant fire resistant plants.
- Plant species selected for vegetated firebreaks must be non-invasive and capable of retarding the spread of fire.

Maintaining firebreaks:

- Mow, disk, or graze vegetative firebreaks to avoid a build-up of excess litter and to control weeds.
- Inspect all firebreaks for woody materials.
- Inspect firebreaks at least annually and rework bare ground firebreaks as necessary.
- Repair erosion control measures as necessary.
- Access by vehicles or people must also be controlled.
- Bare ground firebreaks, which are no longer needed must be stabilized i.e.
 - Sow grass.
 - Mulch.

What to do when conditions favorable for veld fire are forecast:

- Prohibit fires in the open-air during periods of high fire hazard and establish a fire control committee.
- To control fires, an alarm system, firefighting teams, and beaters must be organized in advance and plans prepared.
- Livestock should be moved out of grazing land to a safe place.

What to do during a veld fire:

- Water is generally not available in sufficient quantities or at adequate pressure for the control of major fires; however, sand, or other loose mineral soil material can be an effective method of control.
- Tree branches can be used to beat fire.

H. Flooding

Heavy rainfall raises the water level. When the water level is higher than the riverbanks or the dams, water flows out from the river and flooding occurs.

Preventive measures:

- Construction of proper drainage systems. Drains must be cleaned constantly as they ensure proper water irrigation.
- Mechanical land treatment of slopes such as contour ploughing or terracing to reduce the runoff coefficient.
- Construction of small water and sediment holding areas.
- Construction of floodways (man-made channels to divert floodwater).
- Terracing hillsides to slow flow downhill.
- Water pumps in rivers likely to be affected should be lifted from the riverbanks when a warning for heavy rain has been issued.

What to do when flooding is forecasted:**Avoid:**

- Cutting grass in the rainy season as this can result in nutrient depletion.
- Applying fungicides and pesticide (plants and animals).
- Applying Nitrogen fertilizer as this can burn plants. Dumping fertilizer in one spot can cause the roots below the fertilizer to be burnt and die.
- Irrigation, this can result in waterlogging leading to nutrient depletion.

Other measures to implement:

- Cover Urea licks to prevent them from becoming toxic.
- Provide shelter for animals (young ones can die easily).
- Leave cultivated areas coarse.
- Relocate/ move animals to a safe place.
- Be extra cautious for pest and diseases after rain has fallen, as high moisture content and high temperatures may trigger these.

- Assume that flood water contains sewage and might be harmful for human and livestock consumption.
- Before leading livestock across a river, check whether the water level is rising. This is especially necessary if it is already raining.

Erosion

Erosion is the wearing away of soil and rocks by the action of natural forces, for example, water and wind. The loose and dissolved materials move from one location to another. Erosion therefore may reduce agricultural production potential.

Preventative measures for erosion:

- Do not burn vegetation.
- Keep vegetation cover – e.g., shrubs, grass, small trees; a cover crop may be used to increase organic material and increase soil structure.
- Plant permanent vegetation e.g., perennial grasses where possible.
- Maintain any remaining vegetative cover, e.g. maize stubble during winter wheat sowing, as it acts as a blanket, traps eroded particles and reduces the wind speed at ground level.
- Plant evergreen trees growing densely and perpendicular to the typical wind direction during winter and spring as wind breaks.
- Increase water infiltration by correct management of soil e.g. reduce frequency of plough and use minimum tillage.
- Mulch: to increase infiltration, reduce evaporation, and reduce raindrop impact as well as wind erosion.
- Construct retaining walls around gardens.
- Avoid soil compaction by roughening the soil surface,
 - Furrows and tillage ridges can trap loose soil.
- Farm along contours as this reduces slope lengths.
- Prevent overgrazing.
- Practice conservation farming
 - Maximize retention of crop residues.

I. Heat stress – bad for productivity

- Signs of heat stress:
Bunching in shade, high respiratory rates, open mouth breathing.
- What to do:
 - Offer shade.
 - Offer water- keep good quality water in front of animals.
 - Wet with sprinklers/fire hose.
 - Water ground.
 - Avoid overworking animals.
 - Control insects. Biting insects, such as flies can further stress livestock and interrupt their cooling. If pastures or buildings draw insects to livestock during times of extreme heat, provide proper insecticides or considering relocating your livestock.

Poultry

- Provide cool, clean, quality drinking water to your poultry. Water will help keep your birds cool.

- Always make sure your poultry is in a well-ventilated area in which there is nothing to obstruct the airflow.
- Provide feed during the coolest part of the day.
- Supplement drinking water with electrolytes.
- Reduce the number of birds kept in a house or in an area.
- Avoid excessive activity during the hottest part of the day.

J. Severe thunderstorms/flash floods

Building resilience:

- Identify resources/facilities within 50 km that can be utilized and can be of help during emergencies.
- Be sure to have legal and adequate markings to identify your livestock.
- Stay well informed about livestock in your possession and conduct an inventory after the event.
- Monitor television and local radio stations for information regarding severe storms/flash floods in your region.
- Identify natural or built areas/shelters where animals can be kept during such conditions
 - Sufficient height to be above water level,
 - Sheltered from strong winds and wetness,
- Restrict access to high-risk areas such as low-lying fields close to streams.
- Store food in safe areas sheltered from wetness to be used after storms/flash floods.
- Keep pesticides and other chemicals in areas where water will not be contaminated during extreme rainfall/storm events.
- Inspect/repair farm dams before rainy season, and after each event.

Crops are in reasonable to good condition; however, heatwaves and flooding earlier in the year damaged some crops in many summer rainfall areas. The veld and livestock are in reasonable to good condition in most areas. Below normal rainfall is anticipated in winter rainfall areas during autumn and winter but above normal in the northeastern parts of the country. Temperatures are expected to be above normal.

With the seasonal forecast in mind, farmers are advised to put measures in place for pests and diseases associated with wet and warm conditions. Moreover, it is important for farmers to follow the weather forecasts regularly to make informed decisions. Farmers using irrigation should comply with water restrictions in their areas. Farmers must continually conserve resources in accordance with the Conservation of Agricultural Resources Act 1983, (Act No. 43 of 1983).



Farmers are advised to keep livestock in balance with carrying capacity of the veld and provide additional feed such as relevant licks. Livestock should be provided with enough water points on the farm as well as shelter during bad weather conditions. Veld fires have been reported in some winter rainfall areas, and conditions remain favourable for veld fires. Therefore, the maintenance of fire belts should be prioritized as well as adherence to veld fire warnings. Episodes of flooding resulting from rain bearing weather systems have occurred and may continue; precautionary measures should be in place. Farmers are encouraged to implement strategies provided in the early warning information issued.

The users are urged to continuously monitor, evaluate, report, and attend to current Disaster Risk Reduction issues. It is very important and mandatory for farming communities to always implement disaster risk measures and maintain good farming practices.

The climate advisory should be disseminated widely. Users are advised to be on the look-out and act on the daily extreme weather warnings as well as the monthly advisory. Information sharing groups are encouraged especially among farming communities for sustainable development. In general, effective communication among all stakeholders in the sector will enhance effective implementation of risk reduction measures/early warning services. It is the responsibility of farmers to implement disaster risk measures.

The Disaster Management Act 2002, (Act No. 57 of 2002) urges Provinces, individuals, and farmers, to assess and prevent or reduce the risk of disasters using early warning information. The current advisory can be accessed from the following websites: <https://www.dalrrd.gov.za/>.

For more information contact:-

<p>DALRRD, Directorate: Climate Change and Disaster Risk Reduction Private Bag X250 Pretoria 0001 Tel: 012 319 6775/ 6794 Email: MittaA@Dalrrd.gov.za</p>  <p>agriculture, land reform & rural development Department: Agriculture, Land Reform and Rural Development REPUBLIC OF SOUTH AFRICA</p>	<p>SAWS: Private Bag X097 Pretoria 0001 Tel: 012 367 6000 Fax: 012 367 6200 http://www.weathersa.co.za</p>  <p>South African Weather Service ISO 9001 Certified Organisation</p>	<p>ARC: Institute for Soil, Climate and Water Private Bag X79 Pretoria 0001 Tel: 012 310 2500 Fax: 012 323 1157 Email: iscwinfo@arc.agric.za, http://www.arc.agric.za</p>  <p>ARC • LNR Excellence in Research and Development</p>
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