



# agriculture, forestry & fisheries

Department:  
Agriculture, Forestry and Fisheries  
REPUBLIC OF SOUTH AFRICA

## National Agro-meteorological Committee (NAC) Advisory on the 2017 winter season

Statement from Climate Change and Disaster Management  
10 DAFF 2016

29 June 2017

In the light of the seasonal outlook 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 particular 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 (rain water 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

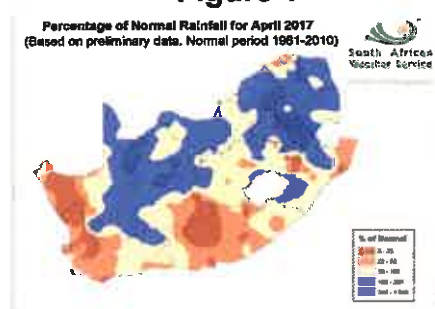


Figure 2

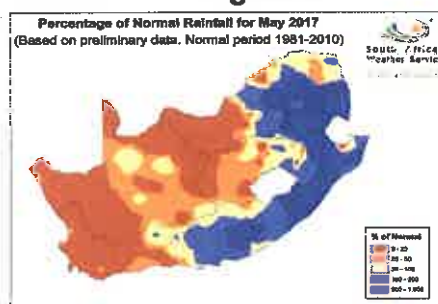


Figure 3

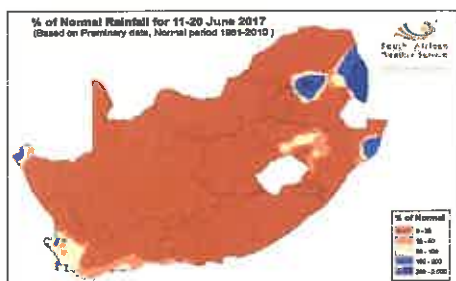
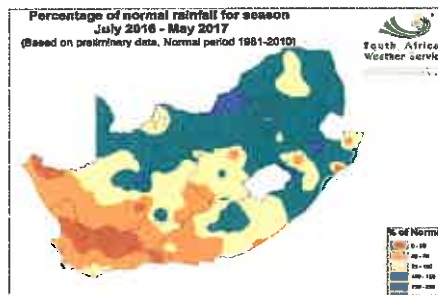
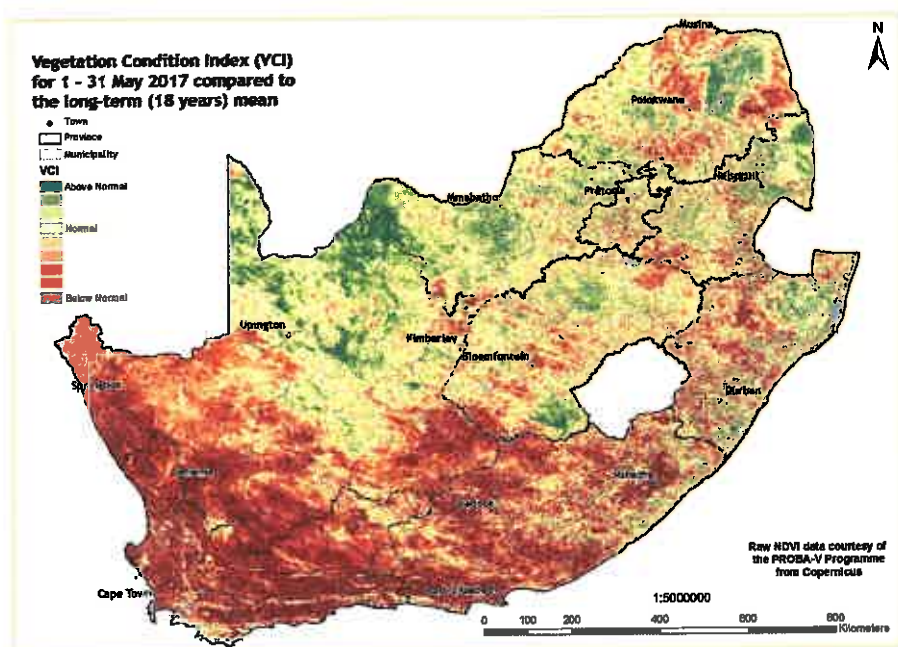


Figure 4



Rainfall received in April was near normal to above normal, but below normal mainly in the Eastern Cape and the extreme western parts of the country (Figure 1). The rainfall decreased further over the central and western parts of the country in May resulting in below normal rainfall (Figure 2). The eastern parts of the country received near normal to above normal rainfall. Mid – June received below normal rainfall with patches of near normal rainfall in some winter rainfall areas, and patches of above normal rainfall in the north-eastern parts of the country (Figure 3). The season July 2016 to May 2017 received below normal rainfall in the south-west becoming near normal to above normal in other regions of the country (Figure 4).

### VCI map for May 2017 compared to the long-term mean



The Vegetation Condition Index map for May indicates below normal vegetation conditions mainly in the Western Cape, Eastern Cape and parts of the Northern Cape.

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

## II. CONDITIONS IN THE PROVINCES DURING MAY/JUNE 2017

### Eastern Cape

The Province received near normal to above normal rainfall in May. Crop conditions are reportedly fair in most areas but good in Alfred Nzo District and poor in Chris Hani District, Nelson Mandela Metropolitan as well as Amathole District. The livestock condition is reasonable in most local municipalities except for some areas in Sarah Baartman, Joe Gqabi, Chris Hani, Alfred Nzo and OR Tambo where poor conditions have been reported. Very poor livestock conditions were reported around Nelson Mandela Bay Metropolitan. There are no improvements in the critical conditions reported in Chris Hani’s Emalahleni local municipality and Sarah Baartman’s Ndlambe local municipality which reflect very poor pastures conditions. The situation in the other areas of the Province ranges from poor to good. Natural veld remains very poor in Sarah Baartman, Emalahleni local municipality in the Chris Hani district, Joe Gqabi, Amathole as well as a part of Alfred Nzo. A few cases of rabies were reported in several areas. Veld fires resulted in damages in some parts of the province during June. The average level of major dams decreased to 58% in 2017 as compared to 68% of 2016.

**Free State**

Below normal rainfall was received in most parts. The southern and western parts of the province remain very dry with little improvement of veld in the central and north eastern parts. Harvesting of maize, sunflower and grain sorghum has begun and yields are slightly higher than expected due to late rain during summer. The condition of natural veld is reasonable but wilted due to frost. The livestock condition is fair in general. Incidents of veld fires were reported in Dewetsdorp, Brandfort, Parys and Kroonstad. The level of major dams has increased as compared to the previous year (83% in 2017; 54% in 2016).

**Gauteng**

The province recorded above normal rainfall. The condition of livestock in communal areas is still good and availability of grazing pasture is also good. The summer crops mostly maize crops are in good condition and vegetables are also doing very well. The level of major dams is high at 90% in 2017 as compared to 86% in 2016.

**KwaZulu-Natal**

Above normal rainfall was received and the drought monitoring maps indicate improvement to minor drought status. Although major dam levels are still low, stream flows and groundwater have improved as have vegetation conditions and evaporative demand has been low. Pastures such as kikuyu's growth rate has slowed slightly but remains green along the coastal and adjacent interior areas due to the late rains and warmer temperatures. Winter pastures in the main dairy areas of Harry Gwala District and Mpofana Local Municipality are performing well in terms of growth rates and bulk. Irrigation is limited and being used only when needed. Crop residues are being used as livestock feed. Maize grain yields are reportedly excellent. Livestock condition is holding and is fair to good. Livestock mortalities have occurred during the beginning of June in the communal sector of Ubuhlebezwe Local Municipality, Harry Gwala District due to inappropriate use/application of dips and/or home remedies. The level of major dams has increased as compared to the previous year (57% in 2017; 47% in 2016).

**Limpopo**

Near normal to above normal rainfall was received and temperatures were above normal. Winter crops are reported to be in good condition. Livestock conditions have reasonably improved in communal areas. General conditions on the grazing areas are fair in communal areas and good in commercial areas. The average level of major dams increased to 78% in 2017, as compared to 58% of 2016.

**Mpumalanga**

Rainfall received was above normal during May. Maize and some vegetables are being harvested in parts of the provinces, while winter crops are being planted. The veld is in good condition while livestock is in reasonable to good condition. Foot and mouth disease has been reported in Bushbuckridge. Water restrictions are still in place and the level of major dams is higher at 78% as compared to 60% of 2016.

**Northern Cape**

Due to the long period of lack of rainfall and current winter conditions, drought is still prevalent in most parts. Overall veld conditions are poor to reasonable and livestock conditions range between poor and good. Grapes, table grapes and lucerne are in winter rest. The level of major dams is high at 93% when compared to 62% of 2016.

### North West

The province received mainly below normal rainfall. Farmers have been encouraged to harvest grass for hay making and reduce the risk of veld fires since there is a lot of fuel material. The grazing nutrients are low and farmers have been advised to provide feed with high protein content. The livestock is still in good condition and market prices for the weaners and unproductive stock are still reasonable. The level of major dams is high (88% in 2017; 66% in 2016).

### Western Cape

Below normal rainfall was received during May and temperatures were warmer than normal. Water restrictions for irrigation remain in place. Conditions remain poor due to the drought especially in the West Coast and Central Karoo. Winter cereal crops are reportedly late due to the dry conditions, although acreage planted seems similar to the previous year. The average level of major dams continued to decline (23% in 2017; 38% in 2016).

**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 2017/06/26

## III. AGRICULTURAL MARKETS

### Major grain commodities

ABSA mentioned that by mid-June week on week new season white maize prices for delivery in July increased by 0.5%, while yellow maize prices increased by 0.8%. During early June, wheat prices for delivery in July increased by 0.6%. The weather outlook remains integral with winter wheat still in early stages of development. Sunflower prices decreased week on week by 0.9%, while soybean prices increased by 1.3%.

Commodity	Future Prices (2017/06/27) R/ton				
	Jul-17	Sep-17	Dec-17	Mar-17	May-18
White maize	1695.00	1750.00	1818.00	1864.00	1925.00
Yellow maize	1807.00	1860.00	1933.00	1976.00	2045.00
Wheat	4180.00	3990.00	3860.00	3993.00	4103.00
Sunflower	4420.00	4560.00	4740.00	4820.00	4830.00
Soybeans	4425.00	4530.00	4655.00	4720.00	4797.00
Sorghum	2700.00	3000.00	3174.00	3335.00	3356.00

SAGIS weekly bulletin: 2017/06/29

### Livestock domestic markets

FNB indicated that beef prices were lower due to lower post-holiday demand. Weaner calves prices weakened due to lack of demand. It is expected that weaner calf prices will remain bullish due to the drought induced supply tightness and the herd rebuilding process. Lamb and mutton prices posted good gains as a result of reduced availability across markets. It is anticipated that the markets will retain the current momentum in the short term on limited availability and stable demand. Pork and baconer prices saw a slight moderation as a result of softer demand. The market is expected to firm slightly in the short term to medium term with softer seasonal demand. Poultry prices traded sideways to lower due to the low seasonal demand.

Livestock prices (R/kg)	Beef	Mutton	Pork	Poultry
Class A / Porker / Fresh birds	47.86	70.57	26.48	25.86
Class C / Baconer / Frozen birds	39.66	51.35	26.32	25.95
Contract/ Baconer/ IQF	49.65	70.20	26.40	23.24
Import parity price	73.29	46.61	38.3	20.4
Weaner calves / Feeder lambs	31.98	34.52		

**ABSA Agri Trends: 2017/06/23**

**NB: Users are advised that these are just indicative prices therefore it is imperative that clients investigate their own individual basis value when marketing their products (livestock and grain).**

#### **IV. SADC REGION**

The Famine Early Warning Systems Network (FEWS NET) report issued in June stated that households are increasingly consuming their own produced crops and most areas in the region are experiencing Minimal (IPC Phase 1) and Stressed (IPC Phase 2) acute food insecurity outcomes. Some exceptions remain in eastern parts of the DRC, and most of Tanzania where Crisis (IPC Phase 3) outcomes persist due to the drought conditions which affected production, as well as conflict in the DRC. These outcomes are expected to continue in these areas through September. As is typical during the harvesting period, demand for maize purchases continue to decline across the region and has resulted in significant price decreases in some countries in the region. Mozambique is a typical example where May prices have generally decreased by between 57 and 73 percent and similar price trends have also been reported in Malawi and Zimbabwe. There are concerns that an oversupply of maize markets will result in small gains for poor households that typically sell maize grain for their livelihood, especially when compared to production costs they incurred. Improvements in the 2017 harvests across the region continue to present income earning opportunities for poor households that are currently engaged in harvesting activities. Average levels of labor opportunities and income are expected to continue through July because harvesting began slightly later than normal in some countries due to late rains. Between July and September, poor households are also expected to get additional incomes through gardening activities. Winter cropping is currently underway in parts of Zimbabwe, Malawi, Lesotho, South Africa, and Mozambique. Prospects for these crops remain positive because of the favorable moisture conditions this season. Apart from further increasing local and household food supplies, winter harvesting activities are also expected to provide labor opportunities for poor households.

[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.]

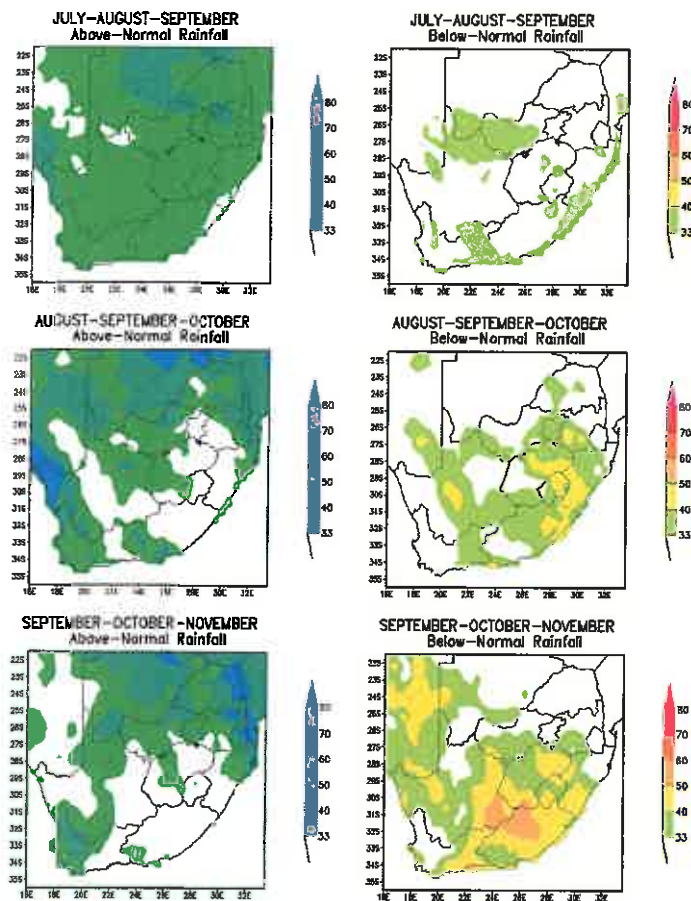
#### **Summary of the reports**

Drought continues in the Western Cape and parts of the Northern Cape. Crops, veld and livestock conditions in other parts of the country are reasonable to good. Cases of rabies were reported in the Eastern Cape, and foot and mouth disease in Mpumalanga. Fires resulted in extensive damages in parts of the Western Cape, Eastern Cape and Free State. Livestock mortalities due to inappropriate use/application of dips and/or home remedies were reported in KwaZulu-Natal. The level of major dams remains high in most provinces, but critically low in the Western Cape.

## V. MONTHLY CLIMATE OUTLOOK

### Seasonal Climate Watch: July to November 2017

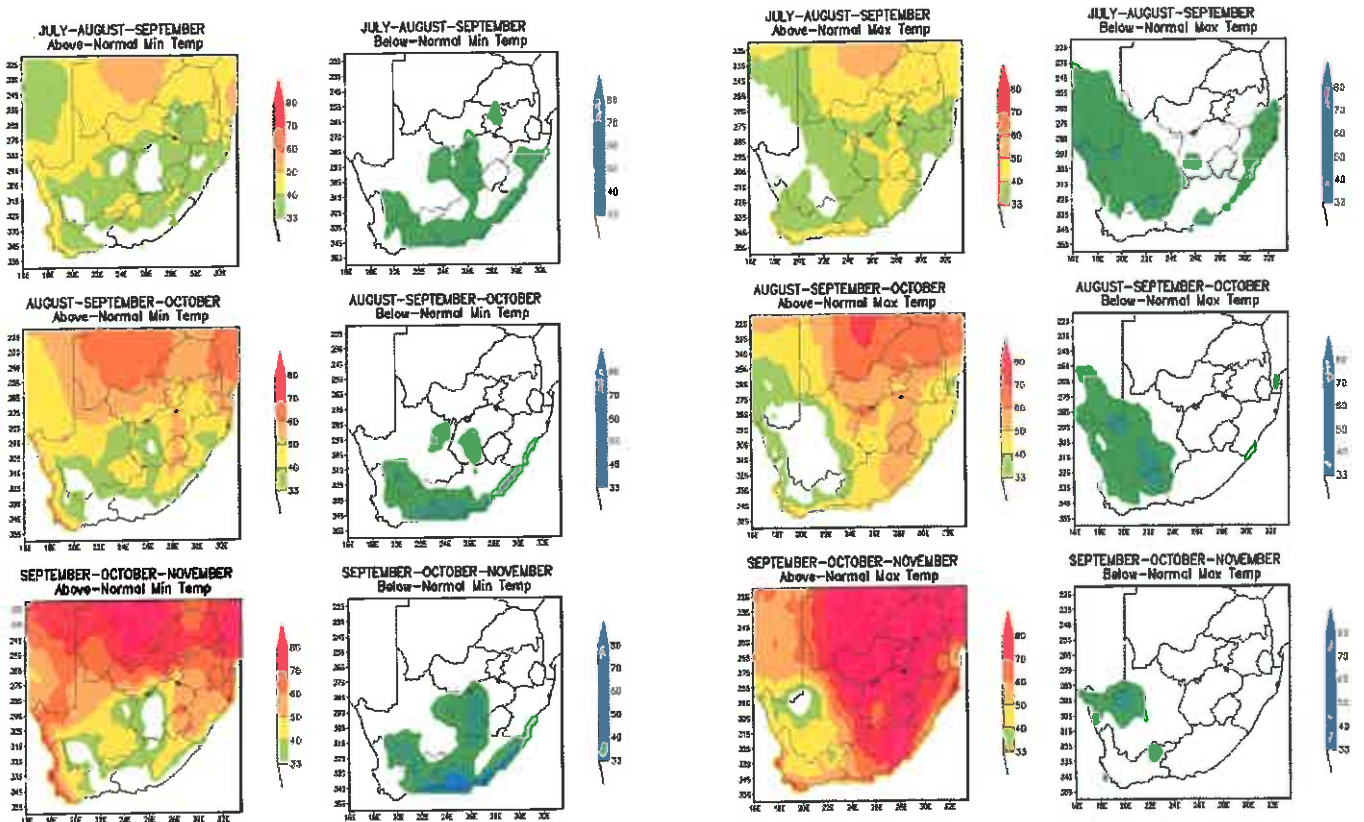
**Figure 1 - Rainfall**



The forecasting system is currently very uncertain on a specific direction of rainfall throughout the country. There is however an indication for above-normal rainfall over the far western parts of South Africa. The uncertainty is particularly common in winter as forecasting systems are unable to predict the important rainfall bearing systems during this time of the year.

Figure 2 - Minimum temperatures

Figure 3 - Maximum temperatures



Despite the fact that temperature forecasts were inconsistent during the past few months, it is expected that temperatures across the country will be higher with the exception of the south-western parts, especially during late-winter.

**How to interpret the forecast maps**

- There are three sets of forecast maps: the rainfall, minimum and maximum temperatures.
- Each set consists of maps showing the probabilities for above-normal (left panels) and below normal (right panels) conditions to occur.
- For each forecast map a probability percentage is given on a scale of 0-50% and above (the colour bars on the right hand side of each map) for the rainfall or temperatures for the season, i.e. JULY- AUGUST - SEPTEMBER 2017.
- The forecast probabilities indicate the **direction** of the forecast as well as the amount of **confidence** in the forecast.

For further clarification using JULY- AUGUST - SEPTEMBER 2017 rainfall (Figure 1) as an example:

for the above normal rainfall category, Eastern Cape Province is shaded mainly in light green (33-40%). In the below normal rainfall category it is shaded mainly in white (less than 33%).

Comparing the two:-

- above normal: green, 33-40%,
- below normal: white, less than 33%

The above normal rainfall value is greater. Therefore during July to September, above normal rainfall is likely in the Eastern Cape Province. Although the value for above normal is higher there is still high uncertainty in the specific direction of the rainfall.

### **State of Climate Drivers**

Observations show that ENSO (El Niño Southern Oscillation) is has now evolved into a warm phase, however forecasts suggest that it will gradually move back towards neutral conditions within the next couple of months. The likelihood for an El Niño event has decreased further from previous assessments and as we near the end of the winter period these forecasts tend to be more reliable.

In summation, the forecasting system remains uncertain on a specific direction of rainfall i.e. as to whether it may be below normal or above normal. Temperatures are expected to be above normal except in the southwest where they may be cooler. 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:

## **VI. SUGGESTED STRATEGIES**

### **A. Rain-fed crop production (Winter Crop)**

**Drought has been declared in the Western Cape and water levels in rivers and dams continue to drop and are critically low for irrigation. Also, water restrictions remain in place. Farmers are advised to be conservative in their planting i.e. planting density/cultivar/area being planted.**

#### Soil choice:

- Choose suitable soil type.
  - Suitable soil and land use management practices that would control wind and water erosion in cultivated lands are suggested.
  - Avoid marginal soils - shallow and low water holding capacity soils.
  - Rather plant in soils with high water holding capacity or with shallow water table.
- Ascertain that the soil profile has enough water when planting commences.
- Roughen the soil surface to minimize evaporation.
- Minimise compaction by reducing the passing of heavy machinery in the field.

#### Land preparation:

- Avoid where possible soils with pronounced plough pans.
- Consider practicing conservation agriculture such as zero or minimum tillage.
- Cover soil with organic matter or cover crops.
- Practice crop rotation.
- Do not expand land under crop production unnecessarily.
- Prioritise fallow land.



#### Crop choice and planting:

- Choose drought resistant cultivars.
- Provide flexibility and diversification.
- Stick to normal planting windows if appropriate and follow the weather and climate forecast regularly so as to make informed decisions.
- Consider staggered planting spreading over weeks.
- Do not experiment with new and unknown cultivars and also avoid unnecessary capital investments.
- Lay out planting rows parallel to the prevailing direction of the cold air flow.
- Keep air drainage pathways open to insure good air drainage and elimination of frost pockets.

#### Crop management:

- Adjust planting density accordingly.
- Consider mulching to minimise evaporation.
- Always eradicate weeds.
- Consider a conservative fertilizing strategy during dry conditions.
- Consider organic fertilization.
- Wheat: The strategy proposed is to scout the plants regularly, correctly identify any pests or diseases and make informed decisions regarding reaction.
- Prune trees properly to avoid blocking air movement. The removal of low hanging, dense branches is a must.
- Using white paint on trunks of fruits tree reduces winter trunk damage.
- Use overhead sprinkler irrigation.

#### B. Irrigation farming

**The very low dam levels in winter rainfall areas continue to have a negative impact on irrigation.**

- 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.
- Irrigate with the correct amount, never over-irrigate.
- 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.
- Use grey water in gardens.

- 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.
- Assessment of vegetation condition and analysis of soil samples can benefit the decision for supplement composition.
- Sell mature, unproductive, 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 in order 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 in advance.
- 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**

The provinces and farmers are advised to create and maintain firebreaks. 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 has to 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 inflammable material capable of carrying a veld fire across it.
- Firebreaks may be temporary or permanent.
- Firebreaks should consist of fire-resistant vegetation, inflammable materials, bare ground or a combination of these.
- Firebreaks must be located 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. Cold spells (snowfall & frost)

When temperatures plunge below zero, livestock and crops need to be given extra attention. Prevention is key in dealing with hypothermia, and other cold weather injuries in livestock and crops.

##### Livestock:

- Hypothermia and dehydration are a serious concern in animals during cold and wet conditions. Wind-chill also adds greatly to the cold stress for animals.
- Livestock should be provided with windbreak, roof shelter and monitored for signs of discomfort (extensive shivering, weakness, lethargy, etc.)
- It is very important that livestock be provided with extra hay/forage/feed to double the calories for normal body heat maintenance during extremely cold conditions.
- It is critical that livestock have access to drinking water. Usual water sources may freeze in low temperatures and dehydration becomes a life threatening factor. In general, livestock tend to drink less water in extremely cold conditions.
- Special attention should be paid to very young and old animals because they may be less able to tolerate temperature extremes.
- Do not shear Angora goats. Also, take extra time to observe livestock, looking for early sign of diseases and injuries.
- Severe cold-weather injuries or death primarily occur in the very young or in animals that are already debilitated.
- Cases of cold weather-related sudden death in calves often result when cattle are suffering from undetected infection, particularly pneumonia.
- Livestock suffering from frostbite don't exhibit pain. It may be up to two weeks before the injury becomes evident as freeze-damaged tissue starts to slough away. At that point, the injury should be treated as an open wound and a veterinarian should be consulted.

##### Crops:

- Prune out the lower portions of windbreaks to allow air to pass through to avoid the formation of a frost pocket.
- Wrapping the trunks with materials such as newspaper, cardboard, aluminium foil will prevent much of frost damage.
- With more severe frosts, canopy death can occur and trunk coverings need to extend up beyond the graft union so that the tree can reshoot from undamaged buds above the graft once the wraps are removed.
- Use heating devices such as orchard heaters to raise temperatures in plantings.

Drought continues in the Western Cape and parts of the Northern Cape, and the seasonal forecast still indicates uncertainty on the specific direction of the rainfall during the remainder of winter for the country. Temperatures are anticipated to be above normal across the country but below normal in the south-western parts of the country. With the seasonal forecast in mind, and the current conditions, farmers are advised to continue to conserve water and other resources in accordance with the Conservation of Agricultural Resources Act 1983, (Act No. 43 of 1983). Winter crop farmers should wait for sufficient moisture before planting and stay within the normal planting window. They are also advised to be conservative in their planting i.e. planting density/cultivar/area being planted. In addition they should consider drought tolerant cultivars

where possible. Irrigation farmers should reduce the planting area in line with water restrictions in their areas. Farmers should follow the weather and climate forecast regularly so as to make informed decisions.


Livestock must continually be kept in line with carrying capacity of the veld, and be provided with additional feed such as relevant licks. They should also be provided with enough water points on the farm as well as shelter during bad weather conditions. As the veld is dry in summer rainfall areas this increases the risk of veld fires. Therefore creation of fire belts should be prioritized as well as adherence to veld fire warnings. Episodes of cold spells and localized flooding resulting from frontal systems will continue to occur during the remainder of winter and precautionary measures should remain in place e.g. moving livestock to a safe location during inclement weather. Farmers are encouraged to implement measures 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: [www.daff.gov.za](http://www.daff.gov.za) and [www.agis.agric.za](http://www.agis.agric.za).

**For more information contact:-**

<p>DAFF, Directorate: Climate Change and Disaster Management Private Bag X93 Pretoria 0001 Tel: 012 309 5722/23; Fax: 012 309 5878 Email: <a href="mailto:MittaA@daff.gov.za">MittaA@daff.gov.za</a></p>  <p><b>agriculture, forestry &amp; fisheries</b> Department: Agriculture, Forestry and Fisheries REPUBLIC OF SOUTH AFRICA</p>	<p>SAWS: Private Bag X097 Pretoria 0001 Tel: +27 (0) 12 367 6000 Fax: +27 (0) 12 367 6200 <a href="http://www.weathersa.co.za">http://www.weathersa.co.za</a></p>  <p><b>South African Weather Service</b> 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: <a href="mailto:iscwinfo@arc.agric.za">iscwinfo@arc.agric.za</a>, <a href="http://www.arc.agric.za">http://www.arc.agric.za</a></p>  <p><b>ARC • LNR</b> Excellence in Research and Development</p>
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