agriculture,
forestry & fisheries

Department:
Agriculture, Forestry and Fisheries
REPUBLIC OF SOUTH AFRICA

National Agro-meteorological Committee (NAC) Advisory on the 2015/16 summer season
Statement from Climate Change and Disaster Management
03 DAFF 2015

27 November 2015

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

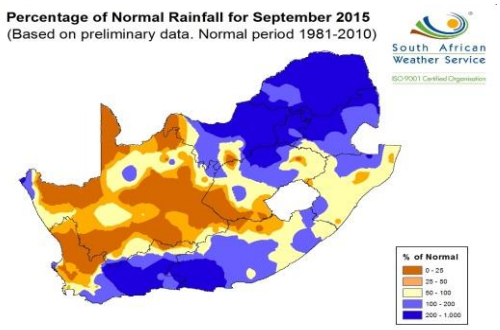


Figure 2

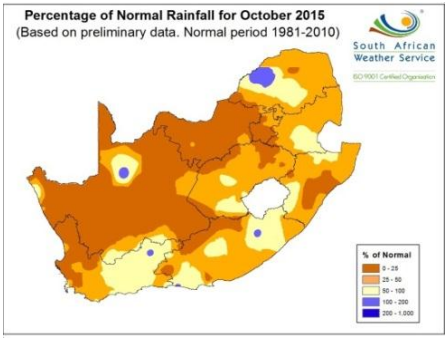


Figure 3

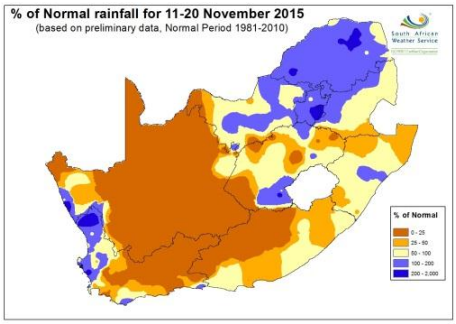
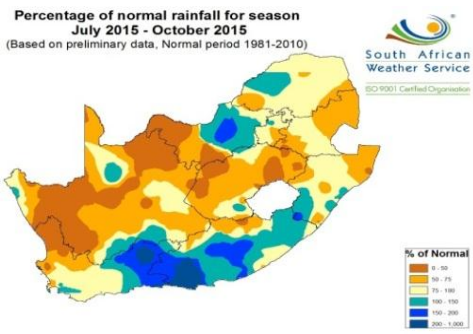
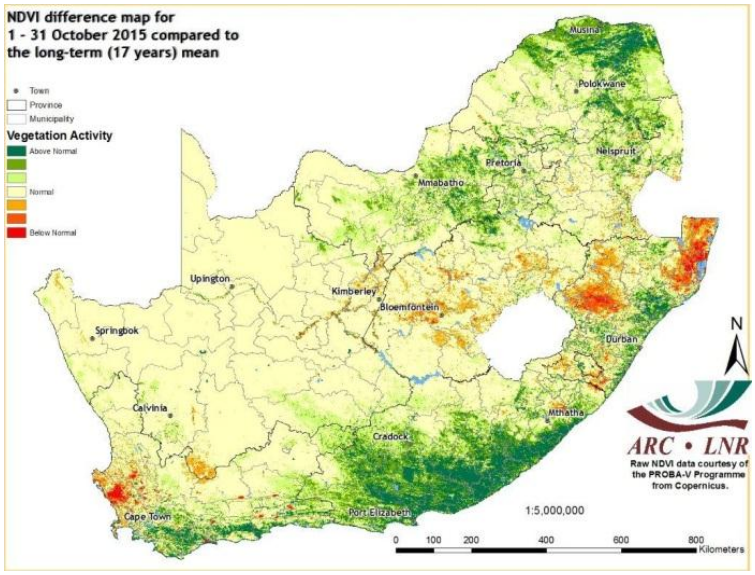


Figure 4



In September, above normal rainfall was received over the north-eastern parts of the country and the southern coastal areas (**Figure 1**) but near normal to below normal elsewhere. In October, the rain decreased resulting in below normal rainfall over much of the country **(Figure 2)**. During 11 to 20 November above normal rainfall was received over the north-eastern parts of the country and the west coast (**Figure 3**). Remaining areas received near normal rainfall but below normal over the western interior. For the season July to October 2015, above normal rainfall was received in the southern coastal areas and parts of North West Province while the remainder of the country received near normal to below normal rainfall (**Figure 4**).

NDVI difference map for October 2015 compared to the long-term mean



Vegetation activity is higher over the south-eastern and north-eastern interior but lower over much of KwaZulu-Natal and the western parts of Western Cape.

II. CONDITIONS IN THE PROVINCES DURING OCTOBER 2015

Eastern Cape

Near normal to below normal rainfall was received. The northern interior areas are experiencing long and severe dry spells that have resulted in low quality and quantity of forage, reduction of water supplies and delayed planting of crops. The conditions of crops have been mainly fair to good in other areas but poor in Gariep, Emalahleni and Elundini. Livestock conditions are good to fair with the exception of Chris Hani, Joe Qgabi and OR Tambo Districts where they are in poor condition. The average level of major dams is at 77% in 2015 as compared to 76% of 2014 during the same period.

Free State

The province received below normal rainfall. Natural veld and livestock conditions are poor throughout the province. Reports of livestock mortalities have been received from Dewetsdorp, Reddersburg, Edenburg, Wepener, Bloemfontein, Botshabelo and Thaba Nchu, and farmers have sold some of their livestock to provide fodder for the surviving stock. There were reports of veld fires in Lindley and Petrus Steyn. Major dam levels have decreased as compared to the previous year. The level of major dams is at 63% in 2015 as compared to 81% of 2014.

Gauteng
Below normal rainfall was received accompanied by very hot conditions. The general condition of the veld/pastures and livestock is poor to very poor. Farmers are providing livestock with supplementary feed. Due to the delay of summer rain, farmers have postponed planting dates. Vegetables on homesteads and community gardens are doing well. The water restrictions in place have an impact on the amount of water required for normal vegetable growth. As such this will have a negative impact on the quality of the final product. Levels in major dams that provide water are decreasing, the average level being at 82% as compared to 93% of 2014. Farm dams are dry and some are nearly dry.

KwaZulu-Natal
Below normal rainfall was received with above normal temperatures. For October five districts were in an emergency drought status and six districts were in the severe drought status. Rye grass pastures growth and regrowth is tailing off because of heat waves. Kikuyu regrowth and greening remains very slow. Most reserves of conserved feeds such as maize silage, wrapped bales (silage) and hay is low and in many areas completely depleted. Hay-lands are not growing as expected and very little hay is being baled at present. Maize and soya planting in the dry-land growing areas has not started. Farmers are planting alternative fodder crops such as millet and oats, and wheat in Uthukela district is starting to become stressed. Reports of livestock mortality due to lack of grazing and water have been received. Cows that are calving in an already poor condition are dying soon after calving as are the calves because of compromised systems. Major dam levels have decreased as compared to the previous year (56% in 2015; 70% in 2014).

Limpopo
The province received below normal rainfall with patches of near normal rainfall in some areas. The general condition of grazing is poor in communal areas and fair in commercial areas. Livestock conditions have deteriorated especially at communal areas. The average level of major dams is at 68% in 2015 as compared to 82% of 2014 during the same period.

Mpumalanga
Rainfall received was below normal. Winter wheat under irrigation in the highveld is drying out while vegetables are wilting and drying up where water is insufficient. Farmers in the dry-land areas are still waiting for sufficient rain to start planting, and sugarcane in the lowveld is in poor condition due to water restrictions. Invasive plants are emerging due to poor vegetation cover and the province is importing bales from other provinces. Mortalities of cattle were reported in the Thembisile Hani municipality due to consumption of invasive plants. The condition of livestock is extremely poor in the entire province. There were reports of high prevalence of secondary pests and diseases in most areas i.e. ticks, heart water, bovine abortion, fruit flies and malaria due to high temperatures. Veld fires were reported in the Lekwa municipality. The average level of major dams has decreased to 66% in 2015 as compared to 85% of 2014.

Northern Cape
Rainfall received was below normal. There are signs of drought in most parts of the province, and crops, veld and livestock are in poor condition. Table grapes are being prepared for the export market. Water restrictions have been put in place in Loeriesfontein and the level of major dams has decreased as compared to the previous year (69% in 2015; 92% in 2014).

North West
The province received below normal rainfall. Livestock conditions are fair to poor. Veld fires were reported in Bojanala and Ngaka Modiri Molema Districts. Sheep mortality was reported due to lightning. The veld is deteriorating further due to poor precipitation and crops under irrigation are

currently experiencing heat stress. The average level of major dams is at 49% as compared to 65% of 2014.

Western Cape
The province received below normal rainfall over most parts with the western side being more extreme and there were reports of untimely high rainfall in the coastal areas of the Overberg. The poor rainfall season in the West Coast District resulted in a smaller wheat crop. Harvesting in the Swartland commenced earlier than normal while harvesting of cash crops in the coastal regions of the Overberg delayed due to untimely rainfall. Conditions of livestock and water supply in the Swartland remained reasonable while veld conditions are below normal due to lack of rain. The level of major dams has decreased compared to the previous year (64% in 2015; 85% in 2014).

III. AGRICULTURAL MARKETS

Major grain commodities
According to FNB, yellow maize continued to rise mainly supported by poor production prospects and higher import prices. It is expected that weather will play a pivotal role with more rains desperately needed to commence with planting. White maize prices softened as rains fell in some of the producing areas. It is expected that weather will play a pivotal role with more rains desperately needed to commence with planting. Wheat prices showed gains on higher import prices and adverse weather conditions. It is expected that prices will go down due to weaker Rand and low international prices. Oilseed prices traded firmer and it is expected that prices will continue to trade at current levels.

Domestic prices per Safex (R/t)

	Futures prices as at (2015/11/24)				
Commodity	2015/12	2016/03	2016/05	2016/07	2016/09
White maize	R3302.00/t	R3343.00/t	R3264.00/t	R3238.00/t	R3243.00/t
Yellow maize	R3226.00/t	R3151.00/t	R2941.00/t	R2897.00/t	R2928.00/t
Wheat	R4450.00/t	R4582.00/t	R4599.00/t	R4616.00/t	R4335.00/t
Sunflower	R6660.00/t	R6565.00/t	R5830.00/t	R5925.00/t	R5986.00/t
Soybeans	R5800.00/t	R5605.00/t	R5370.00/t	R5430.00/t	R5506.00/t
Sorghum	N/a	R3180.00/t	R3150.00/t	R3078.00/t	R3097.00/t

SAGIS weekly bulletin: 2015/11/26

Livestock domestic markets
FNB stated that beef prices trended mostly lower under pressure due to limited demand during midmonth, while conditions improved marginally of late. Dryness continues in many areas and may force producers to reduce their stock with animals reaching the market at lighter weights. The combination of reduced availability of feed and higher maize prices has placed industry profitability under strain. Lamb and mutton prices continued to weaken across the board as drought conditions forced producers to reduce their stock levels, and the lower prices will continue in the short term on increased supplies due to drought. Recent rains in some areas are welcome but more is needed to ensure enough moisture to reboot pastures. The pork and baconer prices were mostly higher as supplies tightened. It is expected that prices will continue on the uptrend due to the increased demand ahead of the festive season. Poultry market traded sideways and it is expected that prices will rise due to seasonal rebound in demand as the holiday season draws nearer.

Producer prices for selected livestock commodities	Beef	Mutton	Pork	Poultry
Open market: Class A / Porker / Fresh whole birds (R/kg)	34.10	52.95	23.83	22.98
Open market: Class C / Baconer / Frozen whole birds (R/kg)	28.68	40.24	21.66	22.31
Contract: A2/A3* / Baconer/ IQF (*includes fifth quarter) (R/kg)	35.32	53.50	22.25	19.55
Import parity price (R/kg)	32.53	33.13	26.76	15.91
Weaner Calves / Feeder Lambs (R/kg)	19.05	25.67		

FNB AgriCommodities:2015/11/20

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 System Network for October 2015 to March 2016 states that the onset of the seasonal rains is late in northeastern South Africa and neighboring Lesotho, southern parts of Angola, Swaziland, and in western areas of Zambia. For most countries in the region, seasonal rains typically begin in November. National and International forecasts predict low rainfall during the October to December period, which could lead to an erratic or delayed start to rainfall. The ongoing El Niño is forecast to continue until mid-2016, increasing regional concerns that several countries will experience below-average rainfall during the season. Poor households in maize deficit areas are well into the lean period and have been relying on market purchases for an extended period this season. Staple food prices in several countries continue to increase, reducing poor household purchasing power. Humanitarian assistance began in parts of Zimbabwe, but has not started in Malawi. Informal trade flows between Mozambique, Malawi, Zambia, Zimbabwe, and South Africa are strong. Crisis (IPC Phase 3) acute food insecurity outcomes are currently taking place in Malawi, Zimbabwe, and Madagascar. Poor households in cereal deficit areas have depleted their own food production stocks and are facing limited labor opportunities. Crisis (IPC Phase 3) outcomes are expected to continue in these countries through March 2016 in the absence of humanitarian assistance. Some areas in Zimbabwe will improve slightly and will be Stressed (IPC Phase 2) in the presence of humanitarian assistance.

[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

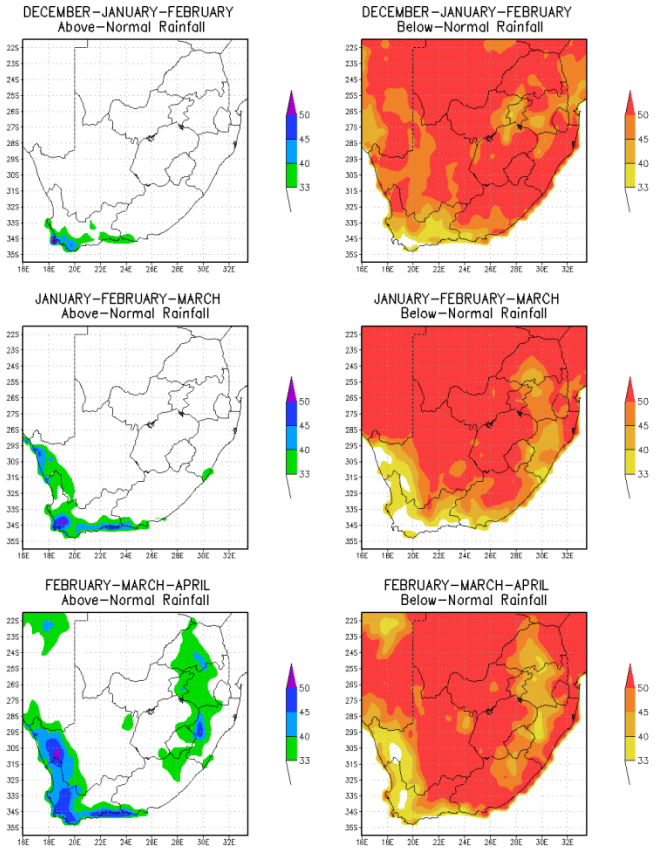
Below normal rainfall was received in most provinces. Water restrictions have been implemented in some provinces. Veld and livestock conditions are poor in many areas and livestock mortalities have been reported in Free State and KwaZulu-Natal due to drought and in Mpumalanga due to consumption of invasive plants and in North West as a result of lightning. Irrigated crops are under stress due to insufficient water and high temperatures. Dry-land farmers have not begun planting in most areas due to lack of sufficient soil moisture. There were veld fires in parts of Free State, North West and Mpumalanga. The levels of dams in provinces have decreased as

compared to 2014 during the same period. Over SADC poor households in maize deficit areas are well into the lean period and have been relying on market purchases for an extended period this season. Staple food prices in several countries continue to increase, reducing poor household purchasing power.

V. MONTHLY CLIMATE OUTLOOK

Seasonal Climate Watch: December 2015 to April 2016

Figure 1- Rainfall



The forecasting system indicates enhanced probabilities of below-normal rainfall for the mid- and late-summer season as well as early autumn countrywide. The mid-summer period also indicates the likelihood for extremely below-normal rainfall totals.

Figure 2 - Minimum temperatures

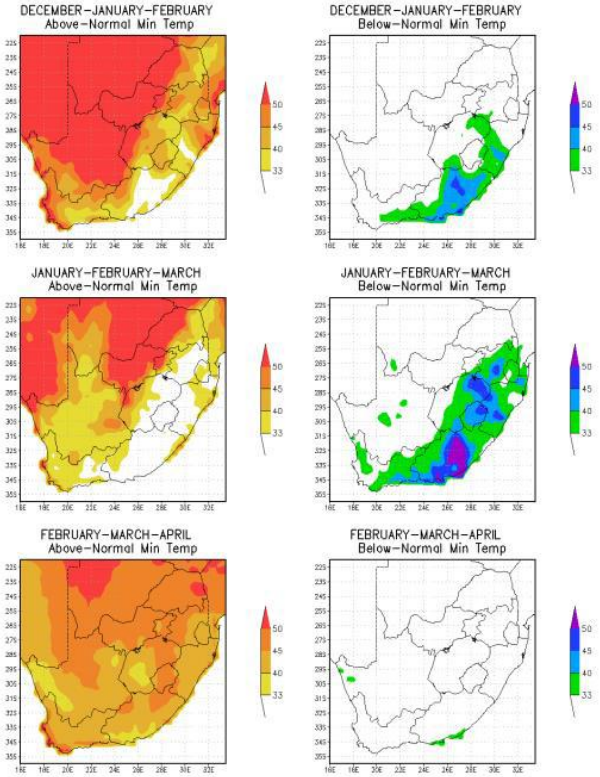
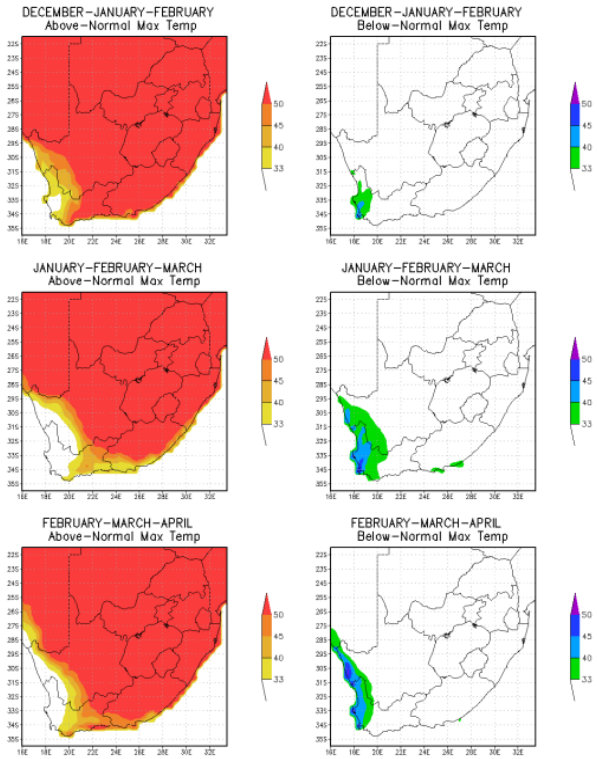


Figure 3 - Maximum temperatures



The forecasting system indicates generally above-normal temperatures across the country through mid-summer towards early autumn, with an exception of below-normal minimum temperatures for the south eastern parts of South Africa.

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. DECEMBER 2015 - JANUARY - FEBRUARY 2016.
- The forecast probabilities indicate the ***direction*** of the forecast as well as the amount of ***confidence*** in the forecast.

For further clarification using DECEMBER 2015 - JANUARY - FEBRUARY 2016 rainfall (**Figure 1**) as an example:
Free State Province, for the above normal rainfall category, is shaded in white **(less than 33%)**. In the below normal rainfall category it is shaded mainly in dark orange **(greater than 50%)**.

Comparing the two:-

- above normal: white (<33%),
- below normal: dark orange (>50%)

The below normal rainfall category for December 2015 to February 2016 has a higher value and is therefore favoured. This means that rainfall is anticipated to be below normal over Free State Province during the period December 2015 to February 2016.

State of Climate Drivers
Observations show that ENSO is currently in the strong El-Niño situation. The atmosphere is also responding to this strong SST (sea surface temperature) warming over the equatorial Pacific including the weakening of the trade winds and other typical patters. Most of the forecast model's predictions indicate the strengthening of El Niño condition through the start of the austral summer and is expected to continue towards late summer and early autumn seasons.

In summation, rainfall is anticipated to be below normal for the remainder of summer with above normal maximum temperatures. Minimum temperatures are anticipated to be below normal in the south-eastern parts of the country but above normal in other areas. 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:

With the seasonal forecast for dry and hot conditions for the remainder of summer, together with limited moisture available, farmers are advised to be conservative in their planting i.e. planting density/cultivar/area being planted.

A. Rain-fed crop production

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 enhance rain water penetration and reduce runoff.
- Minimise compaction by reducing the passing of heavy machinery in the field.
- Add organic material to improve soil structure.

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.
- Rather plant early in the season than late, but stay in the normal planting window 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.
- Consider intercropping for improved soil structure and pest/diseases control.
- Planting in a controlled environment (e.g. green house) is advisable where possible.

Crop management

- Adjust planting density accordingly.
- Consider mulching to minimize evaporation.
- Control weeds regularly.
- Consider a conservative fertilizing strategy during dry conditions.
- Consider organic fertilization.
- Scout for pests and diseases regularly and control where necessary.
- Practice water harvesting techniques e.g. construction of basins, contours, ridges.

B. Irrigation farming

The current drought will 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.
- Obtain the relevant seeds to be planted considering the climate forecast.
- 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.
- Be aware of current and expected weather conditions and re-look at the area to be planted as there are already water restrictions in some areas.
- Manage irrigation so that the plant receives water only when needed.
- Use drip irrigation rather than sprinklers.
- Quality of irrigation system:
    - Repair leaks,
    - For canal irrigation - line with concrete to reduce water loss.

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.
- 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

Grazing has deteriorated throughout the country.

- 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.
- Always eradicate invader plants.
- Periodically reassess the grazing and feed available for the next few months, and start planning in advance.

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.
- Irrigation farmers should monitor for pests and diseases especially those associated with humid and hot conditions.

Livestock

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

G. Veld fires

The provinces and farmers are advised to maintain firebreaks in the summer rainfall areas and to begin construction of firebreaks in winter rainfall 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 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 favourable 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, fire-fighting 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 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. Heat stress – bad for productivity

- Signs of heat stress on livestock:
    - 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.

I. Severe thunderstorms/flash floods

Building resilience:

- Identify resources/facilities within 50km 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, after each event.

Drought/very dry conditions continue in most provinces. The seasonal forecast favors below normal rainfall for the remainder of summer coupled with above normal day time temperatures. With the seasonal forecast in mind, and the current drought/very dry conditions in provinces, farmers are advised to continue to approach the season with extra caution.

Dry-land farmers who have yet to plant should wait for sufficient moisture, but should stay within the normal planting window. Also, they should consider drought tolerant and short season cultivars including sorghum where possible. Irrigation farmers should reduce the planting area in line with water restrictions in their areas and also consider the below normal rainfall forecast. Farmers should follow the weather and climate forecast regularly so as to make informed decisions. Water restrictions remain in place in some provinces hence, water and other resources need to continually be conserved in accordance with the Conservation of Agricultural Resources Act 1983 (Act No. 43 of 1983).

Livestock must continually be kept in line with carrying capacity of the veld and should be provided with additional feed including licks to give sufficient nutrition. Farmers are advised to further reduce livestock to protect the limited grazing i.e. selling of animals. Veld fires have been reported in some provinces and the risk remains high for conditions conducive for veld fires as the veld remains dry. Farmers are encouraged to maintain firebreaks in summer rainfall areas and adhere to veld fire warnings. Farmers in winter rainfall areas should begin putting measure in place for veld fires. Severe thunderstorms with damaging winds and hail as well as heat waves have occurred are likely to re-occur and therefore measures to combat these should be in place. Isolated localised flooding is also possible in summer rainfall areas; precautionary measures for these should be in place.

The users are urged to continuously monitor, evaluate, report and attend to current Disaster Risk 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 and www.agis.agric.za.

For more information contact:-

DAFF, Directorate: Climate Change and Disaster Management Private Bag X93 Pretoria 0001 Tel:012 309 5722/23; Fax: 012 309 5878 Email: MittaA@daff.gov.za	SAWS: Private Bag X097 Pretoria 0001 Tel: +27 (0) 12 367 6000 Fax: +27 (0) 12 367 6200 http://www.weathersa.co.za	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