METEOROLOGICAL SERVICES DEPARTMENT

NEWSLETTER

VOLUME 5 | ISSUE 2

December 2024

Minimizing Risk With Science

PAGE	CONTENTS

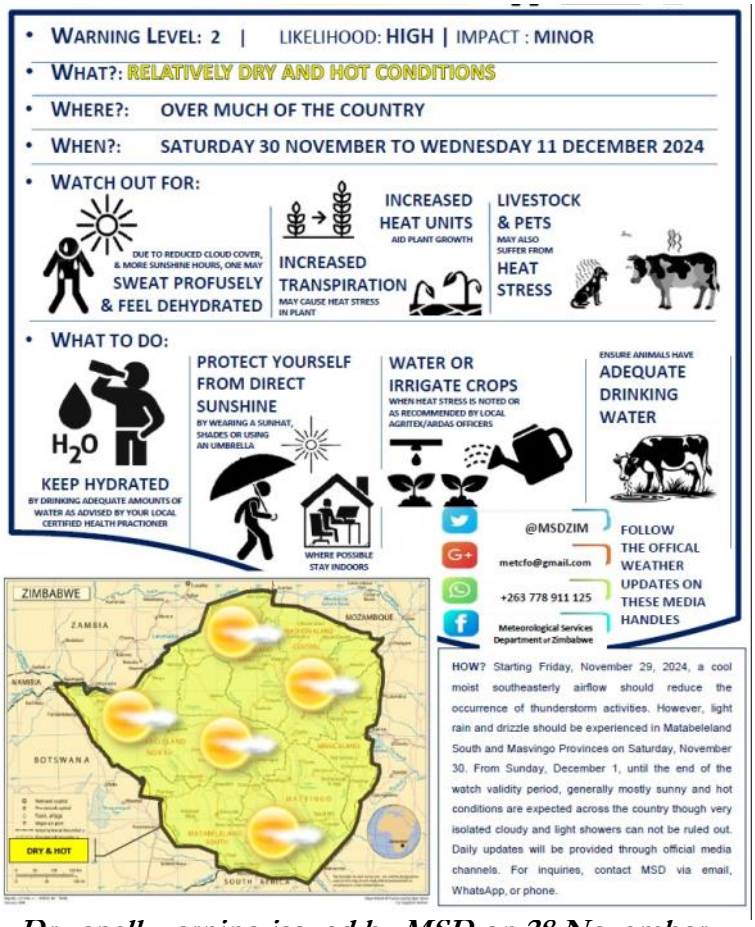
Bereavement Notice!

On 6 December 2024 one of our colleagues Mr. Manjowe lost his elder brother.

May his brother's soul rest in eternal peace.

Zimbabwe Goes Through a Dry Spell

Tinetariro Chikati



Dry spell warning issued by MSD on 28 November

Zimbabwe is facing a challenge due to a dry spell and soaring temperatures which are gripping the nation. On 28 November 2024, it was forecasted that there would be continued hot and sunny conditions in the coming days, with only mild relief arriving after sunset. In addition to the heat, there it was forecasted that that there would be reduced cloud cover and longer sunshine hours. The forecast indicated that the dry spell would be from 30 November 2024 up to 11 December 2024, which is a run time of 13 days. This prolonged dryness is raising alarm over its potential impact on crops and livestock, urging farmers to adopt adaptive measures to mitigate losses. The extreme weather poses significant risks to crops, particularly those at critical growth stages, and threatens livestock health.

The lack of rainfall, combined with intense heat, is depleting soil moisture levels, leaving farmers under pressure to sustain their yields and protect their livelihoods. This situation is being enhanced by the fact that Zimbabwe experienced a drought in the 2023/2024 season, therefore there already wasn't any significant moisture in the soil. Due to the high temperatures people are expected to sweat profusely resulting in dehydration. In addition to this, headaches can also become very common. When the dry weather advisory was issued, MSD recommended that people should drink more water, protect themselves from direct sunshine.

It was also recommended that farmers should irrigate and mulch their crops in response to the increased evapotranspiration in this period. These strategies can help mitigate the effects of the dry spell and safeguard agricultural productivity. Farmers are being urged to stay vigilant and plan their activities based on updated weather forecasts. Regularly monitoring the MSD's website and social media platforms can provide valuable insights into upcoming conditions, enabling farmers to make informed decisions.

What is a dry day?

A day with little or no measurable amount of precipitation, typically less than a threshold of 1mm.

What is a dry-spell?

It is a period of consecutive dry days.

What is a heat-wave?

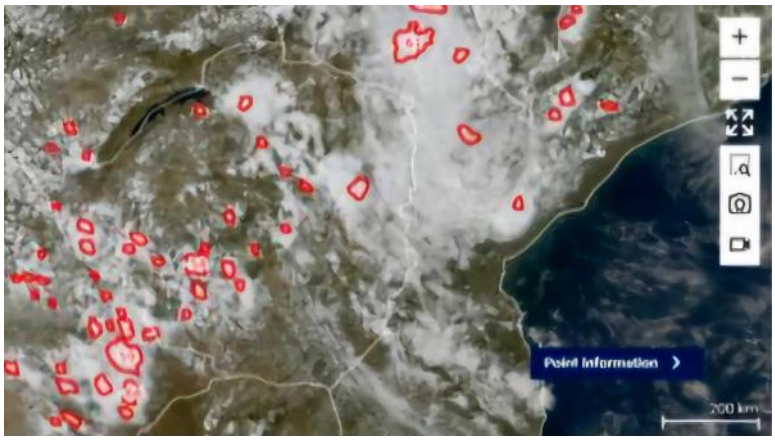
It is a period marked by the invasion of warm air over a large area, usually lasting from a few days to a few weeks. A heat-wave is considered if the temperature of a station reaches at least 40°C for mostly flat areas and at least 30°C for rugged or hilly areas.

GOVERNMENT OF ZIMBABWE

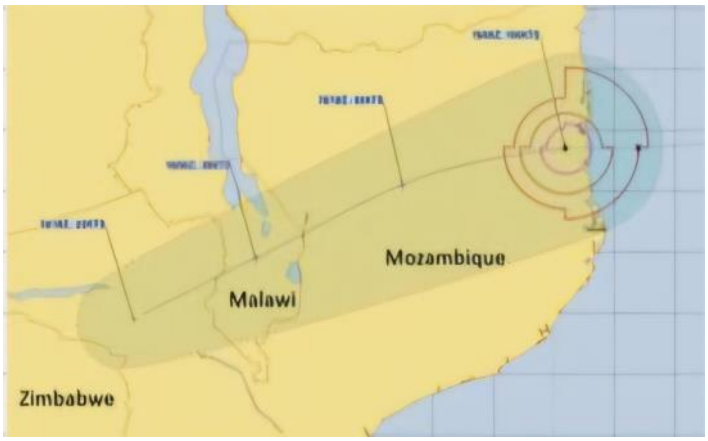
METEOROLOGICAL SERVICES DEPARTMENT

ISSUED IN CONJUNCTION WITH

DEPARTMENT OF CIVIL PROTECTION



(a) Previously observed storms in red circles



(b) Last path of the Overland Depression Chido

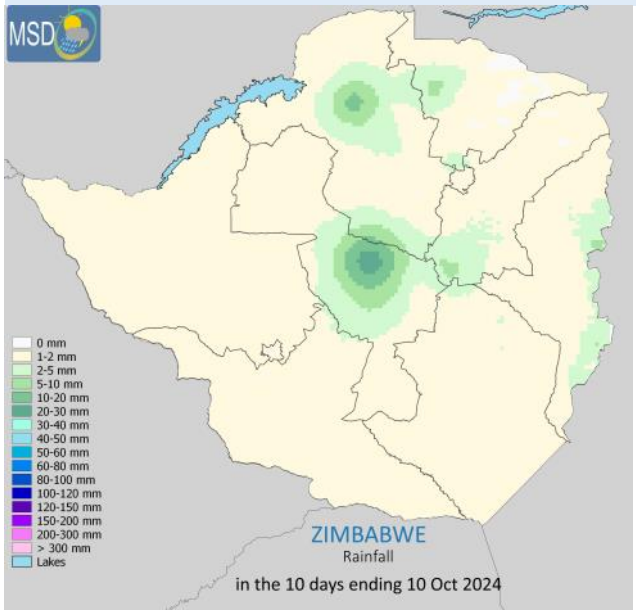
On Sunday, December 15, 2024, at 0615hrs, Tropical Cyclone Chido (named by Zimbabwe) made landfall over northern Mozambique near Pemba in the Cabo Delgado Province. The cyclone brought destructive winds exceeding 200 km/hr and heavy rains with rainfall rates reaching up to 30mm per hour (roughly 30 litres per each square meter every hour). This resulted in flash flooding in the coastal area.

Fortunately, Chido (no longer a cyclone but an Overland Depression) continued its west-south westward movement into Tete Province still in northern Mozambique (but through southern Malawi) by Monday 16 December 2024. This movement overland, reduced its wind speed and rainfall intensity due to increased frictional forces. On Monday 16 December, the residual moisture from the Overland Depression resulted in cloudy conditions over the north-eastern parts of Zimbabwe, bringing light to moderate rainfall in Manicaland and Mashonaland East as early as 0900hrs.

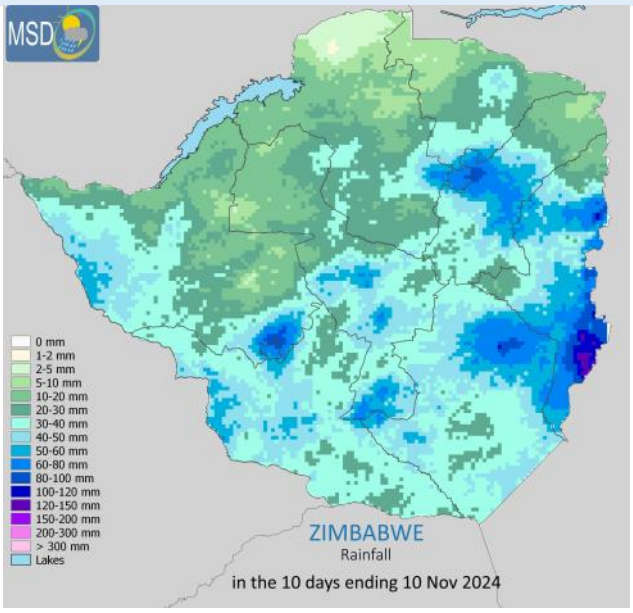
From there, the remnants of this residual moisture should combine with moisture from the usual Inter-Tropical Convergence Zone, which brings rainfall over Zimbabwe from mid-December, as well as the cloud-band from Botswana. This should result in moderate rainfall (30 -80 mm) over much of the country. Thus, the impact of Chido in Zimbabwe may not be as severe as in other regions of Madagascar, Comoros, Mozambique, and Malawi. More influence over Zimbabwe is projected to be from the cloud-band emanating from the west, through both Matabeleland Provinces. This should result in widespread thunderstorms throughout the week (Monday, December 16 to Sunday, December 22).

Despite the anticipation of heavy rainfall exceeding 50mm in provinces like Matabeleland South, Bulawayo Metropolitan, southern parts of Matabeleland North, Midlands, and Masvingo, the risk of flooding is low following a recent dry spell. However, the heat that was over Zimbabwe for much of last week should potentially lead to these storms being violent, with lightning, strong winds, and hailstorms in certain areas. Provinces of particular concern include Mashonaland East, Manicaland, Masvingo, Matabeleland South, Bulawayo Metropolitan, and the southern parts of Midlands.

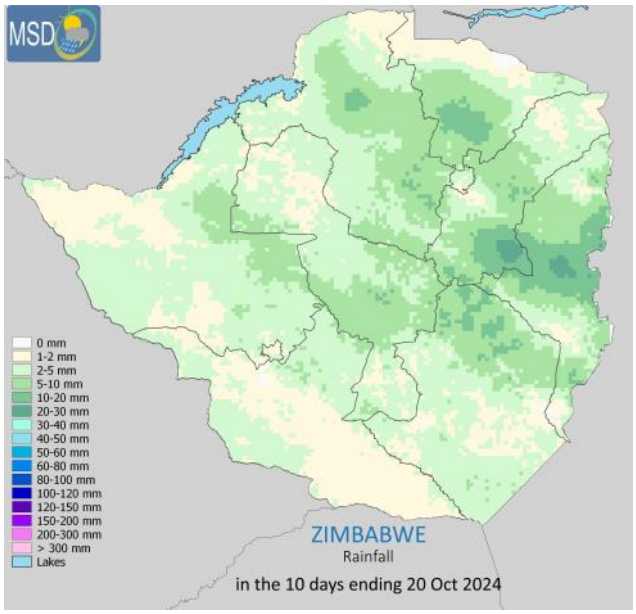
State of the 2024 TO 2025 rainfall season



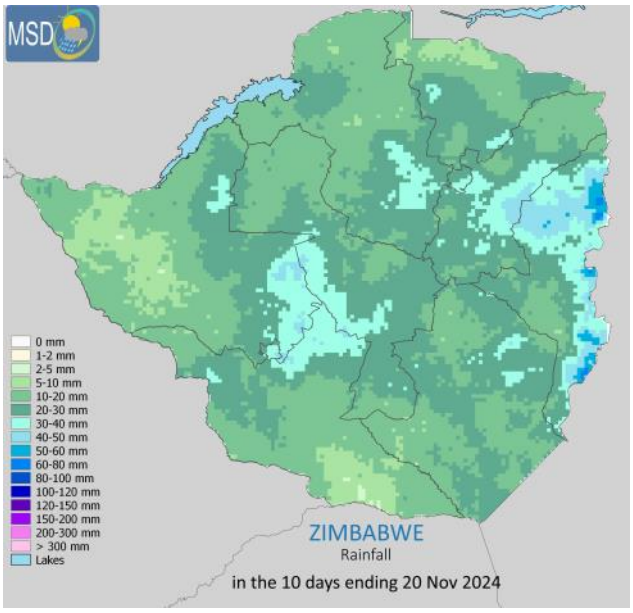
Accumulated Rainfall 1st dekad of October 2024



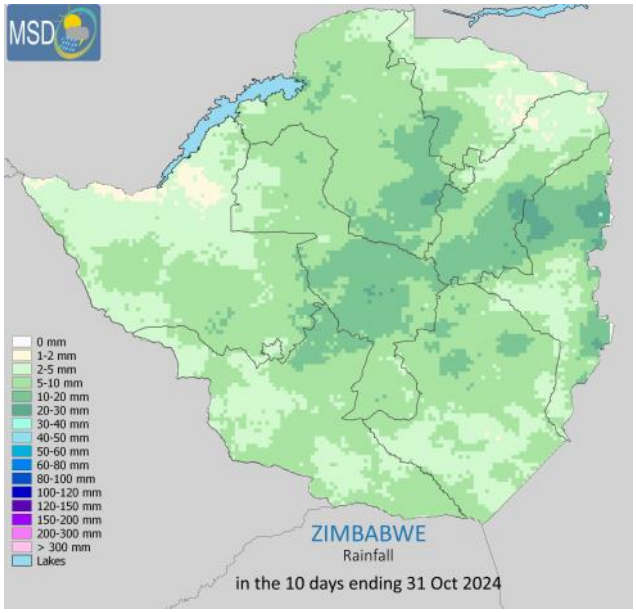
Accumulated Rainfall 1st dekad of November 2024



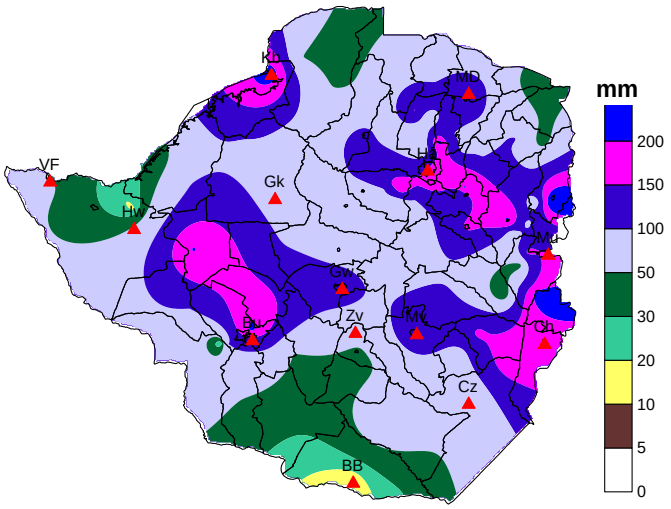
Accumulated Rainfall 2nd dekad of October 2024



Accumulated Rainfall 2nd dekad November 2024



Accumulated Rainfall 3rd dekad of October 2024



Accumulated Rainfall from 1 October 2024 to 11 December 2024

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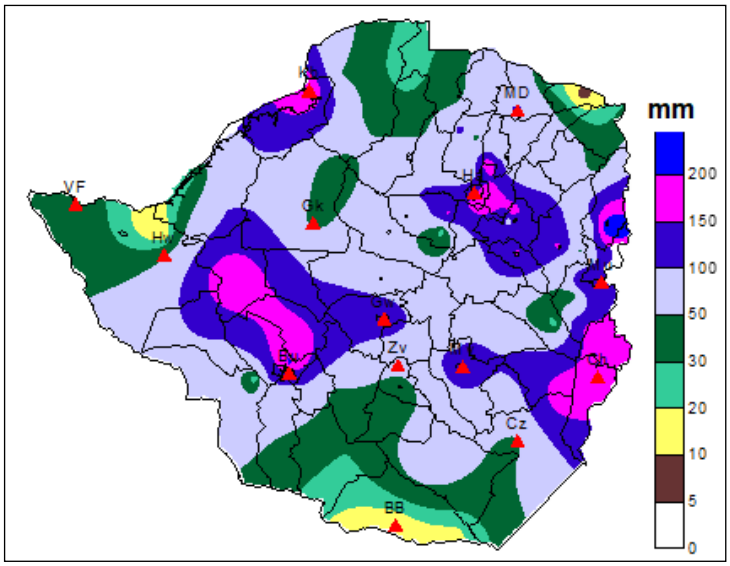
From despair to relief: The 2024-2025 rainfall season

Tinetariro Chikati

As 2023 drew to a close, our hearts were shattered like a jilted bride left standing alone at the altar. The promise of life-giving rains had been broken, leaving the general population in a state of despair. But then, a glimmer of hope emerged. The August SARCOF forecast predicted a dramatic turnaround for the 2024-2025 season, with normal to above-normal precipitation on the horizon.

And indeed, the season has started on a promising note, with most places receiving at least 30mm between 01 October and 27 November 2024. The highest rainfall accumulation is now above 200mm in areas such as Nyanga (255mm), Harare Crowborough (215mm), Bulawayo Goetz (208mm), Arcturus (208mm) and Kariba (202mm). All these places have surpassed their climatic totals for the period to date while a few places have rainfall totals below 30mm.



Rainfall in mm as from 01 Oct to 27 Nov 2024

These places include Binga (23.9mm), Kotwa (7mm), Beitbridge (11mm), Gwashure (24.5mm) and Gwangwava (14.5mm). Vegetation health has undergone a remarkable transformation, with conditions improving significantly.

However, the season has also unleashed its dark side. Strong winds have wreaked havoc, leaving destruction in their wake. In Mberengwa some houses were damaged and some school blocks had their rooves blown away like fragile leaves. In Tsholotsho a child lost his life while taking shelter from a thunderstorm in Mlangisa village. In accordance with that, hiding under the foliage

House destroyed by heavy rain in Mberengwa

of trees is not recommended as it is a very good recipe for disaster. If a lightning event occurs, there is a high probability that it will strike the tallest object in the vicinity. Such events, show that there is still a need for community education and awareness so that people can protect themselves.

School block in Mberengwa affected by strong wind

The 3D printed automatic weather stations have a very big potential

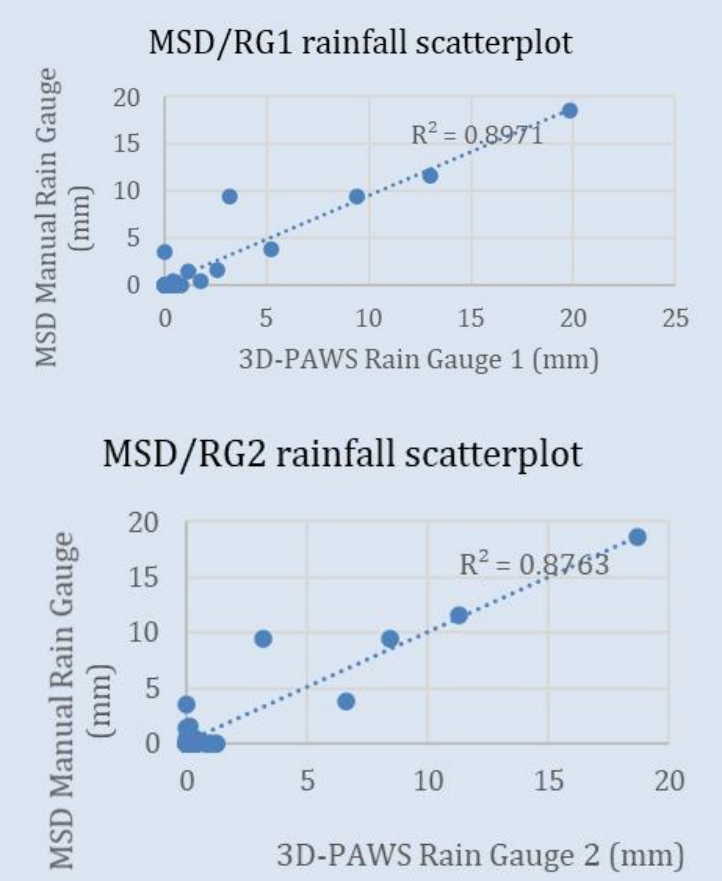
Tinetariro Chikati

3D printing is a manufacturing process that creates physical objects from digital designs by layering materials such as plastic. This process enables the creation of complex shapes and structures. Weather stations, with their intricate designs, are a prime example. Their complex shapes allow them to effectively record weather information.

3D printed weather station at MSD HQ

In August 2024, the Meteorological Services Department began manufacturing its own Automatic Weather Stations (3D PAWS) using 3D printing technology. Immediately after training on manufacturing, assembly, and calibration, two stations were deployed at Kutsaga Research Station and MSD HQ. However, since their deployment, these stations have experienced their fair share of issues, including incorrectly recording rainfall and intermittent data transmission losses, with one instance lasting up to a month at Kutsaga. By October 2024, some of these problems had been resolved, apparently due to firmware issues.

To assess the viability of the 3D-printed stations, a validation exercise was conducted for the MSD HQ station. The exercise compared rainfall, temperature, and pressure readings from the 3D PAWS with manual station data for October, when the rainfall season commenced. The results showed that the rain gauges accurately recorded rainfall, and when discrepancies occurred, the standard deviation was minimal. Consequently, the coefficients of determination were as high as 89%, indicating a strong positive correlation between the 3D PAWS data and the manual station data. Overall, this validation exercise demonstrates that the 3D-printed stations can reliably be used for data collection.



Validation results of the 3D printed rain gauges

MSD HQ: National Clean Up Day 6 December 2024

Strengthening Skills for monitoring the 2024/2025 Rainfall Season: WFP Seasonal monitor workshop.

Tinetariro Chikati

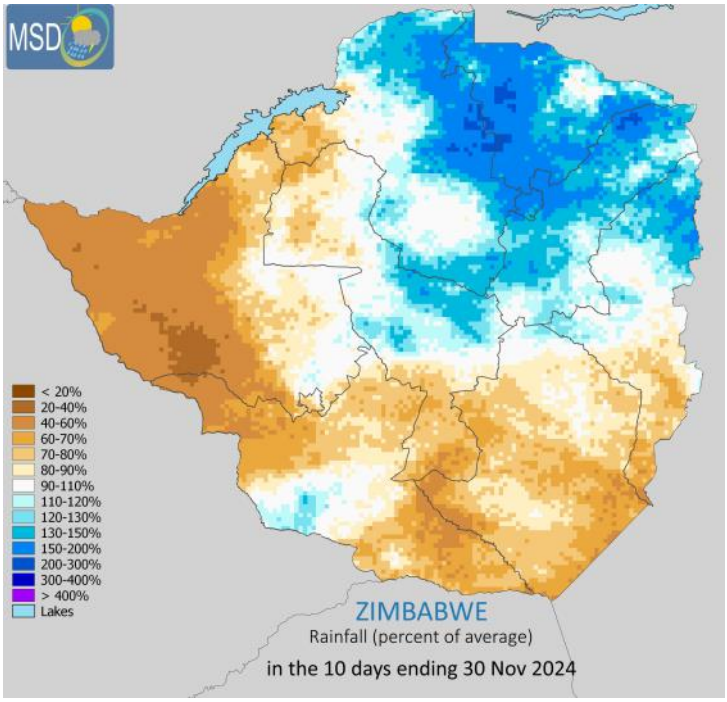
From Monday, December 2, to Friday, December 6, a Seasonal Monitor Workshop was held at the Meteorological Services Department (MSD) Headquarters. Organized by the World Food Programme (WFP), the workshop served as a refresher training for monitoring the upcoming 2024/2025 rainfall season.

The training focused on equipping participants with essential skills and knowledge for effective seasonal monitoring. Key areas of focus included the use of indices such as the Standardized Precipitation Index (SPI), Normalized Difference Vegetation Index (NDVI), and Normalized Difference Drought Index (NDD). These indices are crucial for assessing rainfall patterns, vegetation health, and drought conditions.

Participants also delved into the analysis of anomaly maps for temperature and precipitation, which are vital for understanding deviations from long-term averages. Additionally, they explored the concept of Potential Evapotranspiration (PET) and its impact on agriculture, particularly how water availability affects crop growth and productivity. A significant part of the workshop was dedicated to learning the methodology for blending rainfall and temperature station data with satellite estimates.

This approach enhances the accuracy and resolution of climatic datasets, enabling better decision-making. While participants were given an overview of the blending script used for this process, it was noted that the script requires further refinement to improve its user-friendliness. The workshop provided a platform for participants to strengthen their technical capabilities and prepared them for the critical task of monitoring seasonal conditions in 2024/2025. By integrating advanced tools and methodologies, the training aimed to enhance the capacity of experts to respond effectively to climate variability and its impact on agriculture and food security.

Some MSD colleagues learning the data blending methodology



Example product generated using the Automap program during the seasonal monitor workshop

Establishing a Crop Monitoring System Using Earth Observation Data

Tinetariro Chikati

Denford Sizeni, and Tinetariro Chikati, third and fourth seats from the foreground.

From 19 to 21 November 2024, Mr. Denford Sizeni and Mr. Tinetariro Chikati attended a training workshop in Kadoma, hosted by the Food and Agriculture Organization of the United Nations (FAO) and facilitated by experts from Université Catholique de Louvain (UCLouvain). The workshop aimed to establish an Earth observation-assisted national crop monitoring system (EO-STAT) for Zimbabwe. This system focuses on producing official agricultural statistics, including acreage and yield estimates.

The primary objective was to demonstrate how Earth observation (EO) data can support Zimbabwe's agricultural monitoring systems and enhance crop statistics and drought surveillance. The workshop featured practical exercises on generating and analyzing EO products from Sentinel-2 satellites using the Sen4Stat system, which operates on Zimbabwe's Centre for High-Performance Computing infrastructure. Outputs included: Cloud-free Sentinel-2 mosaics at 10m resolution, Spectral indices like NDVI and Leaf Area Index (LAI), Crop type maps and drought indices time series at 10m resolution.

The World Food Programme (WFP) also introduced its flood monitoring system, ADAM, as a complementary tool. Discussions during the workshop identified potential uses for these products, such as integrating them into seasonal monitoring reports. The MSD participants identified the crop field map as an opportunity for identifying potential areas for deploying new weather stations in farmland areas. These stations could provide critical weather data to farmers, especially for applications like crop insurance claims. The second day focused on hands-on training in QGIS, led by Boris Nörgaard from UCLouvain.

Participants processed raster files from the Sen4Stat system, focusing on spectral indices and biophysical time series to monitor crop health during the summer season. On the final day, discussions centered on data formatting, statistical analysis of Sen4Stat outputs, and lessons learned from field campaigns. The cost of conducting annual field mapping exercises was also evaluated, with EO data emerging as a more cost-effective alternative for agricultural monitoring.

Group photo from the first day of the FAO EO-STAT workshop. (Tinetariro 1st standing from left, Denford 4th standing from the left after the flier)

Throwback To August: Inter-Ministerial Sports Festival in Gweru

Praise Govere

MSD ladies playing netball at the sports festival

This year's Inter-Ministerial Sports Festival, held at Mkoba Teachers College in Gweru, was a resounding success, bringing together various government ministries for a day of sports, camaraderie, and teamwork. The festival featured a range of sporting activities, including soccer, netball, volleyball, and athletics, fostering unity and promoting the well-being of government workers. The Ministry of Environment proudly participated in both men's soccer and netball, showcasing their competitive spirit and teamwork. The enthusiasm was palpable as teams from different ministries gathered to compete and strengthen inter-ministerial relationships. The Ministry of Environment's men's soccer team had a commendable performance, securing a victory against the Ministry of Foreign Affairs and International Trade with a score of 2-0. This win highlighted the team's skill and determination. However, they faced tough competition in subsequent matches against the Ministry of ICT and the Ministry of Health and Child Care, where they fell short despite their best efforts. In netball, the Ministry of Environment Climate and Wildlife also displayed great teamwork and sportsmanship, contributing to the festival's vibrant atmosphere.

The festival saw immense support from the Forestry Commission and Zimparks, who generously provided refreshments, including ample supplies of drinking water for all participants. This gesture was greatly appreciated and played a vital role in keeping everyone hydrated and energized throughout the week. The primary goal of the Inter-Ministerial Sports Festival was to strengthen team spirit, foster unity among government workers, and promote overall well-being. The event successfully brought together individuals from various ministries, encouraging collaboration and friendship beyond the workplace.

The Ministry of Environment Climate and Wildlife's participation in this year's Inter-Ministerial Sports Festival was marked by competitive spirit and unity. With strong performances in soccer and netball, and the generous support from partners like Forestry commission and Zimparks, the festival reinforced the importance of teamwork and camaraderie among government workers. As we look forward to future events, the Ministry of Environment remains committed to promoting health, unity, and collaboration within the government.

Debunking Weather Myths: Facts vs. Fiction

Praise Govere

In our day-to-day lives, weather plays a crucial role, influencing everything from our daily attire to major agricultural decisions. However, with so much information circulating about weather phenomena, myths and misconceptions often arise. In this article, we aim to debunk some common weather myths and provide you with the facts to enhance your understanding of meteorology.

Myth 1: Lightning Never Strikes the Same Place Twice

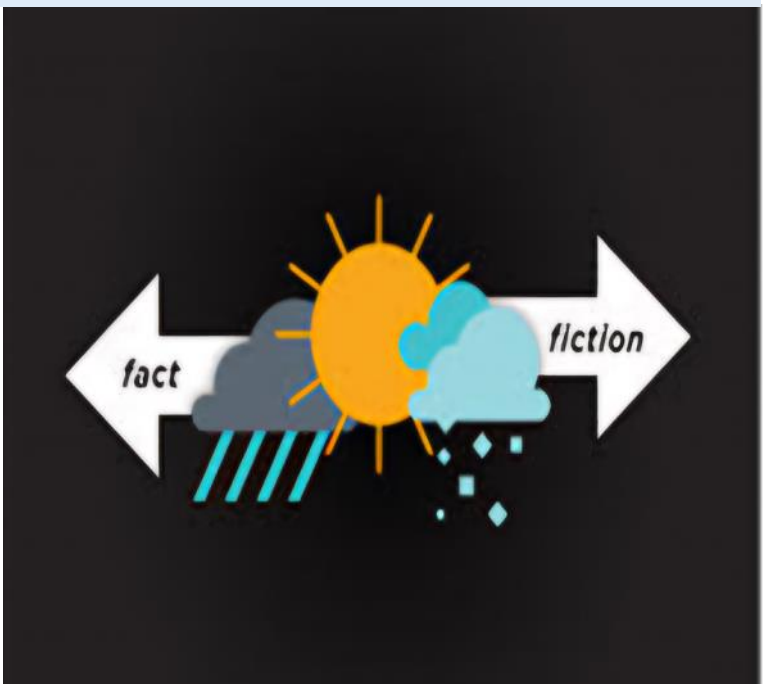
Fact: Lightning can and does strike the same place multiple times. In fact, tall structures like skyscrapers and radio towers are often struck by lightning numerous times during a storm. The Empire State Building, for instance, is hit by lightning about 20 to 25 times a year.

Myth 2: If It's Cold, It Can't Rain

Fact: Rain can occur in cold temperatures. In fact, winter precipitation can be in the form of rain, sleet, or freezing rain, depending on the temperature of the air at different altitudes. Just because temperatures are low doesn't mean precipitation will be in solid form.

Myth 3: Weather Apps and Forecasts Are Always Accurate

Fact: While technology has greatly improved weather forecasting, no forecast is 100% accurate. Meteorologists use models based on current data, but unforeseen changes in conditions can lead to variations in actual weather. It's always good to check multiple sources and stay updated.



Myth 4: You Can Smell Rain Coming

Fact: The scent that often precedes rain is due to a compound called petrichor, which is released from the soil when raindrops hit the ground. While you can't literally "smell" rain itself, the earthy aroma can signal impending precipitation.

Myth 5: The Weather is Always Worse After a Full Moon

Fact: There is no scientific evidence to support the idea that a full moon influences weather patterns. Weather conditions are primarily driven by atmospheric pressure, humidity, and temperature, not lunar phases.

Myth 6: Snow is Just Frozen Rain

Fact: Snow and rain are very different forms of precipitation. Snow forms when water vapor freezes into ice crystals in the atmosphere, while rain forms when these droplets become too heavy to remain suspended in the air and fall to the ground. The processes involved in their formation are distinct.

The Meteorological Services Department Wishes You A Merry Christmas & A Happy New Year

ZIMBABWE

METEOROLOGICAL SERVICES DEPARTMENT

'Where Science Meets The Sky'

MSD

Vision

A world class provider of meteorological, climatological and seismological products and services by 2025.

Mission Statement

To provide customer and stakeholder driven quality seismological, weather and climate services for socio economic development.

Core Values

- **Teamwork:** We value unity of purpose
- **Equality:** We offer equal status, rights and opportunities to all
- **Customer focus:** We prioritize and address customer needs.
- **Transparency:** We are open to scrutiny
- **Integrity:** We have strong moral principles
- **Creativity:** We focus on innovation and continuous improvement.
- **Accountability:** We take responsibility for one's own actions.