

Head Office:
Plot 67 – 75
Clement Hill Road
KAMPALA
E-mail: info@unma.go.ug



Tel: +256 414 251798
Fax: +256 414 251797
P.O. Box 7025
KAMPALA

UGANDA NATIONAL METEOROLOGICAL AUTHORITY

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MARCH TO MAY 2017 SEASONAL RAINFALL OUTLOOK OVER UGANDA

1. GENERAL OVERVIEW OF METEOROLOGICAL SERVICES IN UGANDA

The Uganda National Meteorological Authority (UNMA) under the Ministry of Water and Environment was established by **ACT 2012 of Parliament**. The Authority went into effect on 24th January 2014.

The Vision is “*being a center of excellent on weather and climate services for sustainable development of Uganda*”.

The Mission is “*to contribute to the overall national development through provision of quality, customer-focused, cost-effective and timely information for weather services to all users*”.

The Overall Goal is “*to improve technical and institutional capacity for providing weather and climate information, prediction products and services, early warning system, and related services for sustainable development in Uganda*”.

UNMA is the Government’s authoritative voice on weather and climate. It is mandated to install and maintain weather observations and monitoring equipments, monitor weather and climate, exchange meteorological data, information and meteorological products and issue weather and climate advisories to all sectors of the economy in particular and to international partners in general.

As per its mandate, UNMA provides critical services to different sectors of the economy including the aviation industry, air defence, environmental monitoring, water resources management, agriculture, transport and communication as well as tourism and disaster management among others. This mandate has become increasingly pivotal at this time when human kind is faced with the increasing negative impacts of climate change where the poor among our communities are expected to be affected most.

UNMA normally issues timely seasonal climate forecasts just before the beginning of each rainfall season in Uganda. The seasons are March, April and May (MAM), June, July and August (JJA) and September, October, November and December (SON (D)). The climate forecast in every season provides indications of the expected performance of seasonal rains including the onset and cessation dates and proposed advisories for the different

sectors of the economy. The expected impacts from the forecast are also highlighted for the purposes of advancing appropriate safeguarding planning strategies and decision making for various sectors.

On 17th day of February 2017, UNMA issued seasonal climate outlook for March, April and May (MAM) 2017 period. The MAM period constitutes the first major rainfall season over Uganda.

2. GENERAL FORECAST

Overall, there is an increased probability for **above normal rainfall** for western sector of Uganda, **normal rainfall** for central, Lake Victoria Basin, south-eastern, and central-northern Uganda, **and below normal rainfall** for Karamoja region and some parts of Lango and Acholi regions.

It should be noted that the onset of seasonal rains is expected to be characterised by thunderstorms and hailstorms over some parts of the country as well as dry-spells during the course of the seasonal rainfall performance.

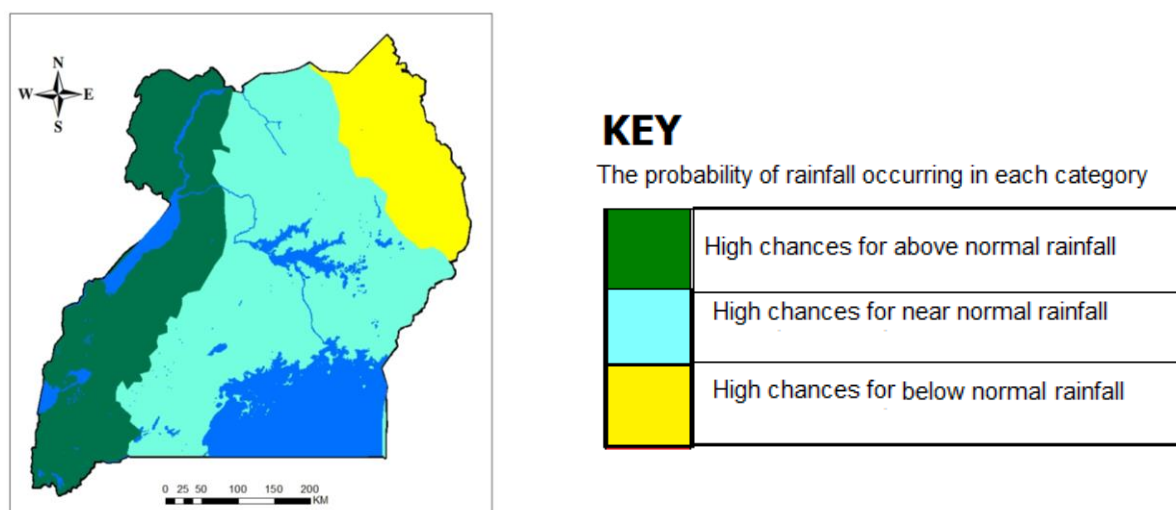


Figure 1: Seasonal climate forecast for March to May 2017

During the 45th Climate Outlook Forum for the Greater Horn of Africa held in Addis Ababa, Ethiopia from 5 to 8th February 2017, the national, regional and international climate scientists reviewed the state of the global climate system and its implications on the seasonal rainfall over the East African region. It was observed that the major physical conditions likely to influence the weather conditions over Uganda and the rest of the East African region for the forecast period of March to May 2017 are as follows:

- i) *The predicted neutral phase of Indian Ocean Dipole and neutral ENSO conditions in the central and eastern Pacific Ocean (No El Niño and no La Niña);*
- ii) *The influence of regional circulation patterns, topographical features and large inland water bodies.*

Based on the above considerations as well as details of the climatology of Uganda and scientific tools for climate analysis, Uganda National Meteorological Authority (UNMA) in the Ministry of Water and Environment, has come up with the following detailed forecast:-

3. DETAILED FORECAST

3.1 EASTERN UGANDA

3.1.1 Eastern Lake Victoria and South Eastern: (*Jinja, Mayuge, Kamuli, Iganga, Bugiri, Namayingo, Luuka, Namutumba, Buyende, Kaliro, Busia and Tororo*) districts

- This region has been experiencing dry conditions since December. The onset of seasonal rains is expected around late February to early March and the peak is expected around mid-April through early May. The cessation is expected around late May. **Overall, this region has a high chance of receiving near normal rainfall.**

3.1.2 Eastern Central (*Pallisa, Budaka, Kibuku, Mbale, Sironko, Manafwa, Bududa, Kapchorwa, Kumi, Kaberamaido, Soroti, Serere, Amolatar, Butaleja, Bulambuli, Kween, Bukwo, Bukedea and Ngora*) districts

- The onset of seasonal rains over this region is expected around early to mid-March. The peak rains are expected around late April and the cessation around mid-June. **Overall the region is expected to receive near normal rains.**

3.1.3 North Eastern Region: (*Katakwi, Moroto, Kotido, Nakapiripirit, Abim, Napak, Amudat, Amuria, and Kaabong*) districts

- This region has been experiencing dry conditions reaching drought levels in several areas since December. However, irregular light rains are expected to set in around late March, thereafter a prolonged dry spell is expected until mid-April when steady rains are expected to get established. The peak is expected around early to mid-May, and then moderate relaxation around mid-June 2017. **Overall, there are high chances for below normal rainfall over this region.**

3.2 NORTHERN UGANDA

3.2.1 Eastern parts of northern region: (*Lira, Alebtong, Kitgum, Agago, Otuke, Pader, Kole, and Dokolo*) districts

- The onset of normal seasonal rainfall is expected around early to mid-April. Moderate relaxation of rains is expected around mid-June. **Overall, near normal rainfall with tendency to below normal is expected during this season.**

3.2.2 Central Northern Parts: (*Gulu, Apac, Lamwo, Nwoya, Amuru, Oyam and Kiryandongo*) districts

- The region is currently experiencing dry spells which are expected to continue up to mid/late March when the onset of the seasonal rains is expected to get established. The moderate relaxation of rains is expected around mid-June. **Overall, there are high chances for near normal rains over this region.**

3.2.3 North Western: (*Moyo, Arua, Maracha, Nebbi, Adjumani, Yumbe, Koboko, Terego and Zombo*) districts

- The region has been experiencing dry conditions since January. The onset of seasonal rainfall is expected around late March to early April. The peak of the rainfall is expected around late April 2017 and moderate relaxation is expected around mid-June 2017. **Overall, there are high chances for near normal to above normal over this region.**

3.3 WESTERN UGANDA

3.3.1 South Western (*Kisoro, Kabale, Rukungiri, Kanungu, Ntungamo, Mbarara, Kiruhura, Isingiro, Ibanda, Bushenyi, Buhweju, Mitooma, Sheema, Rubirizi and Kasese*) districts

- The region has been experiencing dry conditions since December. The onset of seasonal rainfall is expected late February. The peak of the rains is expected around mid-April and the cessation around late May to early June. **Overall, the region is expected to receive above normal rainfall during this season.**

3.3.2 Western Central (*Bundibugyo, Ntoroko, Kabarole, Kyenjojo, Kyegegwa, Kamwenge, Kibaale, Hoima, Buliisa and Masindi*) districts

- The region has been experiencing relatively dry conditions since January. The onset of seasonal rains is expected around mid to late March. The peak is expected around mid to late April. The cessation of the seasonal rains is expected around early to mid-June. **Overall, there are high chances for near normal rains with slight tendency to above normal over this region.**

3.4 LAKE VICTORIA BASIN AND CENTRAL AREAS

3.4.1 Central and Western Lake Victoria Basin: (*Kalangala, Kampala, Wakiso, Eastern Masaka, Lwengo, Mpigi, Butambala, Kalungu, Bukomansimbi, Gomba, and Mityana*) districts

- The onset of seasonal rains in this region is expected around late February to early March and is expected to be accompanied by strong and destructive winds as well as hailstorms and thereafter, rains are expected to intensify with the peak occurring around mid-April. The cessation is expected around early to mid-June 2017. **Overall, there are high chances of near normal rainfall over this region.**

3.4.2 Western Parts of Central: (*Nakasongola, Luwero, Kyankwanzi, Nakaseke, Kiboga, Mubende, Sembabule, Western Masaka, Lyantonde, and Rakai*) districts

- The onset of the seasonal rains is expected to get established around early to mid-March. The peak of rains is expected to occur around mid-April. The cessation is expected around early/mid-June. **Overall, there are high chances of near normal rainfall over this region.**

3.4.3 Eastern parts of Central: (*Mukono, Buikwe, Kayunga, Buvuma*) districts

- The onset of seasonal rains is expected around late February to early March. The peak of rains is expected around mid-April. The cessation is expected around early to mid-June. It should be noted that the seasonal rains in this region are expected to be interrupted by occasional dry spells. **Overall, near normal rainfall is expected over this region.**

4.0 THE IMPLICATIONS OF THE CURRENT FORECAST

- i) **There are high chances that the rainfall performance over several places in the country is expected to be near normal.** The implication is that these areas will receive rainfall within average range of their long term mean and rainfall is expected to adequately support the normal socio-economic activities for the various areas;
- ii) **There are high chances that Karamoja region, parts of Lango and Acholi are expected to experience below normal rainfall during this season.** This implies that the total rainfall expected over these regions is below 75% of the Long Term Mean (LTM). Under this range there are high chances for socio-economic activities being stressed, the level of stress increasing with increasing rainfall deficiency
- iii) It should also be noted that localized episodic flash flood events may also be observed in areas that are expected to receive near normal to below rainfall as a result of isolated heavy down pours and similarly, poor rainfall distribution may occur in localized areas expected to receive above normal rainfall.

5.0 SPECIFIC ADVISORIES TO DIFFERENT SECTORS:

5.1 Agriculture and Food Security Sector

The farmers are advised to do the following:

5.1.1 Regions expecting near normal to above normal rainfall and with 2.5+ months growing season (South-Western, Central, Lake Victoria Basin, and South Eastern regions).

Due to the good expected rainfall, there is increased potential for optimal crop performance over these regions. Farmers in these areas are therefore encouraged to maximize the expected good season by perfecting the following agronomic practices in order to boost food production volumes:

- Start securing inputs and carryout early land preparations, which will allow timely planting;
- Plant long maturing crops like millet, rice, sorghum, maize, cassava, sweet potatoes, coffee cuttings (clonal coffee) on the start of rains and short quick maturing crops later as the rains progress such as legumes, root tubers and vegetables;
- Avoid planting crops in flood and landslide prone zones: cases of

flooding and landslides may be experienced in areas such as Kabale, Kisoro, Bundibudyo, Kasese and areas around Mt. Rwenzori which are expected to receive 300mm of rainfall and above.

- Carryout soil and water conservation practices such as digging trenches, mulching, minimum tillage (ripping, raised beds, planting basins)
- Enhance good agronomic practices (proper spacing, fertilizer use, weeding);
- Livestock farmers are advised to plant livestock fodders at the onset of the rains;
- Carryout water harvesting for home consumption, and ground water harvesting into gardens, dams and valley tanks for livestock and sustaining crop production;
- Enhance surveillance of crop gardens for pests and diseases and timely control (crop rotation MSV, Root Rot, disease resistant varieties like NABE15-23, Longe10H-11H, 7H);
- Encourage tree planting including agro-forestry and fruit trees;
- Enhance usage of cover crops to suppress weeds, avail nutrients and reduce on soil erosion;
- Put in place soil conservation structures to prevent soil erosion for those on slopes and highlands;
- Guard against tick-borne diseases and worms;
- Timely harvesting of maize so as to minimize aflatoxin accumulation in maize;
- Improved post-harvest handling practices e.g. super bags.

5.1.2 Regions expecting below normal rainfall and with length of 1-2.5 months growing season such as Karamoja and neighbouring areas are advised to do the following:-

- Use irregular light rains for early land preparation and securing inputs like seed, fertilizer, chemicals.
- Timely planting of improved varieties (i.e. quick maturing and drought tolerant) such as Beans (NABE 15-23 series), maize (Longe 5, 7H, 10H-11H).
- Enhance rain water harvesting (in-situ, roof, surface-run-off) for usage when the rains start is encouraged;
- Encourage good soil and water conservation practices e.g. terraces, stone bunds, trenches, grass bunds, mulching to control soil erosion and boost soil moisture retention; and Drip irrigation where possible is encouraged;
- Encourage pasture preservation/making hay;
- Carryout good agronomic practices for crops such as proper spacing, proper use of fertilizer;
- Diversify for example intercropping and mixed cropping; Maize/beans, maize-cowpea, maize-soybean.
- Carryout low-cost irrigation systems like small-scale drip irrigation e.g. use of plastic bottles filled with water
- Encourage the usage of improved post-harvest technologies e.g. super bags, metallic silos, cocoons
- Pasture preservation (making hay and silage) and use available water sparingly;

In general, farmers are advised to make use of the seasonal rains by optimizing crop yield through appropriate land-use management. Farmers are also encouraged to plant enough food for both domestic use and sale to emerging markets in the neighbouring countries.

5.2 Disaster Management Sector

It should be noted that local and month-to-month variations might occur as the season progresses. For example, episodic flash floods might be experienced in some areas leading to loss of lives and destruction of property. Other disasters may arise from possible landslides mostly in mountainous areas of western, south-western and eastern Uganda as well as strong and gusty winds and lightning among others. Therefore, appropriate measures should be taken to avoid loss of life and destruction of infrastructure and property.

- Village, Sub county and District Disaster Management committees are advised to report any emerging incident associated with weather and climate hazards immediately to the concerned authorities at National Emergency Coordination and Operation Centre (NECOC), Office of the Prime Minister on toll free line **0800177777**;
- De-silt the dams in Karamoja sub region to capture and store the water flows from expected limited rains for use;
- District authorities are advised to update their contingency plans for better coordination in case of any weather and climate disaster that might occur during this season;
- Construct proper drainage systems around homesteads and urban areas;

5.3 Water, Energy and Hydro-Power generation

5.3.1 Regions expecting near normal to above normal

- Plans for optimization of power generation and distribution should be enhanced due to the expected increased discharge of seasonal rain water into the water bodies;
- Setting up and protection of vegetated/forested buffer zones around water sources to guard against water pollution should be encouraged and communities should avoid consumption of contaminated water;
- Avoid catchment degradation practices e.g. bush burning and vegetation clearing as these have a direct impact on the quantity and quality of water resources;
- Utilities need to ensure de-silting of reservoirs e.g. dams to ensure maximum storage of the available water;
- Plans for optimization of power generation and distribution should be enhanced due to the expected increased discharge of seasonal rain water into the water bodies;
- Control water pollution to ensure that the available water is not polluted. E.g. controlled release of waste water into streams and rivers;

- Setting up and protection of buffer zones around water sources to guard against water pollution should be encouraged and communities should avoid consumption of contaminated water;
- There is a likelihood of accidents such as drowning in flooded waters around settlements constructed in water catchment areas especially flood plains;
- Human activities in steep slope areas should be regulated to avoid flooding in downstream areas;
- More cases of electricity pole and wire breakdowns are expected due to wet soils and strong winds. Transformers also might be at stake.

5.3.2 *Regions expecting near below normal rainfall*

- Water source protection and management should be strengthened for water security;
- Water should be used sparingly and where possible water recycling can also be adopted;
- Protect and conserve the water infrastructure in the areas like already established dams and valley tanks;
- Soil and water conservation should be encouraged like mulching;
- Other energy sources like solar, biogas and wind energy should be exploited for example Biogas fuel using energy saving stoves.

5.4 Infrastructure, Works and Transport Sector

The anticipated near normal rainfall patterns are likely to be occasionally accompanied by intense rainfall events that may lead to flash flooding in some localized places especially in Kampala city and other urban areas. The following measures should be taken:-

- Urban authorities need to clear and reduce blockages of the drainage systems to avoid water logging on streets;
- Strong/violent winds may be experienced that can cause structural damages to buildings (blow off rooftops and collapse of poorly constructed buildings);
- De-silting drainages and other water channels to curtail flooding is encouraged;

5.5 Health

There is need to increase disease surveillance due to expected upsurges of epidemics of diseases related to rainy season such as Malaria, Cholera, Bilharzia and Typhoid, also increase in lower respiratory diseases e.g. Asthma due to humid conditions and allergies from some flowering plants are expected. Health authorities are therefore advised to be on the lookout and equip health units with necessary drugs to deal with such situations as they may arise. Therefore the following measures should be done:

- Intensify health education and awareness campaigns emphasizing the use of mosquito nets, slashing bushes, disposing open containers, filling up open pits, and draining stagnant water around homesteads in order to reduce breeding places for mosquitoes;
- Frequent health inspection in all communities is encouraged;

- Increased prevention for air borne diseases and non-communicable illnesses should be improved;
- Improve domestic hygiene and Sanitation around homes and schools to reduce on the contamination of water. E.g. use of latrines

5.6 LIGHTNING

In case of Lightning the following advisories should encouraged;

- Authorities at all levels should install lightening conductors/arrestors on all structures especially on public buildings (schools, hospitals) and also in homes;
- Teachers should ensure that school children do not play in open grounds or take shelter under trees during light drizzles that precede thunderstorms;
- Avoid contact with metallic objects during thunderstorms since such objects may conduct the electricity discharged by a lightning strike;
- Always listen to your local radios about warnings on impending thunderstorms activity in your area.

6.0 REVIEW OF THE RAINFALL PERFORMANCE FOR SEPTEMBER TO DECEMBER (SOND) 2016 AND JANUARY 2017

In general, the seasonal rainfall performance for the period of September, October, November and December 2016 was majorly driven by the La Niña episode (periodic cooling of sea surface temperatures in the eastern and central equatorial Pacific Ocean) and the negative Indian Ocean Dipole (cooling of the western Indian Ocean), the persistent stay of the meridional arm of the Inter-tropical Convergence Zone (ITCZ) over Democratic Republic of Congo, all these events contributed to the poor performance of the rainfall (suppressed rainfall) over several regions in the country apart from the Western region which received normal rains.

The onset of the seasonal rains was delayed and got established by the late September to early October, and the cessation of the rainfall fell in early to mid-December. The seasonal rains were characterized by heavy and violent downpours during the month of October that caused floods in some parts of the country.

Overall, the most parts of the country received below normal rainfall, a part from the Western region which received near normal to above normal rainfall.

6.1 Rainfall performance during September 2016

Several areas across the country received near normal rains during the month of September. However, Entebbe, Mbarara, Kabale, Masaka, Kyenjojo, Kawanda and Soroti areas experienced above normal rainfall with Kabale and Entebbe weather stations registering the highest amount of 183.7mm and 149mm which are equivalent to 191.4% and 191% respectively of their long term mean (LTM) as shown figures 2(a) and 2(b).

Karamoja region received below normal rainfall with Moroto weather station registering the lowest amount of 16.3mm which is equivalent to 33.3% of LTM.

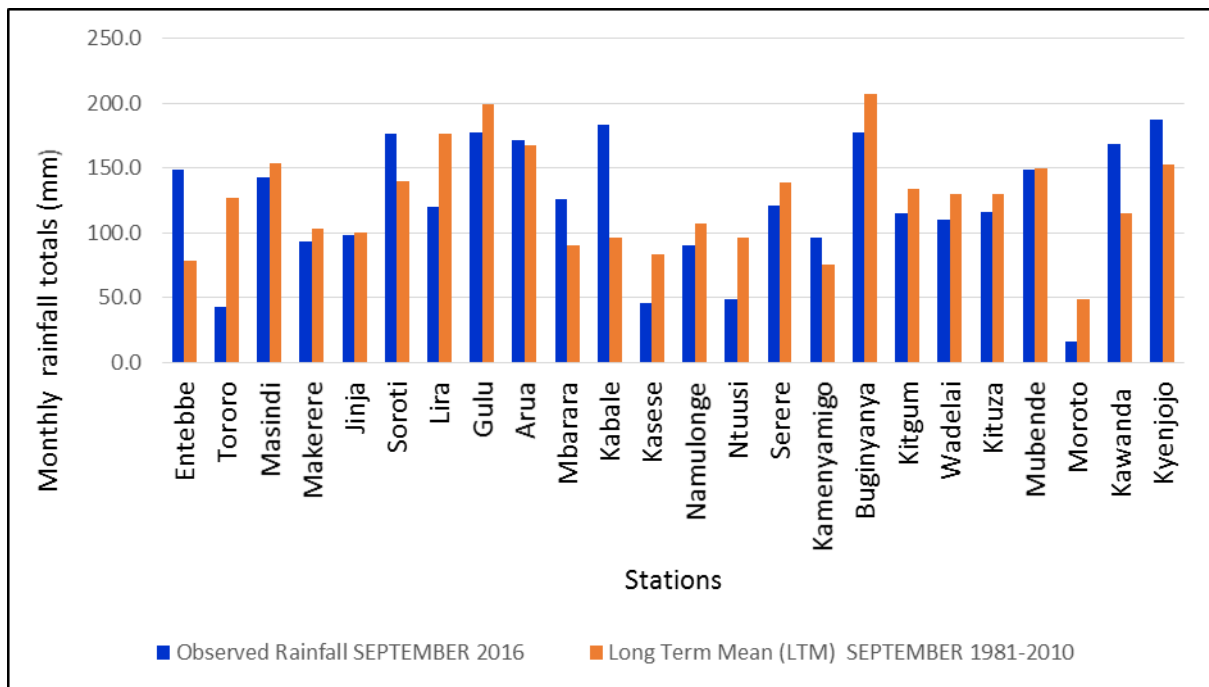


Figure 2(a): Rainfall performance for September 2016

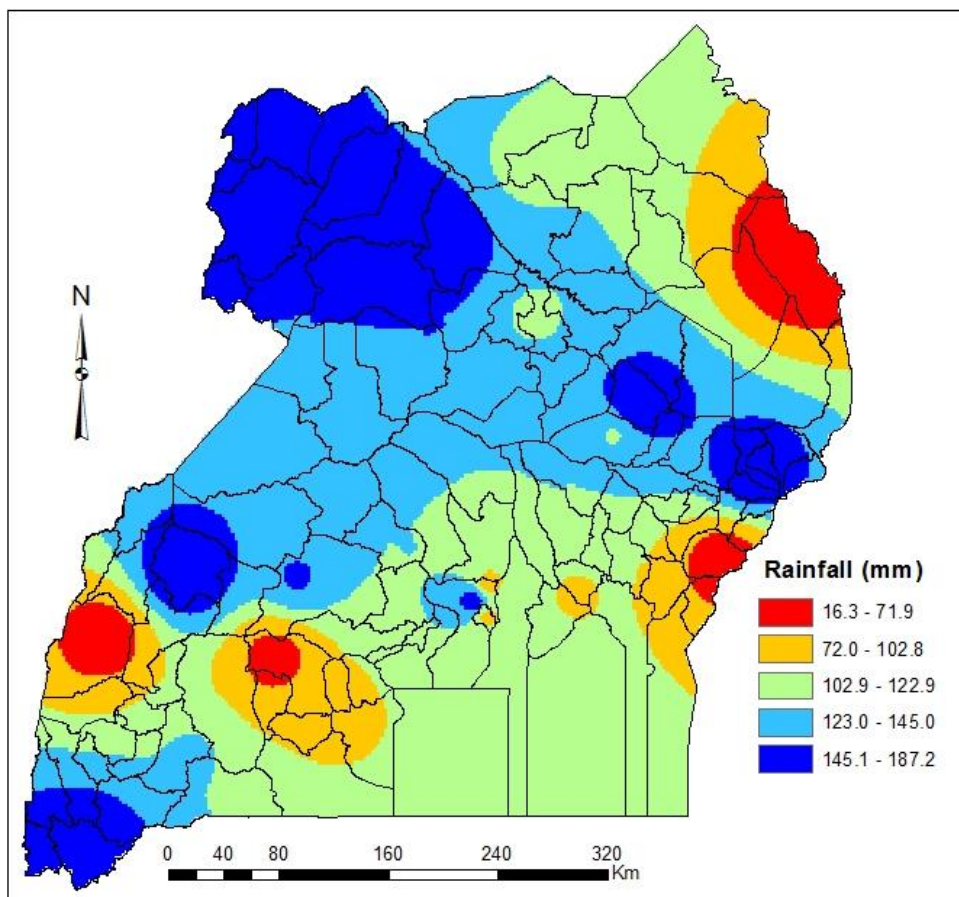


Figure 2(b): Spatial distribution of the observed rainfall for selected weather stations across the country during the period of September 2016

6.2 Rainfall performance during October 2016

During the month of October, several areas across the country received below normal rains. However, Masindi, Kabale, and Kasese experienced above normal rainfall with Masindi and Kasese weather stations registering the highest amount of 290.9mm and 158.7mm which are equivalent to 197.9% and 149% of their long term mean (LTM) respectively as shown figures 3(a) and 3(b). Teso region received below normal rainfall with Soroti weather station registering the lowest amount of 37.3mm which is equivalent to 25.7% of LTM.

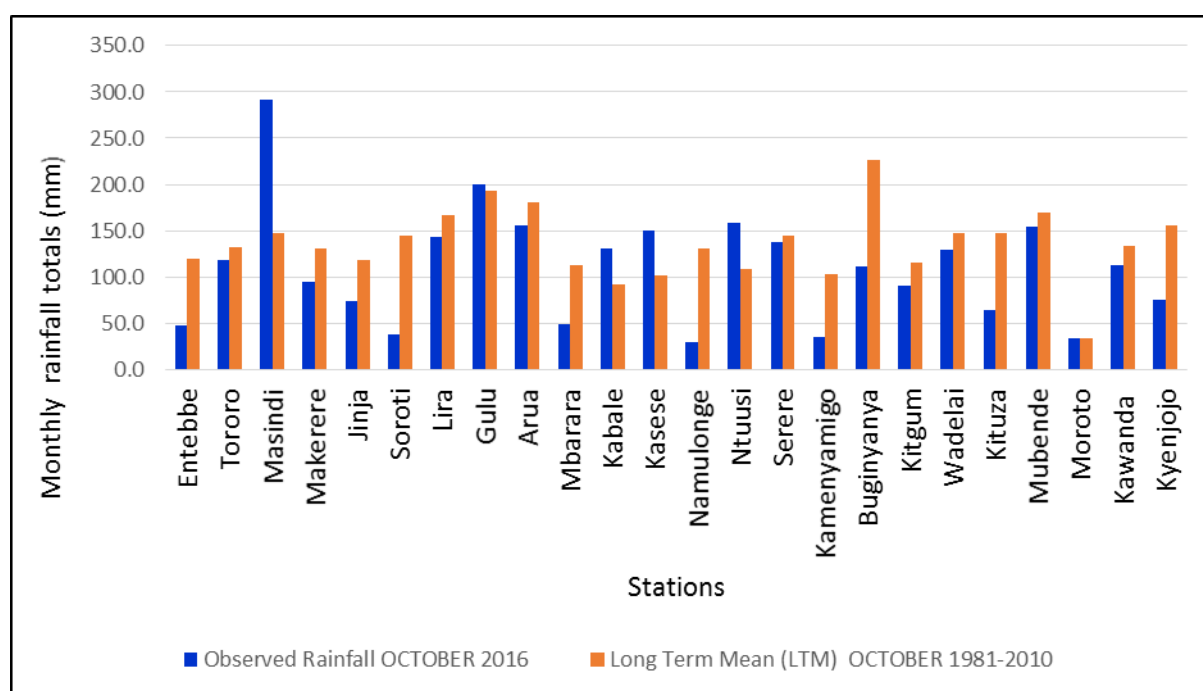


Figure 3(a): Rainfall performance for October 2016

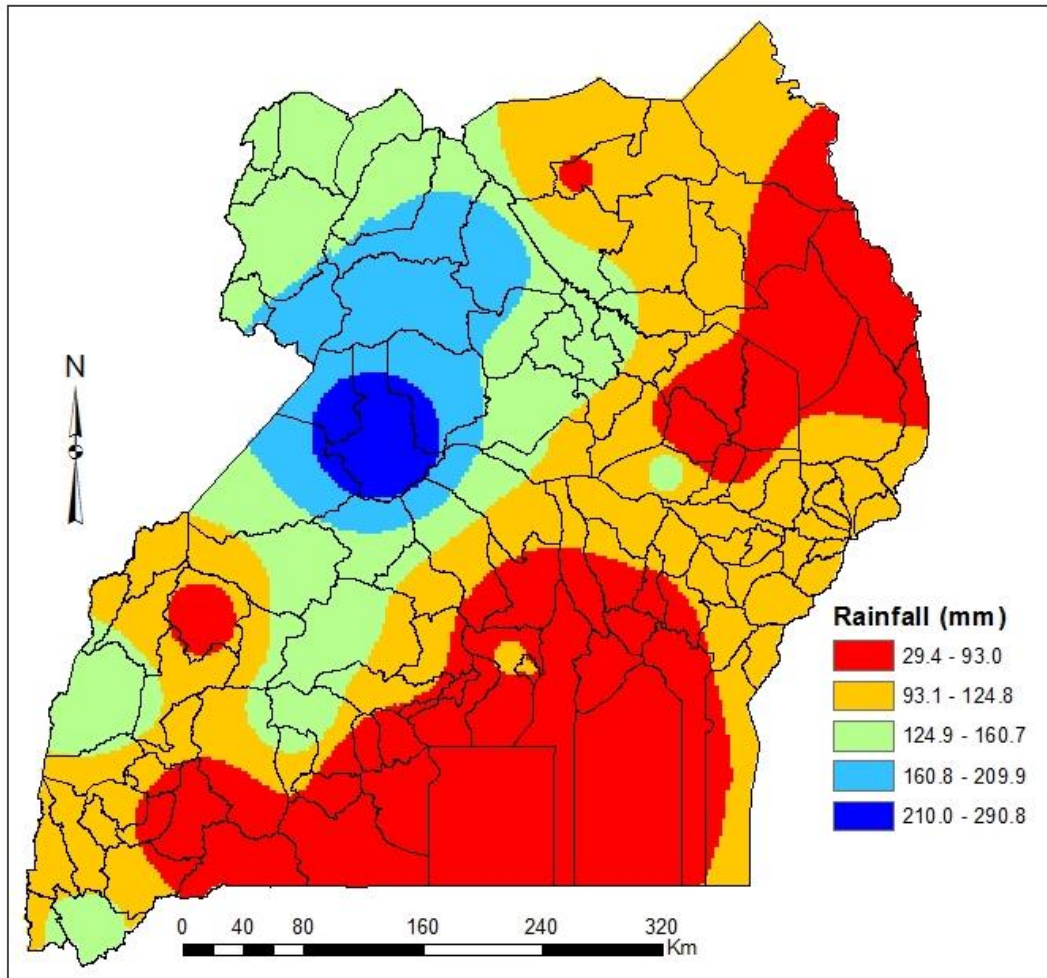


Figure 3(b): *Spatial distribution of the observed rainfall for selected weather stations across the country during the period of October 2016*

6.3 Rainfall performance during November 2016

During November, most areas across the country received below normal rains. However, Arua, Kasese, Sembabule, Kitgum, Nebbi and Kyenjojo areas experienced above normal rainfall with Kyenjojo and Wadelai weather stations registered the highest amount of 258.4mm and 135.9mm which are equivalent to 243.5% and 144.6% of their long term mean (LTM) respectively as shown figures 4(a) and 4(b). Karamoja region received below normal rainfall with Moroto weather station registering the lowest amount of 15.5mm which is equivalent to 55.4% of LTM.

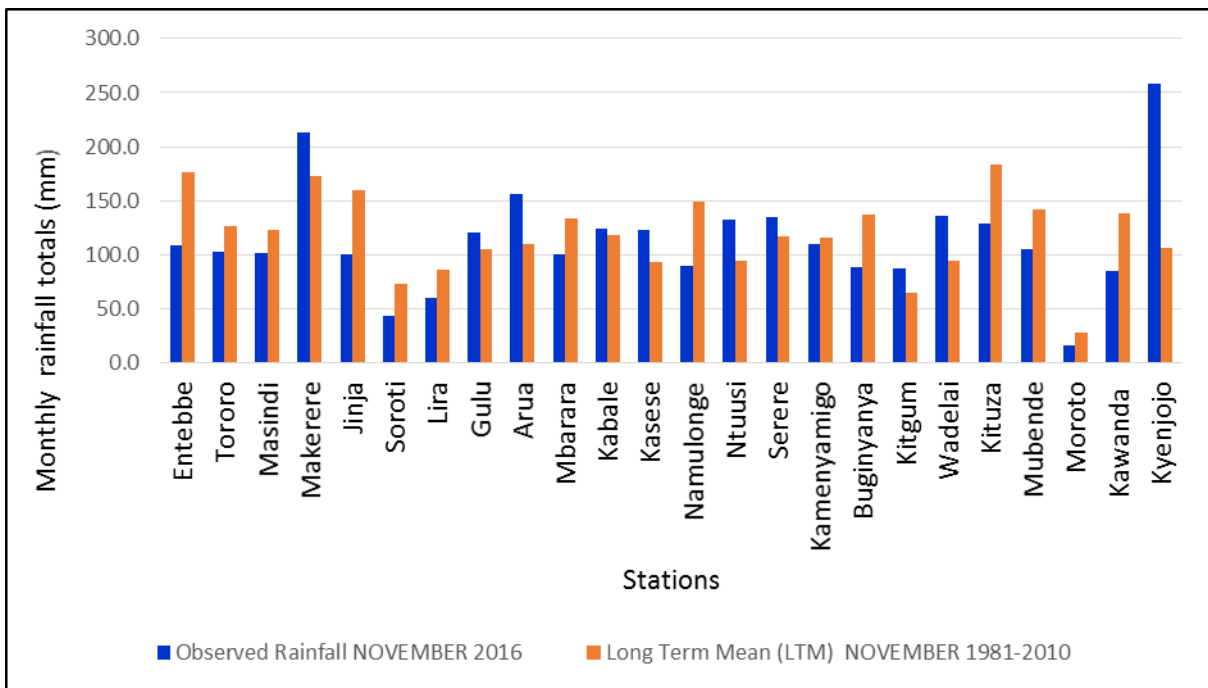


Figure 4(a): Rainfall performance for November 2016

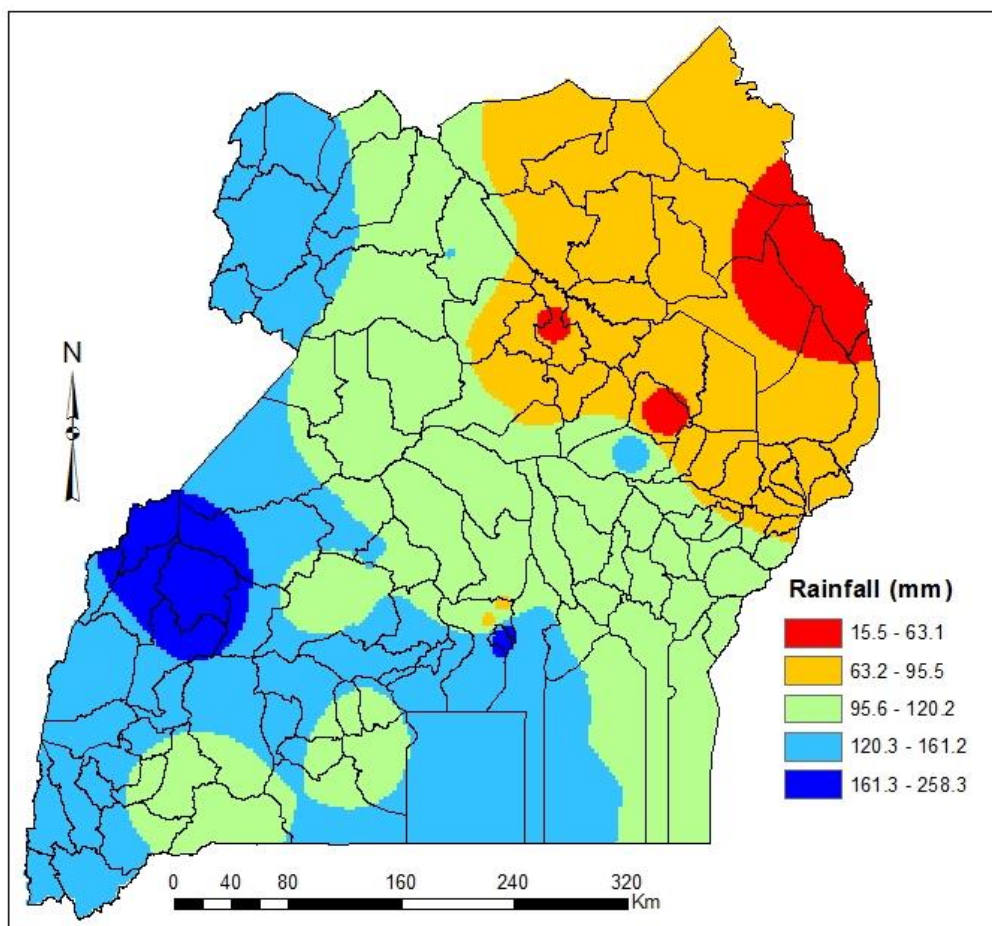


Figure 4(b): Spatial distribution of the observed rainfall for selected weather stations across the country during the period of November 2016

6.4 Rainfall performance during December 2016

The month of December, was generally dry, characterised by below normal rainfall over most parts of the country. However, above normal rainfall was experienced in Arua and Entebbe registering the highest amount of 98.4mm

and 134.5mm which are equivalent to 213.9% and 115.9% respectively of their December long term mean (LTM) as shown figures 5(a) and 5(b). Most parts of Karamoja, Teso, Mt. Elgon, South Western and Central Uganda received below normal rainfall with Moroto and Lira weather stations receiving no rain.

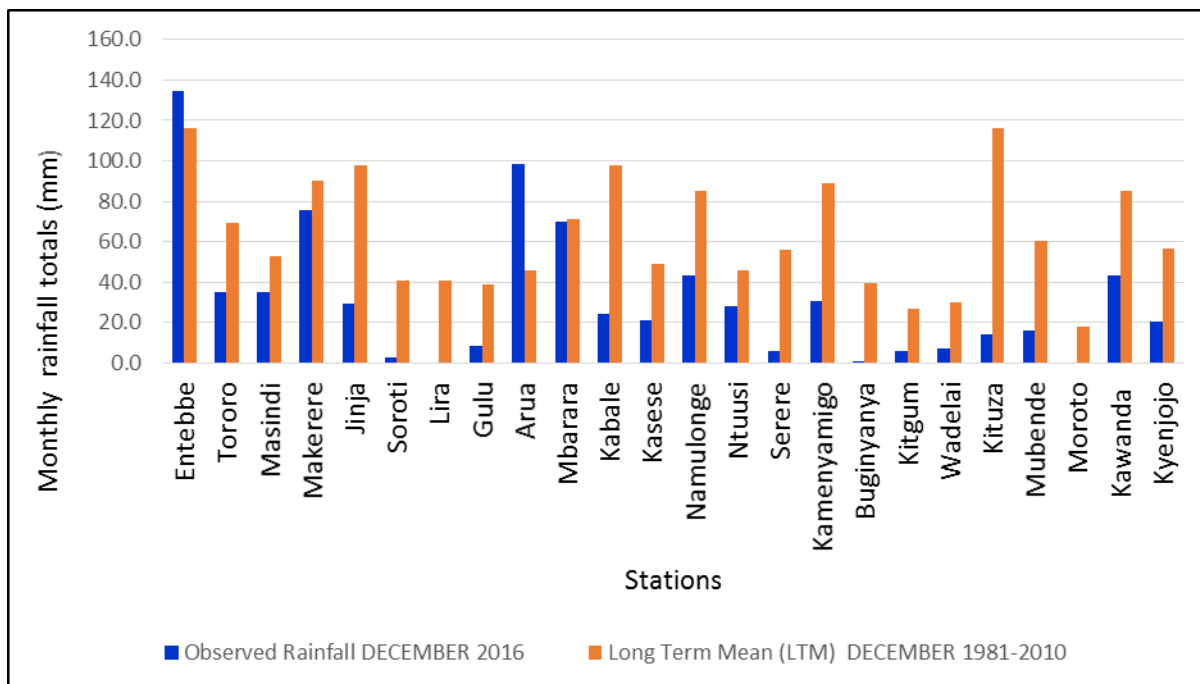


Figure 5(a): Rainfall performance for December 2016

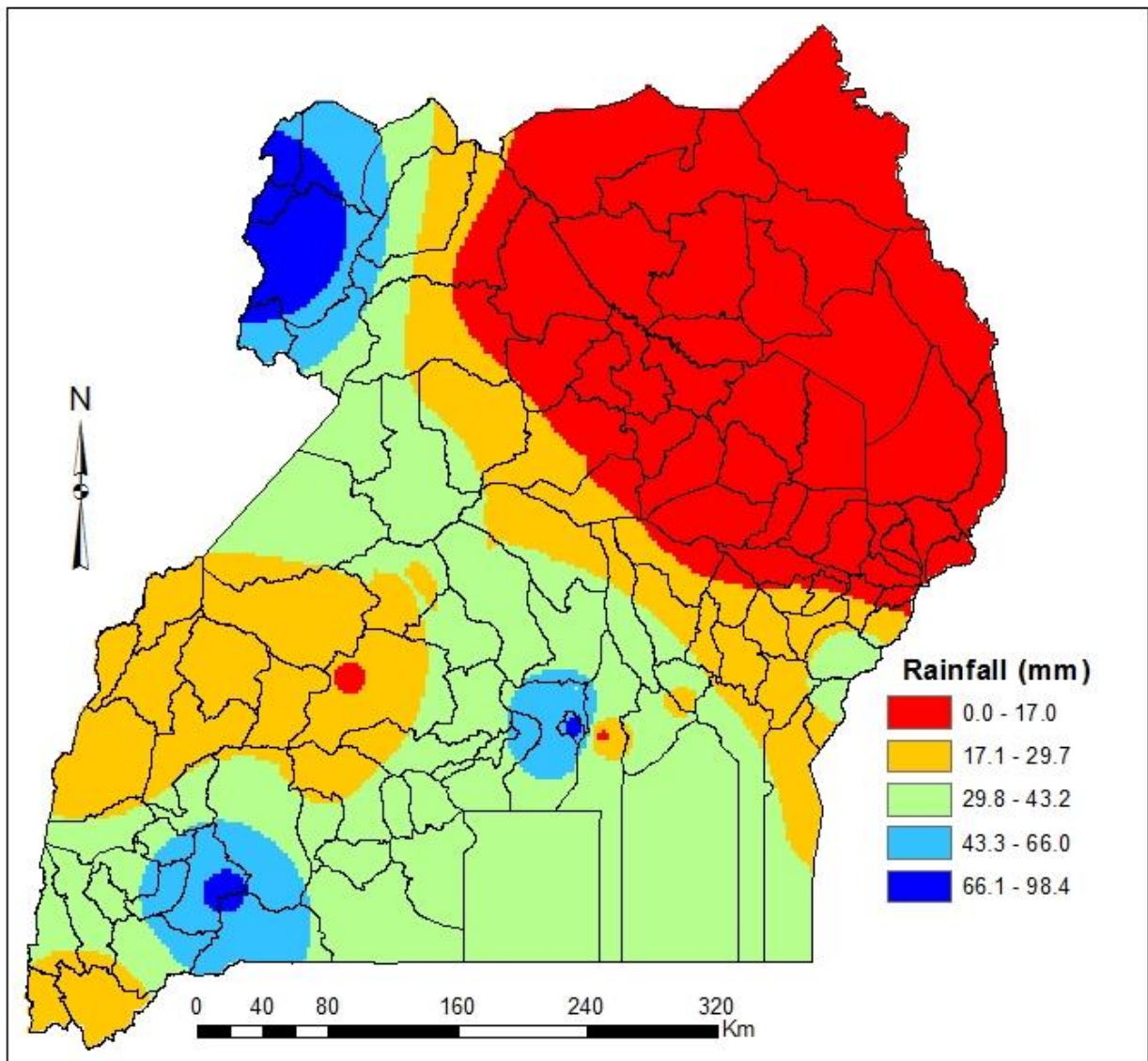


Figure 5(b): *Spatial distribution of the observed rainfall for selected weather stations across the country during the period of December 2016*

6.5 General overview of the total rainfall observed during September to December 2016 season.

In general, much of Uganda received near normal rainfall during September to December 2016 season. However, eastern sector of the country received below normal rainfall with Karamoja region registering the lowest.

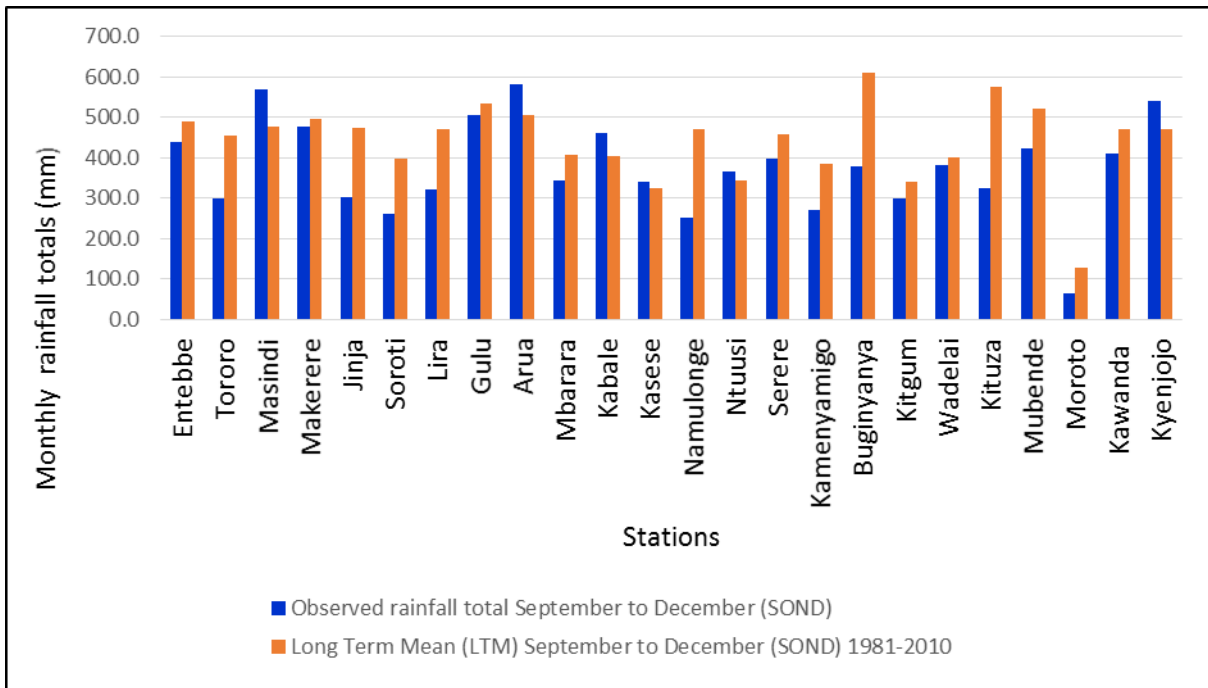


Figure 6(a): Rainfall performance for December 2016

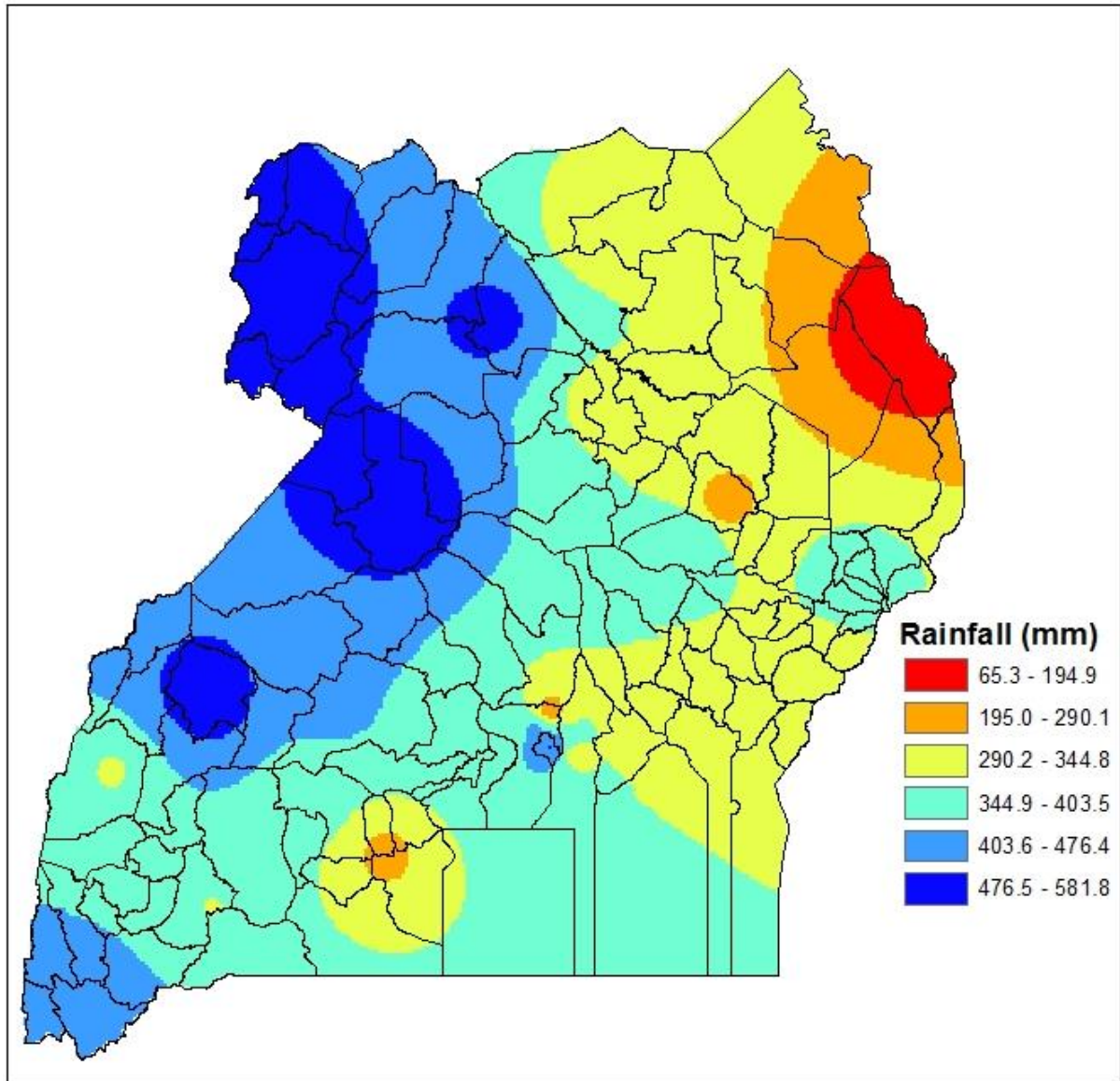


Figure 6(b): *Spatial distribution of the total observed rainfall for selected weather stations across the country during the period of September to December 2016*

In conclusion,

The predicted rains require action in sufficient time and in an appropriate manner so as to take advantage of the information. This forecast should be used for planning in all rain-fed economic activities so as to improve economic welfare and livelihoods for all our communities in their localities.

The Uganda National Meteorological Authority in partnership with other stakeholders have translated this forecast into thirty five (35) different local languages for audio and text messages. These translated messages will be disseminated to communities in different parts of the country mainly using local FM radios, Newspapers and meetings/workshops.

For God and My Country

Festus Luboyera
EXECUTIVE DIRECTOR

EXPLANATORY NOTES TO TERMINOLOGY

- Above Normal:** This is when the total rainfall is above 125% of the long - term -mean (LTM). Impact on socio-economic activities is mostly boosted especially in the modest degrees of above average.
- Normal:** This is when the total rainfall is in the range of 75% to 125%of the LMT. This range of rainfall is expected to adequately support the normal socio-economic activities for the various areas.
- Below Normal:** This is when the total rainfall is below 75% of the LTM. Under this range there are high chances for socio-economic activities being stressed, the level of stress increasing with increasing rainfall deficiency.
- Accuracy:** This forecast is up to 75% accurate. It is supported by useful forecast guidance inputs drawn from a wide range of sources including the World Meteorological Organisation's Global Producing Centres (WMO GPCs). These inputs were combined into a regional consensus forecast using deterministic and probabilistic modelling alongside expert analysis and interpretation to obtain the regional rainfall forecast for the March to May 2017 season.
- General:** The Uganda National Meteorological Authority will continue to monitor the evolution of relevant weather systems particularly the state of the SSTs and issue appropriate updates and advisories to the users regularly.