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Climate Hazard Assessment – Terego District

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Uganda Learning, Evidence, Accountability, and Research Network

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Climate Hazards in Uganda's Refugee-Hosting Districts.

INTRODUCTION

Uganda hosts one of the largest refugee populations in Africa,[1] many of whom live in climate sensitive landscapes highly vulnerable to the impacts of climate change due to its reliance on rain-fed agriculture, limited adaptive capacity, and high exposure to extreme weather events such as floods, droughts, and prolonged dry spells.[2] Over recent decades, the country has experienced more frequent and intense climate hazards, undermining livelihoods, food security, health, and infrastructure.[3,4] Uganda's climate is characterized by a bimodal rainfall pattern; however, this pattern has become increasingly unpredictable, with delayed onset and erratic distribution of rainfall that disrupts agricultural cycles.[5]

Key National Signals

Temperatures have risen by ~1.0 –1.5°C over the last five decades, increasing heat stress and evapotranspiration.

More erratic rainfall: delayed onset, mid-season dry spells, intense rainfall events

Prolonged dry spells and flooding now co-exist as dominant hazards, disrupting agriculture, water access, transport, and shelter

Climate hazards vary across the country, with distinct patterns between the Northern/West Nile and Southwestern regions, highlighting the need for localized analysis. Although both regions are projected to become warmer and wetter by mid-century, the impacts will differ significantly due to variations in baseline conditions, terrain, and livelihood systems.

In the Northern/West Nile region including Yumbe, Koboko, Adjumani, Madi Okollo, Terego, Obongi, and Lamwo, average temperatures are projected to rise from about 25°C to 30°C by mid-century, while annual rainfall increases from roughly 1,138 mm to 1,587 mm. Despite higher rainfall, increased temperatures will accelerate evapotranspiration, leading to greater soil moisture loss and prolonged dry periods during key agricultural seasons. According to the Multi-Sectoral Needs Assessment (MSNA), conducted by [IMPACT Initiatives] in 2024, long dry spells and heavy rains are the hazard types most frequently reported across West Nile and Southwestern regions. With accelerating climate change, they will remain dominant hazards, alongside a growing risk of flash flooding in low-lying and poorly drained areas.[6]

Hazard Type	West Nile	Adjumani	Terego	Koboko	Lamwo	Madi Okollo	Obongi	Yumbe
Drought/Prolonged dry spell	x	31%	39%	40%	46%	31%	36%	46%
Heavy Rains	x	38%	40%	42%	24%	33%	35%	38%
Extreme Temp. Events	x	19%	13%	12%	18%	26%	13%	7%
Flood	x	13%	8%	6%	12%	10%	15%	9%

Table 1: Climate hazards reported in the MSNA, 2024, Northern/West Nile region

In Southwestern Uganda districts, Isingiro, Kamwenge, Kyegegwa, Kiryandongo, and Kikuube, historical temperatures average about **20.3°C** but are projected to rise to around **26°C** by mid-century, marking significant warming. Annual rainfall is also expected to increase from about **842 mm** to roughly **1,372 mm**.

Hazard Type	Southwest	Kiryandongo	Isingiro	Kamwenge	Kikuube	Kyegegwa
Drought/Prolonged dry spell	x	49%	74%	45%	48%	58%
Heavy Rains	x	30%	17%	28%	25%	25%
Extreme Temp. Events	x	16%	6%	23%	18%	13%
Flood	x	6%	3%	4%	9%	3%

Table 2: Climate hazards reported in the MSNA, 2024, Southwestern region

Across both regions, warmer and wetter conditions do not reduce climate risk. Instead, they increase overlapping hazards, with long dry spells, floods, and heat stress occurring in the same districts and seasons. These pressures are especially acute in refugee-hosting areas where land, water, and services are already limited. District-level Climate Hazard Assessments translate national and regional climate trends into local evidence, highlighting key hazards, and exposures to support targeted planning and resilience for host and refugee communities.

Climate Hazard Assessment – Terego District

CONTEXT & RATIONALE

Terego District is a rural administrative area in Northern Uganda's West Nile Sub-region. It was established in **2020** after being carved out of Arua District with its headquarters at Leju trading center.[7] The climate of Terego District follows a **unimodal rainfall pattern**, with a single rainy season extending from **April to November** and a distinct dry season from **December to March**. Rainfall during the period is unevenly distributed, with relatively light rain occurring between April and July and again in October. Agriculture is the mainstay of the local economy, with most households engaged in rain-fed crop production of staples such as beans, maize, and sweet potatoes.[8] Terego District faces **increasing climate variability and environmental degradation** that compound existing development challenges. Like much of the West Nile Region, the district experiences **erratic rainfall patterns, prolonged dry spells, and periods of intense rains**, which undermine agricultural productivity and food security. Dry seasons often reduce soil moisture and limit crop growth, while **heavy rainfall events can damage crops and infrastructure** and aggravate localized flooding in low-lying areas or along seasonal tributaries of the Albert Nile. Soil fertility is generally low, with sandy soils that are sensitive to seasonal drought and erosion, further constraining agricultural yields.[9]

Climate projections under the Moderate Socio-economic Path (SSP2-4.5 scenario), which represents a middle of the road development trajectory with moderate emissions and limited climate mitigation, indicate that Terego District will become warmer and moderately wetter by mid-century. Mean annual temperatures are projected to rise from **25.5°C to 28.2°C**, while annual rainfall is expected to increase from **1,280 mm to about 1,426 mm**.[1] Despite this increase in rainfall, intensifying heat stress is expected to pose greater risks to rural households and displaced populations.[10]

As of January 2026, Terego District hosts over 76,500 refugees in and around Imvepi and parts of Rhino Camp. Refugee Settlements. This has increased pressure on natural resources, with reliance on wood fuel driving deforestation and rising demand for farmland intensifying land competition, both of which increase vulnerability to climate-related shocks. This analysis seeks to provide evidence-based insights into historical and projected climate trends to guide climate-resilient humanitarian and development programming in Terego District.

By identifying hazard susceptibility, exposure patterns, and future climate hazards, this series of district-level analyses aim to support relevant government authorities and humanitarian/development partners in developing targeted interventions, strengthening disaster preparedness and enhancing resilience in Uganda's refugee-hosting districts.

Key Messages

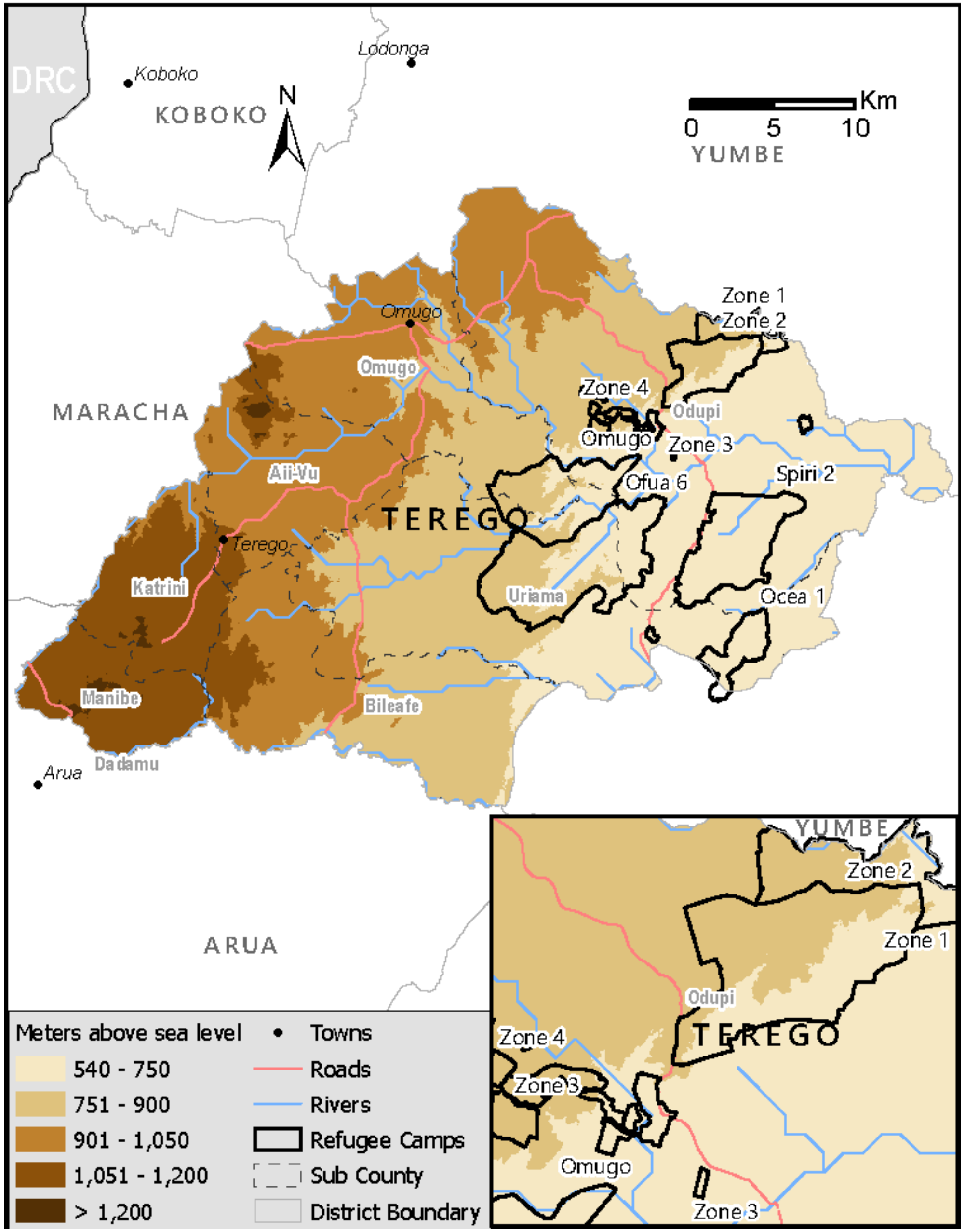
- Rainfall in Terego District is projected to increase moderately from about **~1,280 mm to ~ 1,426 mm** by mid-century under the SSP2-4.5 scenario. However, the gains will be uneven across sub-counties. Areas such as **Omugo, Ali Vu, Katrini, and Dadamu** are expected to record slightly higher increases, while **Uriama, Bileafe, and Odupi** may see comparatively smaller gains.
- Temperatures are projected to increase by **2.6ºC-3.0ºC** during the **warmest months and driest quarters,** suggesting hotter and more intense dry seasons, raising the likelihood of heat waves, higher evapotranspiration and reduced soil moisture.
- Seasonal drought remains a dominant hazard, with the Standard Precipitation Index (SPI) and Vegetation Condition Index (VCI) showing severe dryness across **Odupi, and Omugo** Sub-counties and refugee settlements, more specifically Imvepi **Zone 1&2 and Rhino Spiri 2, Ocea 1, Ofua 6 and Omugo,** leading to reduced crop productivity, affects soil moisture and water availability.
- Recurrent flooding affects sub-counties, such as **Odupi, Ali Vu, Manibe, Uriama and Omugo**, largely due to their low elevation, proximity to seasonal Enyau river and poorly drained terrain.

[1] SSP2-4.5 refers to a *moderate climate change scenario* that combines the "Middle-of-the-Road" Shared Socio-economic Pathway (SSP2) with a radiative forcing level of 4.5 W/m^2 by 2100. It assumes continued socio-economic development along current trends, moderate population growth, and limited but ongoing climate mitigation, resulting in continued warming and increasing climate variability.

Location and Topography

Terego District is in the **West Nile Sub-region** of Northern Uganda. It lies approximately **360 km northwest of Kampala**, the national capital, and was established on **1 July 2020** after being carved out of the former Arua District. The district is bordered by **Yumbe District to the north, Madi-Okollo District to the east, Arua District to the south, and Maracha District to the west**. The district is drained by seasonal tributaries of the Albert Nile, including the **Enyau River**, which contribute to local drainage patterns.[11] According to *Map 1*, Terego's landscape is generally **gently undulating**, with elevations ranging from approximately **540 m to about 1,200 m above sea level**, giving an average elevation of around **1,185 m**. The western and southwestern sub-counties, including **Katrini, Manibe, Dadamu and Ali Vu,** fall within a higher elevation band (901-1200m), while the eastern and southeastern parts, including **Uriama, Odupi and Bileafe,** fall within the lowest elevation band (540-750m). The terrain includes **low rolling plains and modest hillocks**, shaped by the broader relief of the West Nile plateau and dissected by shallow valleys.[12] One of the prominent topographic features in the district is **Mount Wati**, located near the border with Maracha District, which rises to about **1,250 m above sea level** and contributes to local variations in terrain.[13]

The combination of relatively elevated terrain and gentle valleys influence settlement patterns, agricultural land use, and water flow during the rainy season. Lower areas and tributary valleys can experience localized surface water accumulation during heavy rains, while elevated zones may be more exposed to dry conditions during prolonged dry spells. These variations underscore the importance of **location-specific planning and risk reduction strategies** to address differential climate sensitivities, including soil moisture deficits, surface runoff, and erosion across the district.



Map 1: Map showing the Location and Elevation of Terego District.

Demographics and Population Distribution

According to the 2024 National Population and Housing Census, Terego District has a population of over **323,200** people, reflecting steady population growth since its creation as an independent district in 2020.[14] The district is predominantly rural, with most residents living in dispersed settlements and trading centres. The population is mainly **Lugbara**, with **Christianity as the dominant religion**. **Livelihoods** are largely based on subsistence, **rain-fed agriculture**, shaping settlement patterns and population distribution.[15]

Terego District is a **major refugee-hosting area** in Uganda's West Nile Sub-region. The district hosts a large refugee population, mainly from South Sudan, settled primarily in **Imvepi Refugee Settlement** and parts of the **Rhino Camp Settlement area**. As of **December 2025**, the refugee population in Terego District is estimated at **over 76,500 people**. Refugees account for a **substantial share of the district's total population**, significantly increasing population density in settlement-hosting sub-counties.[16]

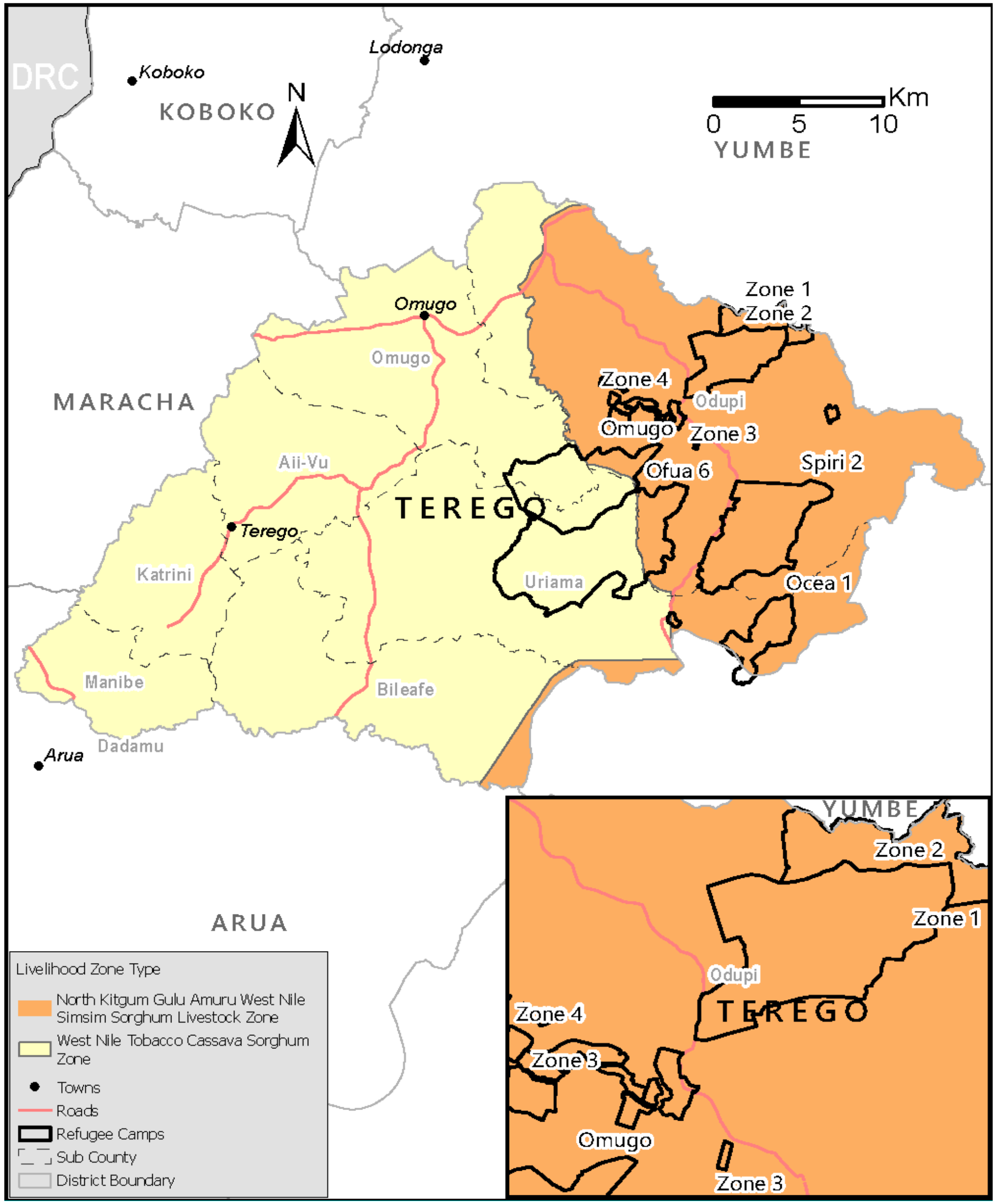
This demographic composition has important implications for district planning and climate risk management. Both **host and refugee populations depend heavily on climate-sensitive natural resources and basic services**, including land, water, education, health, and sanitation. The high concentration of people in settlement areas intensifies pressure on land, forests, and water resources, increasing vulnerability to climate-related hazards such as seasonal droughts, erratic rainfall, and localized flooding.

Livelihoods

Terego District lies in two major livelihood zones: the *North Kitgum Gulu Amuru West Nile Simsim Sorghum Livestock Zone* and the *West Nile Tobacco–Cassava–Sorghum Zone*.

- The *North Kitgum-Gulu-Amuru-West Nile Simsim, Sorghum, and Livestock Zone* is characterized by semi-arid savannah farming systems where households rely on sorghum, sesame (simsim), and livestock as their main sources of food and income. Households depend on sorghum for food security, sesame (simsim) for cash income, and livestock (cattle, goats, poultry) for resilience. As a high plateau, this zone may experience faster runoff to lower elevations. Thus, it may be the first to experience seasonal drought during a dry spell.

- The *West Nile Tobacco – Cassava - Sorghum Zone* is a mixed farming livelihood area where households rely on tobacco, cassava, and sorghum as their main sources of food and income. Tobacco serves as the primary cash crop, cassava provides a reliable food security buffer due to its seasonal drought tolerance, and sorghum is cultivated as a staple cereal. The soils are generally sandy loams and clay loams, moderately fertile but prone to nutrient depletion under continuous cultivation.[17]



Map 2: Map showing Livelihood Zones in Terego District.

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Environment, Land Use and Land Cover

The district is part of the **West Nile savannah landscape**, characterized by **extensive grasslands, scattered forests, and seasonal wetlands.** These ecosystems provide grazing land, fuelwood, and water for people and livestock but have been severely degraded by deforestation, charcoal production, soil depletion, water scarcity, and waste, mainly driven by agricultural expansion and human settlements.[18]

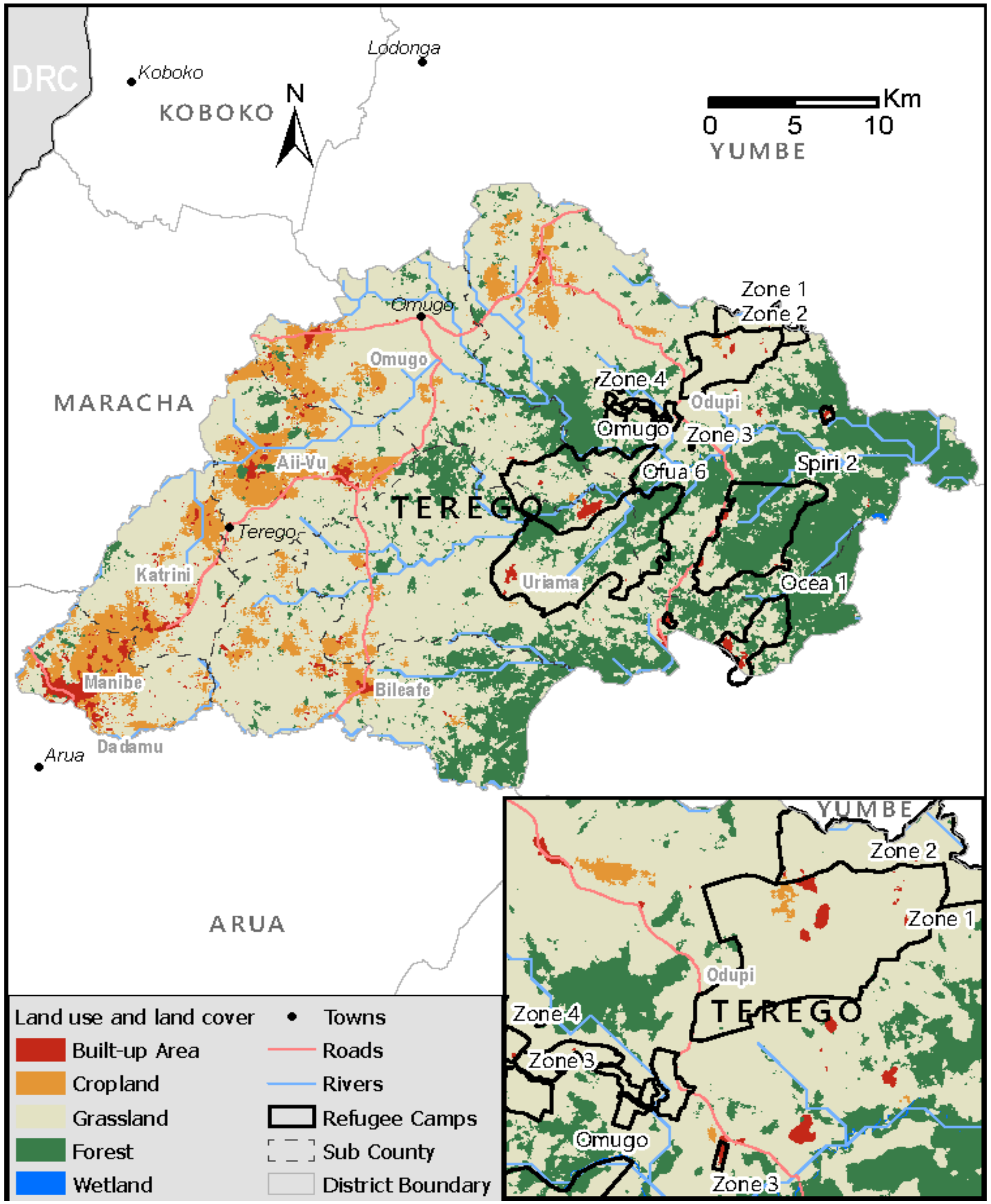
The rapid population increase from an estimated 199,000 in 2014 to over 323,000 in 2024, is largely driven by high birth rates as well as an influx of refugees and asylum seekers to Terego. This has increased demand for fuelwood, construction materials, and agricultural land.[19]

As shown in *Map 3*, Terego District's landscape is predominantly composed of grassland, which covers approximately **65%** of the total land area. Extensive grassland supports key livelihood activities, such as livestock grazing and seasonal cultivation.

Forestlands (25%) cover a significant portion of the district, providing fuelwood, timber, and construction poles, while contributing to soil fertility and erosion control. They are essential for ecological stability, household energy needs, and key livelihoods such as livestock grazing and access to building materials. However, between 2021 and 2024, the district lost about 5% of its forest cover compared to 2000, mainly due to illegal logging, charcoal production, agricultural expansion, and firewood collection.[20]

Cropland, which accounts **for 8% of the district's area**, is vital for subsistence farming, with crops such as tobacco, sorghum, maize, cassava, and ground nuts supporting food security and income. **Built-up areas** cover **2%** of the land and include settlements, trading centres, and refugee zones, as well as key infrastructure such as schools, health centres, and road networks.

Although **wetlands and open water bodies cover less than 0.1%** of Terego District, they are vital for water supply, brick making, dry-season farming, and livestock watering. They also serve as productive agricultural zones and ecological buffers during climate stress, supporting fishing and small-scale rice cultivation. However, agricultural and settlement encroachment is increasing, causing pollution from domestic and agricultural waste, while upland areas remain vulnerable to rainfall variability.



Map 3: Map showing Land Use and Land Cover in Terego District. Source: ESRI land cover map.

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CLIMATE CONTEXT

This section presents an analysis of Terego District's climate using key indicators. Rainfall and temperatures are examined from both historical records and future climate projections to understand long-term trends and emerging hazards. The aim is to provide a clear picture of how climate patterns have evolved over time and how they are expected to change in the coming decades, informing both vulnerability profiling and resilience or wider development planning.

Rainfall

Terego District experiences a **single extended rainy season** from **March to October**, with clear intra-season variability. The long-term average (1981-2024), shown by the dashed line in *Figure 1,* indicates two brief rainfall reductions within the main rainy season, a dip around June-July and another around September before rainfall peaks again in August and October.

The driest months remain December to February, with monthly rainfall totals generally remaining below 50 mm confirming the presence of a distinct dry season. The graph also highlights year-to-year variability, with noticeable differences in both the timing and magnitude of rainfall across 2022, 2023, and 2024 when compared to the long-term average. For example:

- **2022:** Rainfall was mostly below the 1981-2024 average, particularly from April-June, as well as August and October-November. Only March, July, September and December recorded totals close to or slightly above the long-term mean.
- **2023:** Rainfall fluctuated around the 1981-2024 average, with January recording little to no rainfall at all (1.3 mm) and below average totals in February, May, July-September and December. In contrast, March, April June, October and November were clearly above than the long-term mean.
- **2024:** Rainfall departed more strongly from the 1981-2024 average, with below average totals in March-May and December whereas June - September and November recorded clearly above average rainfall. October received average rainfall.

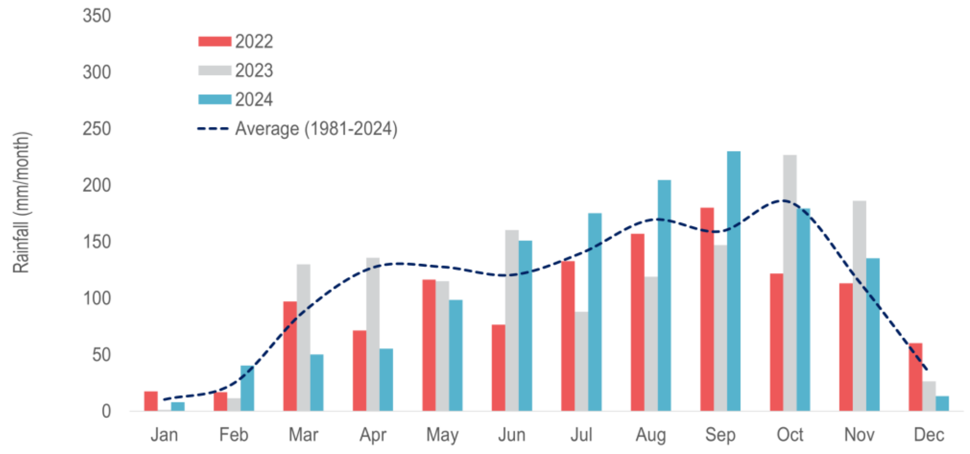


Figure 1: Graph showing Long-term Average Rainfall (2022-2024) in Terego District.

These fluctuations are influenced by climate variability phenomena, such as the El Niño Southern Oscillation (ENSO), which can alter the onset, duration, and intensity of seasonal rains. Historically, the El Niño Southern Oscillation (ENSO) typically occurred in an irregular cycle of two to seven years, with the individual El Nino persisting for 9 to 12 months. In recent decades, greater variability in ENSO timing, intensity and impacts has contributed to less predictable rainfall patterns across the region and as a result, Terego District is increasingly vulnerable to both seasonal droughts and flooding. seasonal rains. Prolonged dry spells, especially during the December-February period, lead to water scarcity, crop stress, and pasture depletion. Conversely, intense rainfall events during the August-October peak can trigger flash floods, crop damage, and disruption of transport and livelihoods.

The dry season is also marked by high temperatures, often exceeding **29°C,** and low humidity, contributing to increased occurrences of seasonal drought and water stress. These conditions are exacerbated by land degradation and limited water infrastructure, affecting domestic use, livestock, and agricultural productivity.[21]

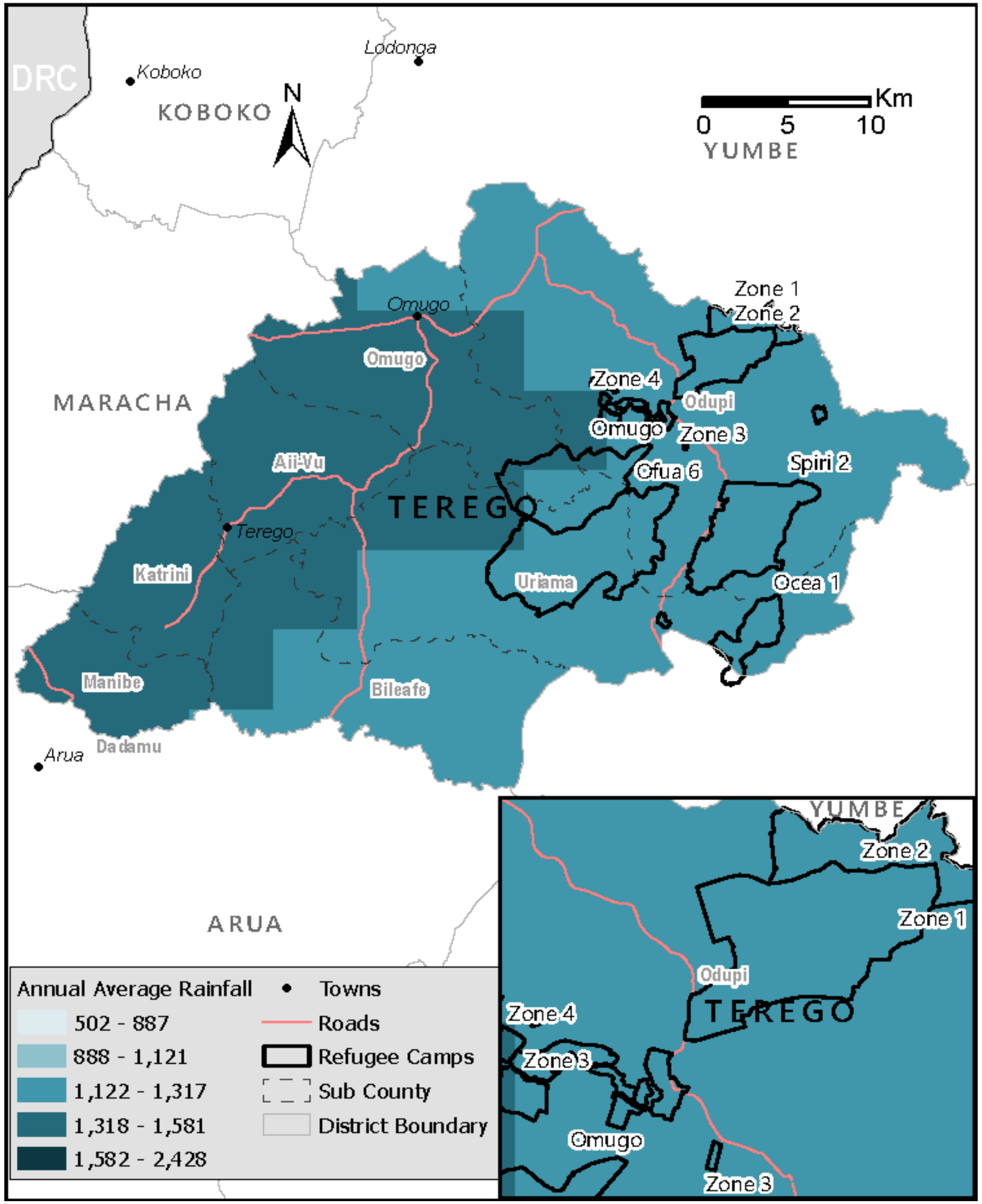
Overall, the increasing variability in rainfall patterns, combined with the district's reliance on rain-fed agriculture, heightens climate hazards for both refugee and host communities. This underscores the urgent need for integrated climate adaptation and resilience strategies to safeguard water availability, food security, and sustainable livelihoods.

Map 4 displays the spatial distribution of average annual rainfall across Terego District for the period 1981-2024, derived from long-term CHIRPS precipitation data. Most parts of Terego District, including **Omugo, Uriama, Odupi, Ali Vu, Katrini, and Bileafe,** fall within the **1,121 - 1,317 mm** and **1,317 – 1,581mm** zones. This suggests relatively consistent rainfall across the district.

Rainfall patterns in Terego District are increasingly affected by climate variability, resulting in unpredictable onset and cessation of rains, mid-season dry spells and irregular distribution of rainfall that disrupts the traditional agricultural cycles which guides timing of planting, growth, and harvesting of food. Household surveys across the West Nile region, including Terego, show that many farmers feel rain is no longer as predictable as they used to be. They report that rains often start later than expected and sometimes end too early, making it difficult to know when to plant and how crops will develop. Across Northern Uganda, farmers increasingly say that these changing rainfall patterns are disrupting traditional farming calendars, creating greater uncertainty and risk for smallholder agriculture.[22]

These changing rainfall dynamics have direct implications for crop production in Terego. As in other northern farming systems, erratic rainfall characterized by variable onset, interruptions during the growing season, and uneven distribution undermines soil moisture availability at critical stages of crop growth. Most farming in Terego relies on rain-fed systems. Crops such as maize, beans, groundnuts, and sorghum are sensitive to moisture stress during flowering and grain filling. As a result, they face a heightened risk of reduced yields or crop failure when dry spells interrupt rainfall during key developmental periods.[23] These patterns are consistent with national and sub-regional observations showing that Ugandan farmers increasingly perceive seasonal droughts and erratic rainfall patterns as worsening over the past decade, contributing to reduced agricultural productivity and food security stress.[24]

In addition to rainfall unpredictability, emerging climate conditions include rising temperatures that increase evapotranspiration and accelerate soil moisture loss and this is line with the national and regional climate assessments which confirm that



Map 4: Map showing Average Annual Rainfall (1981-2024) of Terego District.

temperature increases compound moisture deficits, intensify seasonal drought stress, and heighten vulnerability for rain-dependent farming communities.[25] These rainfall patterns and variability, coupled with the district's reliance on rain-fed agriculture and limited irrigation infrastructure, heighten climate hazards for both host and refugee communities, making timely access to climate information, adaptive agronomic practices, and climate services critical components of resilience building.

In Terego, changing rainfall patterns and rising temperatures are making water harder to find, especially during the January–March dry season. Because most farmers rely on seasonal rains and there is very little irrigation, long dry periods leave crops struggling, livestock without enough water or pasture, and households facing food shortages. Both host and refugee communities feel these challenges. In response, government agencies, partners and local disaster management committees are supporting farmers to adopt climate-smart practices, including planting drought-tolerant crops, harvesting rainwater, and using more sustainable farming methods to help communities better cope with changing climate conditions.[26]

These climate pressures heighten risks across livelihoods in Terego - unpredictable rainfall disrupts planting schedules, prolonged dry spells reduce crop and pasture productivity, and limited water resources in key refugee-hosting zones increase competition for scarce resources. The cumulative effect is an elevated vulnerability among smallholder farmers and displaced populations who rely predominantly on rain-fed agriculture and have limited capacity to buffer against climatic shocks[27,28]

Temperature

Over the past four decades, Terego District has experienced a substantial rise in temperatures, with an increase of approximately **2.6 to 3°C,** a substantial warming trend for a single district. As shown in the graph in *Figure 2* the most pronounced rise has occurred in recent years (2014-2023), indicating a possible acceleration in warming and a growing risk of extreme heat events.

The long-term temperature trend can be summarized as follows:

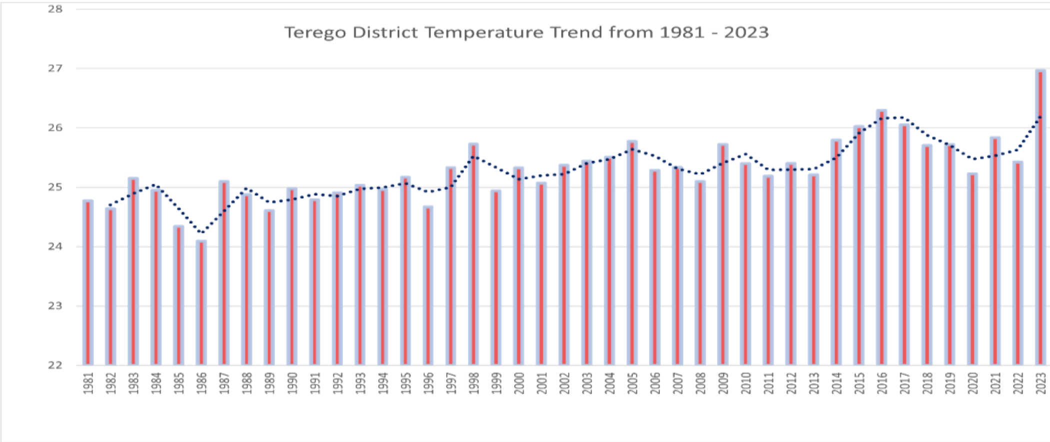


Figure 2: Graph showing the Long-term Temperature Trend (1981-2023) in Terego District.

- **1980s-mid 1990s**: Average annual temperatures remained relatively stable, generally ranging between 24.6°C and 25.1°C. Year to year fluctuations were modest and there is no clear warning trend during this period indicating relatively stable climatic conditions.
- **Late 1990s-2014:** Average annual temperatures gradually increased, typically ranging from 24.8°C and 25.7°C but remained relatively consistent until 2013.
- **2015 onwards:** A clearer warming signal emerges accompanied by increased variability. Most years in this period recorded above 25.5°C and peaks approaching 26°C-26.2°C, followed by an exceptional spike above 27°C in 2023.

Overall, the graph shows a consistent long-term increase in average temperatures in Terego District with more pronounced warning in the recent years. This upward trend comes with implications for crop productivity, water availability, health and overall resilience.

Seasonal temperature patterns in Terego District show consistently warmer conditions during the January-March dry season, when clear skies and high solar exposure drive daytime temperatures above the long-term average. During the April-November rainy period, temperatures remain slightly lower but have been gradually increasing as well. *Figure 3* also indicates a rise in temperature extremes, with recent years showing more days where average daily temperatures exceed the long-term mean. Notably, the sharp increase after 2013 and the peak after 2023 suggest that hotter-than-normal years are becoming more frequent, increasing heat stress on crops, pasture, livestock and water resources. These emerging extremes, coupled with rising seasonal temperatures, highlight Terego District's growing vulnerability to climate-induced heat stress.

The long-term monthly temperature average (1981-2024), shown by the dashed line in *Figure 3*, indicates a gradual decline in temperature from January to August, reaching the lowest values during the July-August, followed by a progressive increase from September to December. This seasonal pattern reflects cooler conditions during the middle of the year and warmer conditions at the beginning and the end of the year.

Recent monthly temperature observations for **(2022-2024)** indicate notable departures from the long-term average during key agricultural periods and can be summarized as follows:

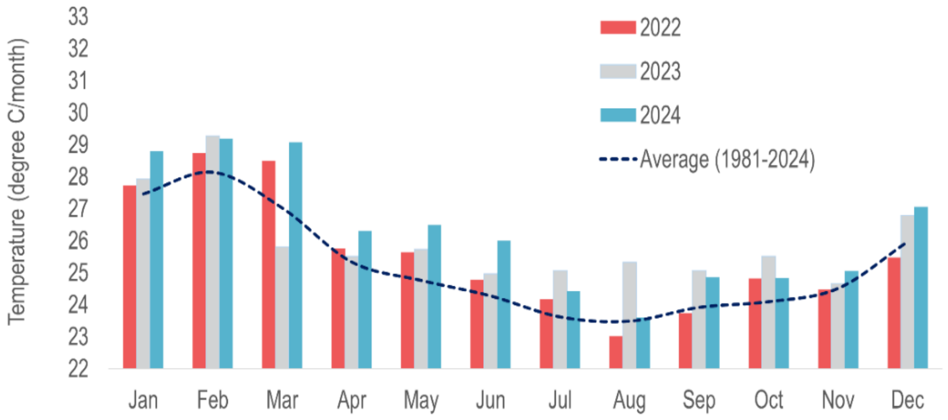


Figure 3: Graph showing Average Annual Temperature (2022-2024) of Terego District.

- **2022:** Based on the graph *(figure 3)*, temperatures during May, which correspond to the crop flowering stage of the first rainy season, were above the long-term average. while temperatures in September, corresponding to the second season, remained close to the long-term average.
- **2023:** Based on the graph, temperatures were consistently above the long-term average in the crop flowering stage of the first season in May-June and above the long-term average in the second season in August-September.
- **2024:** Temperatures in the crop flowering stage of the first season were above the long-term average in April-June and above long-term average in the second season in September. Most months in 2024 appear warmer than the historical average.

Above the long-term average temperatures negatively affect crops at all stages-reducing:

- Germination by accelerating metabolism, leading to depletion of energy reserves, impairing starch breakdown and causing poor root development before seedlings establish.
- Flowering by hindering pollination, fertilization, and impairing chlorophyll function, thus lowering carbohydrate supply, leading flowers to drop prematurely.
- Seed development by reducing carbohydrate and oil accumulation in seeds resulting in smaller seeds, leading to lower seed germination potential of harvested seeds.

Overall, temperatures in all three recent years are consistently at or above the long-term average, with 2024 standing out as the warmest year across most months. This indicates a clear warming trend (in recent years) compared to historical norms. In short, heat stress is most damaging during flowering and seed development. Farmers might mitigate heat stress effect through adjusted sowing dates, use of heat-tolerant varieties and irrigation scheduling.

CLIMATE CHANGE PROJECTIONS

In this section, bioclimatic variables from WorldClim v2.1 are considered as the historical parameter source, which provide high-resolution baseline climate data such as temperature and precipitation patterns. These were compared with future climate projections generated by the UKESM1-0-LL Earth system model under the SSP2- 4.5 scenario, which is considered a “middle of the road” pathway where socio-economic development and moderate mitigation policies lead to stabilizing greenhouse gas emissions. This comparison allows researchers to assess how key climatic factors like seasonal rainfall, temperature extremes, and seasonal drought indications could be expected to change in future decades, highlighting potential impacts on ecosystems, agriculture, and water resources under a moderately warming future.

Precipitation changes
(1970-2000 vs 2041-2060)
SSP2-4.5 Moderate Emission Scenario
Annual precipitation changes

+147 mm

Temperature changes
(1970-2000 vs 2041-2060)
SSP2-4.5 Moderate Emission Scenario
Annual Mean Temperature Increase

+2.7 °C

Figure 4: Annual precipitation and temperature change in Terego District.

Temperature

The mean annual temperature in Terego District is projected to rise from **25.5°C** in the historical baseline to **28.2°C** by 2041-2060. Both minimum and maximum temperatures show substantial increases. The strongest warming **(**up to 2.76-2.79°C) is expected in the Western and central sub-counties, **including Manibe, Katrini, Dadamu and Ali Vu**. **Northern and eastern sub-counties such as Odupi, Uriama and Omugo** experience slightly smaller increases (~2.68°C) but still exceed the districtwide warming trend.

An increase in mean temperature of **+2.6°C in the warmest month** and **+3.0°C in the driest quarter** suggests hotter and more intense dry seasons, raising the likelihood of heatwaves, higher evapotranspiration, and reduced soil moisture. These conditions can strain water resources, reduce agricultural productivity, and increase health risks, particularly in areas with limited tree cover and high dependence on rain-fed farming.

Similarly, an increase of **+3.0°C in the coldest month** and **+3.4°C in the wettest quarter** indicates year-round warming, including during traditionally cooler and rainy periods. Warmer wet seasons may intensify humidity, crop stress, pest outbreaks, and flood-related impacts, posing added risks to livelihoods, infrastructure, and human health.

+ 2.6 ⁰ C	*Increase in mean temperature in the warmest month*	+ 3.0 ⁰ C	*Increase in mean temperature in the driest quarter*
+ 3.0 ⁰ C	*Increase in mean temperature in the coldest month*	+ 3.4 ⁰ C	*Increase in mean temperature in the wettest quarter*

Figure 5: Projected changes in temperature in bioclimatic variables.

Precipitation

Mean annual rainfall is projected to increase from **1,280 mm to 1,426 mm** by mid-century. However, the distribution of rainfall gains is uneven across the district. The largest average increases **(150-153 mm)** are expected in **Omugo, Ali Vu, Katrini and Dadamu,** while sub-counties such **as Uriama, Bileafe, and Odupi show smaller average increases (140-148 mm).**

An increase of **+35.8 mm in the wettest month** and **+61.2 mm in the coldest quarter** indicates heavier rainfall during peak rainy periods, which may heighten the risk of flooding, soil erosion, waterlogging, and infrastructure damage. More intense rainfall events could disrupt agricultural activities, damage crops, and affect road access and water systems.

An increase of **+21.1 mm in the warmest quarter** and a **+3.8 mm increase in the driest month** suggest slightly wetter conditions even during typically dry periods. While this may modestly improve soil moisture and support crop growth, it may also increase rainfall variability and unpredictability, complicating agricultural planning and seasonal timing as shown in *Figure 6 below*.

+ 35.8 mm — Increase in precipitation of the wettest month

+ 21.1 mm — Precipitation of the warmest quarter

+ 3.8 mm — Increase in precipitation of the Driest month

+ 61.2 mm — Precipitation of the coldest quarter

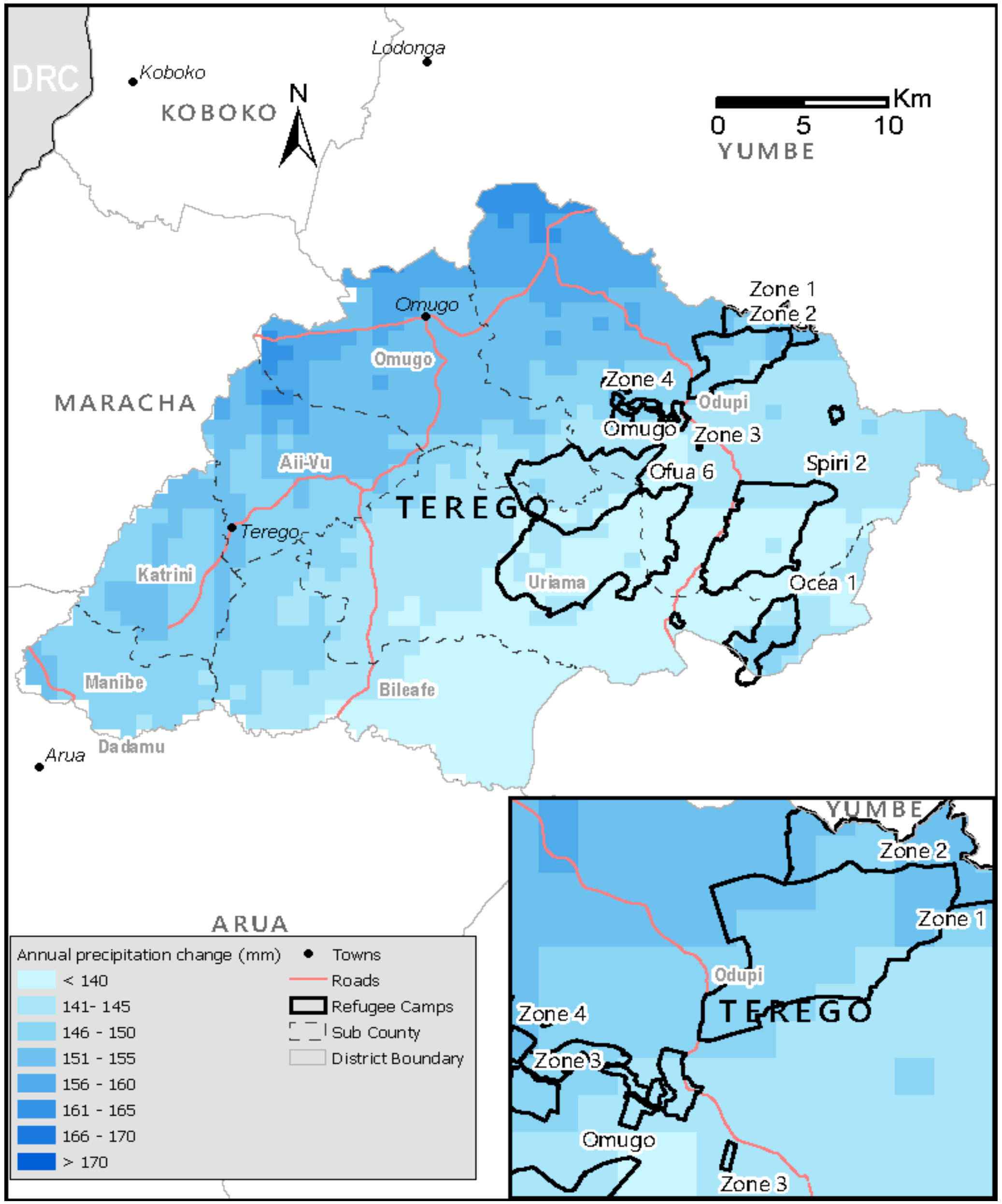
Figure 6: Projected changes in precipitation in bioclimatic variables.

Implications

The projected rise in temperature from **25.5°C to 28.2°C** by mid-century, combined with increases in seasonal rainfall, indicates intensifying climate stress in Terego District. Stronger warming in the western and central sub-counties **(Manibe, Katrini, Dadamu and Ali Vu),** which also receive smaller rainfall gains, is likely to **intensify evapotranspiration, reduce soil moisture and increase heat stress for crops, livestock and communities dependent on rain-fed agriculture.**

Although annual rainfall is expected to rise, heavy rains in the wettest months increase the risk of localized flooding, soil erosion, and waterlogging, particularly in low-lying areas. Small increases in rainfall during the driest month (+3.8 mm) indicate that dry-season water scarcity may persist. **Rising temperatures in both wet and dry seasons may affect crop flowering, grain filling, pasture regeneration, and water availability, increasing vulnerability for smallholder farmers and refugee-hosting communities.** Warmer, more humid conditions during the rainy season can also promote pests, crop diseases, and post-harvest food spoilage.

These projections align with national and East African climate patterns. According to Uganda's Third National Communication to the UNFCCC[29] and the IPCC Sixth Assessment Report[30], temperatures in Uganda are expected to rise 1.5–2.5°C by mid-century, with rainfall becoming more variable and intense. Terego District falls within these ranges, indicating climate shifts consistent with regional trends. The district's climate risk is mainly driven by heat stress, rainfall variability, and seasonal water scarcity, with significant implications for agriculture, water management, infrastructure, and community resilience.



Map 5: Map showing Projected Precipitation Changes from the Baseline (1970-2000) to the Near Future (2041-2060).

SEASONAL DROUGHT HAZARD ASSESSMENT

Terego District faces increasing climatic changes due to unreliable rainfall, prolonged dry spells, and rising temperatures, which threatens agriculture and livelihoods in this rain-fed system.[31] Both host and refugee communities, including those in settlements, face recurrent meteorological droughts (periods of significantly below-average rainfall) and vegetation stress (when crops and natural vegetation suffer from moisture deficits), which disrupt planting seasons, lower yields, and worsen food insecurity.[32]

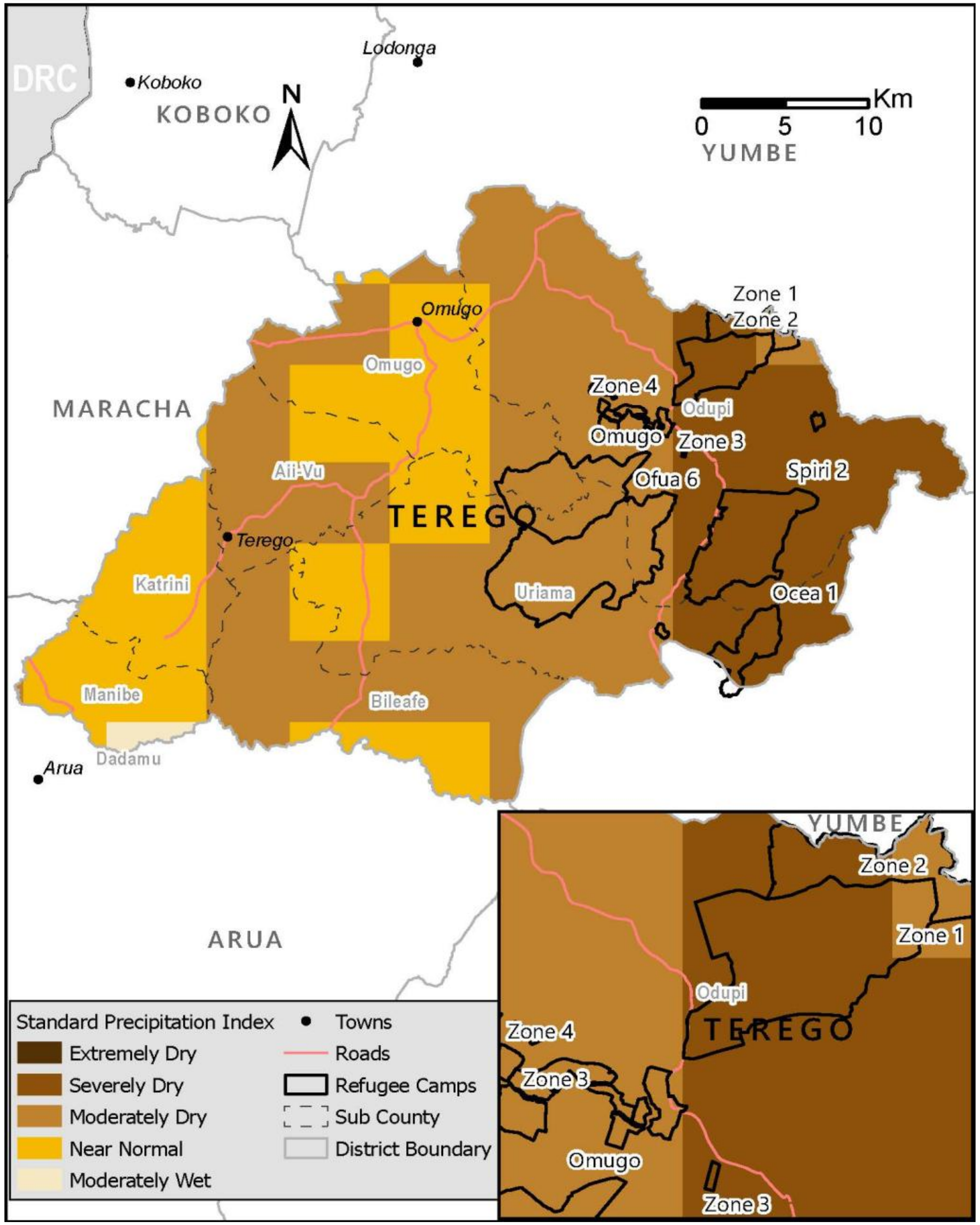
This analysis applies the *Standardized Precipitation Index (SPI)* (which measures precipitation anomalies by comparing observed rainfall to historical averages) and the *Vegetation Condition Index (VCI)* (which shows the biological response of crop to precipitation anomalies), to detect vegetation stress, providing an integrated understanding of seasonal drought occurrence and severity.

Recent observations and community reports show that dry spells have reduced yields and challenged rain-fed production, especially in areas far from water sources. Some households have adopted climate-smart practices, such as small-scale irrigation and improved agronomic methods, but these remain limited and insufficient. While humanitarian and livelihood interventions have mitigated acute impacts, limited access to irrigation and drought-resilient technologies highlights the need for sustained investment in drought preparedness, water management, and long-term adaptation.[33]

SPI Findings

The *Standardized Precipitation Index (SPI)* analysis indicates that March–May 2024, coinciding with the flowering season of first-season crops, was critical for assessing seasonal drought. Much of the district experienced **moderately dry conditions**. Parts of the western and central sub-counties **(Manibe, Katrini, Omugo, Aii-Vu, and Uriama)** had near-normal precipitation, while eastern areas, particularly **Odupi sub-county,** experienced **severely dry** conditions coinciding with the flowering season of first-season crops, was critical for assessing seasonal drought. Much of the district experienced moderately dry conditions.

Parts of the western and central sub counties **(Manibe, Katrini, Omugo, Aii-Vu, and Uriama)** had near–normal precipitation. While eastern areas, particularly Odupi Sub-county, experienced severely dry conditions.



Map 6: Map showing the SPI Index.

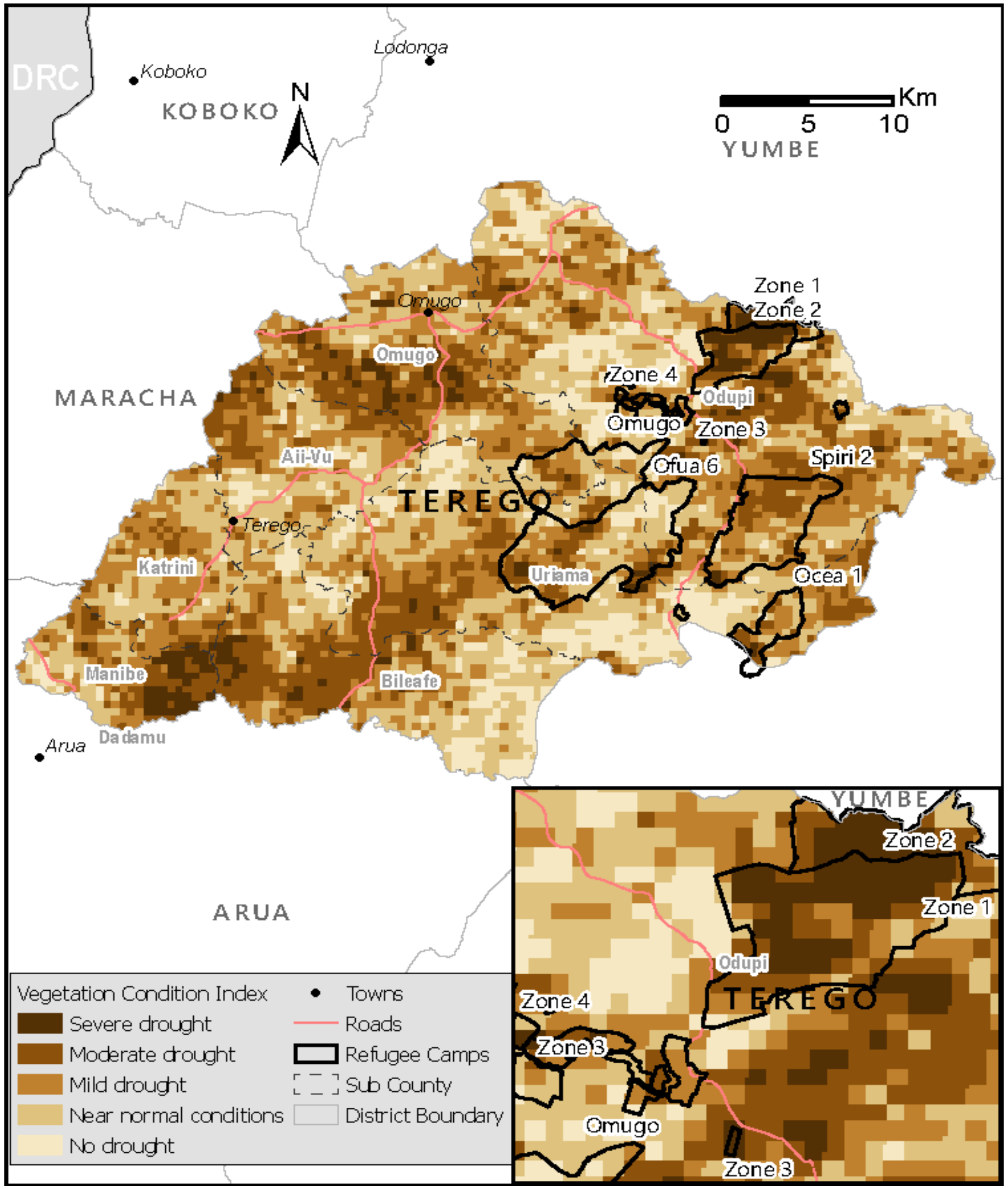
Imvepi (zones 1 and 2) and Rhino (Spiri 2 and Ocea 1), as shown in *Map 6,* experienced severely dry precipitation, while **Imvepi (zones 3 and 4) and Rhino (Ofua 6 and Omugo)** were moderately dry. These conditions affect soil moisture, crop performance, rangelands, and water access, especially in areas overlapping the Imvepi and Rhino Refugee Settlements, where livelihoods are highly sensitive to rainfall variability.[34]

VCI Findings

Vegetation Condition Index (VCI) is informed by a combination of land cover types *(Map 3)* and the Precipitation Index for the corresponding months *(Map 6)*. Grasslands provide the clearest and most reliable signal of seasonal drought severity because they are shallow-rooted and are highly sensitive to rainfall variability. Croplands follow depending on crop type and seasonal calendar timing shifts, forests mask short-term drought because they have deeper root systems and higher biomass, and built-up areas give misleading signals because of bare surfaces and less green vegetation. Areas identified by the SPI as moderately to extremely dry are a cause for concern, because croplands and grasslands in these areas may face moderate to severe seasonal drought.

In Terego District, areas experiencing vegetation conditions above mild seasonal drought are scattered across the western sub-counties of **Omugo and Aii-Vu**, the southern sub-counties of **Manibe, Dadamu, and Bileafe**, and the eastern sub-county of Odupi. The western and southern areas may experience true moderate to severe vegetation seasonal droughts due to the abundance of cropland and grassland, as well as higher elevations, despite receiving moderate to near-normal precipitation. In contrast, the eastern part of the district, with lower elevation, more forest cover, and severely dry precipitation conditions, shows a mix of near-normal to severe vegetation seasonal drought. The northeastern part of the district, where part of the Imvepi Refugee Settlement *(Map 7)* is located, shows a mild vegetation seasonal drought because of abundance of forest cover despite severe dry precipitations. The *VCI Map* consists of landcover and precipitation deficit spatial distribution.

Overall, the findings illustrate that the vegetation health of the district was significantly constrained during this period, affecting both croplands and grazing areas crucial for household food security and livelihoods



Map 7: Map showing the VCI Index.

Implications

The combined **SPI and VCI analyses** reveal a clear link between below-average rainfall and deteriorating vegetation health across Terego District. Areas such as **Omugo, Aii-Vu, Manibe, Dadamu, Bileafe, and Odupi Sub-counties** showed above-mild vegetation stress, indicating that rainfall deficits are translating rapidly into moisture stress for crops and grazing lands. In the **northeastern parts of the district**, including zones within Imvepi Refugee Settlement, vegetation seasonal drought was observed even where forest cover is greater, underscoring how rainfall can undermine vegetation health regardless of land cover type.

These climatic pressures are reflected in local agricultural experiences. During critical cropping periods like **March–May 2024**, many farmers reported that rain was insufficient for optimal crop growth, especially for staples such as **maize, beans and groundnuts**, which are central to household food security. Official assessments show that food insecurity worsened in Terego during 2024 because of **late rainfall onset and prolonged dry spells**, pushing the proportion of food-insecure households from 15 % in 2023 to about 30 % in 2024.[35]

Community testimonies also highlight how the prolonged dry spell and climate variability are affecting livelihoods. Farmers in areas like **Odupi and Omugo** have struggled with crop failure due to erratic rain, leading some households to consume their own seed stocks and plant less land than planned. Locals report that unpredictable rainfall patterns reduce the reliability of rain-fed agriculture, forcing many to adopt alternative coping strategies or reduce productivity year after year.[36]

Beyond crop production, prolonged dry conditions undermine pasture availability, compounding challenges for households that keep livestock. Lower soil moisture also increases land degradation and soil infertility, issues already documented in West Nile. This is due to climate variability and poor soil conditions, thereby weakening the landscape's resilience to future seasonal droughts.[37]

From a preparedness and planning perspective, the findings highlight the importance of **strengthening seasonal drought early warning systems, promoting climate-smart agriculture, investing in water harvesting and small-scale irrigation, and improving natural resource management. Regular integration of SPI and VCI monitoring into district planning can support early alerts, guide timely response, and inform long-term climate resilience across Terego District.**

Photo 1: A Farmer in Uriama Sub-county cutting down Maize Plants that have Dried up due to the Prolonged Dry Spell in the area. Photo Credit: URN

In 2022, a prolonged dry spell hit **Terego District**, particularly **Uriama and Bileafe sub-counties**, leaving many farmers devastated. Rains that began in March suddenly stopped in May, and crops that had just started growing such as **maize, beans, groundnuts, and okra** dried up before they could mature.

Families who had hoped for a harvest found their fields bare. Some households were forced to survive on **one meal a day** as food stocks ran out. Streams and shallow wells dried up, livestock lost pasture, and animals weakened from lack of water and feed. Beyond the fields, the prolonged dry spell brought stress and uncertainty to the community. With farming being the main source of food and income in Terego district, the failed season left communities worried about how they would cope if such dry spells continued.

Local leaders and agricultural officials noted the need for climate adaptation measures such as improved water harvesting, drought resistant crops and farmer sensitization on climate variability. **Source:** Uganda Radio Network (URN) - Drought Hits Hard Terego District Farmers

FLOOD HAZARD ASSESSMENT

Flood susceptibility refers to how likely an area, community, or system is to experience harmful impacts from flooding, based on physical, environmental, and socio-economic factors.
Several factors determine how an area exposure to flood is ranked from low to high. These factors include hydrological (e.g. intensity and duration of rainfall), geographical (proximity to rivers, soil type, and topography), land use and community livelihood types.

For this assessment thirteen indicators were analysed by ranking into five score levels to flood risk.[38] The score rank of the thirteen indicators was summed and ranked into three level of risk.

1. Distance to Permanent water ranked from higher risk to lower risk at 100 meters, 250 meters, 500 meters, and 750 meters.[39]

2. Elevation above sea level ranked from higher risk to lower risk at 600 meters, 700 meters, 800 meters, and 1000 meters.[40]

3. Slope of the area in degrees ranked from higher risk to lower risk at 2, 5, 10, 15.[41]

4. Landcover ranked from higher risk to lower risk as built-up, cropland (include water, flooded vegetation), grassland, shrub and forest.[42]

5. Topographic Position Index ranked from higher risk to lower risk at -8, -6, -4, -2, 0.

6. Normalized Difference Vegetation Index ranked from higher risk to lower risk at 0.2, 0.4, 0.6, 0.8[43]

7. Normalized Difference Water Index (NDWI ranked from higher risk to lower risk at 0.6, 0.2, -0.2, -0.6.

8. Flood Return period ranked from higher risk to lower risk at 10 years, 20 years, 50 years, 100 years, 200 years.[44]

9. Rainfall Intensity as average maximum annual rainfall ranked from higher risk to lower risk at 33 mm, 31 mm, 29 mm, 27 mm.[45]

10. Monthly Number of Days with Rainfall ranked from higher risk to lower risk at 13 days, 10 days, 7 days, 3 days.[46]

11. Frequency of -days with continuous Rainfall ranked from higher risk to lower risk at 2, 1.2, 0.8, 0.4.[47]

12. Height Above Nearest Drainage (HAND) ranked from higher risk to lower risk at 2 meters, 5 meters, 10 meters, 20 meters.[48]

13. Soil texture ranked from higher risk to lower risk with (clay, clay loam, silty loam), (silty clay, silty clay loam), (sandy clay, sandy clay loam), (loam, sandy loam), (loamy sand, sand).[49]

Flood susceptibility mapping relies on integrating multiple environmental, hydrological, and climatic indicators to assess risk levels. Recent literature emphasizes that parameters such as proximity to water bodies, elevation, slope, land cover, vegetation indices, and rainfall characteristics are critical determinants of flood vulnerability. Studies highlight that areas closer to permanent water sources, with low elevation and gentle slopes, are more prone to inundation. Similarly, built-up and cropland land covers tend to amplify flood risk due to reduced infiltration capacity, while vegetation indices (NDVI, NDWI) provide insights into soil moisture and vegetation health, which influence runoff and water retention. The inclusion of topographic indices like HAND and TPI further refines susceptibility mapping by capturing micro-topographic variations that affect drainage and water accumulation.

Hydro-climatic indicators such as rainfall intensity, frequency of continuous rainfall days, and flood return periods are equally vital in flood risk assessment. Literature shows that extreme rainfall events, particularly when sustained over consecutive days, significantly increase flood hazards. Soil texture also plays a crucial role, with clay-rich soils exhibiting lower infiltration rates and higher runoff potential compared to sandy soils. Integrating these thirteen indicators into a composite scoring system aligns with established frameworks that rank susceptibility into multiple risk levels. Such multi-criteria approaches are widely recommended because they capture the complex interplay between terrain, hydrology, and climate, thereby improving the accuracy of flood hazard mapping and supporting disaster risk reduction strategies.

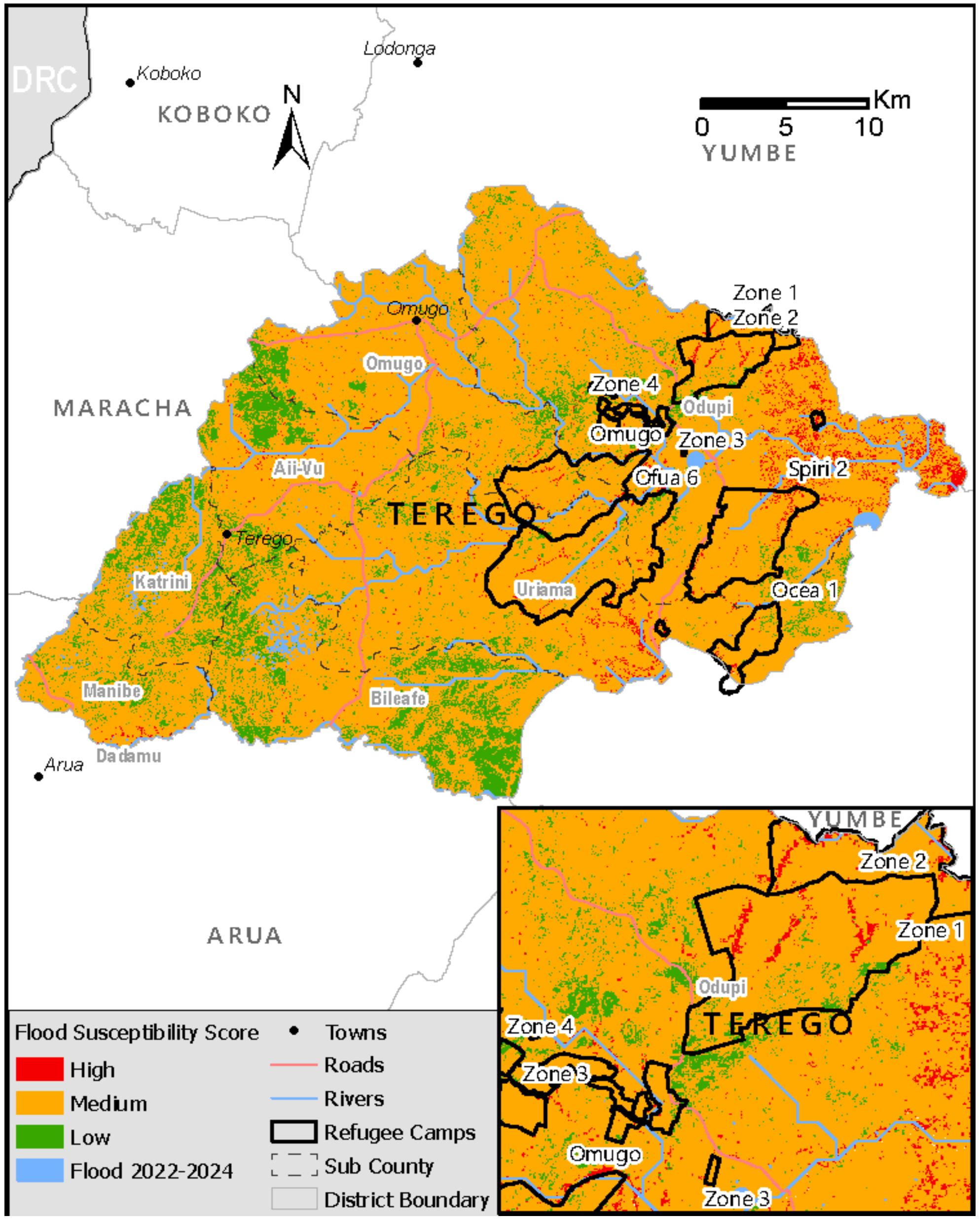
Findings

Several geographic and infrastructural factors exacerbate flood hazards in the district. Adjumani district has predominantly flat terrain, clayey soils, and insufficient drainage infrastructure, which limits water infiltration and increases surface runoff, particularly in low-lying areas and along seasonal streams and permanent rivers.

Satellite-based assessments reveal that **2.6 % of Terego District falls within high-risk flood areas**. **Odupi, Aiivu, Manibe, Uriama and Omugu Sub-counties are considered as the most flood prone.** Their vulnerability stems from low elevation and proximity to seasonal Enyau river channels. In terms of Terego refugee settlements, **Spiri 2, zone 1, zone 2 and Omugu are especially susceptible to flooding**. These zones are situated on gently sloping terrain that accumulates runoff during peak rainfall periods, resulting in repeated damage to shelters, latrines, and access roads. Such events disrupt humanitarian operations and pose significant public health threats, including water contamination.[50]

The flood susceptibility analysis for Terego District (2022-2024) in *Map 8* shows that flooding is highly localized, with the greatest concentration of inundation occurring in the northeastern and western parts of the district.

Flood is strongest in areas aligned with seasonal river channels, low-lying plains, and poorly drained terrain, highlighting the influence of local topography and hydrological pathways. Recurrent flooding in Western and North Terego suggests limited natural drainage capacity, potential siltation of watercourses, and increasing surface runoff linked to land cover modification, including vegetation clearance and the expansion of built-up areas within the broader catchment. These conditions reduce infiltration and increase the likelihood of rapid accumulation of surface water following intense rainfall events.



Map 8: Map of Terego showing Flood Susceptibility (2022-2024).

Risk on Cropland and Settlement

The land cover analysis shows that grassland covers 65%, forest 25%, built-up areas 2%, and cropland 8%. Less than 9% of cropland falls within the low-risk flood zone, while less than 3% of built-up areas are in this zone. Cropland is the most affected by flooding in terms of areas inundated compared to built-up areas; however, these estimates represent district-wide averages and may conceal significant spatial concentrations of impacts at local levels.

The *Land Use and Land Cover Map (Map 3)* shows that most cropland is concentrated around Terego Town and in the western half of the district. These areas fall within low to high flood risk zones, indicating exposure for households farming in floodplains and poorly drained depressions. Localized flooding can cause crop damage, delay planting, and reduce yields. This can lead to income loss and seasonal food insecurity. Built-up areas, which often overlap with cropland around Terego Town and the Imvepi Refugee Settlement, fall within low- to medium-risk flood zones.

Overall, the findings indicate that flood risk in Terego is spatially concentrated in specific terrain types and closely linked to settlement patterns. Effective flood risk management will require targeted interventions in areas along the Enyau River, as well as the western and northeastern corridors where most built-up areas are located. These interventions include improved drainage infrastructure, watershed and riverbank restoration, and strengthened early warning systems, including public awareness campaigns on the dangers of heavy rain.

Integrating flood hazard information into land-use planning and settlement management is essential for reducing vulnerability, particularly in flood-affected parts of the Terego refugee settlements around **Spiri 2, Zone 1, Zone 2, and Omugo.**

The flooding trend corresponds with periods of above-average rainfall and seasonal river overflow, implying a strong link between climatic variability and local hydrological responses. Additionally, expanding settlement and land-use changes, especially around refugee-hosting areas, have contributed to reduced infiltration and increased runoff, thereby amplifying flood recurrence. Overall, the temporal trend points to increasing flood persistence, which poses growing challenges for local livelihoods and infrastructure resilience.

Flood Impacts

Flooding in Terego District has had multidimensional socio-economic and environmental impacts. Enyau River flooding has led to damage of crops and agricultural land, disrupting food production and household income for household that encroach the wetland for farming, sand mining, construction and car washing.[51] Access roads and footpaths in flood-prone areas become impassable during heavy rainfall, affecting mobility and access to markets, schools, and health facilities. Flood also caused individuals crossing Enyau river to drown to death.[52] Floods have also contaminated water sources and damaged sanitation facilities, increasing the risk of waterborne diseases.

Photo 2: Floods cut off Key Roads and Bridges in Maracha and Neighboring Districts. Photo Credit: Robert Elema.

In May 2025, flooding in Terego District left several routes impassable, disrupting transport and cutting off residents from basic services. School children were among the worst affected. The destruction of Onzoro Stream Bridge left children from six villages in Terego District unable to reach their Primary School.

The incident underscored the importance of investing in climate-resilient infrastructures, while also improving education emergency response plans.

Source: [Blogs: When nature becomes 100th problem in West Nile's educ]

Environmentally, river overflow flooding contributes to soil erosion, sedimentation of streams, and loss of vegetation cover, which further degrade the natural drainage systems and exacerbate future flood risk. Socially, households nearby flood-prone areas often face temporary displacement, loss of shelter, vulnerability due to inadequate infrastructure and limited adaptive capacity. These cumulative impacts underline the need for public awareness campaign about dangers of heavy rains, integrated flood management, infrastructure improvement, and community-based adaptation strategies to enhance resilience in Terego District.

Conclusion

The findings of this geospatial analysis highlight the substantial influence of climate-related hazards on both refugee and host communities in Terego District. Over the assessment period, the district has experienced seasonal drought conditions and localized flooding, which together pose major risks to agricultural productivity, water availability, and settlement infrastructure. The SPI and VCI analyses reveal vegetation stress and rainfall deficits, especially during the 2022 first season crop flowering phase, while flood mapping indicates high exposure in low-lying sub-counties, such as **Odupi and Omugo**. These findings underscore the growing climate vulnerability of Terego District, emphasizing the need for targeted adaptation measures including improved water resource management, resilient agricultural practices and settlement planning to safeguard livelihoods and enhance resilience for both refugee and host population

Methodology Overview

The climate risk assessment for Terego District used a combined geospatial, remote-sensing, and climate-modelling approach integrating historical baselines, future projections, and hazard-specific analyses. Historical climate conditions (1970-2000) were derived from WorldClim v2.1 using BIO1 (Annual Mean Temperature) and BIO12 (Annual Precipitation), clipped to the district and summarised through spatial and statistical analysis. Future projections for 2041-2060 were obtained from the UKESM1-0-LL model[53] under the SSP2-4.5 scenario, processed using the same bioclimatic variables to ensure comparability with the historical baseline.[54]

Seasonal drought assessment followed UN-SPIDER protocols[55], using SPI calculated in Google Earth Engine (GEE)[56,57] from CHIRPS rainfall data[58] (2014-2024) and VCI derived from NDVI time-series to measure vegetation stress. Agricultural and rangeland areas were manually delineated to improve spatial accuracy, and VCI classification followed Kogan (1995) standards.[59] Outputs were visualized and analysed in ArcGIS.

Flood mapping was conducted using Sentinel-1 SAR imagery processed in GEE to identify inundation for 2022-2024.[60] Annual flood layers were imported into ArcGIS, where raster summation generated a districtwide flood-frequency map. Together, the historical and projected climate datasets, SPI-VCI drought indicators, and multi-year flood mapping provide an integrated picture of climate hazards affecting both host communities and the Imvepi Refugee Settlement in Terego District.

Limitations

The assessment primarily relied on remote-sensing and global climate datasets, which, while widely used, may not fully capture localized micro-climatic variations or ground-level conditions affecting vulnerability. Community-level vulnerability indicators such as coping capacity, water access constraints, and infrastructure fragility were not systematically integrated due to limited available data. Field verification of seasonal drought and flood extents was not conducted, though the satellite image processing followed established and validated UN-SPIDER protocols.

Further background information can be found in the Climate Risk Profiles for Refugee-Hosting Districts in Uganda Terms of Reference (TOR).

Note on Data Sources

Historical climate estimates in this report use both WorldClim (1970-2000 climatology) and ERA5-Land (1981-2024 reanalysis). These datasets use different observational networks, spatial resolutions and interpolation/assimilation methods and consequently report slightly different estimates of mean annual temperature for Terego (WorldClim ≈ 25.7°C for 1970-2000, ERA5-Land ≈ 24.7°C for early 1980s-2000). These differences are within the expected uncertainty range for gridded climate datasets and do not affect the overall interpretation of a warm tropical baseline and a clear recent warming trend. All historical temperatures in this report should therefore be understood as approximate values in the mid-20s (around 25-26°C) rather than exact point estimates.

To view/access the Climate Hazard Analyses for any of the following districts:

- Adjumani District
- Koboko District
- Yumbe District
- Terego District
- Madi Okollo District
- Lamwo District
- Obongi District
- Kyegegwa District
- Kiryandongo District
- Kamwenge District
- Kikuube District
- Isingiro District

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Definitions

Hazards: A process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation.[61]

Flood: The overflow of water onto land that is normally dry, resulting from the temporary inundation of areas due to factors such as intense or prolonged rainfall, river overflow, surface runoff, or failure of water control structures. Floods can vary in scale and duration and may cause damage to infrastructure, livelihoods, ecosystems, and human health.[62]

Flood Susceptibility: The likelihood of flooding occurring in an area based on physical, environmental, and climatic factors such as topography, rainfall intensity, and proximity to water bodies.[63]

Seasonal Drought: A temporary period of below-average rainfall within a specific season, resulting in soil moisture deficits and vegetation stress, particularly during critical agricultural periods.[64]

Meteorological Drought: A period of abnormally dry weather sufficiently prolonged to cause a serious hydrological imbalance, typically defined by a lack of precipitation relative to the long-term average[65]

Exposure: The situation of people, infrastructure, housing, production capacities and other tangible human assets located in hazard-prone areas.[66]

Risk: The potential loss of life, injury, or destroyed or damaged assets which could occur to a system, society or a community in a specific period, determined probabilistically as a function of hazard, exposure, vulnerability and capacity.[67]

Water Stress: Water stress occurs when the demand for water exceeds the available amount during a certain period or when poor quality restricts its use. Water stress causes deterioration of freshwater resources in terms of quantity (aquifer over-exploitation, dry rivers) and quality (eutrophication, organic matter pollution, saline

Disclaimer

This report provides an evidence-based overview of climate trends, hazards, and projected impacts in Uganda's refugee-hosting districts to support informed planning and decision-making. The analysis draws on historical climate datasets, remote sensing products, and modeled projections, all of which are subject to inherent uncertainties, assumptions, and methodological limitations.

The drought assessment presented in this report focuses primarily on seasonal drought conditions, using indicators such as the Standardized Precipitation Index (SPI) and the Vegetation Condition Index (VCI). These indicators capture short- to medium-term rainfall deficits and vegetation stress within specific seasons and should not be interpreted as representing long-term or permanent drought conditions.

Accordingly, the findings should be considered indicative rather than definitive, particularly at localized scales, where microclimatic variability, environmental conditions, and socio-economic factors may differ. While every effort has been made to ensure data accuracy, this report does not replace site-specific assessments or field verification.

The views expressed herein do not necessarily reflect those of any government, organization, or funding partner. This report should not be used as the sole basis for policy, investment, or operational decisions without further contextual analysis and validation.

Users are encouraged to complement these findings with local knowledge, stakeholder consultation, and additional data sources when designing interventions or resilience strategies.

In case of questions, feedback, or requests for tailored, area-specific remote-sensing products, kindly contact uganda@reach-initiative.org.

Endnotes

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ABOUT REACH

REACH Initiative facilitates the development of information tools and products that enhance the capacity of aid actors to make evidence-based decisions in emergency, recovery and development contexts. The methodologies used by REACH include primary data collection and in-depth analysis, and all activities are conducted through inter-agency aid coordination mechanisms. REACH is a joint initiative of IMPACT Initiatives, ACTED and the United Nations Institute for Training and Research - Operational Satellite Applications Programme (UNITAR-UNOSAT).

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